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A Graphemic-Phonemic Analysis

of the Reading Errors of Inner City Children

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This report is an analysis of the reading errors made by African American children in a Philadelphia elementary school.[1] It is designed to provide the linguistic basis for the improvement of methods of teaching reading, which will address the specific limitations in the reading ability of children who speak African American Vernacular English [AAVE]. This research effort at the Linguistics Laboratory is part of the long-term engagement of the University of Pennsylvania in the educational problems of the West Philadelphia community, under the Center for Community Partnerships. These are the first results of one year's cooperative work involving Penn students and faculty, West Philadelphia high school students, and teachers in West Philadelphia elementary schools.

The research reported here has the goal of developing methods for the teaching of reading to take into account (1) the home language and (2) the culture of African American children. This report will present a linguistic analysis of reading difficulties which should be useful in any method of teaching reading. Reports to follow will evaluate specific methods for correcting the problems outlined here, and the ways in which these methods can be inserted into a cultural framework that is strongly motivating for African American children in the inner cities.

The primary site of the research to be reported here will be referred to as the Woodruff Elementary School, ranging from Kindergarten to the fifth grade. Our first contact with the reading problems of Woodruff students was in the fall of 1997, when Penn students in Linguistics / AFAM 160 acted as teaching assistants in 4th and 5th grade classes. We found many children whose reading skills were one to two years behind grade level and could not read for content at their current grade level. In the spring of 1998, members of

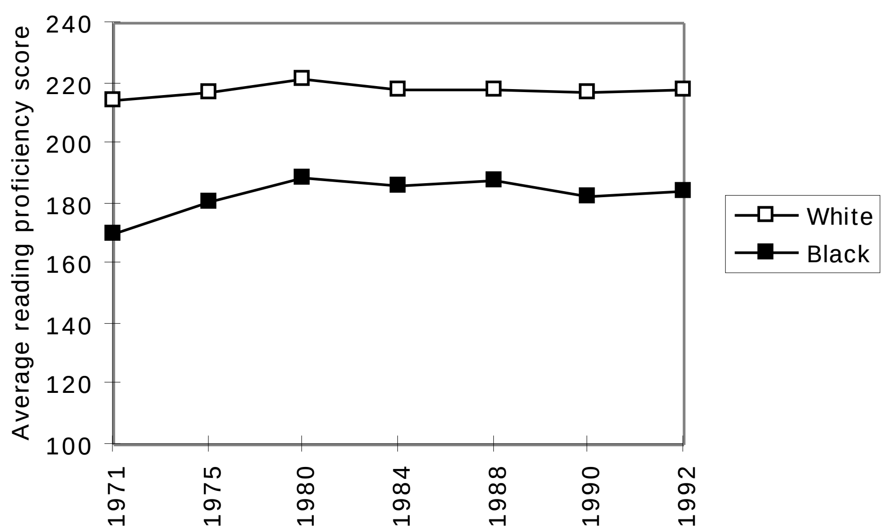
[1] This report is the product of a seminar held in the spring of 1998, Linguistics / AFAM 161, "The Sociolinguistics of Reading." The organization and planning of the Extended Day Program is the work of the Woodruff staff and B. Baker; data on reading errors were collected by Baker, Bullock, Ross and Brown. We gratefully acknowledge the support of the Center for Community Partnerships, directed by I. Harkavy, and the Kellogg Foundation for the organization and development of this activity. We are particularly indebted to the staff of the Woodruff School.

the seminar LinguisticsAFAM 161 engaged in extensive tutoring of 2nd and 3rd grade children in the Extended Day Program organized by B. Baker. This program involved a random sample of 40 children in the 2rd, 3rd, 4th and 5th grades who were one to two years behind in reading grade level. Almost 100% of the children selected for the sample volunteered for the after school program, and therefore provided a representative sample of the reading difficulties of children in the Woodruff School.

1. The stability of the reading problem.

A low level of reading achievement in the inner city has been recognized for more than three decades. What is remarkable is the stability of the problem, in the face of many large scale efforts at remediation. The over-all view of the situation is best provided by the NAEP data, reporting average reading proficiency scores by race / ethnicity. Figure 1 shows the figures for 9 year olds, the age group closest to those we are concerned with. The figure shows that despite a slight improvement from 1971 to 1980, both black and white scores and the black / white differential are essentially stable from 1980. The interpretation of this difference in average scores is important here: Score level 200 is required for "partial skills and undersetanding," and the black average has not reached that level, while the whites are past that level on the way to score level 250, which "Interrelates ideas and makes generalizations." On the whole, the average reading proficiency of the black 9 year olds through 1992 was at the level of "simple discrete reading tasks."

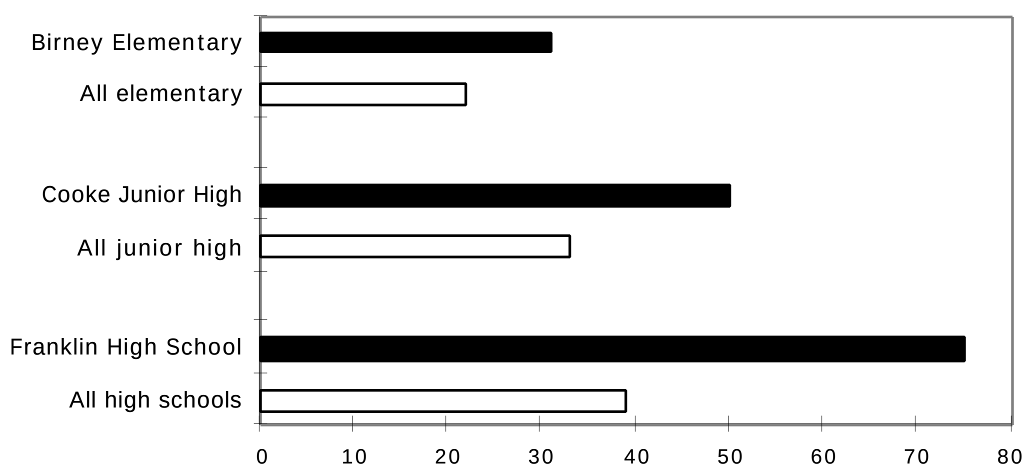
Figure 1. NAEP average reading proficiency scores by race for 9 year olds, 1971-1992



The more detailed study of particular groups of African American students shows that these average figures understate the nature of the problem for inner city children. Work in South Harlem in 1966-1968 addressed the question as to whether the dialect spoken by inner city African-American children was responsible for the failure to teach reading in inner city schools (Labov, Cohen, Robins and Lewis 1968). A review of school records showed that 32 isolated individuals from various backgrounds showed the expected lag of one to two years behind reading grade level, while the problem was far more severe for those who were integrated into organized forms of street culture. For them reading scores showed an absolute ceiling of 4.9 on the Metropolitan AchievementTest, with no improvement visible from the 6th to the 10th grade.

Throughout the United States, the difference between minority and majority performance in reading increases from the third grade onward. In 1976, the California Achievement Test scores reported in Philadelphia showed such a typical decline for schools that had 100% African American enrollment. Figure 2 shows the percent in the lowest 16th percentile for all elementary, junior high and high schools, and for three typical schools with 100% African American enrollment (Philadelphia Inquirer 7/25/76).

Figure 2. Percent of Philadelphia students in the lowest 16th percentile in California Achievement Test reading scores, 1976

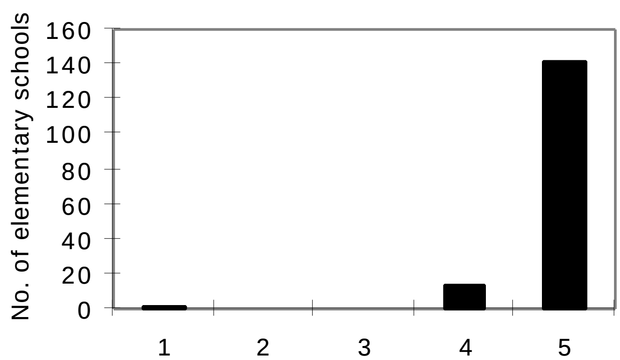


It can readily be seen that the over-all reading failure is even greater than that shown in Figure 2, since the high school percentages do not include those who have dropped out along the way.

The most recent scores published by the Philadelphia School District, using the PSSA test, show that there has been no improvement. These scores show the percentage of school students whose test scores are in the lowest quartile for the state. For Cooke, 58% of the students' scores were in the lowest quartile and for Franklin High School, 80%. For Cooke, only 12% of the students' scores were in the highest quartile, and for Franklin, 0%. This acceleration of the failure rate reflects a low level of reading for almost all schools from the outset. Table 1 and Figure 3 show the distribution of reading scores by quintile for all of the 5th grades in Philadelphia.

Table 1 and Figure 3. Distribution of reading scores by quintile for all 5th grades in Philadelphia by the Pennsylvania System of School Assessment (PSSA) for February 1997 (Philadelphia Inquirer 4/17/98).

Quintile	*No. of schools*
1	1
2	0
3	0
4	14
5	141



The Woodruff Elementary School was in the lowest quintile for these PSSA reading scores. The distribution of students' reading scores by quartile was: 1st, 6%; 2nd, 10%; third, 15% and 4th 69%, typical of most of the schools in the district.

A similar situation is found in schools with high minority enrollment throughout the nation. The figures as normally reported do not differentiate the effect of race and ethnicity from socioeconomic factors. Minority status and poverty are highly correlated, and socioeconomic status is highly correlated with reading performance. In the 1997 data of Table 1, the correlation between the percent of students' scoring in the lowest quartile and the percent of low income students was .75.

This report deals with the reading of African American students from low income families. Some of the results show a correlation with the specific features of African American Vernacular English (AAVE), but many reflect problems that appear to be general for all speakers of English. Further studies will undertake the analysis of reading difficulties for comparable socioeconomic groups with different cultural backgrounds.

2. Data gathering

The Extended Day Program gave the 40 elementary students involved a great deal of individual attention. Children engaged in many activities with the Penn students, volunteers from West Philadelphia High School and Woodruff staff. The most systematic tutoring in reading was done by the Woodruff staff and Penn students. The researchers who obtained the data in this report selected illustrated books from a wide range that had been determined to be at the students' grade level.[2] Children read the texts aloud; when there were errors or difficulties, tutors supplied the word only when the child had made several wrong efforts, paused for at least five seconds, or indicated that they had no idea what the word was.

Two types of data were recorded: words where no effort was made to pronounce a guess or a version, and words that were read aloud in a form that could not be interpreted as corresponding to the sense intended in the text. Throughout this proceeding we distinguished carefully between differences in pronunciation and mistakes in reading (Labov 1965, Goodman 1969). It has been well established that speakers of AAVE frequently do not pronounce the second element of apical consonant clusters (in *past, passed,* etc.), although there is good evidence that these clusters are intact in their underlying mental dictionaries.[3] When students read words like *worked* as *work,* this was not rated as a mistake in reading unless there was clear evidence that they had failed to grasp the past tense meaning.

The main body of findings to follow is the result of the analysis of the second type of data, where readers gave some version of the word aloud. These data permit us to locate the source of the reading difficulty more precisely than the simple inability to read the word. However, an examination of the words that were not read at all is consistent with the findings of the analysis of attempted reading errors. A total of 450 reading errors from 20 children form the body of data to be examined in the sections that follow.

3. Graphemic/phonemic analysis

Our first contact with the reading problems of second and third grade children showed that they suffered a high level of frustration in attempting to read the books that were designed for 2nd and 3rd grade readers. One might point to many of the sources of reading problems identified in the literature: a

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[2] The books read included *Come to My Island, Math Workbook, Martin Luther King, , History of Jazz, Spelling Words, V-Tech game, Molly's Monsters, Five Little Monkeys, Maya Angelou, Alexander and the Terrible, Horrible, NO Good, Very Bad Day, Lil's Purple Plastic Purse, I Like Me, Little Witch's Big Night, The Grouchy Lady Bug, Magic School Bus at the Waterworks, The Witch Baby, Kyla's Big Day, Daydreamers.*

[3] The main evidence for this fact is that the clusters are realized in their full form much more frequently when the next word begins with a vowel, and that there is little or no hypercorrection (Labov, Cohen, Robins and Lewis 1968, Labov 1972, Baugh 1983).

lack of familiarity with the vocabulary or the subject matter, poor strategies for deducing the meanings of unfamiliar words from context, lack of attention to the main ideas, and so on. However, the first priority was given to the analysis of their ability to use sound/letter correspondences to identify words that are included in their speaking and hearing competence. A great deal of recent discussion of children's decoding abilities has focused on predictors of success or failure in reading, and the development of phonemic or phonological awareness has played a major role (NRC 1998: 110-112). Our focus is not on prediction but upon the actual description of children's ability to use the regularities of grapheme-to-phoneme correspondence to identify words. In this respect, we continue the tradition of Calfee and Venezky (1968) who examined children's abilities to decode specific alphabetic elements and relations; we extend this approach to the reading of inner city African American children. We have reason to believe that there are specific weaknesses in this population's grapheme-to-phoneme processing. Earlier studies of the reading errors of AAVE speaking youth indicated that the alphabet was used consistently for the first consonant and vowel, but that it was frequently ignored for the following material (Labov, Cohen, Robins and Lewis 1968).

If it should turn out that there were little relationship between the frequency of errors and the phonemic structure of words, one would conclude that weakness in decoding skills was not an important part of the causes of reading failure, and turn to other aspects of reading. But if there is a high correlation between frequency of reading errors and the complexity of the word and syllable, we can conclude that there is a great deal to gain by reinforcing children’s knowledge of these relations.

The analysis must necessarily combine graphic and phonemic relations. Our first question on any letter is whether the reader paid attention to it and recognized it for what it is. The second question is whether it was interpreted properly as an individual phoneme, as a part of a digraph indicating an individual phoneme, or as a part of a cluster of phonemes which function jointly as the onset, nucleus, and coda of the syllable.[4] A third question is whether it was combined with other elements to produce a recognizable version of the intended word.

This analysis of reading errors is consistent with findings from studies of children’s abilities to use sound/letter correspondences in reading nonsense words (Venezky 1972; Venezky and Johnson 1972; Calfee, Venezky and Chapman 1972). However, the pronunciation of nonsense words introduces factors which underestimate the actual reading competence of children, since rules of sound/letter correspondence are not equally productive, and the role of exceptions in weakening the person’s confidence

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[4] The *onset* of a syllable consists of all the consonants that precede the first vowel. The *nucleus* consists of the vowel and glide that form the peak of sonority of the syllable. The *coda* is the consonant or consonants that follow the nucleus. Thus in *cat* the onset is /c/, the nucleus is /æ/, and the coda is /t/. In *strengths*, the onset is /str/, the nucleus is /e/, and the coda is /NQs/.

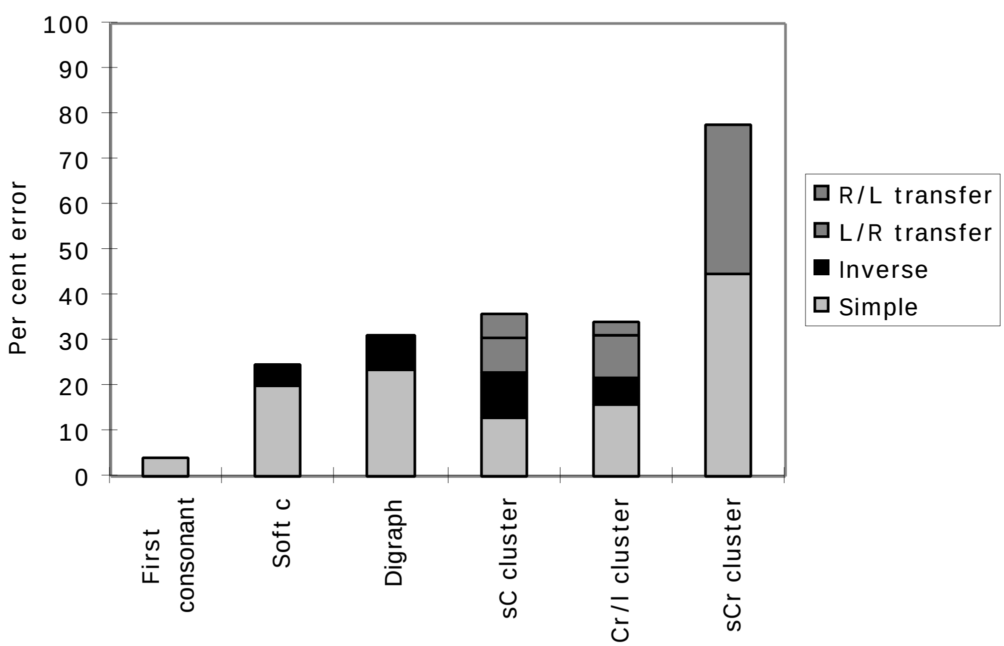
in the validity of rules is not yet understood. The study of meaningful reading in context has the advantage of eliminating the artifactual nature of nonsense words. Yet it introduces the opposing problem of overestimating decoding skills by mixing the process of decoding with the recognition of sight words. By focusing on the distribution of letter/sound correspondences in reading errors, where sight words are least likely to appear, we should come closer to a valid estimate of decoding skills.

4. The onset

Table 2 and Figure 4 show the distribution of reading errors for the onsets of the first syllable—all of the consonants that precede the first vowel.

Table 2 and Figure 4. Distribution of reading errors for onsets of first syllables.

	N	Total errors	Percent errors	Inverse	L/R transfer	R/L transfer
First consonant	414	17	4	0	0	0
Soft c	20	5	25	1	1	0
Digraph	42	14	33	3	0	0
sC cluster	39	14	36	3	0	2
Cr/l cluster	93	32	34	5	9	3
sCr cluster	9	7	78	0	0	3



Perhaps the most important finding of this study is shown in the first column on the left: errors in reading the initial consonant. This measure indicates whether or not the reader accurately detected what letter was present, but not the application of contextual rules of sound/letter correspondences. For example, the word *ceiling* was read as “killing,” showing a failure to apply the rule that *c* is pronounced as /s/ before a front vowel *e* or *i.* However, it was recognized as *c*. The percent of errors is very low: 3%. The 17 errors include four which indicate problems in spatial location rather than identification of letters: the familiar reversal *was* for *saw*, *yes* for *eyes,* and two misreadings of *them* which began with *m* .

Thus it is clear that the children's reading problems are not the result of children’s failure to learn values of the letters of the alphabet. Consistent with earlier studies of Harlem adolescents (Labov et al. 1968), we do not find 2nd and 3rd graders in West Philadelphia who fail to use the alphabet accurately for the initial consonant. A comparison can be made with a study which used the standard methodology of testing children's ability to give plausible readings of nonsense words: the Wisconsin study of Venezky, Chapman and Calfee (as cited in Venezky 1972). The West Philadelphia reading of lone initial consonants is comparable to the decoding skills of the highest quartile of Wisconsin children tested at the end of grade 2. For the recognition of the invariant consonants *m, d, l, b,* the range was 97 to 99% correct in initial position. Since our measure looks only at words that were read incorrectly, the actual rate of success in reading all *m,d,l,b* would be much greater; yet for the 75 words in our list beginning with these consonants, the West Philadelphians made only one error in the initial consonant. The West Philadelphia children are far superior to the Wisconsin lowest quartile, whose error rates were close to 10% for all four consonants.[5]

This situation contrasts sharply with error patterns for any words in which the onset has more than a single consonant. The third row of Table 2 and third column of Figure 4 shows reading errors associated with initial digraphs. The list of errors includes not only cases of digraphs read as a single grapheme (*scenes* -> *sense, thump* -> *jump, their* -> *her, three* -> *tree*), and as another digraph (*that* -> *what*), but there were also inverse errors, where a phoneme corresponding to a digraph was used when only a single consonant was printed (*tank* -> *think*, *trout* -> *throat*, *suggested* -> *shoulder*). Such inverse errors are shown as black bars in the error column for all items in Figure 2 and figures to follow.

The column labeled *sC- cluster* designates all words that have consonant clusters or "blends" beginning with *s*-. Here we find an additional

[5] A certain number of errors are to be expected for the rule for the softening of /c/ before front vowels /i/ and /e/. Here again, the West Philadelphia children are not markedly different from the Wisconsin group who had just finished the second grade. The average per cent of errors for such words was 30%, with quartile scores ranging from 19 to 40% (Venezky 1972: Figure 1). For those words read wrong in West Philadelphia which involved a syllable initial *c,* one third did not apply this rule: *ceiling* -> *killing*, *forced* -> */fohrk´d/*, *ocean* -> */okohrn/*. This included one inverse example, where softening was applied before an unstressed vowel, spelled *u*:: *circus* -> */s´rsis/.* On the other hand, the softening rule was correctly applied in the majority of cases, even when other errors were made: *process* -> */prowsiys/*, *voice* -> *vice*, *ceiling* -> */sæniy/*, etc.

type of error—readings in which the second element of the cluster is transferred to the right, on the other side of the vowel nucleus. Thus we have *stall -> /sætːl/ steel -> settle*, *strong -> short*. There are also reverse, right-to-left locational errors, with a segment moving from the coda of the syllable to the onset, as in *settling -> stealing*.

The next category, *Cr/l clusters*, involves onset clusters where the second consonant is a grapheme indicating a liquid phoneme— an /r/ or an /l/. The first consonant is a grapheme corresponding to an *obstruent*: phoneme: that is, either a stop (*p,t,k,b,d,g*) or a *fricative* (*f,s*).[6], Errors with clusters of this type are more numerous and show the same pattern. In addition to the loss of the second grapheme (*dragons -> danger*, *crops -> coops*, *shrubs -> shubs*, *drawn -> down*), there are frequent re-assignments of the second element to the syllable coda, as in *cloud -> cold*, *tried -> tired*, *friendly -> fire*, *slimy -> smelly*). In some cases, an element of the coda is moved into the onset: *dirtying -> drying*, *peddlars -> platters*, *fell -> flew*). There are also a good share of inverse errors, where a single consonant is read as a cluster: *tack -> track*, *double -> trouble*.

The distribution of errors among the various types of complex onsets is remarkably stable, close to 35%. In the smaller subset of words with three-member onsets, the combination of *sC*- and *Cr*- problems is uniformly responsible for errors: *strong -> short*, *screamed -> scare*, *struggle -> /ː/*. The fact that the spatial location of the second segment is uncertain is not surprising. Thus Adams (1990) notes:

> Although the visual system is quite fast and accurate at processing item information (such as the identities of the individual letters of a word), it is both slow and sloppy about processing their spatial locations. --113.

Adams found (1979) that a major difference between less skilled and more skilled readers was in their ability to view and report ordered pairs of letters, particularly in their sensitivity to the frequency with which a pair of consonants occurred in printed English.

In our data, the contrast between simple and complex onsets is almost categorical: when words are read wrong, it is rare to find that a lone initial consonant is involved; but if a complex onset was present in the word, it is very likely responsible for the error. The pedagogical implications of this fact will be developed in section 8.

5. The vowel nucleus.

The view of reading errors for the vowel nucleus shows a much higher level of errors than the onset. By far the lowest value is shown in the column for the first vowel. In the majority of the reading errors, the first vowel was

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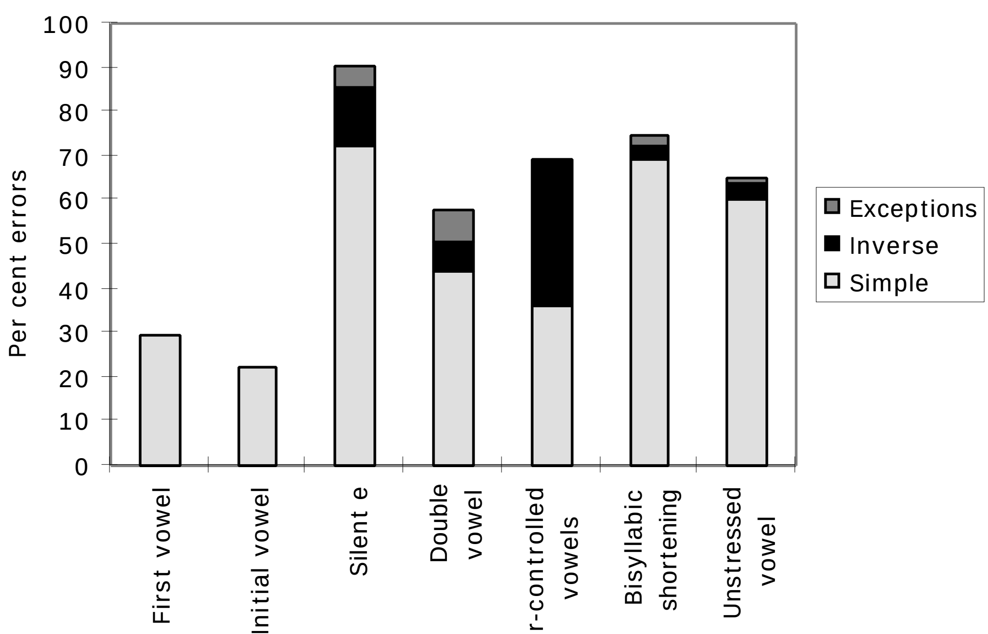
[6] In some clusters, the first element is a digraph, as in *three* or *shrewd*. In this case, the word is counted in both the digraph category and the Cr/l category.

recognized for what it is; yet the percent of errors is seven times as great as for the first consonant.

One might attribute this higher rate for the first vowel to the fact that it is not as salient in the word, but comes after an initial consonant. However, when we compare in the next row the error rate for words read wrongly with initial vowels, it is 22%, not far behind the overall rate of 29% for the first vowel, and much greater than the 4% for the first consonant: *uses* -> *sees*, *united* -> */ɨnaytɨd/*, *over* -> */ʌv ɨr/*, *even* -> *any*, etc.

Table 3 and Figure 5. Distribution of reading errors for the vowel nucleus.

	N	Total errors	Percent errors	Inverse	Exceptions
First vowel	436	128	29	0	0
Initial vowel	36	8	22	0	0
Silent e	61	55	90	8	3
Double vowel	118	70	59	8	7
r-controlled vowel	55	39	71	18	0
Bisyllabic shortening	27	36	75	1	1
Unstressed vowel	127	97	76	5	0



Complications in the nucleus are responsible for a much higher rate of the reading errors than complications in the consonantal onset; the rates in Figure 3 are all well above 50%. The first of these columns shows the distribution of errors for words containing the "silent e" pattern, that is, a final orthographic *e* in the second syllable after a lone consonant. Of all regularities in English vowel system, this is one of the most reliable. It consists of two parts:

(1) An *e* after a lone consonant is not pronounced. (Only exceptions: *Nike, adobe*).

(2) The vowel of the first syllable has its appropriate long sound. (Exceptions: (a) *have, give, live;* (b) *love, glove, shove, hover, oven, above, cover, dove;* (c) *move, prove*.

The exceptions to the second part of this rule are heavily concentrated in the specific environment of -*ov*-[7] and there are a vast number of words which follow the pattern regularly. Nevertheless, the West Philadelphia students have plainly not mastered the silent *e* rule. We observe a large number of simple errors. Some are simply a preservation of the short sound of the vowel in defiance of the silent *e*: *plane* -> *plan, globes* -> *globs, aside* -> *acid, ate* -> *after, Pete* -> *pet, fluoride* -> */flohrid/, concrete* -> */ka[illegible]kret/.* In other cases, a vowel is supplied that has no relation to the basic rule: *device* -> */divoys/, stated* -> *started, arrive* -> */riyv/, mice* -> */miys/.* Some errors are plainly motivated by the exceptions noted above: *moves* -> *more, moves* -> *most, moved* -> *most*.

A most significant set of errors are the inverse errors, where a long vowel is supplied when a short vowel is dictated by the spelling: *slid* -> *slide, crops* -> *coops, hymns* -> */haymz/, children* -> *chide, listen* -> *lice, twenty* -> *twice, suppertime* -> *supertime, hopscotch* -> *hopescotch.* These indicate that the mastery of the simple regular CVC pattern is not complete. The fact that *slid* can be realized as *slide* shows that the reader does not control either the rule that *i* is short /i/ in the environment C(C)VC (Exceptions: none), or the rule that *i* is long /ay/ in the environment C(C)VCe (Exceptions noted above).

The third column in Figure 5 indicates that when an error does occur in a word subject to the CVCe regularity, in nine out of ten cases the silent /e/ rule is not being used accurately.

There is no simple regularity governing sequences of two vowels: the often quoted rule that the first vowel says its own name applies only to *AY, AI, EE, OA, UE* but not to *AU, AW, EY, OO, OY, OU, OW, UY*. The analysis of the individual patterns would require a larger data set, based on frequency of all words in the texts read. However, Table 4 gives some indication of the patterns involved in the 108 reading errors with double vowels in the nucleus. The words in which the errors occur are classified as "regular" if they follow the major regularity that can be described by a rule. For example, the word *looked* is considered regular since all *oo* combinations before /k/ are pronounced with short /u/ (Exception: *kook*); the word *dew* is regular since it shows *ew* -> */uw/,* while *sew* is irregular.

In Table 4, there are very few errors involving the most regular double vowel combinations: AY, AI, OA. But the most transparent double vowel of all, EE, is well represented among the list of errors. The irregular combination

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[7] Though the scope of this set of exceptions is limited, its regularity was plainly observed by the student who read *over* as */Uv´r/.*

EA is also well represented, with *threatened* -> /[illegible]/, *earth* -> *each*, *dean* -> *Dianne*, etc. The totals for all vowels indicate a relation between irregularity and reading errors (Chi-square = 3.8, p < .05).

Table 4. Errors and successes with double vowels in words with reading errors. (Upper figure: reading of VV correct; lower figure; reading of VV incorrect).

	Regular	Irregular	Inverse
ee	3/3		2
ei		1/4	
ea	16/6	1/3	1
ew	1/5		
eo	1/0		
ey		1/1	
ie	1/2		
ai	0/1		2
ay	4/1		
oi/y	2/0		1
oa	0/1		
oo	4/1		2
ou	2/6	4/9	1
ow		0/3	
aw	2/5		3
ue	0/2		
Total	36/33	7/20	12

The next category, *r-controlled vowels*, refers to vowels followed by /r/ in the same closed syllable: *here, card, hardware, store, board* etc., but not *merry*, *orange* or *arrest*. This category seems to show the effect of the phonetic pattern of AAVE. In Philadelphia, speakers of AAVE show a wide range of variation in the realization of postvocalic /r/, with most speakers averaging about 50% consonantal and 50% vocalized /r/.[8] In this data set, there are only three examples of an orthographic *r* not being registered in the interpretation of the word: *earth* -> *each*, *return* -> *runting* and *Missouri* -> *messes*. It is

[8] In a city like New York, where the surrounding vernacular of the mainstream community shows uniform vocalization of /r/, speakers of AAVE use 100% vocalized /r/ (Labov et al. 1968).

more common to find that the vowel supplied is not the one indicated in the spelling: *star -> store, stare -> store, war -> /wiyr/, where -> worry, their -> her, Hampshire -> hemisphere.* More often, we find the /r/ pronounced as if it occurred in a different location in the word: *assorted -> across, strong -> short, threaten -> /*[illegible]*/, tried -> tired, dirtying -> drying, Corvette -> /kohrvendɨr/.* But the most common type of error is inverse: an /r/ is supplied although there is no indication in the spelling that an *r* is present. Thus we have

another	->	*Arthur*
stated	->	*started*
economy	->	*/*[illegible]*/*
cousins	->	*/kohrzinz/*
agent	->	*/ohrgid/*
Albert	->	*/ahrbɨrt/*
ocean	->	*/owkohrn/*
moves	->	*more*
they	->	*their*
while	->	*where*
glide	->	*girlies*

This pattern of errors indicates that postvocalic /r/ is a stumbling block in the reading patterns of the West Philadelphia speakers of AAVE. Since /r/ does not have a stable representation in the spoken language, the step from orthographic representation to phonemic interpretation appears to be obstructed.

Problems with the interpretation of bisyllabic words are too frequent and complex to be dealt with here. One of the problems lies with the readers assigning long vowel status to the vowel in a second syllable that is

storage	->	*/*[illegible]
notice	->	*/natays/*
carrot	->	*/kærowt/*
pirate	->	*/pɨriyt/*
ocean	->	*/owkohrn*
aphid	->	*/æ*[illegible]*hiyd/*
models	->	*/midey/*
moment	->	*mommy*

There are many other difficulties involved in bisyllabic words, but it is clear that rules for assigning stress must be incorporated to advance one's reading level. This problem is highlighted by a question that students have asked more than once: why is *comfortable* not pronounced *"comfort-table"?*

The last column in Figure 5 concerns unstressed vowels. As in the previous case, the number and variety of errors involving unstressed vowels is too great to allow a simple analysis. But there is a remarkable tendency to simply omit a final syllable, which is the converse of the tendency discussed above to assign a full value to unstressed vowels. Thus we have a second syllable simply omitted:

closet	->	*/klowz/*
seconds	->	*six*
dizzy	->	*diz*
broomy	->	*broom*
morning	->	*moon*
nasty	->	*nast*
grouchy	->	*grouch*
daydreamers	->	*daydreams*
strangest	->	*strange*

Even greater problems are created by trisyllabic words with unstressed vowels in a middle syllable: *separate* -> *sport*, *incident* -> */inhent/*. This is not surprising, since all of the problems outlined so far are multiplied in such multisyllabic words.

6. The coda

In previous discussions of how one might apply knowledge of AAVE to the teaching of reading, it was emphasized that the relation between the written and the spoken language was far more complex at the ends of words (or syllables) than at the beginning. This is particularly true for AAVE, where the tendency to simplify final consonants is more extreme than in other dialects, particularly in absolute final position, or "citation form." It was therefore suggested that in the teaching of reading to speakers of AAVE, more attention be given to the ends of words than the beginnings (Labov 1983, 1995). So far, the special phonological character of AAVE has been reflected in reading errors only in the r-controlled vowels. Further evidence will appear in this section of the analysis.

The error rate for the lone post-vocalic consonant shown in Table 5 and Figure 4 comes close to the error rate for the first vowel. While it is higher than for the initial consonant, it is considerably lower than any of the more complex codas.[9] Again, this figure reflects the fact that even readers who are operating at one or two years behind grade have the ability to recognize and integrate individual letters into the reading process. The errors that do occur are the result of a wide variety of causes which are often connected with the problems reflected at the end of the last section: the segmentation of syllables.

Final geminates seem at first glance to be no different from final lone consonants. In speech, English phonological rules automatically reduce them to single consonants. Yet they produce a distinctly higher rate of errors in the words involved here. It is not clear that the errors of *planning* -> *play* and

[9] The lone consonant here is assigned to the coda, but in many cases it actually occupies an "ambisyllabic" position, sharing membership in the preceding and following consonant.

passing -> *pages* have anything to do with the -*nn*- and -*ss*- involved here. It is even less clear how the -*tt*- in *letting* is involved in the misreading *lesting*. But the overall picture is that any complication in the coda will be a focus of difficulty in decoding.

The final digraphs -*ch*, -*th*, -*ng*, -*ck* lead to a further increase in the likelihood that this will be the site of a reading error. It is the set of words with -*gh* spellings that are responsible for this increase, marked in the table and figure as exceptions: *thoughts* -> *things*, *thoughts* -> *though*, *right* -> *ridge*. This is hardly surprising.

The fourth and fifth categories in Table 5 and Figure 6 deal with clusters of two different consonants. In speech, English clusters are frequently simplified; this happens in different ways, depending on whether the second element is a tongue-tip or *apical* consonant (/t, d/) or a consonant of a different type formed with the lips (/p, b/) or the back of the tongue(/k,g/). In speech, the apical consonants are frequently deleted by speakers of all dialects, yielding forms like *good ol' boy* or *las' month*. Clusters ending in non-apical consonants follow a different pattern. If the first element is nasal consonant (/m,n/) it is often vocalized, and the second element is rarely dropped. If the first consonant is an /s/, we find that second element in words like *wasp* or *ask* is occasionally deleted, but not as often as with apical consonants.[10] These patterns of simplification are found in all English dialects, but for AAVE, it occurs at a relatively high rate, and simplification in absolute final position is very high.[11] This means that when a word is explicitly introduced to a learner ("This is *gold*."), the final /d/ is in a position where it is least likely to be pronounced or heard.

The most likely focus for reading errors in the final set of consonants is therefore in the group of clusters that are most reduced in AAVE speech: the apical clusters -*st*, -*nd*, -*nt*, -*ld*, -*lt*. Of the 38 words with such final clusters, 26 are the site of a reading problem.

It is sometimes thought that AAVE does not simplify clusters with heterogeneous voicing like -*lt* in *belt* or *dealt*, and -*nt* in *sent* and *went*. The rate of simplification is lower for such clusters than homogeneous clusters, but there is a regular rate of reduction for all speakers (Labov et al. 1968). The reading problems are comparable:

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[10] When the cluster is complicated by an additional final /s/, as in *wasps, desks, ghosts* the rate of simplification is much higher, and for speakers of AAVE, it is categorical, as indicated above.

[11] For most English dialects, absolute final position is the least likely place for simplification to occur. Guy 1981 shows that white speakers in New York City also have a high rate of simplification in final position, but this is not typical of most mainstream dialects.

Homogeneous			Heterogeneous		
-ld			*-lt*		
bald	->	*blad*	*salty*	->	*sailintli*
mold	->	*molid*	*split*	->	*spilt*
children	->	*chide*			
mold	->	*miles*			
fieldlets	->	*findlets*			
-nd			*-nt*		
behind	->	*beginning*	*twenty*	->	*twice*
round	->	*right*	*moment*	->	*mommy*
seconds	->	*six*	*moment*	->	*meat*
			wanted	->	*water*
			agent	->	*/ohrgid/*

Among the highest rates of simplification in speech are the clusters in *-st*, exemplified here by *roasted* -> *rose, suggested* -> *shoulder, strangest* -> *strange*. It is not an accident that the word *posts* is read as *pots,* since the cluster *-sts* is categorically unpronounceable in AAVE (Labov et al. 1968:131), and this is one of the ways of reducing it to a speakable form.

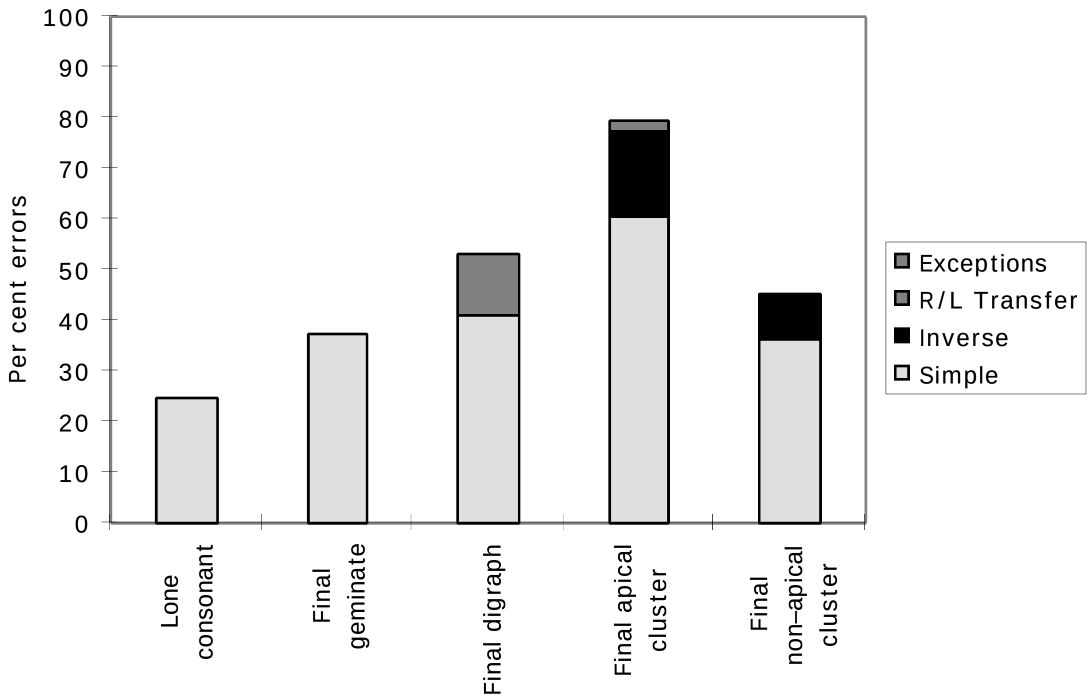
There are also significant rates of inverse errors involved with consonant clusters: *Audrey* -> *Andrew, decided* -> *dances, disease* -> *distance.* It is interesting to note that these additions of clusters where no errors were found in the spelling all involve the insertion of an apical nasal consonant /n/.

Only 10 non-apical clusters are found in the list of reading errors, and of these, only are the site of an error: *Hampshire* -> *hemisphere, clumping*-> *climbing, Ralph* -> */rip../,* and the inverse *hiding* -> *hanking.* [12]
The orthographic problems posed by non-apical clusters are no different from those posed by apical clusters, and this difference must therefore be attributed to the intersection of speech patterns and phonological perception with decoding of the visual signal.

Table 5 and Figure 6. Distribution of errors in the consonantal coda.

	N	Total errors	Inverse	R/L transfer	Exceptions
Lone consonant	225	56	0	0	0
Final geminate	48	18	0	0	0
Final digraph	34	14	0	0	4
Final apical cluster	58	46	10	1	0
Final non-apical cluster	11	5	1	0	0

[12] The difference between the rate of errors in the apical clusters and the non-apical clusters is significant with a chi-square of 5.9.



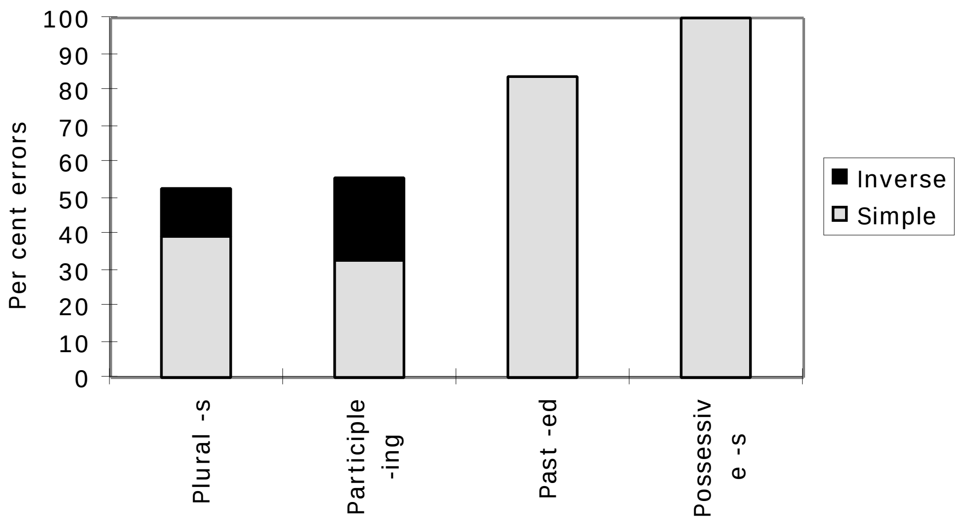
7. Inflectional elements

Appended to the coda are the English series of grammatical inflections: the plural *-s,* the possessive *-'s,* the third singular *-s* on the present tense of the verb, the comparative *-er* and superlative *-est,* the regular past tense *-ed*, and the present participle *-ing*. Here one would expect to see the most specific effects of the home language of the West Philadelphia students, since AAVE treats the various suffixes quite differently. In the body of reading errors, there is a fair amount of data on three of these: the plural *-s,* past *-ed*, and participle *-ing.* We have a small set of possessives, sufficient to give a bare indication of how readers treat this suffix.

Though the inflections represented by a single consonant form part of the coda of the preceding syllable, they are treated differently in speech from other members of the coda. For example, the word *goes* usually shows the length and phonetic position of the free vowel in *go,* as opposed to the checked syllable of *rose*. In reading, we would also expect that those who are familiar with the functions of these particles will treat them differently from other members of the coda.

Table 6 and Figure 7. Distribution of errors for grammatical inflections.

	N	*Total errors*	*Inverse*	*% errors*
Plural -*s*	89	47	12	53
Participle -*ing*	34	19	8	56
Preterit -*ed*	25	21	0	84
Possessive -'*s*	3	3	0	100



7.1. The plural.

Every study of AAVE shows that the plural inflection is intact. There are only two points of difference from other dialects to be noted:

(a) Like many other Southern dialects, AAVE does not use the plural inflection with nouns of measure: e.g., *three books* but *three cent, five year.*

(b) The -*s* is generalized to nouns that take a zero plural in other dialects: *deers, sheeps, fishes,* and nouns with the -*en* plural: *mens, womens.*

Some pre-adolescents will omit the plural inflection, but Torrey's study of second graders in Harlem in 1967 showed over 95% use of the plural in spontaneous speech, and no difficulty in semantic interpretation. Ball's replication in Michigan in 1983 showed similar results. Because the plural is regularly pronounced, we count every omission of it as a probable error in reading.

Table 6 and Figure 7 show a sizeable error rate for plural -*s,* but by no means as high as the other elements in this section, and quite moderate when compared with the coda in Figure 6. Furthermore, the pattern of inverse errors indicates a consciousness of the use of the plural as a grammatical inflection. In *changing* -> *changes, thinking* -> *things* and *passing* -> *pages* the reader is plain substituting one inflection for another. It is interesting to note that many of the simple omissions involve the variant -*es,* used after sibilants and *i* (from *y*): *dresses* -> *dress* (twice), *witches* -> *witch* (twice), *houses* -> *house, bodies* -> *body* . The actual percentage of simple errors of the plural -*s* is then reduced to a small number.

It follows that the West Philadelphia readers have a better understanding of the consonantal representation of the plural as -*s* than the alternate spelling -*es.* The ability to read the -*s* inflection is shown in such errors as *treaters* -> *treats,* where the -*er* on the unusual word *treaters* is omitted but not the plural itself.

7.2. The *-ing* suffix.

So far, no observations of AAVE have indicated any difference from other dialects in the use of the -*ing* suffix.[13] At first glance, it seems surprising that there is such a high error rate in the reading errors: 61% of the words involving -ing show errors. But a second glance shows that most of these are inverse errors: -*ing* being supplied where it did not exist in the original text. The significance of such inverse errors for a suffix is quite different for the silent -e rule. Instead of showing a lack of knowledge, it indicates that readers are aware of the -*ing* suffix and are willing to supply it to make sense of the text. In order to explore this topic more deeply, we would need a different type of data, examining the reader's efforts to interpret the entire sentence. At the moment, it seems clear that the treatment of -*ing* is comparable to the treatment of plural -*s,* both suffixes that are well known and recognized in AAVE.

7.3. The past tense *-ed*.

As noted above, many studies of the simplification of past tense clusters show that AAVE speakers have the same variable behavior as in all other dialects of English. The second element of clusters ending in -*t* or -*d* is deleted, less often when the following word begins with a vowel and less often with stressed syllables. Most importantly for this section, the deletion occurs less often when the -*t* or -*d* represents a separate morpheme, either the regular past -*ed* or the participle -*ed* used with the passive or the perfect. It is important to note that this has nothing to do with knowledge of the past tense, for the irregular verbs like *told* and *gave* are used consistently for the past in the same way as other dialects. The fact that this is a phonological rule is underlined even more sharply by the fact that the /əd/ form used after apical stops is never deleted: the suffix is quite regular in *wanted, interested, demanded*.

At the same time, it should be noted that the grammatical constraint is weaker in AAVE than in other dialects, and experimental evidence shows that core speakers of AAVE are not able to use the information of the -*ed*

[13] It has been observed that the constraint on using the progressive with *stative* verbs is weakened in AAVE.

suffix in a written text to obtain past tense information.[14] The rate of errors shown in Table 6 and Figure 7 is very high, comparable to the monomorphemic apical clusters in Table 5 and Figure 6. This similarity in error rates suggest that the readers are behaving as if the past tense clusters do not contain any special information, consistent with the experimental results on semantic interpretation.

Because the realization of *-ed* is variable in speech, the absence of *-ed* was never counted as an error when it was omitted except after apical consonants *-t* and *-d*. Thus *tricked* -> *trick* was not included as an error, since we must follow the basic principle of distinguishing (possible) differences in pronunciation from mistakes in reading. The case of *acted* -> *act* is counted as an error, since this full syllable is never omitted in spontaneous speech. The error list does include 7 cases from several readers where the *-ed* is pronounced as [əd] after non-apical consonants: *tricked* -> /[illegible]/, *forced* -> /[illegible]/, *winked* -> /[illegible]/, *tucked* -> /[illegible]/, *watched* -> / [illegible]/ (twice), *screeched* -> /[illegible]/, *looked* -> /[illegible]/. In these cases, we can conclude that the reader has not detected the past tense information, since the suffixes would never be pronounced in this way in speech.[15]

The high error rate for the *-ed* form, as compared with the plural, therefore reflects the high rate of variation in speech and the unreliability of the printed signal for deriving past tense information for speakers of AAVE.

7.4. The possessive *-'s.*

Every study of spontaneous speech in AAVE shows that the possessive suffix is absent in attributive position. Although it appears regularly in absolute position (*This is hers, that is mines*), it is close to 100% absent in the basilectal vernacular in such constructions as *my brother house, the dude old lady*. Furthermore, the experiments of Torrey and Ball show that second grade children cannot assign a semantic interpretation to *–s* ro distinguish pairs like *the duck nurse* vs. *the duck's nurse*. There are only three occurrences of the possessive *-s* in the reading errors, all involving the form *witch's*. As Table 6 shows, the *-s* does is absent from the reading in all three cases.

In spite of the limitations of the data set on grammatical affixes, the over-all picture that emerges from Table 6 and Figure 7 is quite clear. The inflections that are stable in AAVE show only a moderate percent of reading errors, including a high proportion of inverse errors. The significance of these inverse errors is the opposite of inverse errors in phonology, as in the reading of CVC syllables with long vowels. Inverse grammatical errors indicate that

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[14] In reading a sentence like *Last month, I read the sign,* subjects can transfer the past tense information in *last month* to derive the past tense pronunciation of *read*. But in the sentence, *When I passed by, I read the sign,* results were random.

[15] These are not to be identified with the duplicated plurals that are commonly heard in speech, where /´d/ is added after the regular form, as in *pickted, lookted*.

the suffix is part of the inventory of forms that the reader is willing to supply in the effort to make sense of a sentence when other difficulties arise.

On the other hand, suffixes that do not have a stable position in the underlying grammar will show a very high rate of reading errors, and will not be supplied when they are not present in the text.

8. Pedagogical implications.

In assessing the pedagogical implications of this research, the first step is to sum up the strengths and weaknesses of the Woodruff 2nd and 3rd graders in decoding skills. One clear strength is in the accuracy of their recognition of consonants. For initial consonants, it is very high: at least 96%. In this respect, the goals of the initial phase of their phonics program can be said to have succeeded. This level of accuracy is less for the first vowel, but it is still moderately high, and even when a lone consonant is imbedded in the middle of a word, it is recognized correctly 80% of the time. The next steps in advancing the level of reading can build on these skills.

The findings show that this level of accuracy contrasts sharply with a very great degree of difficulty the Woodruff students have with any syllable structure other than CVC. Complexities in the consonantal onset are responsible for more than 30% of the errors in words read incorrectly, and when more than one consonant occurs , this rate jumps to 40, 50 and 80%, depending on the structures involved. When more than one vowel occurs in a word, this is responsible for the mistake in an even higher proportion of reading errors: from 60 to 90%. It is startling to find that the most reliable of all the sound to letter correspondences in the choice of long or short vowels—the silent *e* rule—is not learned at all.

We can couple these findings with what we know about the teaching of phonics in the Woodruff school. The most commonly used phonics book is the Steck-Vaughn series (York 1995). The approach to phonics is typical of many other phonics books. Table 7 shows the distribution of topics, the ordering, and the amount of effort devoted to each phonics area. It is clear that the lion's share of the attention goes to the first, lone consonant and the first (short) vowel; 62% of the lessons are devoted to these topics. If we add in the lone consonant after the vowel, we find that 72% is devoted to the CVC structure. It is not simply the proportion of lessons that is involved here, but their ordering. It is not until page 157 that long vowels are introduced.

Table 7. Topics of lessons for Year 1 of Steck-Vaughn Phonics Series.

Pages	Letter recognition	Consonants				Vowels		
		Initial	Med/final	Blends	Digraphs	Short	Long	Y
0-	10							
10-	10							
20-	8	2						
30-		7	2			2		
40-		4				8		
50-		10	1			2		
60-		4	2			7		
70-		6	1			6		
80-		5	2			7		
90-		4				10		
100-		8	1			1		
110-		6				10		
120-		5				6		
130-		4	3			4		
140-		4	4			6		
150-			6			5		
160-							10	
170-							10	
180-							10	
190-							8	2
200-				2			8	6
210-				10				
22-0					10			
230-					8			
Total	28	69	22	12	18	74	46	8

Grammatical inflections are introduced at the end of the first year: three pages devoted to plurals, 5 to verbal *-s* and *-ing*. Discussion of vowel digraphs or r-controlled vowels, diphthongs or shwa is relegated to the second year. This is not an unreasonable procedure, if we follow the hierarchical principle of beginning with the simplest objects and relations and adding more complex ones only when they have been mastered. It is an open question whether or not this level of success in identifying initial consonants could be achieved with less time and effort. The question to be considered here is whether the grave defects in decoding more complex structures which persist even into the fourth grade might be corrected by following a different strategy.

At present, we do not know how much time is devoted to the whole phonics series, either in individual or group sessions. But it is clear that no school child is likely to work through all of the lessons of the Steck-Vaughn or any other series. The long vowels are not introduced until page 160 of the texts. There are 129 lessons in the first year; to keep pace would mean 3 or 4 lessons every week: the long vowels are not introduced until lesson 79, and one would have to guess from the end result that the children had not been exposed for any length of time to this topic.[16]

The implications of this report suggest strategies that are radically different from those most widely used in the field. One general strategy is obvious: that more time should be devoted to the "rhyme": the vowels and consonants which follow the consonantal onset, and especially to the consonants at the ends of words. The lessons devoted to the initial lone consonant should be accompanied by lessons that consider the same consonant in final and perhaps medial position in the syllable.

The second general strategy that emerges from this report is that the CVC syllable should not dominate the introductory phonics lessons to the extent that it does. The high prevalence of inverse errors in the long/short vowel pattern shows that teaching CVC patterns in isolation does not lead to an understanding of the basic relations involved. The fact that children learn to read the word *hop* accurately does not mean that they understand when a given spelling regularly indicates a short vowel, since in other occasions they read *hope* as *hop.* Knowing that *hop* is /hap/ is not sufficient; they must also know that *hope* cannot be /hap. By introducing CVCe words earlier, in conjunction with CVC, one would allow the child to learn not only that *bit* is /bit/, and *bite* is /bayt/, but also that *bit* is not /bayt/ and that *bite* is not /bit/; that *hope* is not /hap/. It is this contrastive relation which would solidify the child's understanding of the CVC structure.

The same argument applies to vowel combinations. The more stable vowel digraphs, like OA and AI, may be introduced early to solidify the contrast between *cot* and *coat, rod* and *road, pan* and *pain, mad* and *maid*.

These are particular strategies. The general approach that seems necessary is to increase learners' awareness of the *structure* of words very soon after they have achieved accurate letter recognition. This can be done by many means, consistent with any explicit or implicit approach to phonics that controls the reading vocabulary. We are developing and testing methods that will increase the accuracy of students' early perception of the number of graphemes in the onset, a nucleus and coda, so that they are ready to apply decoding strategies to structures that are recognized as CVC, CCVC, CVVC, and so on.

This research into methods accompanies the gathering a larger body of data to confirm or revise the findings presented here. The suggestions put forward here are designed to contribute to the thinking of the many educators

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[16] This situation can be generalized to the phonics programs as a whole. In 1963, Clymer examined the teachers' manuals of four widely used basal programs, and extracted 121 phonics generalizations; of these, he found that 45 were clearly stated in all four programs (1963; cited in Adams 1990). It is generally assumed that no reading program can actually teach all of these relations, but that some initial exposure to the general principles will help children to continue to abstract the patterns themselves as they continue to read. The initial configuration of phonics teaching is therefore of great importance. From our examination of reading errors, some suggestions emerge which might be helpful in reforming this initial configuration.

who are engaged in the long and difficult process of improving the teaching of reading.

References

Adams, Marilyn Jager 1990. *Beginning to Read: Thinking and Learning about Print*Cambridge, MA: MIT Press.

Baugh, John. 1983. *Black Street Speech: its history, structure and survival.* Austin: University of Texas Press.

Calfee, Robert C. and Richard L. Venezky 1968. *Component skills in beginning reading.* Technical Report No. 60. Madison, WI: Wisconsin Research and Development Center for Cognitive Learning, U. of Wisconsin.

Clymer, T.. 1963. The utility of phonic generalizations in the primary grades. *Reading Teacher*16:252-258.

Fasold, Ralph.. 1972. *Tense Marking in Black English.* Arlington, VA.: Center for Applied Linguistics.

Goodman, Kenneth S. 1969. Dialect barriers to reading comprehension. In J. Baratz & R. W. Shuy (eds), *Language Differences: Do they interfere?*Newark: DE, International Reading Association. Pp. 14-28.

Labov, William 1995. Can reading failure be reversed: a linguistic approach to the question. In V. Gadsden and D. Wagner (eds.), *Literacy Among African-American Youth: Issues in Learning, Teaching and Schooling.*Cresskill, NJ: Hampton Press. Pp. 39-68.

Labov, William, P. Cohen, C. Robins and J. Lewis.. 1968. A study of the non-standard English of Negro and Puerto Rican Speakers in New York City. Cooperative Research Report 3288. Vols I and II. Philadelphia: U.S. Regional Survey (Linguistics Laboratory, U. of Pa.)

Labov, William. 1972. *Language in the Inner City.* Philadelphia: Univ. of Penn.

Labov, William. 1983. Recognizing Black English in the classroom. In J. Chambers (ed.), *Black English: Educational Equity and the*Law. Ann Arbor: Karoma Press. Pp. 29-55.

NAEP 1994. National Assessment of Educational Progress: Achievement of U.S. Studenets in Science 1969-1992, Math 1973-1992, Reading 1971-1992, Writing 1984-1992. Washington: Department of Education.

Torrey, Jane. 1983. Black children's knowledge of standard English. *American Educational Research Journal*20:627-643.

Venezky, Richard L. 1972. Language and Cognition in Reading. Technical Report No. 188. Madison, WI: Wisconsin Research and Development Center for Cognitive Learning, U. of Wisconsin.

Wolfram, Walt. 1969. *A Sociolinguistic Description of Detroit Negro Speech.*Arlington, VA: Center for Applied Linguistics.

York, Barbara 1995. *Phonics*: *Book A*. Austin, TX: Steck-Vaughn.