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ABSTRACT
        Punctuation serves as a system of visual markers that
contradict previously generated false grammatical expectations. Word
order conditions define the redundant or critical aspect of
punctuation cues to visual display. Parsing (grouping) sentences into
meaningful phrases and clauses aids language comprehension, and
children who have reading problems have often been shown to lack
parsing skills. There is also evidence to suggest that visually
marking subject, predicate, and phrase boundaries results in an
improvement in children's reading comprehension. If text segmentation
or end of line punctuation is related to an improvement in developing
children's reading comprehension, it might be worthwhile to redesign
some texts so that (1) modified terminal punctuation is used for
beginning low ability readers, (2) punctuation is used to determine
the boundaries between chunks of text, (3) printed intonation cues in
texts are eliminated, (4) chunked text due to lack of space is not
broken at right margin, and (5) line breaks are made between phrases
or toward the end of the sentence. New technologies, specifically
microcomputers and word processing software, can help children to
become more cognizant of these language patterns that affect
comprehension. (HOD)

Evidence of the Cognitive and Metacognitive

Effects of Punctuation and Intonation:

Can the New Technologies Help?

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Running head: Evidence of the Cognitive and Metacognitive

2

Evidence of the Cognitive and Metacognitive

Effects of Punctuation and Intonation:

Can the New Technologies Help?

This paper examines the research and literature relevant

to investigating the effects of punctuation and other phrase

boundaries, in prose and expository materials, on the intonation

and resulting comprehension efforts of children (Note 1).

Additionally, this paper will consider the question, "Is

there evidence in the reviewed literature that the new

technologies, such as microcomputers, could have an impact

on helping children improve their comprhension of text?"

Suggestions for text design and the designing of programmed

software, based on the reviews, will be made (Note 2).

Punctuation and Intonation

Five major purposes of punctuation in written

communication have been identified: (a) to terminate, (b)

to combine and separate, (c) to introduce, (d) to enclose,

and (e) to indicate omission. Cronnell (1980) indicates

that because of the large number of punctuation rules, errors

can be expected even among good writers. In his review

of the literature, he found little research conducted in

the teaching of mechanics of punctuation. Generally, it

seemed that introductory instruction begins with rules and correction of mispunctuated or unpunctuated sentences. The literature reviewed by Cronnell suggested that punctuation be taught functionally, as students need the instruction; however there were few suggestions as how to do this.

Punctuation, to some extent, provides the phrasing necessary for meaningful speech, but is a poor substitute for the degree of phrasing required in reading (Stevens, 1981). Gutknecht, Apol, and Morton (1982), from an analysis of second graders' miscues, determined that terminal punctuation and its location in text affects comprehension. Most second graders in the study comprehended more when they read standard texts in which punctuation appeared randomly at the end of each sentence. It was concluded that as readers become more proficient, location of terminal punctuation in text does not reduce comprehension. Readers at all levels should be exposed to random terminal punctuation. At the same time, Gutknecht found that less proficient readers comprehended more when reading modified texts. Modified texts in this study consisted of textual material restructured so that the terminal punctuation was always at the end of a line of text and the next sentence started on the next line.

The results of this study suggests that less proficient

developing readers may need more structural cues.

Baldwin and Coady (1978) explored the relationship

between punctuation and grammatical expectation using fifth

graders as subjects. The children were given a manipulated

text in which critical punctuation cues were varied depending

on preceding word order: canonical sentences which confirmed

the expectation of a particular grammatical pattern and

non-canonical sentences which refuted the expectation of

a particular grammatical pattern. The study was repeated

using graduate students in linguistics as subjects and the

results of both groups' performance was compared. There

was a striking difference in the extent that children and

adults utilized punctuation during reading. Both groups

were not influenced by the presence or absence of punctuation

in canonical sentences. Both groups demonstrated lowered

comprehension with non-canonical sentences without punctuation.

But the apparent difference occurred on punctuated non-canonical

sentences. Adults comprehended these better: almost as

well as punctuated canonical sentences. The fifth graders

comprehended these no better than non-canonical sentences

without punctuation. These readers appeared to ignore,

or failed to perceive, the purpose of punctuation, even
when commas, question marks, and so forth, were syntactically
critical. Baldwin and Coady extended their investigation
further by studying 80 second to fifth graders'use of
semi-noncanonical sentences. Ninety errors were made associated
with commas and grammatical intonation at noun and main
clause boundaries. Fifth graders performed no better than
second graders. The studies dealt only with sentences,
not general context, so it is still an open question as
to how redundant or critical punctuation becomes in discourse
where prior context may build up semantic expectation biases
that influence attention to punctuation.

It seems likely that the major function of punctuation
is to serve as a system of visual markers which contradict
previously generated false grammatical expectations. Word
order conditions define the redundant or critical aspect
of punctuation cues to visual display. When sentences are
non-canonical, punctuation seems essential in arriving at
correct syntactic analysis, but when sentences are canonical,
punctuation appears to reiterate grammatical information
already provided by word order. Baldwin and Coady suggest
that the rules of English punctuation established in conjunction

with traditional grammar are empty conventions which neither

predict nor explain reading behaviors involving punctuation.

As . result, Baldwin and Coady raise the question of whether

punctuation as an active cue system can be considered for

10 year-olds, and by extension, elementary school children.

An implication is that punctuation, as a cue system in reading,

has a later onset. Another question that could be asked,

is whether or not the late onset of punctuation utilization

is due to maturation of the reader or lack of appropriate

early instruction.

Read et al (1978) suggest that many beginning readers

have difficulty comprehending what they read, even though

they can identify the individual words in a written sentence,

because they depend heavily on prosodic cues. Prosodic

cues have a influence on oral reading and comprehension

(Witte, 1980). If children can translate print into something

resembling their own oral language, the retrieval of meaning

will be accomplished with greater ease (Stice, 1978). Readers

do not attend to all details before them on a page, but

selectively attend to a sampling. Details selected are

called cues because readers use then as a basis for making

a guess as to the correct response (Vogel, 1975).

7

Words alone do not carry meaning until they are placed
in the structural system of the English language. Intonation
functions as a controller of meaning and provides more phrasing
information to the reader for the purpose of organizing
the words into meaningful units (Eisenhart, 1974; Stevens,
1981). Eisenhart states that readers must bring to the
printed page, the ability to recognize the graphic cues
that signal meaning. Graphic cues operate as a three part
system: vocabulary, structure, and sound. The whole system
should be taught non-technically to children at an early
age as they are learning to read. Children already know
a lot about language structure intuitively, so the signals
are not new. She indicates that training in graphic cues
has to be done in the context of meaning in reading not
as part of a spelling or grammar lesson. Gutknecht et al
state that changes in stress, pitch, or pause indicate the
reader's anticipation with regard to expected grammatical
structure. They list seven categories of intonation: (a)
within words, (b) between words within a phrase of a sentence,
(c) relative to phrase or clause structure of a sentence,
(d) at termination of phrase or sentence, (e) where conjunction

is used in place of terminal punctuation, (f) direct quotes,
and (g) no change.

Read et al (1978) observed that 7 year-old children
correctly identified subject and predicate phrases with
surprising accuracy. Poorer success was demonstrated when
children were presented with sentences that contained misleading
intonation contours. They seemed to be particularly dependent
upon phrase-final lengthening as a cue signaling syntactic
structure. The prosodic system, the rhythmic patterns of
speech, consists of timed sequences of short and long syllable
duration, accented and unaccented levels of stress, and
the rise and fall of pitch--information readily available
to the listener but missing when the listener becomes a
reader (LeCoultre & Carroll, 1981). Martin and Meltzer
(1976) conducted a study generated from the notion that
if syllables were seen and heard as when spoken, it would
help children make the connection between sequence of symbols
seen and sequence of sounds heard. Their conclusion seemed
to be that visual rhythm should improve ability to organize
read sentences into well-structered wholes and facilitate
fluency. Le Coultre and Carroll conducted a study to determine
whether, as Martin and Meltzer predicted, visual syllable

duration pattern affected comprehension   The visual display
in their study consisted of a slash for a long syllable,
a triangle for a short syllable, an inverted triangle to
indicate a pause and dashes for rhythm-pulse. They concluded
that:

1. Visual rhythm gave children an advantage in ability
to comprehend sentences. Their study could not clarify
whether it was the duplication of speech rhythm or the nature
of the visual display which aided comprehension.

2. The fluency effect described by Martin and Meltzer
was not robust.

3. Any pattern not consistent with speech pattern
would not aid comprehension.

Ehri (1976) conducted a study with second, third, and
below grade level fourth graders using words printed in
three sizes to correspond to the intonation patterns of
the text. The intoned text was then compared with a standard
text and a random text in which words were printed in different
sizes and spaces were varied at random. Her results indicated
that children trained to read intoned print did not outperform
the standard print or random print groups. She concluded
that printed intonation cues are useless to beginning readers.

Ahlvers (1970) conducted a study aimed at instructing
first-graders in intonation skills in reading. There was
no significant difference in overall reading comprehension
between the experimental groups, receiving the intonation
instruction and the control groups, not receiving the intonation
instruction. However, on the oral Test of Intonation, when
children were rated for appropriate use of pitch, stress,
and terminal juncture, there was a significant difference
between groups.

Means (1968) found that children who use fewer inappropriate
intonation patterns in oral reading, comprehend better in
oral and silent reading. Independent readers appear to use
each element of intonation equally well. Witte (1980) indicated
that by modeling correct intonation patterns orally, combined
with students repeated reading practice, comprehension
performance can be improved in the reading of passages silently.
Flippo (1980, 1982) has emphasized the developmental quality
of intonation in children.

Vogel and McGrady point out the importance of children
internalizing the intonation or melody pattern of their
native language for the development of syntax and for reading
comprehension. They state that intonation is perhaps the

11

most important and least understood signaling system at the sentence level. Intonation's role in children's acquisition of reading behaviors and its relationship to instruction is evidenced by Coady and Baldwin's (1977) survey of Economy, Holt, Ginn, Houghton Mifflin, and Scott Foresman primers, in which they found difficult, confusing sentences with regard to intonation cues, and a virtually complete lack of guides for instruction in intonation in the teacher's manuals.

Flippo (1980) also examined the texts of major publishers of basal readers (Economy, 1980; Macmillan, 1975; Harper & Row, 1976; Rand McNally, 1974; Harcourt Brace Jovanovich, Bookmark, 1974, 1979; Scott Foresman, 1974; Houghton Mifflin, 1976; Holt, 1977). It was found that many of the second grade level basals examined, contained ending punctuation structure that could conceivably alter the meaning for unsophisticated primary grade children. Again, no suggestions were found in the teachers' manuals for children experiencing comprehension difficulties with the location of ending punctuation.

Because written language is devoid of intonation, the reader must reimplant the melody by utilizing clues that

punctuation and one's own background of oral language provide.
Auditory memory does not appear to be a factor. Children
seem to have the ability to internalize melody patterns
as they relate to language acquisition, and of a foreign
language as well, while adults do not. Clay and Imlach
(1971) found that poor progress in reading could be interpreted
as a failure to structure a very complex set of response
hierarchies to intonation cues. Children who make fewer
pauses tend to be the best readers. Better readers complete
a sentence with fall in pitch. Poor readers pause more
and are likely to use a rising or sustained pitch implying
uncertainty. Good readers read seven words between pauses
and 4.7 words per stress. Poor readers read 1._ words between
pauses and stress every word as in reading a list.

The findings of a study by Stice (1978) indicate that
children who usually have the most success comprehending
written language also have the most success comprehending
oral contrastive stress in standard English. Conversely,
lack of success in comprehension includes lack of success
comprehending stress in standard English. Intonation as
a significant part of language is a potential instructional
element for improving what the developing reader needs to

know about language. She points out that several reading
educators advocate teaching intonation patterns as part
of the developmental reading curriculum. This would give
readers a greater awareness of an additional signal system
to indicate meaning. Reading, she maintains, is a matter
of utilizing all the available cues to meaning. Intonation
operates similarly across all dialects of English. Some
strategies that could be used to affect cue selection in
the structuring of meaning are listed:

1. Segment utterances into recognizable and manageable
units;

2. Draw attention to special content;

3. Make contrasts with previously stated or inferred
information;

4. Point out new material;

5. Confirm or negate a query;

6. Tag words, phrases, sentences according to type
and function;

7. Indicate that pause can be signaled with a punctuation
mark;

14

8. Indicate that context of passage and word placement in a phrase or sentence are aids to proper identification and meaning; and

9. Develop awareness of WH words as cues.

Beardsley (1982) supports the view that children make use of context cues according to age and ability (Flippo, 1980, 1982). If linguistic constraints within the text are to be of value to the reader, some consideration must be given to understanding which cues are likely to be the most useful at different stages of reading development. Beardsley's study indicates that the more useful cue for all readers, other than six to seven year old poor readers, was the proactive semantic constraint. In other words, the gist of the phrase following a deleted word in the cloze test gave the most help in determining what the missing word could be. Young readers seemed to have expectations of meaning from the material they read based on their experiences with language. The youngest

ir readers predicted words to fit the syntactic structure of the material. This may be due to the fact that young readers are bound by the limits of their ability to take in only certain elements of the materials and may not have

interpreted the reading operation as a linguistic one.
Good six year old readers and good and poor readers in the
seven to eight year old age group showed that proactive
and retroactive semantic cues were important information
for interpretation.

Beardsley, and Clay and Imlach seem to agree that reading
behavior becomes patterned close to the onset of instruction
in ways determined by visual and linguistic quality of text;
emphasis of the teacher and his/her methods; and the
developmental status of the pupil in the visual, linguistic
and cognitive areas. Approaches to instruction will inevitably
influence the young readers' willingness to use what the
material has to offer and the ability to integrate the different
aspects of text. The studies so far outlined seem to argue
well for approaches which base early reading materials on
meaningful language without too rigorous an emphasis on
the precise visual scanning of letters and words, and helping
children become aware of words in relation to one another
(Beardsley, 1982). They also support the idea that the
key to reading lies in the child's own language and not
in some standard model of English (Stice, 1978). These
studies emphasize the importance of intonation as a controller

of meaning (Eisenhart, 1974), and also suggest that punctuation

exerts a variable influence upon comprehension (Baldwin

& Coady; Gutknect et al).

Phrase Boundaries and Text Structure

As children learn that prosodic cues are not preserved

in writing, they begin to make better use of other kinds

of signals that are preserved, such as semantic and contextual

features (Schreiber, 1980). The key to fluency is grouping

words together into meaningful sequences and beginning to

understand that the purpose for reading is to extract the

message that the written form communicates. Students who

have difficulty providing meaningful phrases for words comprehend

little. Even if they understand the words, they will not

grasp the meaning of paragraphs unless they organize the

words into meaningful units (Stevens, 1981). Poor readers

read word-by-word rather than organizing their input into

meaningful groupings, but when encouraged to group reading

in a meaningful way, they are able to comprehend at a level

comparable to that of good readers (Cromer, 1970). Once

individuals have become proficient in the recognition of

single words, they must progress to the notion that words

occur in groups with a certain sense of patterning sequence

and meaning. If they do not, cautions Cromer, they may
have overlearned word-by-word patterns of reading. These
individuals can be instructed to change by artificially
grouping words in a m'.nner that is meaningful for them.
Cromer recommended the following techniques to build phrase
unit processing: (a) being read to in phrase units, (b)
flashing groups of words too quickly for readers to read
them word-by-word, (c) separating groups of words or phrases
with slashes or spaces, and (d) printing beginning reading
books in preestablished and meaningful word groupings which
vary systematically the context in which words appear ("Look
at Joe go." "Go look at Joe.").

Parsing (grouping) sentences into meaningful phrases
and clauses is an essential step in language comprehension.
Parsing difficulty is a common reading problem (Kleiman
et al, 1979). Early and recent theories regarding how readers
code items of information suggest that phrases or segments
of written material, chunks, are the perceptual units of
spoken and written language. Chunking sentences facilitates
free recall of informaiton and promtoes rapid memorization
of prose passages. Therefore, preorganization of reading
materials into meaningful word groupings might improve efficiency

18

of reading as it has improved recall and memorization (Carver,

1970). Carver suggests that punctuation should be used

to determine the boundaris between chunks of text and that

chunked text should not be broken due to lack of space at

right margins. Royer and Cable (1975) indicate that good

readers may, in contrast to poor readers, organize what

they read.

O'Shea and Sindelar (1983) determined that segmenting

sentences assisted both low and high performance readers

in comprehension as measured by a maze task. Segmentation

of written discourse into meaningful units helps simplify

the syntax of complex sentences. With units isolated, the

reader is cued to the relationship among intrasentence phrases.

They found that children who read slowly, but accurately,

scored higher on segmented passages than on standard passages.

There was no difference between standard and segmented passage

performance for children who read with both high fluency

and accuracy. Since segmentation aids young developing

readers in comprehension, its use in the classroom would

seem appropriate as a supplement to basic instruction.

O'Shea and Sindelar segmented passages as follows: (a)

subject and predicate of simple sentences were separated

and the object was also separated from the predicate;(b)
noun modifiers, if short, were linked with nouns, and verb
modifiers with verbs; (c) clauses were set off and if long,
broken into appropriate thought units. They indicated that
an alternative to retyping passages would be to use vertical
lines of underlining. Students could help in the preparation
of these segmented passages.

Goldman, Hogaboam, Bell, and Perfetti (1980) looked
at the length of input segments related to recoding, or
the transforming of material from short term to long term
memory; sentence boundaries serve as cues to the individual
to recode. They found differences between reading and
listening. Boundaries are less important in reading because
discourse is under reader control, the individual can reread
and backtrack to re-encode, whereas in listening the speaker
controls input. The study indicated that skilled readers
retain encoded discourse of more difficult length longer
than younger and less skilled readers. The latter used
sentence boundary as a recoding cue only when relatively
few words in an easy text had to be read. Demands of word
recognition over lengthier and more difficult text produce

working memory overload, even within a sentence, for less skillful readers.

In order to help children understand that reading with expression means compensating for lack of prosodic cues in written text, Blum and Hoffman (1979), and Schreiber (1980) suggested drawing attention to the spacing between words as a kind of graphic device. While it only very occasionally provides evidence about phrasing, readers do observe white spaces between words, and through them can develop clarity about the function of spaces in defining written word boundaries. Exposure to meaningful print, they maintain, results in clarity about word space and skill in recognizing words.

There is also evidence in the literature to suggest that visually marking subject, predicate, and phrase boundaries should result in an improvement in children's reading comprehension. Weiss (1983) as part of his dis. ertation, investigated two methods of text segmentation to test this hypothesis. The results of this study support the theory that making the underlying oral phrase boundaries visible facilitates elementary school children's reading comprehension. Text segmentation is effective in helping elementary school

children comprehend text they are reading. Good, average,

and poor readers, when reading material evaluated as "at

or above grade level," did improve their reading

comprehension when reading texts that were segmented along

phrase boundaries. The theory could not be conclusively

supported however, since this study did not directly compare

oral discourse with the syntactic and pausal phrase formats

in written discourse. Weiss points out that this would

be an interesting area of future research. Findings of

his study also indicated that less able readers performed

at a level typical of average readers when reading a phrased

difficult passage without teacher assistance. There was

no evidence to suggest that phrasing easy passages would

hinder good readers' comprehension. There is support for

recommending that new social studies textbooks be written

using the syntactic and pausal phrase format in presenting

the content material. Weiss suggest that the children's

comprehension would have shown even greater improvements

if they had been trained to use the phrase segments beforehand.

Raban (1982) chose line-breaks, a feature of text display

in books printed for young readers, as the focus for her

research. Fluent reading requires that the reader discount

line endings which occur at any point in syntax without

this affecting their reading comprehension or fluency.

Research has found this to be the cas? with readers aged

ten years and up whose eye-movements have stabilized. Cromer

(1970) supported the notion that one source of comprehension

difficulty could be attributed to a difference in the way

in which the word grouping are arranged in the text. Raban

felt there was a great deal of "impressionistic" evidence

that line-breaks do cause difficulties to children when

they are young and still learning to read. The difficulties,

however, do not become apparent immediately, because children

are mostly encountering sentences of less than one line

in length; difficulties emerge as sentences increase in

length. Teachers can be alerted to confusion possibly caused

by line-breaks if children's reading is marked by various

non-fluencies and self-corrections. In her study, Raban

investigated children's reading of a text with line-breaks

in every possible position, as frequently as possible within

a Subject-Verb-Object-Adverbial sentence pattern. From

the findings of her study, Raban concludes:

    1. The solution to the problem of where to break the

line in texts for young children is not straightforward.

Research points to the value of line-breaks both within

and between phrases. Line-breaks within a phrase cause

less disruption of fluency when they occur towards the end

rather than rear the beginning of the sentence. "And" should

not occur at the beginning of a line. "And" and prepositions

act as "signposts" in text.

2.   More research is needed in the field, particularly

to identify the hierarchy of elements of sentences like

"and", so that publishers have alternatives with regard

to line-breaking while preserving the integrity of sentence

meaning.

The Raban research enhances the findings of Gutknecht

et al (1982) and confirms the position of Flippo (1980,

1982). The effect of the location of ending punctuation

in text on intonation and resulting comprehension is a

developmental process and effects the unsophisticated and/or

low ability early childhood reader. However, the more

able/mature/and developed reader is not so affected by location

of ending punctuation and line-breaks.

Cognitive and Metacognitive Effects

Metacognition refers to one's knowledge concerning

one's own cognitive processes and products. It is involved

in comprehending what we know and knowing how to modify

what we know, and it allows reading flexibility to occur.

Better readers show metacognition during reading; poor readers

do not, because they do not know when they have not understood

and do not have a sense for how to modulate their activities

to rectify their failure to understand (Guthrie 1982).

Guthrie studied the reading behaviors of fifth grade subjects.

The effective readers increased study time when presented

with relatively difficult materials. Less successful readers

did not regulate their study time in response to their

misunderstanding; instead, they reduced their inspection

time of the text material. According to Simpson and Lorsbach

(1983), young children process print differently than older

children. Older children and adults appear to process print

with conscious attention and automatic activation. Young

children process nonstrategically. As children become older,

they become better able to use context deliberately to help

process information. They learn to determine when such

conscious attention is adaptive to the task and use it.

Those strategies used to process information in memory show

greatest change with age. However, those children that

are not helped by a strategy, show little change. In experiments

conducted by Simpson and Lorsbach,   efforts in letter

and word recognition in context and conscious attention

to them changed considerably with age. The results of the

study imply that there is facilitation of word recognition

when a word is preceded by congruous context and inhibition

of word recognition when a word is preceded by incongruent

context.

Readence and Harris (1980) examined the so called

prerequisite skills necessary for successful comprehension

and the priority teachers should place on skills deemed

essential to teaching comprehension. They feel that studies

such as theirs are just the beginning steps in examining

the sequence of skills notion in teaching of reading. False

prerequisites are those skills which were unattained by

75% or more good readers in the study. Skills which may

be necessary, but are not taught sufficiently for comprehension,

are identifying possible outcomes, using punctuation clues,

and understanding syntax. The skills were unattained by

10% of the good readers, and 50% or more by the poor readers.

Skills associated with competency are identifying main idea,

drawing conclusions, determining sequence, identifying pronoun

referents, and deriving meaning from context. All the good

readers possessed these skills but few poor readers did.

Goodman and Burke's miscue analysis (1972) gives insight

into how children regress, and lookback to fix up inconsistencies

produced while reading, and highlights childrens' use of

syntactic and semantic features. Research information on

how children are effected by text structure, such as the

information presented in this paper, coupled with factors

of intellect, language background and ability, physical

and emotional stability, allow children to make the most

of the events and situations that enhance the transfer of

learning. Teachers and publishers should become more aware

of the importance that punctuation, intonation, and phrase

boundaries have in children's reading comprehension. If

text segmentation or end of line punctuation is related

to an improvement in developing children's reading comprehension,

it might be worthwhile to redesign some texts.

Implications for Text Design

The research and literature reviewed in this paper

has provided some evidence to suggest the desirability of

modifying textbook design for use with young developing

unsophisticated readers. In summary those suggestions include:

1. Modified terminal punctuation should be used for beginning   low ability readers (Gutknecht et al 1982).

2. Punctuation should be used to determine the boundaries between chunks of text (Carver, 1970).

3. Consideration should be given to the possibility of a syllable duration and visual rhythm display in texts (Le Coultre & Carrol, 1981).

4. Printed intonation cues in texts should be eliminated (Ehri, 1974).

5. Phrasing of text should be printed in meaningful units to facilitate elementary school children's reading comprehension (Weiss, 1983; Raban, 1982; O'Shea & Sindelar, 1983; Cromer, 1970; Stevens,1981; Carver, 1970).

6. Do not break chunked text due to lack of space at right margin (Carv r, 1970).

7. Make line breaks between phrases or towards the end of the sentence (Raban, 1982).

8. Do not use "and" or prepositions at the beginning of a line of print (Raban, 1982).

9. Sentences causing confused intonation should be eliminate   rom texts (Coady & Baldwin, 1977).

10. Information for dealing with intonation of text
should be provided in the basals' teachers' manuals (Coady
& Baldwin, 1977).

Can the New Technologies Help?

Technological devices such as films, television, computers,
filmstrips, and slides have the potential within an instructional
context to create graphic visualizations that encourage
reading listening comprehension. This field, particularly
the microcomputer part of it, is changing so rapidly that
everyone involved is finding it hard to keep up with the
advancements taking place in the technological laboratories
and in the marketplace. Burke (1981) feels that making
use of television and computers to stimulate reading depends
on teacher inservice and knowledge of advances in the
technologies.

Marsh (1983) ascertains that computer-assisted instuction
(CAI) can present complications and cause confusions, but
in spite of this, the techniques have conquered the world
of business, science, math, and are in evident use in schools.
He reviewed the findings of a number of CAI studies in reading
at the elementary school level. Marsh summarized that:

1. Computer speed did not work fast enough to hold the interest of all students;

2. Audio reacted too slowly;

3. Quality of reading software was poor;

4. Teachers' and students' attitudes toward CAI were positive, but there was no indication that use of CAI would be more effective than traditional methods;

5. Not all the studies agreed about the value of CAI in reading;

6. Several studies found that primary boys gained more from CAI than from traditional programs;

7. Some studies suggested that culturally disadvantaged children would benefit from CAI;

8. One study noted a decline in social behavior;

9. Individualization and flexibility of instruction was high in CAI; and,

10. Cost was high.

Mason (1982) lists some advantageous features of computers and also some of their disadvantages. On the plus side:

1. Computers are interactive--print can change size, color, blink, and scroll.

2. Computers provide immediate feedback; they interact faster than the teacher with the student.

3. They are impassive, nonthreatening, and nonjudging.

4. Patterns change to remind the learner of the display, thereby focusing attention on the learning task.

5. The parameters can vary.

6. Skills can be embedded in game format.

7. Records can be kept.

On the minus side:

1. Equipment is costly.

2. Quality of display and programs are very variable.

3. Computers are dependent upon electricity.

4. Printouts often are not clear.

5. Computers provide limited display device.

6. Vision problems can occur.

The reviewed literature and research indicates that young unsophisticated beginning readers and low ability readers intonation and resulting comprehension is often effected by punctuation and other phrase boundaries in text. It is possible that the new technologies, specifically microcomputers and certain microcomputer software could have an impact on assisting these readers with comprehension

efforts. For instance, use of language experience techniques

with a word processor could make children more aware of

sentence structure, word groupings, phrase boundaries, and

terminal punctuation. Also, voice activators and voice

synthesizes could provide cues for intonation. Use of these

components might make for an interesting research study

in the area under consideration.

Word processing can be structured to attend to the

Gutknecht et al (1982) findings. Beginning readers could

be shown the "word wrap" capability of computer programs.

Materials could be more easily rewritten and programmed

so that the ending punctuation could be placed at the end

of the line of text (Gutknecht et al, 1982; Flippo, 1980,1982)

and line breaks and phrasing could be put in appropriate

chunks and locations (Carver, 1970; Raban, 1982; and others).

Additionally the word processor could be used to prepare

materials for miscue analysis (Goodman & Burke, 1972).

This would facilitate easier use of miscue analysis in teacher

and reading education. The study of miscue analysis could

enhance teachers'understanding of punctuation, intonation,

and other textual cues and miscues that effect cognition.

As pointed out by Coady and Baldwin (1977) the teachers'

32

manuals do not attend to information pertaining to intonation miscues.

Most of the suggestions summarized as implications for text design, could be facilitated in the classroom by use of a word processor. Software could also be developed by reading researchers to enhance the intonation and comprehension success of beginning and less abled readers, as previously suggested, and this software could be made available for classroom use. Very little is available at this time, that could be endorsed. Marsh (1983) suggests that one of the most pressing needs in the microcomputer market is the development of quality software by reading experts.

33

Reference Notes

1. This review of the literature and research relevant

    to investigating the effects of punctuation, phrase

    boundaries, and line breaks in texts on intonation and

    comprehension, is an update of earlier reviews (Flippo

    1980, 1982). This update was made possible by the work

    of Hazel Campbell (1984), one of my graduate students,

    who carried out the update under my guidance and direction.

2. The evidence of technological implications in the reviewed

    literature and research, and many of the suggestions

    for text design and use of microcomputers were from

    the paper by Hazel Campbell (1984), Prosodic, structural

    and technological influences in reading comprehension,

    a paper written under my guidance and direction.

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