The Simple View of Reading

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ABSTRACT: A simple view of reading was outlined that consisted of two components, decoding and linguistic comprehension, both held to be necessary for skilled reading. Three predictions drawn from the simple view were assessed in a longitudinal sample of English-Spanish bilingual children in first through fourth grade. The results supported each prediction: (a) The linear combination of decoding and listening comprehension made substantial contributions toward explaining variation in reading comprehension, but the estimates were significantly improved by inclusion of the product of the two components; (b) the correlations between decoding and listening comprehension tended to become negative as samples were successively restricted to less skilled readers; and (c) the pattern of linear relationships between listening and reading comprehension for increasing levels of decoding skill revealed constant intercept values of zero and positive slope values increasing in magnitude. These results support the view that skill in reading can be simply characterized as the product of skill in decoding and linguistic comprehension. The paper concludes with a discussion of the implications of the simple view for the practice of reading instruction, the definition of reading disability, and the notion of literacy.

KEYWORDS: components of reading, decoding, listening comprehension, literacy, reading ability, reading comprehension, reading disability, reading instruction

The view of reading as a *complex* activity has long been a part of experimental psychology. At the turn of the century, Huey (1908/1968) wrote that to analyze reading would be to describe "very many of the most intricate workings of the human mind" (p. 6). Four decades later, Gates (1949) expressed a similar view, stating that reading is "a complex organization of patterns of higher mental processes ... [that] ... can and should embrace all types of thinking, evaluating, judging, imagining, reasoning, and problem-solving" (p. 3). Holding to the same position, the authors of a recent report commissioned by the National Academy of Education (Anderson, Hiebert, Scott, and Wilkinson 1985) have likened reading to "the performance of a symphony orchestra" (p. 7).

In counterpoint, a different view of reading has developed. This view was clearly stated by Fries (1963) who noted that while reading certainly does involve the host of higher mental processes cited by Gates, "every one of the abilities listed may be developed and has been achieved *by persons who could not read* ... [as] they are all matters of the uses of

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language and are not limited to the uses of reading" (p. 118). In this *simple* view, what distinguishes reading is that the reader is exercising such abilities in response to graphic rather than acoustic signals, a feat requiring the reader decode the graphic shapes into linguistic form. Thus, one central claim of the simple view is that reading consists of only two components, decoding and linguistic comprehension.

The simple view does not deny that the reading process is complex. Linguistic comprehension is certainly a complicated process, whether accomplished in reading or auding;[1] and decoding, as evidenced by the extreme difficulty some have in acquiring it, is also no simple matter. The simple view simply holds that these complexities can be divided into two parts.

Moreover, the simple view holds that these two parts are of equal importance. The simple view does not reduce reading to decoding, but asserts that reading necessarily involves the full set of linguistic skills, such as parsing, bridging, and discourse building; decoding in the absence of these skills is not reading. At the same time, the simple view holds that decoding is also of central importance in reading, for without it, linguistic comprehension is of no use. Thus, a second central claim of the simple view is that both decoding and linguistic comprehension are necessary for reading success, neither being sufficient by itself.

The Separability of Decoding and Linguistic Comprehension

There is much evidence suggesting that decoding and linguistic comprehension are separate components of reading skill. First, decoding and linguistic comprehension can clearly be dissociated (cf. Gough and Tunmer 1986). It is quite possible to find average and even superior linguistic comprehension in the virtual absence of decoding skill, as the phenomenon of dyslexia demonstrates. One can even meet the more stringent requirement of double dissociation as evidenced by the superior decoding skill of individuals with inferior linguistic comprehension in the syndrome known as hyperlexia (Healy 1982). Nonetheless, these are extreme cases and they do not demonstrate that decoding and linguistic comprehension are separable in the range of the ordinary reader.

A number of investigations of normal reading and its relationships to decoding and linguistic comprehension have recently appeared (Curtis 1980; Jackson and McClelland 1979; Palmer, MacLeod, Hunt, and Davidson 1985; Singer and Crouse 1981; Stanovich, Cunningham, and Feeman 1984; Stanovich, Nathan, and Vala-Rossi 1986). The general correlational trends found in these studies can be summarized succinctly: in the early school grades, decoding and linguistic comprehension are unrelated; both skills correlate with reading comprehension, but that with decoding is substantially stronger (coefficients of about 0.55 for decoding, about 0.35 for linguistic comprehension). In the latter grades, the strength of the relationship between decoding and linguistic comprehension increases (with coefficients ranging from 0.30 to 0.65); and while both remain related to reading comprehension (coefficients of about 0.45 for decoding, about 0.65 for linguistic comprehension), the relationship with linguistic comprehension becomes the dominant one (cf. Sticht and James 1984; but for an interesting perturbation see Stanovich et al. 1984; Stanovich et al. 1986).

In addition to simple correlations, more sophisticated analysis techniques have been used to further explore the contributions of decoding and linguistic comprehension to reading comprehension. Employing multiple regression, Curtis (1980) found that in her samples of second-, third-, and fifth-grade students, only decoding (all grades) and linguistic comprehension (Grades 3 and 5) consistently made significant, independent contributions to reading comprehension. Curtis found that after removal of the effects of nine other variables, decoding uniquely accounted for from 3% to 13% of the variance in reading comprehension across the three grade levels studied, while linguistic comprehension accounted for from 23% to 35%.

Singer and Crouse (1981) tested relationships within a sixth-grade data set via path analysis, finding that decoding and linguistic comprehension (assessed as vocabulary knowledge) were both causally related to reading comprehension after removal of the effects of nonverbal intelligence (with standardized coefficients of 0.29 and 0.71, respectively). In a model including both nonverbal intelligence and phonological awareness, a path analysis of the first grade data of Stanovich et al. (1984) revealed that only decoding and linguistic comprehension made significant independent contributions to reading comprehension (with standardized coefficients of 0.39 and 0.26, respectively). In the same study, a series of hierarchical multiple regression analyses on the third- and fifth-grade data sets showed that after the removal of the effects of nonverbal intelligence, decoding accounted for 19% and 38% (Grades 3 and 5, respectively) of the variance in reading comprehension; linguistic comprehension accounting for 14% and 13%, respectively.

While such studies demonstrate that both decoding and linguistic comprehension are substantially related to reading comprehension (noting that the pattern of relationship changes over grade levels), the analyses do not specifically address the issue of how these two variables combine in that relationship. Whether the relationship can be adequately expressed as a multiplicative one was a focus of the present study.

Reading Ability and Reading Process

The simple view of reading must be distinguished from a kindred hypothesis, the so-called "bottom-up" model of the reading process, a hypothesis that has been shown to be inadequate (Rumelhart 1977; Stanovich 1980). The bottom-up conception holds that reading is a serial process, with decoding preceding comprehension. On this view, decoding should take place before, and thus, independently of comprehension, and it should not be influenced by things taking place at any higher levels. Yet word recognition can be dramatically influenced by linguistic context (e.g., see Stanovich and West 1983), and this falsifies the strictly bottom-up model.

However, the apparent failure of the bottom-up hypothesis does not invalidate the simple view of reading, for two reasons. First, while the bottom-up model is undoubtedly wrong, it is not clear how wrong it is. Although word recognition can be influenced by linguistic context under certain conditions, a strong, empirically supported argument can be made that during normal reading, the more proficient the reader, the less the reliance on context (Gough 1983, 1984; Stanovich 1980). In short, fluent reading may best be characterized as a bottom-up process.

Second, the fact that decoding does not necessarily precede linguistic comprehension in terms of a description of reading *process* does not imply that decoding is not separate from linguistic comprehension in terms of a description of reading *ability*. Questions concerning the components of a given process are distinct from questions concerning the relationships of those components.

Decoding, Linguistic Comprehension, and Reading Comprehension

From the standpoint of the simple view of reading, the terms decoding, linguistic comprehension, and reading comprehension can be defined as follows.

Decoding. For the simple view, skilled decoding is simply efficient word recognition: the ability to rapidly derive a representation from printed input that allows access to the appropriate entry in the mental lexicon, and thus, the retrieval of semantic information at the word level.

As argued elsewhere (Gough and Hillinger 1980), for *beginning readers* the representational capability that must be acquired is one that is phonologically based, for the major task confronting beginning readers is one of accessing the mental lexicon for known words that have never before been seen in print. If the novice can derive appropriate phonological representations for such novel printed inputs, then a lexicon already accessible on the basis of phonological codes through the course of language acquisition, can also begin to be accessed on the basis of print.

Lexical access via phonological codes may not predominate skilled reading, such being augmented, as practice accumulates, by a more direct graphemically-based system (for a review, see Henderson 1982). However, such direct access systems cannot benefit the beginning reader, for in order to acquire a direct access system, both the printed word and its pronunciation must be encountered together at least once, and it is precisely because of the rarity of such *provided* pronunciations that acquisition of the phonologically-based system is critical if the non-reader is to become literate.

Whether the system responsible for generating such phonologically-based representations in beginning reading is found to incorporate letter-sound correspondence rules (e.g., Gough and Tunmer 1986), analogy (e.g., Glushko 1979), or some other process, is not central to the simple view. The simple view only requires that the acquired system allow efficient (i.e., fast and accurate) access of the mental lexicon for proper, arbitrary orthographic representations.

Concerning assessment, in general, an adequate measure of decoding skill must tap this ability to access the mental lexicon for arbitrary printed words (e.g., by assessing the ability to pronounce isolated real words). However, for beginning readers, who must acquire a phonologically-based system, an adequate decoding measure must assess skill in deriving appropriate phonologically-based representations of novel letter strings (e.g., by assessing the ability to pronounce isolated pseudowords).

Comprehension. In the simple view of reading, linguistic comprehension is the ability to take lexical information (i.e., semantic information at the word level) and derive sentence and discourse interpretations. Reading comprehension involves the same ability, but one that relies on graphic-based information arriving through the eye.

A measure of linguistic comprehension must assess the ability to understand language (e.g., by assessing the ability to answer questions about the contents of a listened to narrative). Similarly, a measure of reading skill must assess the same ability, but one where the comprehension process begins with print (e.g., by assessing the ability to answer questions about the contents of a read narrative).

Relevant to the assessment of comprehension is the debated distinction between natural and formal language. Some have argued that this distinction reflects a difference between oral and written language (Olson 1977). Others, while acknowledging the linguistic differences of text, argue that a natural-formal language distinction is independent of modality (Freedman and Calfee 1984). The debate will not be joined in this paper, but it is important to note that if the simple view of reading is to be adequately tested, *parallel* materials must be employed in the assessments of linguistic comprehension and reading comprehension (e.g., if narrative material is used in assessing linguistic comprehension, then narrative, as opposed to expository, material must also be used in assessing reading comprehension).

Specification of the Simple View

On the simple view, then, reading consists of only two parts, decoding and linguistic comprehension, both necessary for reading success, neither sufficient by itself. If reading (R), decoding (D), and linguistic comprehension (L) are each thought of as variables ranging from 0 (nullity) to 1 (perfection), then the simple view of reading can be expressed as $R = D \times L$.

That decoding and linguistic comprehension are combined multiplicatively captures the relationship of necessity coupled with non-sufficiency: progress in reading requires both components be non-zero. To highlight the difficulty involved in empirically assessing the multiplicative claim of the simple view, Figure 1 graphically depicts the relationship between decoding, linguistic comprehension, and reading comprehension, contrasting additive and multiplicative combinations of the two components. Note the gross similarities between the two graphs: in general, under each account, reading skill increases monotonically with increases in skill in either decoding, linguistic comprehension, or both. The relatively subtle difference in this context of overwhelming similarity is that no increase is found in reading skill under the multiplicative combination whenever decoding or linguistic comprehension is zero.

Predictions of the Simple View

Three testable predictions can be drawn from the simple view. The first prediction is that skill in decoding and linguistic comprehension will make substantial contributions toward explaining variation in reading comprehension, but that the product of skill in the two components will significantly improve the estimate of reading comprehension over that obtained from the linear combination of the two components. That is, an additive model, while found to be informative, will not prove to provide a fully adequate account of the relationship of decoding and linguistic comprehension to reading comprehension, showing improvement upon inclusion of the product of the two components.

Second, the simple view holds that poor reading skill results from one of three conditions: (a) when decoding skill is adequate but linguistic comprehension is weak, (b) when linguistic comprehension is adequate but decoding skill is weak, or (c) when both decoding and linguistic comprehension skills are weak. Thus, a second prediction of the simple view is that for less skilled readers, the relationship between decoding and linguistic comprehension will be negative.

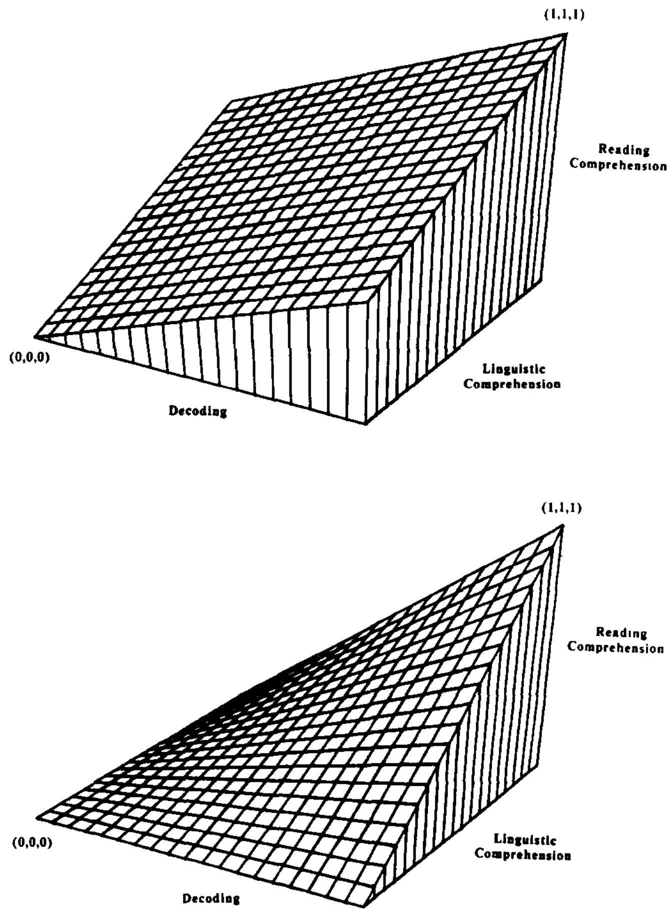

Fig. 1. Graphic depiction of the relationships between decoding (D), linguistic comprehension (L), and reading comprehension (R), where each ranges from nullity (0) to perfection (1). The top panel displays the additive combination of the components ($R = 0.5[D + L]$), the bottom panel, the multiplicative combination ($R = D \times L$) that represents the simple view of reading.

Third, as the multiplicative notion of the simple view holds reading comprehension to be proportional to decoding and linguistic comprehension, the following pattern of linear relationships between linguistic comprehension and reading comprehension for increasing levels of decoding skill is predicted. First, the intercept values are predicted to be zero because regardless of the level of decoding skill, reading comprehension will be null if linguistic comprehension is. Second, the slopes are predicted to increase, as the rate of improvement in reading comprehension over levels of linguistic comprehension is not constant, but is conditional upon decoding skill, increasing in magnitude with increases in decoding skill.

Third, the slope values are predicted to increase from a floor value of zero because regardless of skill in linguistic comprehension, if decoding is null, then reading comprehension will also be null.

As an example, for the student whose decoding skill is perfect, an improvement in linguistic comprehension from nullity to perfection results in an identical improvement in reading comprehension. However, for the student whose decoding skill is only halfway toward perfection, the same improvement in linguistic comprehension (from nullity to perfection) leaves, as incomprehensible, half of the material that can be read by the former student. In sum, for the former student, improvement in reading comprehension is one-to-one with improvement in linguistic comprehension; for the latter, this ratio is halved.

Each of these three predictions was assessed through a secondary analysis of a longitudinal data base. The primary study and the secondary analyses conducted for this report are described in the next sections.

METHOD

Subjects

As this work constitutes a secondary analysis, the primary study's sampling plan and the subsample drawn for inclusion in these secondary analyses are discussed. As further description of reading-related experiences, summaries of the primary sample's pre-reading skills at school entry and the reading instruction programs subsequently received are also provided.

Sampling plan. The *Teaching Reading to Bilingual Children Study* was conducted by the Southwest Educational Development Laboratory (SEDL) during the years of 1978—1985 in five sites in Texas. This natural variation study tracked 254 English-Spanish bilingual children through the early elementary grades. Multiple yearly assessments were made of each student's development in cognition, language, and reading, employing multiple instruments within each domain, and assessing both English and Spanish skill with respect to the latter two. Relatively extensive classroom observations and teacher interviews were also conducted in order to document the reading instruction received by each student.

The primary study employed a hierarchical sampling plan that focused successively at the levels of region, school district, school, classroom, and student. Once classrooms had been selected for participation, an assessment battery was administered to each of the classrooms' students. Based on those assessments, within each classroom, 10 target children were selected to provide systematic variation in degree of bilingualism, cognitive style, and gender. Once selected, target students were tracked through subsequent classroom assignments effected by the schools' normal administrative procedures without influence from the research team.

The sample. Over the five years of data collection, 254 bilingual students were tracked, 206 students from the beginning of kindergarten and 48 from the beginning of first grade. All students were followed through second grade, 101 through third grade, and 61 through fourth grade. Given certain restrictions in the primary study's reading assessment procedures (discussed later), the secondary analyses were based on data from 210 students at first grade, 206 at second grade, 86 at third grade, and 55 at fourth grade.

Pre-reading skills. Upon entering the study, each student's pre-reading skills were assessed employing the *Stanford Foundation Skills Test* (Calfee and Associates 1978, 1980). The sample's performance on the assessments of English skills at kindergarten entry can be summarized as follows: (a) about half the students knew the alphabet; (b) visual matching skills were highly developed; (c) sight word recognition was minimal; (d) phonemic segmentation training, based on the rhyming of familiar words, was generally successful, but the transfer of this skill to novel items was difficult for some; and (e) vocabulary knowledge was high relative to the ability to retell listened to stories.

Reading instruction. Each of the study's sites had developed both English and Spanish reading programs. In four of the sites, Spanish-speaking students with low English oral skills at school entry generally began reading instruction exclusively in Spanish; in the remaining site, all students initially received both English and Spanish reading instruction. Transition to exclusive English reading instruction was a goal of each site, and transition criteria included both the students' English oral skills and achievement in English and/or Spanish reading skills.

The general type of English reading instruction received varied by site and teacher. The instructional emphasis in two of the sites was one of "skills development," where the components of decoding, vocabulary, and text comprehension were given relatively equal attention during the early phases of instruction. In two other sites, reading instruction focused heavily on letter-sound correspondences and word attack skills in the early stages, with increased attention given to comprehension skills as decoding facility improved. In the final site, the reading program was characterized by individualized instruction managed through student contracts. The orientation was strongly "meaning-based," with little formal instruction in letter-sound correspondences until after the child had gained some reading fluency. Two years into the study at this site, the district shifted to a basal reading program, thus abandoning their individualized approach for a more traditional small-group instructional procedure. (Detailed accounts of the instruction received by these students, based on classroom observations and teacher interviews, can be found in Hoover, Calfee, and Mace-Matluck 1984b.)

Sample suitability. As noted by Gough and Tunmer (1986), an assessment of the predictions of the simple view of reading requires a data base where evidenced reading skills are not so highly developed that both the independence of component skills and their variability are restricted. The SEDL data base, representing varying degrees of student bilingualism, decoding skill, and reading comprehension skill, met these criteria.

Tasks, Materials, Scoring, and Administration

The SEDL study employed the *Interactive Reading Assessment System* (IRAS) (Calfee and Calfee 1979, 1981) as one set of yearly administered reading assessments. The instrument consists of nine subtests, individually administered, requiring from 45 to 90 minutes to complete. Each test was given by trained personnel at the individual student's school, audio taped, and subsequently scored by SEDL staff based on both the tape and written protocols completed during testing.

Given the program emphasis on English reading in the primary study's sites, only English literacy indices were analyzed here. In what follows, the three subtests relevant to these analyses are discussed, providing details on the structure of each, the materials, and the scoring procedures employed in deriving summary indices of performance.

Synthetic word decoding. In this IRAS subtest, the student was presented with six lists of synthetic words, the first four lists containing 6 items each and the remaining two lists, 9 items each. All 42 items conformed to English orthography, and lists were ordered by difficulty ranging from simple monosyllabic CVC patterns to polysyllabic items containing blends, digraphs, and vowel variations (e.g., from *hin* and *pame* in the lowest ordered list to *rhosmic* and *conspartable* in the highest ordered list). Before being asked to read the synthetic words aloud, the student was told that the items were not real words and had no meaning, but could be pronounced like English words. Each student began on the easiest list and proceeded to more difficult lists as long as responses were attempted to at least half of the list's items. Once this criterion was not met, performance on subsequent lists was not assessed, assuming failure.

For the lists of synthetic words, each item was scored as follows. A value of 3 was assigned to any item that was pronounced without error. A value of 2 was given to those responses that were mostly correct (i.e., completely correct except for a minor letter-sound error such as a vowel shift within vowel family, a stress variant, or pronunciation of a final *e*). A value of 1 was given for responses that were partly correct (i.e., completely correct except for a single vowel or consonant substitution or deletion). A value of 0 was assigned for assumed failure, no response, or mispronunciations beyond those tolerated in the above categories. Note that the scoring was fairly stringent as two major errors within an item resulted in a score of 0 (e.g., pronouncing *affremiation* as *affrematon*).

Student performance over the lists was represented by a *critical index* (the rationale for this measure is given in Hoover, Calfee, and Mace-Matluck 1984a). The integer portion of the index represented the ordinal value of the list of highest success (ranging from 0 to 6 in this task), where success on a given list was achieved if half or more of its items were at least minimally correct (i.e., received a value of 1 or more). To this value a decimal was added that was the ratio of assigned points to total possible points on the list of highest success. Thus, scores for this scale were bounded by 0.00 and 6.99 (completely correct responses to all items at the level of highest success were given decimal values of 0.99).

In the primary study, reliability analyses of each of the IRAS subscales were conducted during each of the five years of data collection. Over this period, the average reliability index (Cronbach's coefficient alpha) for the synthetic word decoding task was 0.95.

Reading and listening comprehension. The final IRAS subtests assessed the students' comprehension of texts, both for material read *by* the student (reading comprehension) and for parallel material read *to* the student (listening comprehension). The comprehension component consisted of nine ordered levels, with each of the first six levels containing two well-formed narrative passages, parallel in structure, one to be used in the assessment of reading comprehension, the other in testing listening comprehension. The final three levels contained only passages for the assessment of reading comprehension under the assumption that students who successfully read beyond level six (roughly corresponding to beginning fourth-grade basal material) were only limited by their comprehension abilities. Passages across levels were ordered in difficulty based on constituent word frequency, number of words per sentence, number of sentences, and number of propositions expressed per sentence. Each story conformed to the principles of story grammar, and associated with each element (e.g., setting, initiating event, attempt, outcome) was a probe question.

In reading comprehension, the student was presented with the appropriate narrative and asked to read it, aloud in the first four levels and silently in the last five levels (these being appropriate for the grade-level equivalents of the passage). Once finished reading, the student was asked to retell as much of the story as could be remembered. After completing this free recall task, any element that was not adequately recalled was then probed with the corresponding question. If half or more of the elements were mentioned under either free or cued recall, then more difficult levels were presented following the same procedures until this criterion was failed. For students not successful in reading comprehension at the seventh level or higher, listening comprehension was assessed using the same procedures.

Each narrative element was assigned a single value ranging from 0 to 7 based on the quality of response under both free and cued recall: (a) a value of 7 was given to any element recalled completely under free recall; (b) a value of 6 was assigned to elements briefly mentioned in free recall (i.e., some, but not all, of the propositions expressed in the element were given), but recalled completely in cued recall; (c) a value of 5 was given to elements not mentioned in free recall, but completely given in cued recall; (d) a value of 4 was assigned to elements only briefly mentioned in both free and cued recall; (e) a value of 3 was given to elements briefly mentioned in free recall, but incorrectly recalled in cued recall; (f) a value of 2 was assigned to elements not mentioned in free recall, but briefly mentioned in cued recall; and (g) a value of 0 was given to elements not mentioned under either free or cued recall.

As final summary indices of performance, critical indices were computed. As before, the integer portion of the index represented the level of highest success, where success on a given narrative was achieved if half or more of the narrative's elements were at least minimally correct (i.e., received a value of 2 or more). The decimal portion of the value was the ratio of assigned points to total possible points at the level of highest success. Thus, for reading comprehension, the index was bounded by 0.00 and 9.99; for listening comprehension, by 0.00 and 6.99.

For the purposes of the primary study, the reading comprehension index was used as an estimate of listening comprehension skill for those students not assessed in the latter because of success in reading at the seventh or higher levels. This procedure was followed in these secondary analyses as well. The number of such estimates and their percentage of the corresponding grade-level sample were as follows: 1 case in Grade 1 (0.5%), 7 cases in Grade 2 (3.4%), 17 cases in Grade 3 (19.8%), and 22 cases in Grade 4 (40.0%). Given the large proportion of such cases in the fourth-grade set, interpretations of the fourth-grade results must be made cautiously as these procedures may underestimate the listening comprehension skills of these students.

As mentioned earlier, reliability analyses of both listening and reading comprehension subscales were conducted during each of the five years of data collection. These analyses were conducted at the level of individual narratives, and over the five year period, the average reliability index

(Cronbach's coefficient alpha) for the listening comprehension narratives was 0.87; for the reading comprehension narratives, 0.84.

Administration procedures. Complex administration procedures linking the IRAS subtests were developed by the SEDL research team in an effort to reduce testing time. In certain cases these procedures allowed no testing of reading comprehension (assuming failure) when decoding skills were minimal (for full details, see Hoover et al. 1984a). In these secondary analyses, all such cases were dropped (thus, the reduction in sample size described earlier).

RESULTS AND DISCUSSION

The descriptive statistics and intercorrelations summarizing the sample's performance at each grade level are displayed in Table 1. At the end of first grade, skill in decoding was relatively low with the average student succeeding on only the simplest synthetic words presented. For listening comprehension, average first-grade performance was at the third-level narrative, but only at the first-level narrative for reading comprehension, reflecting the average low level of decoding skill. Skill in each of the areas increased over grade levels with the largest increases in performance evident in the second grade (though the differences in sampling represented at the remaining two grade levels, which are also confounded by site, complicate these grade-level comparisons).

The correlations between components were all positive and highly significant. The lowest coefficients within each grade level were between the decoding and listening comprehension indices. The component correlations with their product showed the relatively stronger contribution of the decoding index, especially in the early grades, reflecting the greater number of zero values it contained (121 versus 19 in Grade 1, and 32 versus 2 in Grade 2, for decoding and listening comprehension, respectively). Finally, for the correlations with reading comprehension, the largest values were for the product of the decoding and listening comprehension indices, with the next largest values for the decoding index in the first two grades, but for the listening comprehension index in the last two grades. This shift in correlational pattern with grade level agrees with that found in the earlier cited studies. However, the large proportion of listening comprehension estimates in the fourth-grade data complicates this interpretation.

Prediction 1

The first prediction drawn from the simple view was that skill in decoding

Table 1. Descriptive statistics and intercorrelations of variables

Variables	1	2	3	4
	Grade 1 ($N = 210$)			
1. Decoding		0.42	0.95	0.84
2. Listening			0.50	0.46
3. Product				0.84
4. Reading				
Mean	1.26	3.01	5.66	0.92
Standard deviation	2.06	2.16	10.79	1.45
	Grade 2 ($N = 206$)			
1. Decoding		0.59	0.95	0.80
2. Listening			0.70	0.71
3. Product				0.85
4. Reading				
Mean	3.68	5.00	21.11	3.22
Standard deviation	2.40	1.92	15.47	2.11
	Grade 3 ($N = 86$)			
1. Decoding		0.54	0.89	0.75
2. Listening			0.81	0.80
3. Product				0.91
4. Reading				
Mean	4.94	5.74	30.63	4.44
Standard deviation	2.15	1.98	16.86	2.47
	Grade 4 ($N = 55$)			
1. Decoding		0.72	0.97	0.84
2. Listening			0.79	0.87
3. Product				0.91
4. Reading				
Mean	5.35	6.67	37.58	5.84
Standard deviation	2.06	1.31	15.55	2.00

For all correlation coefficients, $p < 0.001$.

and linguistic comprehension would make significant contributions toward explaining variation in reading comprehension, but that the product of the two components would improve the estimate over that obtained from their linear combination. To assess this prediction, a hierarchical multiple regression was run on each of the four grade-level data sets, entering the decoding and listening comprehension indices first, then the product of the two on the second step. The results of these analyses are summarized in Table 2.

As seen in the top panel of the table, at each grade level a substantial proportion of the variance in reading comprehension was accounted for

Table 2. Summary of regression analyses

Variable	Multiple *R*	*R* square change	*F* change	*p*
		Component Terms Followed by Product Term		
		Grade 1		
Linear	0.849	0.721	267.70	0.000
Product	0.856	0.011	8.80	0.003
		Grade 2		
Linear	0.853	0.728	271.87	0.000
Product	0.865	0.020	16.16	0.000
		Grade 3		
Linear	0.884	0.782	148.62	0.000
Product	0.921	0.067	35.95	0.000
		Grade 4		
Linear	0.922	0.851	148.36	0.000
Product	0.948	0.048	24.34	0.000
		Product Term Followed by Component Terms		
		Grade 1		
Product	0.843	0.711	511.11	0.000
Linear	0.856	0.022	8.41	0.000
		Grade 2		
Product	0.848	0.720	523.27	0.000
Linear	0.865	0.029	11.55	0.000
		Grade 3		
Product	0.911	0.830	409.91	0.000
Linear	0.921	0.018	4.95	0.009
		Grade 4		
Product	0.909	0.826	251.29	0.000
Linear	0.948	0.073	18.50	0.000

Linear = Linear combination of the individually weighted decoding and listening comprehension indices.
Product = Product of the decoding and listening comprehension indices.

by the linear combination of the decoding and listening comprehension indices, ranging from 0.72 at Grade 1 to 0.85 at Grade 4 (though the value at Grade 4 is inflated due to the estimation procedure discussed earlier). However, the product of these two indices accounted for an additional significant proportion of variance, ranging from 0.01 at Grade 1 to 0.07 at Grade 3. These findings are consistent with the contentions of the simple view, namely, that decoding and linguistic comprehension are substantially related to reading comprehension, but further, that their relationship is conditional.

While the results show that the additive (i.e., linear) model provides an inadequate account of the data, and that such a model is improved by inclusion of the product term, it does not show the superiority of the multiplicative notion of the simple view. Equity would dictate that to test this, the regression should be run in the reverse order, entering the product of decoding and listening comprehension on the first step and the two individual components on the second step. The results of such an analysis for each grade-level data set appear in the bottom panel of Table 2.

As was true in the first regression analysis, at each grade level a substantial proportion of the variance in reading comprehension was accounted for by the product of the decoding and listening comprehension indices, ranging from 0.71 at Grade 1 to 0.83 at Grade 3. On the second step, the linear components accounted for an additional significant proportion of variance, ranging from 0.02 at Grades 1 and 3 to 0.07 at Grade 4. These findings, symmetrical with the earlier regression results, complicate the interpretation, suggesting that neither the additive nor multiplicative account is adequate alone, but that components of both are needed. These outcomes should be interpreted in the following context.

In the additive case, the regression procedure combines the two components (decoding and listening comprehension) with optimal weights to maximize the least squares fit to the reading comprehension data. In the multiplicative case, the individual components can not be weighted in the same manner: multiplication of either component by a constant is equivalent to multiplication of the product of the components by that constant, a manipulation that has no effect on the strength of the relationship of the product to the criterion variable. This advantage in weighting is what prevents a fair comparison of the multiplicative and additive notions by contrasting the simple r of reading comprehension and the product of the two components with either the simple r of reading comprehension and the sum of the two components (a procedure that combines the components with arbitrary weights) or the multiple R obtained from the regression on decoding and listening comprehension (a procedure that combines the components with optimal weights).

However, in maximizing the least squares fit of the product of decoding and listening comprehension to reading comprehension, adjustments made to the zero points of the two component terms could significantly alter the relationship with the criterion variable. Such adjustments to the component terms are expressed in the following equation:

$$R = a_1 + b_1[(a_2 + D)(a_3 + L)]$$

Expanding the terms shows that the equation represents the linear sum of a constant and the individually weighted component terms and product:

$$R = (a_1 + b_1 a_2 a_3) + (b_1 a_3 D) + (b_1 a_2 L) + (b_1 DL)$$

In short, if the multiplicative notion of the simple view is true and non-zero adjustments to the zero points of the component terms are optimally made, then the regression including both additive and multiplicative terms will be superior to the regression containing only the additive or the multiplicative terms. The difficulty, of course, is in finding the optimal zero-points for the component terms.

Prediction 2

The second prediction drawn from the simple view was that for less skilled readers an inverse relationship would hold between skill in decoding and linguistic comprehension. To assess this prediction, the correlation between decoding and listening comprehension was computed within each grade level for subsamples of students defined by successively reduced reading comprehension skill. That is, after computing the correlation over the entire sample within a grade level, the correlation was next computed for the same students less those successful on the highest level passage, followed in turn by computing the correlation for all students less those successful at either of the top two passages, continuing in this manner until the sample included only those who were not successful on the first passage presented. The results of these analyses are summarized in Table 3, providing the sample size at each reduction, the correlation

Table 3. Descriptive statistics and correlations between decoding and listening comprehension for successive sample reductions based on decreasing reading comprehension skill

Max R	*n*	Correlation		Descriptive statistics (mean and standard deviation)			
		r	*p*	D	L	P	R
			Grade 1				
7	210	0.422	0.000	1.26	3.01	5.66	0.92
				2.06	2.16	10.79	1.45
2	184	0.257	0.000	0.77	2.73	2.96	0.51
				1.57	2.13	7.30	0.98
1	157	0.003	0.487	0.35	2.47	0.86	0.14
				1.00	2.14	3.00	0.43
0	144	−0.125	0.067	0.15	2.40	0.21	0.02
				0.52	2.20	0.88	0.10

Table 3 (Continued)

Max R	*n*	Correlation		Descriptive statistics (mean and standard deviation)			
		r	*p*	D	L	P	R
			Grade 2				
8	206	0.592	0.000	3.68	5.00	21.11	3.22
				2.40	1.92	15.47	2.11
5	193	0.555	0.000	3.51	4.85	19.49	2.96
				2.39	1.88	14.55	1.91
4	163	0.498	0.000	3.10	4.59	16.48	2.48
				2.34	1.93	13.45	1.69
3	141	0.471	0.000	2.81	4.41	14.55	2.16
				2.34	2.00	13.10	1.59
2	87	0.431	0.000	1.89	3.80	9.30	1.19
				2.22	2.23	12.03	1.27
1	57	0.271	0.021	0.92	3.07	3.87	0.38
				1.71	2.33	8.27	0.72
0	45	−0.087	0.285	0.25	2.52	0.46	0.02
				0.83	2.20	2.11	0.05
			Grade 3				
8	86	0.543	0.000	4.94	5.74	30.63	4.44
				2.15	1.98	16.86	2.47
6	69	0.476	0.000	4.61	5.29	26.46	3.67
				2.26	1.96	16.13	2.14
5	62	0.440	0.000	4.43	5.11	24.66	3.36
				2.31	1.99	15.96	2.03
3	40	0.285	0.037	3.53	4.44	17.14	2.24
				2.41	2.17	14.94	1.65
2	22	0.019	0.467	2.50	3.50	8.86	1.02
				2.39	2.46	12.32	1.26
0	13	−0.546	0.027	1.49	2.59	1.03	0.04
				2.14	2.62	3.00	0.07
			Grade 4				
8	55	0.717	0.000	5.35	6.67	37.58	5.84
				2.06	1.31	15.55	2.00
6	33	0.645	0.000	4.62	6.05	30.01	4.67
				2.38	1.36	15.89	1.77
4	12	0.569	0.027	2.59	5.17	16.01	2.75
				2.62	1.92	16.29	1.57

Max R = Maximum reading comprehension level included in the subsample
D = Decoding index
L = Listening comprehension index
P = Product of decoding and listening comprehension indices
R = Reading comprehension index

coefficient and its significance level, and the descriptive statistics for each variable (decoding, listening comprehension, their product, and reading comprehension).

First, note from the descriptive statistics tabled that within each of the four grade levels represented, as the sample was reduced based on decreasing reading comprehension skill, aggregate skills in each of the other indices (decoding, listening comprehension, and their product) also decreased. Within each grade level, the correlations were significantly positive when computed over the entire grade-level sample, with coefficients ranging from 0.42 in Grade 1 to 0.72 in Grade 4. As the sample was reduced, the coefficients declined in magnitude to values not significantly different from zero, and in Grades 1 and 3, to values that were negative (approaching significance for the former, and significant for the latter).

It is possible that these results are artifactual. As the samples are reduced, a few outliers off the diagonal could lead to negative correlations. Note, however, that this argument is symmetric: if measurement error is responsible for negative correlations as the samples are successively restricted to the weakest readers, then it should similarly constrain the correlational trends as the samples are successively restricted to include only the strongest readers. Accordingly, analyses were conducted identical to the ones above, save that sample reduction was based on increasing (as opposed to decreasing) reading comprehension skill. The results of these analyses are summarized in Table 4.

As expected from the simple view, and in contrast to the results displayed in Table 3, aggregate skills in decoding, listening comprehension, and their product increased as the sample was reduced based on

Table 4. Descriptive statistics and correlations between decoding and listening comprehension for successive sample reductions based on increasing reading comprehension skill

Min R	*n*	Correlation		Descriptive statistics (mean and standard deviation)			
		r	*p*	D	L	P	R
			Grade 1				
0	210	0.422	0.000	1.26	3.01	5.66	0.92
				2.06	2.16	10.79	1.45
1	66	0.566	0.000	3.70	4.34	17.56	2.89
				2.05	1.34	12.77	1.00
2	53	0.647	0.000	3.98	4.61	19.90	3.22
				1.98	1.23	12.83	0.80
3	26	0.608	0.001	4.73	5.00	24.80	3.80
				1.77	1.10	12.19	0.79

Table 4 (Continued)

Min R	*n*	Correlation		Descriptive statistics (mean and standard deviation)			
		r	*p*	D	L	P	R
				Grade 2			
0	206	0.592	0.000	3.68	5.00	21.11	3.22
				2.40	1.92	15.47	2.11
1	161	0.256	0.001	4.64	5.69	26.88	4.11
				1.72	1.09	12.32	1.41
2	149	0.307	0.000	4.74	5.74	27.70	4.30
				1.68	1.03	12.13	1.29
3	119	0.304	0.000	4.99	5.88	29.74	4.70
				1.54	0.97	11.49	1.14
4	65	0.367	0.001	5.57	6.29	35.33	5.50
				1.12	0.78	9.54	0.95
5	43	0.409	0.003	5.87	6.54	38.65	6.00
				0.91	0.73	8.48	0.79
6	13	0.457	0.058	6.19	7.27	45.10	7.03
				0.54	0.48	5.93	0.70
				Grade 3			
0	86	0.543	0.000	4.94	5.74	30.63	4.44
				2.15	1.98	16.86	2.47
1	73	0.539	0.000	5.56	6.30	35.91	5.22
				1.46	1.18	12.16	1.76
3	64	0.431	0.000	5.79	6.50	38.12	5.61
				1.23	0.97	10.51	1.50
4	46	0.059	0.349	6.17	6.86	42.36	6.36
				0.60	0.73	6.42	1.06
6	24	0.270	0.101	6.27	7.34	46.08	7.24
				0.55	0.46	5.49	0.60
7	17	0.180	0.244	6.29	7.56	47.56	7.56
				0.58	0.31	5.09	0.31
				Grade 4			
0	55	0.717	0.000	5.35	6.67	37.58	5.84
				2.06	1.31	15.55	2.00
5	43	0.358	0.009	6.12	7.09	43.60	6.70
				0.93	0.64	8.44	0.99
7	22	0.039	0.432	6.44	7.60	48.92	7.60
				0.40	0.26	3.52	0.26

Min R = Minimum reading comprehension level included in the subsample
D = Decoding index
L = Listening comprehension index
P = Product of decoding and listening comprehension indices
R = Reading comprehension index

increasing reading comprehension skill. Within each grade level, the correlations were positive, though at the smaller sample sizes within Grades 3 and 4, they were not significantly different from zero. These results fail to support an artifactual interpretation of the correlational trends found within the weaker readers. Indeed, one finds outliers distributed within the weaker readers of just the type predicted by the simple view, namely, children with (a) poor listening comprehension skill coupled with relatively stronger decoding skill, and (b) poor decoding skill coupled with relatively stronger listening comprehension skill. For the strongest readers, such a distributional pattern is neither predicted nor found.

Note that both additive and multiplicative combinations of decoding and linguistic comprehension predict the obtained trend of positive correlations in skilled readers becoming negative correlations in unskilled readers. Thus, this evidence cannot inform any selection between these conceptions. Nonetheless, the result is important in demonstrating the separate contributions of decoding and linguistic comprehension to reading ability, as the trend is consistent with the view that for skilled reading, skill in both components is required, while a weakness in either component is sufficient for less skilled reading.

Prediction 3

The third prediction drawn from the simple view was that as the level of decoding skill increased, the pattern of linear relationships between linguistic comprehension and reading comprehension would reveal (a) constant intercept values of zero and (b) positive slope values increasing in mangnitude from a floor value of zero. Unlike the previous prediction, this one can distinguish between additive and multiplicative combinations of decoding and linguistic comprehension, as the additive conception predicts (a) intercept values that increase from a floor value of zero (rather than constant zero-valued intercepts), and (b) positive, but constant, slope values (rather than positive slope values that increase in magnitude from a floor value of zero).[2]

In assessing this prediction, intercept and slope values expressing the linear relationship between listening and reading comprehension were computed within each grade level for various subsamples of students equated on decoding skill. In this analysis, decoding skill levels were defined by the list of highest success (i.e., the integer value of the decoding index, disregarding the decimal value). Some decoding skill levels were collapsed in certain instances to obtain sample sizes that would provide reasonably trustworthy estimates of the linear indices. As expected, in the early grades such pooling was restricted to the higher decoding skill levels, while in the latter grades, pooling was confined to the lower levels. The results of these anlayses are displayed in Table 5, giving the number of students contained in each decoding skill subsample, the intercept and slope values, and their associated significance levels.

For the first-grade data, decoding levels 2, 3, and 4 (containing 2, 5, and 10 students, respectively) were collapsed into a single group (thus representing students whose decoding indices ranged from 2.00 to 4.99); decoding levels 5 and 6 (with 12 and 13 students) were also combined. As seen in Table 5, for each of the decoding skill groups, none of the intercept values differed significantly from zero. The slope values, however, were significantly positive, with the exception of that associated with the lowest decoding skill subsample, which did not differ from zero. Further, these slopes showed the predicted increases in magnitude with increases in the level of decoding skill (evidence concerning the statistical significance of these apparent increases is presented later).

For the second-grade data, only decoding levels 2 and 3 were pooled

Table 5. Intercept and slope for the linear relationship between reading and listening comprehension at various levels of decoding

Decoding levels	*n*	Intercept		Slope	
		Value	*p*	Value	*p*
		Grade 1			
0–0.99	135	0.02	0.223	0.00	0.310
1–1.99	33	0.39	0.173	0.47	0.000
2–4.99	17	0.58	0.102	0.54	0.000
5–6.99	25	0.07	0.468	0.64	0.000
		Grade 2			
0–0.99	45	−0.14	0.162	0.11	0.003
1–1.99	22	1.20	0.046	0.38	0.004
2–3.99	17	0.76	0.155	0.48	0.001
4–4.99	43	1.32	0.064	0.41	0.006
5–5.99	38	0.07	0.472	0.79	0.000
6–6.99	41	−3.18	0.003	1.31	0.000
		Grade 3			
0–1.99	13	0.23	0.388	0.17	0.183
2–4.99	15	−0.31	0.285	0.77	0.000
5–5.99	18	−1.06	0.161	0.98	0.000
6–6.99	40	−3.74	0.000	1.44	0.000
		Grade 4			
0–4.99	12	−1.24	0.139	0.84	0.001
5–5.99	11	−3.26	0.114	1.35	0.003
6–6.99	32	−4.16	0.000	1.53	0.000

(containing 4 and 13 students, respectively). The intercept values were not significantly different from zero with two exceptions. One value was positive, but only marginally close to the 0.05 significance level, while a second value, that associated with the highest decoding skill group, was substantially negative. The slope values were all significantly positive, and again, increased in magnitude with decoding skill.

For the third-grade data, decoding levels 0 and 1 were collapsed (with 9 and 4 students, respectively) and levels 2, 3, and 4 (with 1, 4, and 10 students). The intercepts again did not significantly differ from zero with the exception of the value associated with the highest decoding skill group, which, as in the second-grade data, was substantially negative. The slope values again increased in magnitude with the level of decoding skill, each significantly positive, except for that associated with the group of lowest decoding skill, which did not differ from zero.

Collapsing decoding levels 0 through 4 (with 5, 2, 1, 1, and 3 students, respectively), the fourth-grade data followed the pattern found in the second-grade data: intercepts not significantly different from zero except for the highest decoding skill group (with a large negative value), and significantly positive slopes that increased in magnitude with decoding skill.

Overall, for the 17 intercept values computed over the four grade-level data sets, none differed significantly from zero, with the exception of one value within the second-grade data set that was only marginally significant, and three large negative values that were associated with the highest decoding skill group within the second-, third-, and fourth-grade data sets, respectively. These latter values are most likely artifacts reflecting a ceiling effect in the decoding assessment, influencing the linear estimates as follows. For the sample of students successful in decoding the highest level list presented, the best decoders (i.e., those who would have decoded higher level lists had such been available) were pooled with those of lower skill (i.e., those who were successful on the most difficult list available, but who would not have been successful on any more difficult lists had such been presented). Such pooling results in the (expected) greater reading comprehension skills of the former group of students contributing large positive (i.e., outlier) values relative to the latter group, leaving the intercept values deflated and the slope estimates inflated. Thus, in general, the obtained intercept values conform to the prediction of the multiplicative notion expressed in the simple view of reading.

For the corresponding 17 slope values, all were significantly positive with the exception of two zero values, those associated with the lowest decoding skill groups within the first- and third-grade data sets. As discussed earlier, the simple view predicts zero-valued slopes for students completely lacking decoding skills. However, students in the lowest decoding skill groups in these analyses may, nonetheless, possess some decoding skill. First, the easiest list of synthetic words presented to these students did not necessarily contain the simplest items that could be decoded with the most rudimentary of decoding skills. Thus, the lowest level of material may be relatively insensitive to the lowest levels of decoding skill. Second, the upper boundary defining the lowest decoding skill group was 0.99 for the first- and second-grade analyses, and 1.99 and 4.99 for the third- and fourth-grade analyses, respectively. As such, for each grade level the ranges of skill included in the lowest decoding skill group allowed for at least some success in decoding, though it may not have been sufficient to meet the criterion for success on the lowest level list presented (i.e., not succeeding on the lowest level list, but correctly decoding one or two of the six items it contained).

Thus, for these groups of low skill decoders, the simple view does not predict slope values of zero, but rather values that are the lowest of any associated with a group possessing greater decoding skill. As seen in Table 5, the data followed just this pattern.

To assess the statistical trustworthiness of the slope increases, the correlation between decoding skill (using each group's mean decoding value) and slope value was computed. Cautioning that these estimates are not independent (given the longitudinal nature of the data base), the correlation over the 17 relevant pairs was significantly positive ($r[16] = 0.85$, $p < 0.001$); the coefficient was only slightly reduced when the inflated slope estimates from the highest decoding skill groups within each grade level were dropped ($r[12] = 0.81$, $p < 0.001$). Thus, these findings indicate that the rate of improvement in reading comprehension over levels of listening comprehension increased with decoding skill, such predicted by the simple view.

To summarize, in accord with the third prediction of the simple view, the results generally indicated that as the level of decoding skill increased, the linear relationships between listening comprehension and reading comprehension were characterized by constant intercept values of zero and positive slope values increasing in magnitude.

IMPLICATIONS

A simple view of reading has been proposed holding that reading consists of only two components, decoding and linguistic comprehension. The simple view holds that neither component is sufficient for skilled reading, but rather, that skill in both components is necessary if skill in reading is to advance.

The simple view does not deny the complexity of reading, but asserts that such complexities are restricted to either of the two components. Consider a more complex model proposed by Calfee and Drum (1986), where reading is held to consist of decoding, vocabulary, sentence comprehension, paragraph comprehension, and text comprehension. The simple view, while not denying the added complexity, argues that the last four components are constituents of linguistic comprehension. Importantly, such a simplification explicitly states that these skills are not specific to reading, that advancement in any one represents advancement in linguistic skill, such also advancing reading skill to the degree allowed by skill in decoding.

While the simple view provides an adequate account of reading, the task remains to define the components underlying decoding and linguistic comprehension. Thus, might the vocabulary and sentence comprehension skills specified in the Calfee and Drum (1986) model be combined multiplicatively, and if so, how might their product be combined with the additional proposed skill areas of paragraph and text comprehension? Answers to these questions await further research.

While acknowledging these issues, the simple view of reading does have several important implications, these concerning the practice of reading instruction, the definition of reading disability, and the notion of literacy. Each of these is discussed below.

Reading Instruction

The simple view suggests that instruction that advances skill in either decoding or linguistic comprehension will promote skill in reading as long as skill in neither component is nil. The instructional implications for both components are treated in turn below.

Decoding. While language is naturally acquired by the normal child through exposure in the context of human interaction, the acquisition of decoding is not, formal instruction generally being required (Calfee and Drum 1986; Gough and Hillinger 1980; Stanovich 1986). The difficulty in acquiring decoding skills is that a natural strategy based on selective association (the pairing of a partial stimulus cue to a response), while initially successful in linking the printed and spoken word, has limited utility: selective association will not permit the recognition of novel printed words, and for the beginning reader, print novelty is ubiquitous (Gough and Hillinger 1980; Jorm and Share 1983). In alphabetic systems, if the child can learn the systematic relationship between the units of the printed and spoken word, then novel printed words can be accessed without the requirement imposed by the associative process that such novel words be accompanied by pronunciations.

If the child is to advance from the stage of *code reading* characterized by selective association, to that of *cipher reading* based on knowledge of the systematic relationship between printed and spoken word, a number of conditions must be met (Gough and Hillinger 1980). The child must have (a) the intent to discover the print-sound relationship, (b) awareness of the alphabetic units of the printed word, (c) awareness of the phonemic units of the spoken word, and (d) access to sufficient data (namely, pairs of printed and spoken words). If such specific conditions must be met in order to successfully internalize the cipher, then instruction that efficiently addresses these should facilitate decoding acquisition.

Though instructional effectiveness is determined by more than just method (e.g., Barr 1984), some have argued that phonic approaches to reading instruction represent the most effective schemes known for teaching decoding (Flesch 1981; Williams 1985). While there is evidence suggesting that phonic approaches are superior to other methods with which they have been compared (Bond and Dykstra 1967; Chall 1967; Guthrie, Martuza, and Seifert 1979; Johnson and Baumann 1984), such evidence does not imply that phonic approaches are the *most* effective and efficient instructional methods for acquiring the cipher. Further, the relative successes of phonic approaches do not imply that those successes are attributable to the acquisition and use of the grapheme-phoneme correspondence rules generally taught in such methods (e.g., when two vowels go walking, the first does the talking). As argued elsewhere (Gough and Hillinger 1980), such rules cannot be the basis of lexical access for they are both too few and too slow.

Rather than having any direct influence, the effects of phonic approaches in acquiring the cipher may be entirely indirect. As one possibility, phonic methods may simply facilitate phonological awareness (explicit recognition that the speech stream can be segmented into discrete phonemic units), thereby satisfying one of the four conditions specified above for acquiring the cipher. To take another possibility, instruction in phonics may simply provide the child with a strategy for generating pronunciations from printed words, such contributing data to be used in discovering the systematic relationship embodied in the cipher. In each of these cases, the effect of phonic approaches would have no direct bearing on the specific character of the cipher acquired.

To summarize, the simple view holds that skill in decoding must be acquired for success in reading. Further, it has been argued that in an alphabetic orthography, decoding acquired as ciphering will allow the recognition of novel printed words, thus freeing instruction from having to provide pronunciations for every novel printed word encountered by the child. While phonics instruction seemingly facilitates acquisition of the cipher (though the mechanism of influence is unknown), the simple view does not hold that phonics instruction is necessary in order to acquire the cipher: what is acquired (the precise content of the cipher) and what constitutes the best method for acquiring it are independent, and currently unanswered, questions.

Linguistic comprehension. The simple view also claims that linguistic comprehension is a necessary component of skilled reading. The simple view does not claim that *exactly* the same procedures used in linguistic comprehension are employed in reading comprehension, for there are clear differences. To take a few examples, the suprasegmentals represented in speech are greatly impoverished in written language; the availability of previous input makes review much easier for written than for spoken language; and the interpretation of deictic terms may be derived differently in written than in spoken language (Danks 1980; Rubin 1980). Each of these differences is likely to be reflected in processing differences.

The simple view, however, argues that these differences are relatively minor in comparison to the great similarities between linguistic and reading comprehension. The commonalities argued for in the simple view suggest that instruction facilitating linguistic comprehension should likewise facilitate reading comprehension (if decoding is not nil), and indeed, a number of studies indicate that improvements in listening comprehension (effected through a variety of training programs) lead to improvements in reading comprehension (for a review, see Sticht and James 1984).

In addition, the simple view implies that as an individual's knowledge base increases (through whatever mechanism), as that knowledge base is reflected in linguistic comprehension, so should it be reflected in reading comprehension, and vice-versa. To take one relevant study, Pearson, Hansen, and Gordon (1979) have shown that specific knowledge of a given area is positively related to reading comprehension. Taking two groups of second-grade readers matched on IQ and general reading comprehension, but differing in specific knowledge of a given domain, Pearson et al. found that those with greater expertise in the selected domain better comprehended passages pertinent to that domain than did those with less expertise. In terms of the simple view, the greater the knowledge base expressible through linguistic comprehension, the greater the reading comprehension (assuming non-zero decoding skills).

As pointed out by Perfetti and Curtis (1986), the *activation* of relevant knowledge while reading may be problematic for some children, the difficulty stemming from effortful decoding. For such children, instruction that leads to more efficient decoding will allow more of limited cognitive resources to be devoted to comprehension processes, including the activation of relevant knowledge.

Reading Disability

The simple view of reading also has important implications for reading disability (Gough and Tunmer 1986). As reviewed earlier, skill in decoding and linguistic comprehension have been found to be positively related in the literate population. Such would be expected given the reciprocal relationships (Stanovich 1986) between these skills (i.e., as decoding skill improves, reading improves, such tending to lead to increased amounts of reading, which further strengthens both skill in decoding and linguistic comprehension). However, within the illiterate population, the simple view of reading holds that decoding and linguistic comprehension can be dissociated, and, most interestingly, *must* be dissociated if substantial skill is evidenced in either of the two components.

Dyslexia. There has long been recognition of a specific difficulty restricted to reading that is not accompanied by difficulty in other cognitive functioning. Commonly known as dyslexia, the disability is defined by exclusion, dyslexics being those who have difficulty reading despite normal intelligence and sensory functioning, an adequate opportunity to learn, and an absence of severe neurological or physical disability, emotional or social difficulty, or socioeconomic disadvantage (Vellutino 1979).

The simple view, while silent on the unresolved issue of a singular or multiple etiological base, claims that the reading difficulties encountered by all such dyslexic individuals, by definition linguistically competent, can only stem from a deficiency in decoding skill. Though definitive studies have not been conducted, there are a number of investigations showing that individuals selected on the basis of the exclusionary criteria given above are indeed substantially deficient in decoding skill (Doehring, Trites, Patel, and Fiedorowicz 1981; Seymour and Porpodas 1980; Snowling 1980; Vellutino 1979). Thus, while the question of why decoding skills are deficient in dyslexics is unanswered, there is support for the assertion of the simple view that the commonality of reading failure represented in dyslexia is a failure in decoding.

Hyperlexia. A second type of dissociation within the illiterate population predicted from the simple view concerns superior decoding skill accompanied by inferior comprehension skill. Given the nature of language acquisition, such cases are rare; those that have been identified are known as hyperlexics.

A study by Healy (1982) identified a small sample of children who evidenced exceptional skill in decoding but reading age equivalents that were some two years lower than those expected from chronological age. While demonstrating that decoding skill is not sufficient for reading skill, it does not follow from such evidence that decoding is therefore not necessary for reading. Indeed, as would be predicted by the simple view, the students in Healy's study evidenced listening age equivalents that were also two years lower than their chronological ages. From the simple view, when decoding skills are highly developed, reading and listening skills will be equivalent, and in the case of hyperlexia, reduced linguistic comprehension will be responsible for reduced reading comprehension.

Literacy

A third implication of the simple view of reading concerns the notion of literacy. Clarity about the meaning of literacy is important not just for purposes of theory, but also because confusion over what constitutes literacy will likely result in confusion over the solutions proposed to reduce illiteracy. In the treatment below, only those aspects of literacy linked to reading will be discussed, ignoring writing (though the arguments could be extended to include it).

From the simple view, literacy (limited to reading) may be seen as the contrast between linguistic comprehension and reading comprehension. For example, suppose an individual has mastered most of the syntax of English yet knows only the most frequent English words. Further, suppose this person can decode the printed versions of precisely the same set of known words, no more nor fewer. Under the simple view of reading, linguistic comprehension and reading comprehension in this individual are equivalent: with respect to current linguistic skill, such a person is fully literate (for reading) since whatever can be comprehended by ear can likewise be comprehended by eye, and vice versa.

Simply increasing the decoding skill of such an individual will not increase reading comprehension as the meaning of any words that can now be decoded given the newly expanded skill will still be absent from the internal lexicon. In like fashion, simply increasing linguistic comprehension by, for example, expanding the domain of known words, will also fail to result in increased reading comprehension unless success in decoding the printed representations of those words in the enlarged domain is also guaranteed.

Treating literacy as reading ability, expanded linguistic comprehension (e.g., through expansion of lexical entries) without expanded decoding skill results in reduced literacy as the difference in skill between oral language (linguistic comprehension) and written language (reading comprehension) has been increased. However, this circumstance also results in an increased potential for literacy as linguistic capacity has been expanded thereby allowing expanded *reading potential* (Sticht and James 1984) should adequate decoding skills be acquired.

Of course, the reading skills of fully literate individuals can be improved. If decoding skills are adequate to efficiently decode any word encountered, then the limit on reading is the limit on linguistic comprehension, and for each increase in linguistic comprehension, there will be an equal increase in reading comprehension. Similarly, for individuals whose decoding skill is not adequate to decode new entries to the internal lexicon, if decoding skill improves to allow recognition of the printed representation of such new entries, then reading comprehension will improve in step with linguistic comprehension.

While the reading ability of an individual can be simply viewed as the difference between linguistic comprehension and reading comprehension, many argue that the notion of literacy entails a certain degree of conceptual understanding or cognitive ability assessed relative to an external standard, for example, by reference to some set of concepts one is expected to be familiar with or to some set of tasks one is expected to be able to perform (Applebee, Langer, and Mullis 1987; Harman 1987; Venezky, Kaestle, and Sum 1987). A number of points can be made concerning the relationship between reading and a literacy component representing conceptual understanding.

First, the acquisition of familiarity with a specified set of culturally valued literary works or knowledge bases is independent of the mode of acquisition, as such can be achieved in a number of ways that do not involve the individual's own reading. Second, Fries' (1963) point, cited earlier, that the skills of thinking, evaluating, judging, imagining, reasoning, and problem-solving can be found in both illiterates and literates is important, as it emphasizes that these cognitive abilities are not the exclusive dependents of reading. Finally, while reading is exclusively linguistic, many of the commonly claimed literacy tasks are non-linguistic (e.g., knowing how to carry out arithmetic operations or how to "read" a map).

These points all argue that the notion of conceptual understanding as a component of literacy is logically independent of reading. While the understanding of a particular concept does not have a necessary connection to reading ability, as understanding develops, linguistic comprehension with respect to that conceptual arena will also likely expand. As linguistic comprehension expands, reading potential will increase, this potential being realized if decoding skills are adequate. That such understanding may develop either through oral or written language is a key point, the important application as follows: Teaching reading (in the simple sense of achieving equal linguistic comprehension and reading comprehension) will not reduce the problem of illiteracy if that problem is mainly seen as one focused on conceptual understanding. While reading undoubtedly can further conceptual understanding (e.g., learning through reading), to substantially reduce illiteracy defined with respect to conceptual understanding the overall education of individuals must be considered not just their ability to understand through reading what can be understood through listening.

CONCLUSIONS

The strength of the simple view of reading, in addition to its simplicity, is that it has allowed a set of non-trivial and testable predictions. Under the assessments described above these predictions could not be falsified, thereby supporting the assertion that skill in reading can be simply characterized as the product of skill in decoding and linguistic comprehension.

Implications of the simple view, arguing for the necessity and sufficiency of decoding and linguistic comprehension in skilled reading, include the following: (a) when skill in both components is non-zero, then instruction that advances skill in either component will advance skill in reading; (b) within the illiterate population, skill in decoding and linguistic comprehension will be inversely related if substantial skill is evidenced in either component; and (c) advancing literacy by achieving equal linguistic and reading comprehension will not necessarily have direct impact on the problem of illiteracy if that problem is mainly seen as one of conceptual understanding.

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NOTES

[1] Auding, a term coined by Brown (1954), is defined as listening to language for the purpose of comprehension.

[2] John Loehlin has pointed out that when measurement error is present, both additive and multiplicative combinations of decoding and linguistic comprehension predict increases in intercept values. This is because at the floor, error will result in some obtained zero values that are associated with greater than zero true values, and at the ceiling, some obtained maximal values that correspond to less than maximal true values. Fitting lines based on the products of such true scores results in positive (rather than zero) intercepts, the magnitude of the intercept increasing with decoding level. Measurement error, however, does not affect the different predictions of the additive and multiplicative notions with respect to slope values.

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