A study investigated the effect of imagery upon the comprehension of students above and below average reading ability. Through a series of conditions—listen/read or individually for approximate 30 minutes—the students were asked to make pictures in their heads while listening and reading one of two passages. A cued recall test was given to assess statistically significant differences in mental imagery for listening and reading comprehension. The findings suggested that poor readers had difficulties that do not apply to good readers. The findings were also consistent with the hypothesis that reading comprehension depends on the use of mental imagery.
Da B.: And Others

The Induced Mental Imagery upon
A Comparison of Written Versus Oral
College Park. Reading Center.

Presented at the Annual Meeting of the
Reading Conference (30th, San Diego, CA,
1980).

Postage.

Processes: Grade 6: Intermediate Grades:
Processes: *Listening Comprehension:
Comprehension: Reading Difficulties:
Arch: Recall (Psychology):

al Imagery

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of oral versus written discourse for
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were randomly assigned to one of two
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help you remember" under both
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the subjects responded to questions
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and reading for either free or cued
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suffer from specific comprehension
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with the assumption that listening and
upon the same basic process. (FL)
THE EFFECTS OF INDUCED MENTAL IMAGERY UPON COMPREHENSION:
A COMPARISON OF WRITTEN VERSUS ORAL PRESENTATION

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University of Maryland  Reading Consultant  Prince George's County
Reading Center  Washington, D.C.  Public Schools, Maryland

Induced mental imagery has been identified in recent research as a promising strategy for increasing comprehension of discourse (Kulhauy & Swenson, 1975; Lesgold, McCormick & Golinkoff, 1975; Levin, 1973; Steingart & Glock, 1979). Since mental imagery appears to be associated with efficient learning and remembering, it may provide a
critical link in explaining the transition from a novice to sophisticated comprehender (Pressley, 1976, 1977). One cause for caution, however, with respect to interpreting the results of the research on mental imagery is that increases in learning from written text are slight while the results of learning from orally presented text have been more substantial. It appears that mental imagery has merit as a strategy for increasing listening comprehension but the value of induced mental imagery as a strategy for increasing reading comprehension needs further investigation (Tierney & Cunningham, 1980). The research to date on induced mental imagery does not provide a direct comparison of the effects of induced mental imagery upon listening and reading comprehension.

The main purpose of this study was to investigate the effects of induced mental imagery upon the comprehension of oral versus written discourse for above and below average readers. A secondary purpose was to determine, through a follow-up interview, the students' ability to induce mental imagery.

Method

Subjects

Sixty-three sixth grade above and below average readers enrolled in six suburban Maryland public schools served as subjects in the study. Criteria for
classification as above and below average readers were: (1) Iowa Test of Basic Skills comprehension scores (below average reading scores between 3.5 and 5.5 grade level and above average reading scores of 6.5+), (2) Cognitive Abilities Test scores within 1 standard deviation above or below the mean, and (3) teacher verification of subject identification as an above or below average reader.

Materials

The stimulus materials used in this study consisted of two short (approximately 300 words each) expository type passages written at the 3.0 grade level. A matrix design was used to develop parallel fictional passages about two groups of people. One passage was about the Blue Swamp Clan and a second passage was about the Pine Folks. The passages were developed to reflect the structure of materials which students encounter in the classroom; yet they contained novel information, thereby reducing the possible effects of prior knowledge.

For each passage a set of 10 short answer cued recall questions was constructed. Literal and paraphrase questions were asked for each passage.
A brief interview was developed for use following the listening and reading tasks. The purpose of the interview was to validate if students were able to induce mental imagery when given instructions to do so.

Procedure
Subjects were randomly assigned by ability to one of two conditions, listen-read or read-listen, depending upon whether they read or listened to a passage first. Half the students under each condition read the Blue Swamp passage and listened to the Pine Folks, while the reverse was true for the remaining subjects. These procedures were used to control for the effects of condition order and passage order.

The students were met individually for approximately 25 minutes. All subjects were instructed to "make pictures in your head to help you remember" under both listening and reading conditions. Immediately after listening to or reading a passage, the subjects responded to the interview about use of mental imagery. The interview did not tap specific passage information and therefore also served as an intervening activity to eliminate the effects of short term memory upon the comprehension assessments which followed. Upon completion of the interview, students were asked to
retell the passage information. Subjects were told to pretend that they were trying to tell a friend everything they could remember about the Blue Swamp Clan (or Pine Folks). Subjects also responded to a 10-item cued recall test for each passage.

**Results**

Two independent raters divided the two stimulus passages into propositions of three levels of importance using an adaptation of Meyer's (1975) procedure (interrater reliability for the Blue Swamp passage = .97, Pine Folks = .98). The subjects' free recall protocols for the listening and reading tasks were then scored by two independent raters (interrater reliability = .97).

Preliminary inspection of the data on free and cued recall revealed no differences attributable to story or order of presentation, so these variables were not considered further. Data on free and cued recall were analyzed using analysis of variance with repeated measures.

Significant ability differences were found, as expected, for both listening and reading tasks in favor of the above average readers on both free and cued recall. No statistically significant differences were found between the effects of induced mental imagery for listening and reading for either free (Table 1) or cued (Table 2) recall. On free recall of higher level propositions, however, sex and ability
interaction effects were found for listening and reading. This sex and ability interaction effect was also found on the reading task for recall of lower level propositions (see Table 1).

Discussion

The results of the comparison of the effects of induced mental imagery under listening and reading conditions are not consistent with the research which suggests that induced mental imagery is more potent for listening than for reading comprehension (Pressley, 1977). The results of the present study suggest that instructions to induce mental imagery may be equally effective under listening and reading conditions. It should be noted that this study attempted to eliminate and reduce major methodological problems inherent in the existing research which has prohibited direct comparisons of the effects of induced mental imagery for listening and reading comprehension of discourse.

Above average males recalled more higher level propositions than above average females, however, below average females recalled more than below average males under both
listening and reading conditions. The same effect was found with respect to lower level propositions under the reading condition. The statistically significant sex and ability interactions found in this study suggest that sex differences may be a promising area for future research.

The results of the interview on use of mental imagery revealed that under the listening condition 17% of the below average subjects reported that they were not able to induce mental imagery while only 3% of the above average readers reported they were unable to do so. Under the reading condition 21% of the below average readers and 6% of the above average readers reported they were unable to induce mental imagery. More below average readers than above average readers report an inability to induce mental imagery. As Tierney and Cunningham (1980) have suggested further research is needed to determine how imagery may be effectively induced since a rather large percentage of below average readers in this study apparently had difficulty imaging.

Finally, the results of this investigation lead to two additional conclusions. First, the results support the findings of Smiley et al. (1977) and Guthrie (1973) which suggest that poor readers suffer from specific comprehension difficulties which do not appear to involve decoding skills. There were large differences between above and below average readers comprehension performance under both
listening and reading conditions. Second, the data are also consistent with the assumption that listening and reading comprehension depend upon the same basic process.
Acknowledgments

The research reported herein was supported in part by a grant to the first author from the University of Maryland Reading Center Research Committee.

The authors would like to thank Natalie Felsher and Paula Jawitz for their help in data collection and Dr. Chan Dayton and Gary Skaggs for statistical assistance.
References


Kulhauy, R. W., & Swenson, I. Imagery instructions and the comprehension of text. *British Journal of Educational Psychology, 1975, 45, 47-51.*


Table 1
Means and Standard Deviations of Free Recall
Scores for Propositions - Level 1 (highest), Level 2, and Level 3 (lowest)

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
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<tr>
<td></td>
<td>N=19 Above Average</td>
<td>N=15 Below Average</td>
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<td>Level 1 Propositions*</td>
<td></td>
<td></td>
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<tr>
<td>**</td>
<td></td>
<td></td>
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<tr>
<td>Listening</td>
<td>M 10.32</td>
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<td>SD</td>
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<td>SD</td>
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<td>4.68</td>
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<tr>
<td>Level 2 Propositions**</td>
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<td></td>
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<tr>
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<td>5.00</td>
</tr>
<tr>
<td>SD</td>
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<td>2.64</td>
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<tr>
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<td>6.00</td>
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<tr>
<td>SD</td>
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<td>4.15</td>
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<tr>
<td>Level 3 Propositions***</td>
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<td>.75</td>
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<tr>
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<td>.53</td>
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<tr>
<td>SD</td>
<td>1.30</td>
<td>.74</td>
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*significant ability differences at the .01 level.
**significant sex and ability interaction at the .05 level.
***significant ability differences at the .05 level.
Table 2

Means and Standard Deviations of Number of Correct Answers to Cued Recall Questions

<table>
<thead>
<tr>
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<th>Females</th>
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<td>N=15 Above Average</td>
<td>N=15</td>
<td>N=14 Above Average</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N=15 Below Average</td>
<td></td>
<td>N=14 Below Average</td>
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<tr>
<td>Listening*</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
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<td>8.00</td>
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<td>SD</td>
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<td>2.86</td>
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*significant ability differences at the .01 level.