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A Summary of the Major Findings from "Reading with Television: An Evaluation of the Electric Company"

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BACKGROUND

The Electric Company represents the first large-scale experiment in the use of television in teaching reading skills to young children. As such, there was a need to evaluate the program to determine whether the 26-week series was effective in meeting the goals set for it by Children's Television Workshop (CTW) and its educational advisors.

To meet the need, CTW circulated a request for proposals for the evaluation of *The Electric Company*, its content, and its approach. The contract was awarded to Educational Testing Service (ETS) — a non-profit educational measurement and research organization in Princeton, New Jersey. ETS has conducted evaluations of the first two years of the CTW-produced *Sesame Street*.

Among the questions ETS explored were:

- What are the program's effects on first through fourth grade classes who view *The Electric Company* in school?
- What are the effects of viewing *The Electric Company* in school on its main target audience — that segment of second, third, and fourth graders who are experiencing reading difficulties?
- What are the program's effects on similar groups of children who view at home rather than in school?
- Does frequency of viewing affect the program's impact on at-home viewers?
- What are the effects of the program in each of the 19 main curriculum areas for the show's first season?
- What are the program's effects on viewers of Spanish background, on blacks and on whites, and on boys and on girls?
- Is the program more effective when

seen in color rather than in black and white?

- Does the program affect the attitudes of children toward reading or school?
- Does the program affect the attitudes of teachers or parents toward the children and their reading performance? What are the attitudes of teachers toward the program?

ETS has published its findings in a report entitled **READING WITH TELEVISION: AN EVALUATION OF THE ELECTRIC COMPANY**.^{*} The following is a summary of some of the highlights and major conclusions of the full report.

* Copies of the full text of the final two-volume report are available from the Educational Resources Information Center (ERIC), Document Reproduction Service. TM 002433 and 34.

MAJOR POSITIVE FINDINGS

Television can be an effective classroom tool in helping first through fourth graders learn to read.

The ETS study clearly indicates that as a result of watching *The Electric Company* in school during the 1971-72 inaugural broadcast year, viewing classes made significantly greater gains than non-viewing classes in the reading skills the program was designed to teach. The program had a clear and significant impact on its primary target audience — second grade children who were in the bottom half of their class as indicated by standardized reading test scores — indicating the program was an effective instructional supplement for children who were beginning to experience reading difficulty.

The program, according to the ETS findings, also was successful on first-grade classes that viewed in school. The first graders were not among the primary tar-

get audience for whom the program originally was designed.

- The program had a significant impact on third and fourth grade classes that viewed in school, although the effect was somewhat less than in the lower grades.

- The program was successful in producing gains among first and second grade classes across almost all of the 19 major curriculum areas built into the program and tested in the ETS study. Some positive effects on a standardized reading test were also found.

- The program had a similar effect on all groups who viewed in school — Spanish background, blacks, whites, boys, and girls.

- The program won a generally favorable reaction from teachers who found it useful in teaching and reviewing certain reading skills.

THE PROGRAM

The Electric Company is built around a specific set of curriculum goals developed by CTW's educational advisors and its research and production personnel. The goals are premised on the need to give children some tools required for "decoding," the process of extracting meaning from written messages.

Specific goals for the first season included 19 curriculum areas grouped under such categories as consonants, vowels, and consonant "blends" (for example, "bl," "dr," "st"); letter groups or "chunks" (like "ai," "ch," "ar"); scanning for structure (for example, recognizing that a final "e" changes the sound of a word); and reading for meaning.

The 130 half-hour programs were telecast daily from the end of October to the end of April. The curriculum provides a "cafeteria" of instructional approaches to teaching basic reading skills. This is made possible through a segmented and varied format of short, varied components, including live performances, some film, and cartoon animation.

The Electric Company in its first season was aimed at second, third and fourth graders, with a main target audience of second graders who score in the lower half of their grade on standard reading achievement tests, and on third and fourth grade pupils scoring in the lowest

quarter of their grades on the standardized tests.

THE SAMPLES

The evaluation of the effects of viewing *The Electric Company* in school involved 100 public school classrooms in each of two sites — Fresno, California, and Youngstown, Ohio. Half of the classrooms studied in each site were randomly assigned as viewing classes and the other half as non-viewing.

The sites were selected on two criteria. The first was control of viewing conditions. In both locations, children from designated non-viewing classes were not able to view the program. In Fresno, the program was telecast to viewing classes only over the county school system's closed circuit network. In Youngstown, there was no educational television station and the program was telecast to viewing classes only over a commercial outlet. In neither site was the show telecast after school hours.

The second criterion was demographic variety. Fresno County, a largely rural area, offered the opportunity to test the program's impact on rural children and, at the same time, on children of Spanish background (comprising about 50 percent of the Fresno sample). Youngstown provided an opportunity to examine effects on urban youngsters (50 percent of the sample was black).

An attempt was made to evaluate the effects of viewing *The Electric Company* at home in Richmond, Va., and Washington, D.C. The 200 predominantly black classes sampled were designated as either encouraged or not encouraged to view the program at home during after-school hours. These two sites were selected because it was thought that control groups could be maintained in these UHF (ultra high frequency) areas.

In all, the total sample included 8,363 first through fourth grade children in some 400 classes. It should be noted that the children viewed or were encouraged to view in class units, so that most of the results of the tests were based on class performance and not on the performance of individual pupils.

THE TESTS

The ETS study of *The Electric Company* involved a battery of tests administered to classes both prior to and following the broadcast season. The key element was a 123-question test, "The Electric Battery," designed to assess children's performance on the program's curriculum objectives rather than their general reading performance. "The Electric Battery" included 19 subtests under the 4 major curriculum goal areas: blending letter sounds, chunking groups of letters, scanning for structure and reading for meaning. The questions in "The Electric Battery" sampled skills associated with each of the goal areas.

First grade children, having little previous formal reading instruction behind them, were given a shorter, 24-question version of the battery at pretest.

The battery also included assessments of children's attitudes toward reading and toward school and their preferences in subject matter. A random 20 percent of all children also received a 42-question, individually administered test which assessed their abilities to read aloud certain sounds, words, and word groups.

In addition, questionnaires were employed with both teachers and parents to evaluate the program's impact on such areas as parent, teacher, and pupil attitudes. All viewing and encouraged classes were observed during regular reading instruction in an effort to relate classroom reading instruction and reading performance.

Finally, a section of the standardized Metropolitan Achievement Test was administered to each grade level before the broadcast season to identify target children and after the season to measure gains in general reading ability. In Richmond and Washington, measures of amount of viewing of *The Electric Company* were also part of the evaluation.

THE RESULTS

The evaluation of *The Electric Company* was essentially a matter of determining whether classes that viewed made greater gains in certain reading skills than classes that did not view. *The Electric Company* audience is made up of school-aged children, all of whom can be assumed to be gaining from their school experi-

ence in the same areas that make up the program's objectives. The evaluation is thus a determination of whether classes that watched made gains over and above those achieved through regular classroom instruction.

The In-School Viewing Study

The ETS study, as noted earlier, clearly indicated that *The Electric Company* was successful in achieving its major goals, particularly with target readers in second grade and with first-grade classes that viewed in school. The series benefited children at different levels of reading achievement and in first and second grades this benefit included improvement in almost all of the 19 main curriculum areas. The series also benefited third and fourth grade classes, but to a lesser extent than in the lower grades.

On the 123-question battery, the advantage from viewing was found to be significant in every grade. First grade viewing classes had an estimated 5.5 point advantage at posttest over non-viewing classes in Fresno; in Youngstown, the estimated advantage from viewing was 10.2 points. In second grade viewing classes, the estimated advantage was 5.8 points in Fresno and 2.2 points in Youngstown. In third grade, the estimated gain was 2.4 point in both sites and in fourth grade it was just over 1 point.

The smaller gains in the higher grades may have been the result of a "ceiling effect" — that is, many of the children at pretest already had mastered many of the skills assessed in the battery. Therefore, these children had little to gain on this test battery: third and fourth grade classes at pretest averaged scores of 94 and 106, respectively, on the 123 questions. It may be that the test were too limited in difficulty and that a more challenging test instrument would have produced evidence of greater gains. Another possibility is that some poorer readers in the third and fourth grades, with a history of reading difficulty, already had developed negative attitudes toward reading and toward school and thus had difficulty benefiting from the program.

The study indicated that viewing classes in first and second grades made significant gains across almost the full spectrum of the program's curriculum goals. Examination of the scores on items designed to test achievement in the pro-

gram's sub-goals indicates that the overall scores were the results of gains in almost all of the goal areas.

The two most striking examples were among second grade target viewers in Fresno, who scored significantly more than non-viewers in 17 of the 19 subtest areas, and among first grade viewers in Youngstown, who scored significantly more than their non-viewing counterparts in 18 of the areas.

Looked at another way, within the target second grade test group in Fresno, the viewers gained an additional 2.5 percent to 19.0 percent more than non-viewers. The average percentage advantage among viewers was 8.7 percent.

In addition, a significant gain was made on a standardized reading test by viewing classes in Youngstown first grade and in Fresno fourth grade.

Also important was a finding in the ETS study that gains due to viewing occurred whether time for viewing was normally taken from or added to regular reading instruction. Gains were about equal in classes where *The Electric Company* was viewed during time normally devoted to reading instruction and in classes viewing during the time normally devoted to instruction in other subject matters.

The effects of viewing the program in school appeared to be similar for all groups of children, regardless of ethnic background or sex. Similar gains were registered for girls and boys, blacks and whites, and children from Spanish-speaking and English-speaking backgrounds.

And a number of additional findings were noted.

Teachers in general and first-grade teachers in particular reported favorable attitudes toward the program.

At the first-grade level, parents of viewing children regarded their children as better readers than did parents of non-viewing children. (Similar reactions were not found at the higher grade levels and no other parental attitude changes were noted.) The attitudes of children toward school and reading did not seem to be affected by the program.

No difference in achievement was found between children who viewed the program in school in color and those who viewed it in black and white. The study

did not measure motivational aspects of viewing in color vs. black and white.

The At-Home Viewing Study

The evaluation of the effects of viewing *The Electric Company* at home did not provide conclusive results. In both Washington and Richmond, children in classes that were not encouraged to view at home viewed on their own almost as much as children in encouraged classes. Since amount of viewing between the two groups was not very different, it is not surprising that gains were also quite similar.

Attempts to see if the amount that children viewed at home had any effect upon scores turned up no systematic differences among children of differing levels of viewing. One possible conclusion is that amount of viewing the show at home did not influence scores. An alternative possibility is that the measures used were not precise enough to accurately assess amount of viewing.

FOLLOW-UP STUDIES

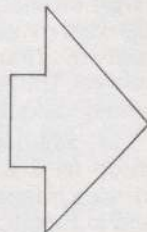
To evaluate an experimental educational effort adequately is a long-term project. The first year findings indicate that the in-school viewing of the program was successful in meeting its immediate goals. The final "report card" will not be in until follow-up studies can be made of the target audience to determine whether the program has a lasting impact on their reading ability.

As an example, it was not possible in a first year study to determine whether the program has the desired effect of preventing reading failure among first and second-grade pupils. Nor was it possible to explore such questions as whether the failure of older children can be reversed.

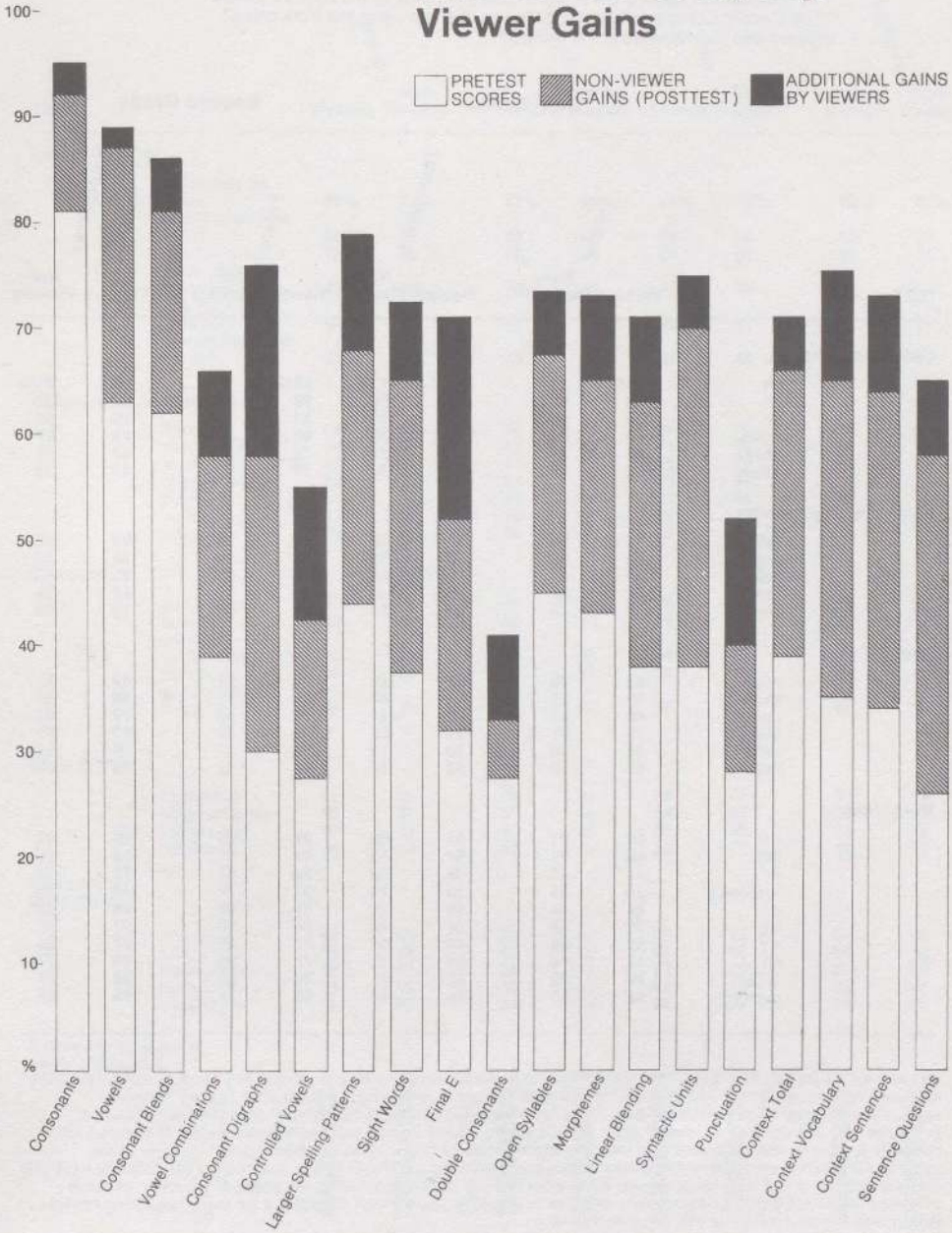
Accordingly, CTW has commissioned ETS to undertake a second-year study of *The Electric Company*, following second and third grade classes in Fresno and Youngstown that last year were first and second grade classes. Included will be children who were in non-viewing classes last year but who are in viewing classes this year — and vice versa — as well as children who were not included in the first-year study. The new study will make it possible to evaluate the impact of two years of viewing and one year of viewing and to further look at the program's

influence on viewers attitudes toward school and reading.

According to findings by the Educational Testing Service, second grade target viewers in Fresno, California, scored significantly higher than non-viewers in 17 of the 19 subtest areas and slightly higher than non-viewers in the other 2 areas in the evaluation of the television series. Chart illustrates additional percentage gain made by the target viewers in the subtests, which correspond to the 19 curriculum goals of the first season. Across the range of subtests, viewers gained from 2.5 percent to 19 percent more than non-viewers on the questions passed after pretest, and the average advantage among viewers was 8.7 percent. The chart shows percentage of each subtest answered correctly at pretest, the percentage of gains made by non-viewers during the study, and the additional gains made by viewers. "Target" students are those who at pretest scored in the lower half of a nationally normed reading test. The Fresno viewers were among 8,363 grade school pupils who were tested by ETS before the series began and again at the end of the 130 daily, half-hour programs that made up the first broadcast season.



The Electric Company: Viewer Gains



Excerpts From 'The Electric Battery'

The Educational Testing Service's evaluation study of the new TV series "The Electric Company," produced these posttest averages from sets of viewers and non-viewers of the program.

TEST	First Grade				Second Grade			
	Fleetsno		Youngstown		Fleetsno		Youngstown	
	Viewers	Non-Viewers	Viewers	Non-Viewers	Viewers	Non-Viewers	Viewers	Non-Viewers
<i>Consonant Digraphs</i>								
ph	48%	28%	60%	17%	83%	46%	95%	61%
ch	62	63	68	55	92	82	92	87
th	69	63	66	52	81	67	83	82
wash	60	53	69	58	90	82	92	87
shake	48	34	38	24	72	48	67	57
chew	46	37	57	38	77	59	85	76
<i>Larger Spelling Patterns</i>								
tall	64	60	77	59	86	78	89	83
high	60	58	58	39	85	75	85	82
ball	75	81	89	83	91	83	95	90
talk	57	51	69	43	86	70	88	83
wing	49	40	51	39	74	60	75	68
<i>Final E</i>								
mate	43	38	47	29	75	61	82	75
note	55	51	61	43	80	71	86	81
cone	48	37	50	37	74	56	72	63
kite	75	61	71	56	91	72	90	85
robe	34	20	33	12	50	27	50	31
tire	55	50	53	42	80	62	76	68
<i>Morphemes</i>								
est	92	91	91	89	99	96	99	99
ing	68	75	84	73	94	91	98	98
er	41	47	55	36	78	62	78	74
's (poss.)	29	38	33	24	54	39	48	35
ed	45	44	59	38	81	90	84	82
ing	70	78	85	78	94	90	97	97
n't	53	59	70	54	83	66	87	84
n't	44	44	60	37	74	58	83	77
's (is)	29	29	27	25	30	35	29	24
s (plural)	56	52	70	62	82	74	99	88

YOUNG VIEWERS OF 'THE ELECTRIC COMPANY' registered more mastery of certain key reading skills than their non-viewing counterparts in nearly all of the 123-item battery of tests which Educational Testing Service researchers dubbed "The Electric Battery." The tests were administered before and after the first season of programs to 8,363 children in several parts of the country. These figures represent percentages of children who correctly answered test questions and indicate which group of children, all of whom started the year at the same general achievement level, were farther along in mastering each skill by the end of the year. Both viewers and non-viewers continued to receive regular classroom reading instruction during the season. The over all survey indicates that The Electric Company was effective in teaching areas which are difficult for many beginning readers. Group with higher average is indicated in bold face.

First Grade

Second Grade

TEST	Fresno		Yountstown		Fresno		Yountstown	
	Viewers	Non-Viewers	Viewers	Non-Viewers	Viewers	Non-Viewers	Viewers	Non-Viewers
<i>Linear Blending</i>								
He swings the bat.	63%	57%	67%	61%	86%	78%	90%	84%
She is wearing a skirt.	65	51	68	46	81	68	85	77
The car is white.	72	72	78	68	91	86	96	95
He is cleaning the horse.	41	36	56	43	67	50	72	67
The book is on the seat.	60	63	81	70	90	87	95	94
The waiter drops a dish.	35	24	36	23	60	48	67	56
<i>Choosing by Parts of Speech</i>								
noun	68	65	79	73	85	78	91	86
preposition	44	37	52	33	74	54	87	73
verb	49	51	77	59	85	79	93	88
preposition	43	38	64	42	79	66	83	77
adjective	51	52	68	54	78	74	84	76
verb phrase	67	69	76	59	95	87	97	92
adjective	58	63	76	63	87	77	91	87
<i>Punctuation</i>								
cap & period	37	42	45	27	76	56	68	64
quotes	49	36	66	43	66	53	75	53
period,								
exclamation	38	28	50	34	64	37	69	48
commas	26	22	35	25	35	29	45	32
cap, question mark	26	28	37	29	50	43	62	54
<i>Sight Words</i>								
basketball	53	64	70	54	86	78	94	93
hippopotamus	50	37	57	35	84	67	86	73
refrigerator	47	44	57	39	68	59	75	68
helicopter	58	60	67	49	82	77	85	79
<i>Sight Words in Sentences</i>								
tricycle	62	61	70	51	88	79	94	90
refrigerator	53	55	63	50	84	69	84	83
hippopotamus	56	53	58	42	82	69	87	77
helicopter	59	55	63	47	85	73	92	84
basketball	69	70	84	74	94	89	98	96
<i>Answering Questions About Sentences</i>								
bus	62	52	69	54	80	75	86	80
animal	42	39	59	46	79	67	86	78
large	31	27	43	28	62	56	77	66
two	49	52	59	36	81	68	87	80
a ball	50	45	58	43	76	67	80	75
his father	39	47	59	38	79	65	90	83
a fish	39	36	44	32	72	60	80	69
a glass	38	31	47	29	66	55	76	64

How Electric Company Viewers Fared: Pattern of Achievement

Chart, based on findings by Educational Testing Service, details areas where viewing classes scored significantly higher than non-viewing classes in Fresno, Calif. and Youngstown, Ohio. Included in the second grade study were "target" students who saw the show regularly and scored in the lower half according to national reading norms and "non-target" students reading at or above grade level. Third and fourth grade "target" students were those scoring in the lowest quarter, again using the national norms.

A definite pattern favoring viewers emerges in the 123-question test covering the 19 curriculum areas included in the experimental series' first season. Greatest gains were made by second graders who were rated as poor readers, and by first grade classes. All four grades showed some progress as a result of viewing the show. Where differences are not considered significant, the grid is left blank meaning the probability of differences happening by chance alone is more than 10 percent; ETS tested 8,262 grade schoolers before the series began and again at the end of the 130 daily half-hour programs that made up the first broadcast season.

TEST AND SUBTESTS	Number of Items	Grade One: (All Target) TOTAL		Grade Two:				Grade Three:				Grade Four:				
		Fresno	Youngstown	TARGET		NON-TARGET		TARGET		NON-TARGET		TARGET		NON-TARGET		
				Fresno	Youngstown	Fresno	Youngstown	Fresno	Youngstown	Fresno	Youngstown	Fresno	Youngstown	Fresno	Youngstown	
Matching Words	8		■	■						■						■
Blending Total	28	■	■	■							■	■	■	■		
Consonants	13	■	■	■							■	■	■	■		
Vowels	6	■	■				X							■	■	■
Consonant Blends	9		■	■					■							
Chunking Total	28	■	■	■				■	■		■	■	■	■	■	■
Vowel Combinations	9	■	■	■							■	■	■	■	■	■
Consonant Digraphs	6	■	■	■				■	■					■	■	■
Controlled Vowels	4		■	■				■	■							
Larger Spelling Patterns	5	■	■	■						■				■	■	■
Sight Words	4		■	■								■				■
Scanning Total	14	■	■	■					■		■	■	■	■	■	■
Final E	6	■	■	■					■			■	■	■	■	■
Double Consonants	4		■	■							■			■	■	■
Open Syllables	4		■	■								■			■	■
Reading for Meaning Total	45	■	■	■			■	■		■	■	■	■	■	■	■
Morphemes	10	■	■	■				■	■		■	■	■			■
Linear Blending	6	■	■	■				■	■					X		
Syntactic Units	7	■	■	■				■	■					X		
Punctuation	5	■	■	■									■	■	■	■
Context Total	9	■	■	■												
Context Vocabulary	4	■	■	■				■	■							X
Context Sentences	4	■	■	■						■	■	■				■
Sentence Questions	8	■	■	■				■	■							■
Grand Total	123	■	■	■			■	■	■	■	■	■	■	■	■	■

In all boxes where squares appear, there is a 90 out of 100 or better chance that the differences favoring the show's viewers occurred as a result of their watching The Electric Company rather than by chance. Blank boxes on the grid indicate areas where differences are not considered significant. (The several X marks on the grid indicate where differences favored non-viewers.)

Impact of The Electric Company On Beginning Readers

How viewers and non-viewers of the experimental TV series fared is indicated by these results from individually administered tests conducted by Educational Testing Service at the close of the program's first season.

	First Grade				Second Grade			
	Fresno		Youngstown		Fresno		Youngstown	
	Viewers	Non-Viewers	Viewers	Non-Viewers	Viewers	Non-Viewers	Viewers	Non-Viewers
Sounds in Words								
l	69%	69%	77%	65%	98%	95%	99%	94%
o	65	50	57	31	90	80	92	85
t	70	59	76	63	94	82	96	90
ay	53	57	57	37	94	81	95	85
r	69	69	84	56	98	82	100	93
a	59	62	61	43	93	74	95	81
ch	51	39	70	37	83	59	90	84
pl	80	79	95	83	100	100	98	100
y	63	65	67	49	100	93	98	93
st	65	54	37	21	78	68	82	69
lp	69	76	88	91	96	88	98	98
oi	11	12	11	4	50	46	53	37
Sounds in Nonsense Words								
l	70	65	81	52	95	86	94	92
i	62	59	66	39	86	64	77	74
oy	53	44	70	45	73	75	83	71
ing	53	41	50	18	74	71	75	57
sk	69	53	40	17	85	71	71	58
e	27	27	22	4	41	33	42	21
oi	16	14	11	4	55	49	51	39
th	62	51	59	39	80	64	80	69
ern	33	28	30	39	53	51	58	39
a	32	16	24	14	62	36	41	24
i	33	24	29	2	64	50	59	46
ight	29	16	32	13	62	46	76	59
sh	62	55	47	31	95	72	81	66
ar	43	36	27	13	64	44	63	44
nk	50	38	33	17	70	57	66	58
a	36	16	43	36	52	38	60	59
Reading Words in Sentences								
He	84	83	89	71	98	94	98	97
went	54	61	84	56	96	92	96	93
home	82	69	90	64	98	96	100	97
correct order	62	57	93	91	86	80	100	98
The	91	93	95	81	100	100	100	100
little	80	93	95	83	100	100	99	97
toy	65	57	84	67	91	94	99	94
is	91	88	95	84	99	100	100	98
mine	35	21	40	15	69	57	78	60
correct order	64	65	97	90	83	77	100	99
Scrambled Sentences								
walks town the she to	27	37	40	19	71	51	80	62
big I am	70	64	91	84	96	88	98	99
boy tall is the	52	45	67	27	86	64	93	78
sees red he house a	27	20	36	19	70	48	72	58

INDIVIDUALLY TESTED VIEWERS OF "The Electric Company" consistently outpaced their non-viewing classmates in tests of skill areas treated by the experimental series which is designed to help teach beginning readers. All students in the test groups in Fresno, Calif. and Youngstown, Ohio, continued with their regular classroom reading instruction, but some also watched the TV series while others did not. These tests, administered to a random 20 percent of grade schoolers in the study, provide an assessment of the child's ability to apply what he or she has learned because they require an overt reading response which virtually rules out guessing. The figures report the average percentage of children in each group who correctly answered test items at the end of the first broadcast season and are not test scores. In other words, these figures gauge which groups of children, all of whom started the year at the same general reading level, are farther along in mastering each skill. Group with higher percentage is indicated in bold face.