> everyone possesses this minimum; not everyone is sufficiently aware of the units in the phonological representation or can acquire this awareness by being taught. In the special case of alphabetic writing, it would seem that the price of greater efficiency in learning; is a required degree of awareness higher than for logographic and syllabary systems..." (p. 144)

An understanding that the speech stream can be broken into phonemes which correspond more or less to the letter units of the written code is required. The Electric Company exhibits this principle with animated print, which mirrors the speech stream, displaying in left-to-right progression, letter by letter, a written representation of language which is simultaneously realized in speech. Since this routine is carried out in many different contexts, the principle must eventually shine through. The point of this example is that television may well strengthen crucial conceptual foundations in the course of teaching specifics, because of the inherent properties of the medium through which these specifics are taught. Television can deal easily with concepts of directionality, the relation of print to speech, the relations among punctuation, intonation and meaning, and so on. These are, again, things teachers tend to assume as part of the understanding children wither bring to school, or infer through exposure to the specifics of the written code.

On the other hand, The Electric Company may be communicating some dysfunctional messages about literacy. It suggests, for example, that reading is a matter of sounds, words and occasional phrases, not of paragraphs, pages and whole books. It suggests that print is something tacked onto unfolding events; not the primary means for conveying them. These, too, are inevitable outgrowths of the media mix. It is not possible to present long passages of print on television comfortably. Nor is it possible to abandon the dramatic aspects of the presentation and still hold a television-minded audience.

Black and White and Read All Over: Acquiring Literacy in Two Media

Barbara R. Fowles
AERA
San Francisco
April , 1976

My topic is the process of learning to read from television, which is to be distinguished from learning to 'read' television, or in the current jargon, becoming "visually literate." It is largely a case study of "The Electric Company," a half-hour program which uses short humorous animated and live sequences to present basic reading instruction. The program reaches an audience of about eleven million children, in school and at home, preschool through puberty. It therefore constitutes an educational influence unprecedented, except perhaps for Sesame Street, in our history. I think I can quite safely limit my sample to "The Electric Company" while at the same time claiming to discuss the influence of television on the process of becoming literate.

There are many people, of course, who think there is nothing in this topic worth discussing. To them The Electric Company is an undesirable hybrid, which can result only in "low-grade literacy." (Parker, 1974) This point is worth considering. A communication medium, while it is not the message, endows any message with peculiar properties. In some cases the nature of a message may be significantly changed when it is translated from one medium into another. Critics suggest that children are doomed to something bearing little relation to true literacy when they learn to read from television rather than from traditional instructional media, because television violates, or obviates, the organizational principles of print.

What is a child likely to learn from regular viewing of a program like The Electric Company? What are the implications of television's invasion of the province of print?

A first look at The Electric Company itself offers little cause for alarm. Consonants and vowels, punctuation, the same old basics of reading are there, jazzed up a bit with color, rock music, movement and humor. Little material is offered in units larger than a phrase. The pace is perhaps a little unnerving; but for the most part The Electric Company probably appears to be more of the same: a traditional phonics-based approach to reading, revamped to lure the television generation.

However, the significance of translating a message into a new medium is in the way the message is altered in the process. The ultimate importance of The Electric Company is not likely to be in what is taught, but in how the teaching is accomplished: Television conveys messages about print to children that they could not otherwise receive. These are not messages about letter sounds and sight words, but principles relating print to speech and meaning, and notions of the role of print communication. Television can deal directly in abstractions, which are often impossible to explain to young children, and which children are unlikely to infer for themselves.

Talk of abstract principles may not seem to be relevant to a discussion of beginning reading, which we tend to think of as a skill. But for a child, learning to read is probably the most demanding intellectual task of her school career. The cognitive prerequisites for learning to read are considerable (Voyat, 1970), and many children reach school without acquiring them. Since teachers tend to plunge right into the nuts and bolts of reading without bothering to provide these cognitive foundations, many children suffer as a result, blundering through initial reading instruction

in what Downing (1972) has identified as a state of "cognitive confusion". Television, in the course of teaching skills, effortlessly displays some of these conceptual foundations. This is accomplished most effectively through the powers of animation.

In an early (1945) paper, Charles Palmer, who was an animator for the Disney Studios, pointed out that animation can come remarkably close to functioning as "the mind's eye." To bring this closer to our present frame of reference: animation can create concrete visual analogies for the abstract principles governing the relationship among print, meaning and speech. These analogies, though concrete, are nevertheless not realistic. (The components of an animated drawing need not bear much resemblance to familiar objects or beings). Thus general principles, laws, can be exhibited without being bound to specific examples. Children tend to deal in particulars, but this may be because they are caught up in distracting details, (Piaget, 1967) rather than because of inability to operate on an abstract level when the distractions of the particular are removed. There is evidence from other contexts to suggest that this is so (e.g. Bruner, Olver, Greenfield, 1966; Samuels, 1970)

Animation can also create visible models for information-processing strategies. As Bruner (1974) points out, a filmed presentation can do what the skilled performance cannot do, it can render salient the key features of that skilled performance (in reality subsumed by a smooth flow of behavior) render them larger in life, brightly colored, "frozen" for study, etc. If it can do this for motor skills, mental skills should not be much different. As an example, consider one aspect of the development of literacy:

> "While reading does not make as many demands on linguistic awareness as, say, solving British crossword puzzles, there must be a minimum level required, and perhaps not

everyone possesses this minimum; not everyone is sufficiently aware of the units in the phonological representation or can acquire this awareness by being taught. In the special case of alphabetic writing, it would seem that the price of greater efficiency in learning is a required degree of awareness higher than for logographic and syllabary systems..." (p. 144)

An understanding that the speech stream can be broken into phonemes which correspond more or less to the letter units of the written code is required. The Electric Company exhibits this principle with animated print, which mirrors the speech stream, displaying in left-to-right progression, letter by letter, a written representation of language which is simultaneously realized in speech. Since this routine is carried out in many different contexts, the principle must eventually shine through. The point of this example is that television may well strengthen crucial conceptual foundations in the course of teaching specifics, because of the inherent properties of the medium through which these specifics are taught. Television can deal easily with concepts of directionality, the relation of print to speech, the relations among punctuation, intonation and meaning, and so on. These are, again, things teachers tend to assume as part of the understanding children wither bring to school, or infer through exposure to the specifics of the written code.

On the other hand, The Electric Company may be communicating some dysfunctional messages about literacy. It suggests, for example, that reading is a matter of sounds, words and occasional phrases, not of paragraphs, pages and whole books. It suggests that print is something tacked onto unfolding events; not the primary means for conveying them. These, too, are inevitable outgrowths of the media mix. It is not possible to present long passages of print on television comfortably. Nor is it possible to abandon the dramatic aspects of the presentation and still hold a television-minded audience.

By this time, the following point has surely occurred to you: Whatever effects The Electric Company may have must be attenuated by classroom instruction, and other everyday experiences with reading. If The Electric Company doesn't show children that reading is a matter of pages, chapters and books a matter of comprehension as well as decoding, the teacher certainly does. And conversely, if the failing reader gets a glimpse of the whole conceptual forest from The Electric Company, classroom drill will bring her reliably back to the trees.

Research on The Electric Company (e.g. Ball and Bogatz, 1972; Herriot and Leibert, 1972) has generally indicated a small but positive and consistent effect on school children, and a positive attitude toward the program on the part of teachers. This sounds innocuous enough. Why should we be much concerned about the program's impact on literacy?

The answer is because millions of preschool children are watching The Electric Company, either with older siblings or as "slopover" from Sesame Street, which is typically scheduled in an adjacent time slot. Many parents report that their preschool children prefer The Electric Company to Sesame Street because it is generally faster and more colorful. These children are of interest because for many of them The Electric Company provides their only instruction in reading for a period of one, two, even three years. The effects of The Electric Company, good and bad, are therefore temporarily unmoderated in this population. While these tots will eventually go to school and meet with alternative views, their earliest conceptions of print and reading must be profoundly effected by what they see. Because they are cognitively and experientially distinct from their school-age siblings, they may be learning completely different things from the very same program. We do not know to what degree early often intensive, exposure to television reading instruction may alter the course and ultimate character of literacy. If we want to get some idea, however, we should begin by con-

sidering the intellectual attributes of these very young viewers, and the implications of these attributes in terms of response to The Electric Company.

The essential difference between the preschooler and the school child whom The Electric Company is intended is a difference between preoperational, or intuitive, and concrete operational intelligence. For the child still in the intuitive stage, perception has primacy over reasoning. What se sees is what is real. Fantasy has the status of reality: so an animated cartoon, a newsreel, a dream, all are equally valid. The boundaries between objective and subjective experience are so fluid that the child is prone to see television sequences a objectifications of her own though processes.

Especially relevant is the nature of the symbol system employed by the child during the preoperational period. This symbol system, manifested in drawing, speech, and even in the writing systems which are occasionally devised during this period (Chomsky, 1971) tends to be idiosyncratic, and show little regard for the conventions of interpersonal communications systems. (Fowles and Voyat, 1974)

The principles of an alphabetic code are therefore clearly alien to this preoperational intelligence. As noted earlier, reading is a highly abstract activity. The symbols of the alphabetic code are not iconic, but arbitrary conventions, both in their phonological and their semiological structure. The preoperational child, who may believe that the name of a thing is one of its inherent attributes (like its size and shape) rather than a tag we agree to give it, is confronted with the relationship between the name, its written symbol, and the other critical attributes of the thing. In reading, the left-to-right arrangement of symbols is critical in a way that experience with real objects does not presage. Nor is the decoding process as simple as a left-to-right summation

of the symbols. The orientation of the symbols in space matters, but other attributes, such as their size, color and certain of their typological embellishments do not. Learning which features of the written symbols count, goes against much of what the child has only just mastered about important variables in the physical word. A chair, turned upside down is still a chair; a "p" turned upside down becomes a "b".

Thus, in the preschooler watching a television program about reading we have a child who is unprepared to sort out the essential attributes of the print code from the incidental (or not so incidental) attributes of the television presentation. At the same time, this child is likely to be extremely skilled in the business of watching television. Typically she spends several hours a day hard at it. So she knows what to look at, and what to ignore; she is well adjusted to the pace, and familiar with the format conventions of many programs. The improbable events of animated cartoons are the stuff of every day experiences.

As a result, she is likely to figure out what is important in a given presentation on The Electric Company before she has any inkling why it is important. She may attend to print because it is the "star" of the show, even though it is at least initially meaningless.

What is the message that comes through? Consider the following animated sequences from The Electric Company as viewed through the eyes of a four-year-old:

FILM

1. Cat/dog study:

In this animated film, the word "cat" is chased up a tree by the word "dog." The word "cat" appears to meow, and the word "dog" appears to bark.

From this film, our naive four-year-old might notice that:

a) Different collections of squiggles (which can probably identify as various letters, thanks to Sesame Street)

mean different things.

b) Print is mobile and colorful, and its motion, shape and color provide cues to its meaning;

c) With more exposures, she may come to notice the details of the configuration, the individual letters and the order in which they occur. There is nothing in the segment, however, hinting at the projection rules linking the visual configurations of letters to the sounds "dog" and "cat". It is more likely to establish the association CAT="meow". Even more strongly, it suggests that the letters combine to form some sort of picture, or ideograph of what the represent.

2. A film of comedian Victor Borge sitting in an armchair with a large open storybook. He reads a sentence from the book, signaling each punctuation mark with silly but suggestive sound. The appropriate written punctuation marks appear on the screen, along with the print, as the sentence is read.

After several exposures to this routine, our four-year-old might begin to connect certain punctuation markes with intonation patterns and meaning. However, the salient function of this film is clearly to establish an associative link between punctuation marks and sound effects, and to indicate that one "reads" punctuation aloud in this fashion. The potential misconception here is too obvious to require much elaboration. Nor is this misconception likely to be a serious one, though it is a challenge to explain to a four-year-old why Borge's rendition is wrong, and what punctuation marks are for if they are not to be spoken.

3. A song focused on the adverbial morpheme ly accompanied by an animated film in which a humanoid cartoon character dramatizes lyrics such as the following:

You're wearing your squeaky shoes
and right there taking a snooze
Is a tiger
How do you walk on by?
Carefully!
Carefully!
Careful - L-Y.

In each verse a different adverb is illustrated. The adverb appears on the screen during the verse, with the -ly contrasting in color of the rest of the word, but faded in at one point to encourage processing of the word as a whole.

The ostensible purpose of this film is to establish the spelling-to-sound correspondence for the -ly unit, and to encourage processing of -ly as a single unit, an information "chunk". This is probably well beyond the grasp of a four-year-old, who is nevertheless likely to recognize L and Y and observe that they recur across several written contexts, in connection with scenes about how something is done. She may infer that -ly is the important property of all these words and that -ly occurs in many different words. The relation between -ly and the description of action may be established in an unarticulated form. As I noted earlier, abstract ideas of this ilk are not normally the province of four-year-olds, but the concret visible means of expression may well render them accessible in a way that is consonant with intuitive thinking.

Films of this kind encourage the clustering of words for their structural properties (paradigmatic groupings) rather than the grouping of words to form meaningful units (syntagmatic groupings). This is not only a cognitively advanced kind of grouping, corresponding to a relatively abstract mental representation of the structure of language,

but would tend to lead one to focus on language as a thing-in-itself rather than as a medium for communication. The isolation of particular words from the speech stream for visual scrutiny and within those words, the emphasis on a particular non-referential cluster, signals the over-riding importance of that cluster to the viewer, whether she can read it or not.

4. Another music-accompanied animation. A child is being pursued by a giant lollipop. The song is a vehicle for -ll- words, each of which appears on the screen as it is sung. The -ll- is printed in a contrasting color, and therefore emphasized visually.

This film's implicit message is similar to that of the -ly film: Common structural properties of words are most deserving of attention. Messages involving print are organized to illustrate and emphasize these properties, not to tell the story, which is essentially carried by the audio and video tracks. For information, print is largely redundant, except when it comes to information about itself.

5. This animation features a gentle superhero, "Letterman" who wields letters as his means of controlling events. He gets himself and others out of scrapes, concocted by a wicked character called the Spellbinder, by changing letters in words, and in so doing, changing one object into another.

The primary message of these films - there are several of them - is not anything to do with the particulars of the written code, since these are hardly emphasized. Instead a principle of word magic, by which changing the written word causes the object to which it refers to be changed is repeatedly demonstrated. In contrast to the previous films, this one deals with the function of print (though it is through crucial alterations in the phonic building blocks of

words that this function comes about). The function however, is not realistic, but magical. The viewer may or may not realize that we cannot actually change things by changing labels. However, the underlying message in either case is that non-magical functions of print are not very interesting.

So each film conveys many messages about the nature of the written code in the course of establishing the spelling-to-sound correspondences which are generally their raisons d'etre. Some of these messages are true principles of our alphabetic system and thus desirable. Some, such as word magic, are undesirable or at least irrelevant messages that grow almost inevitably out of the marriage of print to television. Preschool viewers tend to have little basis for sorting one from the other.

Of course, television has been with us for a long time, and there are alot of us around now who grew up watching it, and are still conventionally literate. But The Electric Company is not ordinary television. The latter, since it largely excluded print, left us as children with the impression that print had its own domain, its own organizational principles, which television would never reveal. The Electric Company, on the other hand, gives the impression that print can be subsumed by television. Reading may appear to have the status of an intellectual game, (as a rebus or crossword puzzle is to us) rather than the status of a vital medium of communication.

The child watching The Electric Company, like every television viewer, looks to sound and picture for meaning, feeling tone, and such. Print is, as a result, defused. What print on The Electric Company does convey, however is very good information about itself. Normally printed messages cannot call attention to

themselves, but on The Electric Company, as these animations have illustrated, important structural features of words are signalled by visual cues carried by the words themselves. And since these cues are also part of television's message code (e.g. "What is brightly colored is important; what moves is important; what blinks is important) children, veteran viewers that they are, are not likely to miss them. Print turns inward on itself in the context of television as it cannot do otherwise. The child's concept of print must reflect this.

This removed view of print is reinforced by the lessons The Electric Company conveys as well as by its way of conveying them. As we have noted, the emphasis is on structure rather than function. It is hard, after all, to see how it could be otherwise: Though the program's writers try gallantly, it is difficult to be convincing about the functional value of print when all the communicative magic of television is at one's disposal. The result as the animations show, is that magical powers come to reside in the print. Print can only be convincingly functional in a magical context when it functions magically. On its own, print is not capable of such magic. So in this case the child's 'real world' experience may reinforce misconceptions. Print indeed has no magic of its kind apart from television. In the words of one of one of The Electric Company's cartoon characters, "It just sits there and does nothin'." (It's hardly ever in color, either.) Print appears to need television. (In the "Letterman" animation, television at least needs print, too, but hardly in a way that affords a convincingly model for the child.)

We really can't know now what the ultimate outcome of intensive preschool exposure to The Electric Company will be. Perhaps we are fostering a generation of language technicians, attuned to the

structural properties of language and oblivious to its narrative powers. Perhaps functional literacy will lose its meaning as a term anyway, in this world of videotape and computer tape. Or perhaps the effects of The Electric Company are washed out in the school setting. It is difficult to even know what questions to ask: Are veteran viewers more likely to see language as a "thing" than other children? Are they more likely to look to irrelevant cues of configuration, color and accompanying illustrations? We have no answers to these questions. I can only conclude with a paradox that must be shared by much of the instructional television, but particularly by those programs such as Sesame Street and The Electric Company, which attempt to "...use media to express old concepts.", (Parker, op. cit.) of traditional representational systems like numbers, letters, and time, and of ways of thinking like deduction, convergence and hypothesis-testing: The more proficient and appealing these programs are, the more they inevitably convince children that television is what's real and important. What they teach well, they simultaneously demean in importance. Parents often play along unwittingly: When a very young child learns to count from Sesame Street, it is not the child who is deemed amaging, nor the useful intellectual tool she has managed to grasp; it is Sesame Street that is amazing. We encourage not more counting, but more viewing. Our alternatives, however, are ludicrous: Take the programs off the air? Make them less good? We can only wait and see what form literacy takes when its origins are thus reshaped. I have only tried to suggest some dimensions for us to think about.

References

Ball, St. Bogatz, G.A. Reading with television: An evaluation of "The Electric Company". Princeton, N.J.: Educational Testing Service, 1972.

Birdwhistell, R. Movement with Speech. In Kinesics and Context. Philadelphia: U. of Pennsylvania Press. 1970 110-127.

Bruner, J. R. Olver and P. Greenfeld, Studies in Cognitive Growth N.Y.: John Wiley and Sons, 1966.

Cazden, C. Play and metalinguistic awareness: one dimension of language experience. Urban Review 7 (1) 1974. 28-34.

Chomsky, C. Write first, read later. Childhood Education 47. 269-299.

Fowles, B. and Voyat, G. Piaget meets big bird: Is tv a passive teacher? Urban Review, 7 (1) 1974. 69-80.

Gibbon, S., Palmer, E., Fowles, B. "Sesame Street," "The Electric Company," and Reading in J. Carroll and J. Chall (Eds.) Toward a Literate Society. N.Y.: McGraw-Hill. 1975. 215-256.

Gibson, E. Principles of Perceptual Learning and Development N.Y.: Appleton-Century- Crofts. 1965

Goodman, J. Rules and repertoires, rituals and tricks of the trade: Social and informational aspects to cognitive and representational development. In S. Farnham- Diggory, (Ed.) Information Processing in Children. N.Y.: Academic Press. 1972.

Herriot, R. and Liebert, R. "The Electric Company": In-School utilization study. Talahasee: Center for the Study of Education, Institute for Social Research, Florida State University, in conjunction with Research Triangle Institute, 1972.

Literacy, plain or visual. Advertisement, Kodak. The New York Times Magazine. Mar. 7, 1976 p.11

Mattingly, I. Reading, the linguistic process, and linguistic awareness. In J. Kavanaugh and I. Mattingly (Eds.) Language by Ear and by Eye. Cambridge, Mass: M.I.T. Press. 1972.133-148.

Olson, D. and J. Bruner Learning through experience and learning through media. In D. Olson (Ed.) Media and Symbols. Chicago: NSSE.1974. 125-150.

Palmer, Charles. Cartoons in the classroom. Hollywood Quarterly 1945.

Parker, H. The beholder's share and the problem of literacy. In. D. Olson (Ed.) Media and Symbols Chicago: NSSE. 1974. 81-98.

Piaget, J. Six Psychological Studies N.Y.: Vintage.1968

References (cont'd)

Samuels, S.J. Effects of pictures on learning to read, comprehension and attitudes. Rev. of Educational Research, 40, 1970. 397-407.

Sproull, Natalie, Personal communication Feb. 24, 1976.

Voyat, G. Minimizing the problems of functional illiteracy. Teacher's College Record 72 (2), 1970. 171-186.