# Effect of Think Alouds on Literal and Higher-order Reading Comprehension

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**Abstract**

*This study examines the effect of training in think alouds on literal and higher-order reading comprehension. Thirty-two (n = 32) eighth grade students of English as a foreign language (EFL) participated in the study. The participants were randomly assigned to control and experimental conditions. Descriptive statistics, correlation coefficients, and a multivariate analysis of variance (MANOVA) test were conducted. The results indicated that think alouds is positively related to over all reading comprehension, critical, and interpretive comprehension as well as effective in improving critical comprehension. The results are discussed and recommendations for further research are suggested.*

Recently, reading research and practice have focused on enabling readers to become proficient and self-motivated readers who monitor their comprehension through the application of a range of metacognitive strategies. Metacognition is a higher order thinking process dealing with a) knowledge about cognition and b) regulation of cognition. Knowledge about cognition involves readers' awareness of the existence and use of various strategies while reading. Meanwhile, regulation of cognition means that readers become able to evaluate, plan, and regulate reading activities (Anderson, Osborn, & Tierney, 1984; Cohen, 1998).

Think alouds, defined as the conscious disclosure of thought processes while reading, has been proclaimed as an effective technique in helping readers acquire a variety of metacognitive comprehension strategies such as evaluating understanding, predicting and verifying, and self questioning before, during, and after reading (Bauman, Jones, & Kessell, 1993; Pressley & McDonald, 1997; Cohen, 1998; Pressley, 1998; Wade, Buxton, & Kelly, 1999). Likewise, previous research on the applications of think alouds procedures in teaching reading has indicated that this technique is a useful mechanism in describing and defining the thought processes of readers (Crain-Thoreson, McCledon-Magurson, &

Lippman, 1997) as well as enhancing learners' self-regulated learning (Zimmerman, Bonner, & Kovach, 1996). Similarly, Smith (1991) concluded, based on empirical evidence, that think alouds sheds light on readers' comprehension processes as they read written discourse.

In addition, several studies have reported empirical evidence that training in think alouds enables readers to acquire a wide-range of strategies that enhance comprehension and enable them to overcome text difficulties (Bauman, Jones, & Kessell, 1993). Furthermore, Silven & Vauras (1992) and Gordon &Day (1996) reported that training in think alouds improves gist comprehension and main idea identification.

The preceding review suggests that training readers in the application of think alouds strategies sheds light on their thought processes during reading as well as improves their comprehension of the gist and main ideas of written discourse. Furthermore, educators such as Carrell (1989) and Young (1993) have called for extending the application of think alouds and other metacognitive strategies into the domain of second and foreign language reading instruction. However, it remains unclear whether think alouds improves all types of literal and higher-order comprehension, especially when reading materials in a second or foreign language.

Therefore, the purpose of the present study is to examine the effect of training in think alouds on improving literal and higher-order reading comprehension of readers of English as a foreign language as described by Burns, Roe, & Ross (1999). These researchers defined literal comprehension as ability to understand directly stated ideas in the text thereby follow written directions, recognize details and sequence, and understand cause-effect relationships. Meanwhile, higher-order comprehension requires interpretation, analysis, and synthesis of information and involves the three types of interpretive, critical, and evaluative comprehension.

Burns, Roe, & Ross (1999) define interpretive comprehension as reading between the lines and making inference in order to derive ideas that are not directly stated in the text. As such, interpretive comprehension includes inference about main ideas, implied cause-effect relationships, and understanding pronoun and adverb referents. Interpretive comprehension also includes detecting the mood of a passage and the author's purpose in writing it, drawing conclusions, and interpreting figurative language. Meanwhile, critical comprehension involves evaluating written material by comparing the ideas presented in the material with known standards and drawing conclusions about their accuracy, appropriateness, and timeliness. As such, critical comprehension

depends on both literal and interpretive comprehension and on readers' ability to grasp implied ideas. Finally, creative comprehension involves going beyond the material presented by the author to produce new ideas and apply what has been read.

Specifically, the study addressed the following questions:

1. What is the relationship between mastery of think alouds procedures and literal and higher-order reading comprehension?
2. Is training in think alouds more effective than regular instruction in improving literal and higher-order reading comprehension?

## Method

### Participants

The participants were 32 eighth-grade learners of English as a foreign language (EFL) enrolled in a private school in a Middle Eastern country. The participants were randomly assigned to control and experimental conditions. The control group included 16 participants and received regular reading instruction; where as, the experimental group included 16 students and received instruction in the applications of think alouds strategies in reading the same material read by the control group. The age of the participants ranged from 12-13 years.

### Instruments

A reading comprehension posttest was administered to all participants in the control and experimental group at the conclusion of the study. This test was specifically designed for the purpose of present study and intended to measure the four types of reading comprehension under investigation (literal, interpretive, critical, evaluative). The content validity of the test was ensured by using a specification table as suggested by Gay (1996). The specifications covered the reading aspects involved in the four types of comprehension and were matched to specific test items that measure these aspects. The test consisted of 30 items: 7 items measure literal, 8 items interpretive, 5 items critical, and 10 items creative comprehension. Finally, the posttest was based a reading selection titled "The Lady or the Tiger" and was not read before by the participants in the study.

In addition, a think alouds checklist was used in the study and aimed at providing additional practice in the use of think alouds procedure as well as analyze the interview protocols of the students in the experimental group. The checklist focused on determining the frequency of using the strategies involved in the think alouds procedure and included a five-point scale designed to determine the mastery level of the think alouds technique.

### Study Design

The study employed an experimental posttest-only control group design. The experimental group received training in the application of think alouds strategies as they read selections from the regular academic program of the participants. These strategies included predicting, picturing, comparing, identifying problems, and using fix-up measures. Predicting involved using illustrations and titles to predict what the text being read might be about. Picturing entailed visualizing characters and settings. Comparing focused on story events and life experiences. Identifying problems covered vocabulary, misinterpretation, and misunderstanding of written material. Finally, the fix-up measures included rereading, reading on, self-questioning, predicting and verifying, making reflections, asking whether what is read makes sense, and retelling.

The control group read the same material read by the experimental group according to the procedures suggested in their textbook. These procedures focused on prediction, teacher explanation, question/answer, and vocabulary instruction. In order to control for validity threats, both the experimental and control groups were taught by the same teacher who did not have any pre-perceived desirability of the effects of the treatment in improving comprehension. Furthermore, all instructional conditions were identical for both groups except for the treatment. More specifically, both groups followed an identical instructional scope and sequence during the first three phases of the study. However, individual interviews were only conducted with the participants in the experimental group in the last phase of the study as explained below.

The study was implemented in four phases. Phase I focused on training the teacher who participated in the study in the application of the think alouds procedure. This phase lasted for one week, following which Phase II started and continued for four weeks. During this phase, the participants in the experimental group received instruction and practice in applying the procedures of the think alouds strategy as they read written material. The first two weeks of phase II were focused on individual and pair practice and the last two weeks involved further demonstrations of the think alouds procedures by one of the researchers, the teacher, and individual participants. Phase III lasted for one day during which all the participants in the study were administered the reading comprehension posttest. Finally, phase IV lasted for one week and involved conducting individual interviews with the participants in the experimental group in order to determine their mastery level of the think alouds procedures. Each interview lasted for about twenty minutes during which each participant

read a short selection and applied the procedures of the think alouds strategy. The verbal protocols of the participants were tape-recorded and analyzed in order to determine their mastery level of the think alouds procedures.

## Data Analysis

Two independent raters assessed the participants' performance on the reading posttest. The inter-rater reliabilities were as follows: 1) overall reading comprehension score r = 0.98, literal comprehension r = 1.0, interpretive comprehension r = 0.76, critical comprehension r = 0.89, and creative comprehension r = 1.0. In addition, the raters scored the verbal protocols of the participants in the interviews to determine their mastery levels of the think alouds procedures and achieved an inter-rater reliability of r = .92.

Descriptive statistics (Means and Standard Deviations) were computed and Pearson Product-Moment Correlation coefficients were computed in order to address the first question in the study regarding the relationship between the mastery levels of think-alouds and the different types of reading comprehension.

In addition, a Multivariate Analysis of Variance (MANOVA) test was run in order to address the second question raised in the study regarding the effect of training in think-alouds on the different types of reading comprehension. The treatment condition (experimental versus control) was used as independent variable (Factor) and the levels of reading comprehension on the posttest (literal, interpretive, critical, and creative) were used as dependent variables.

## Results

Correlation Analysis

The correlation analysis indicated a significant relationship between mastery level of think alouds and overall reading comprehension, $r = 0.73$, $P < 0.01$. Likewise, there was a significant relationship between mastery level of think-alouds and critical comprehension, $r = 0.53$, $P < 0.05$ and a significant relationship between mastery level of think alouds and interpretive comprehension, $r = 0.72$, $P < 0.01$.

**Table 1: Correlation Coefficients Between Mastery Level Scores of Think-Aloud and Reading Comprehension**

| | Overall Score | Literal | Interpretive | Critical | Creative |
|---|---|---|---|---|---|
| Think-Alouds Score | 0.73** | 0.18 | 0.72** | 0.53* | 0.36 |

** P <0.01 * P <0.05

However, the analysis did not reveal a significant relationship between mastery level of think alouds and creative comprehension, r = 0.36, P > 0.05 and between mastery level of think alouds and literal comprehension, r = 0.18, P > 0.05. (See Table 1).

MANOVA Analysis by Treatment

Table 2 presents a summary of descriptive statistics (means and standard deviations) by treatment, overall comprehension, literal comprehension, and higher-order comprehension. The results of the multivariate analysis of variance MANOVA test on the comprehension scores of the experimental and control group are shown in Table 3 and reveal the following:

**Table 2: Summary of Means and Standard Deviations of Posttest Scores by Treatment**

| | | Overall Score | | Literal | | Interpretive | | Critical | | Creative | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Trt | N | M | SD | M | SD | M | SD | M | SD | M | SD |
| Exp | 16 | 15.87 | 2.52 | 4.28 | 0.89 | 3.90 | 1.06 | 3.68 | 0.98 | 4.06 | 0.79 |
| Cnt | 16 | 14.87 | 2.36 | 4.78 | 0.57 | 3.59 | 0.96 | 2.40 | 1.33 | 4.12 | 0.61 |

Note. Exp. = experimental; Cnt. = control; Trt. = treatment; & overall score = overall reading comprehension posttest score

First, the analysis indicates a significant difference between the experimental and control group by treatment F (5, 26) = 3.17, P < 0.05. Second, the univariate analysis of variance shows a significant difference in literal comprehension in favor of the control group F (1, 32) = 3.10, P < 0. 01; the mean score of the experimental group was 4.28 (SD = 0.89), and the mean score of the control group was 4.78 (SD = 0.75). However, there is a significant difference with regard to critical comprehension in favor of the experimental group F (1, 32) = 9.59, P < 0. 01; the mean score of the experimental group was 3. 68 (SD = 0.98), and the mean score of the control group was 2.40 (SD = 1.33). Finally, there are no significant differences at the P < 0.05 level between the control and experimental group with regard to overall reading comprehension F (1, 32) = 1. 34, P = 0. 25, interpretive comprehension F (1, 32) = 0. 75, P = 0.39, and finally creative comprehension F (1, 32) = 0. 06, P = 0. 80.

**Table 3:Multivariate Analysis and Univariate Analysis of Variance MANOVA by Treatment**

| | Multivatiate ANOVA (a) | Universe ANOVA (b) | | | | |
|---|---|---|---|---|---|---|
| Score | F | Overall Score | Literal | Interpretive | Critical | Creative |
| Treatment | 3.17** | F 1.34 | 3.10* | 0.75 | 9.59*** | 0.06 |
| [a]dfs. = (5,26) | [b]dfs. = (1.32) | *P<0./1 | **P<0.05 | ***P<0.01 | | |

**Discussion**

This study was conducted to investigate the connection between think alouds and literal and higher-order comprehension and the effect of training in think-alouds on improving the reading comprehension of eighth grade EFL students. The first question was about whether the mastery levels of think-alouds are related to readers' literal and higher-order and reading comprehension. The results of the correlational analysis indicated that there was a significant relationship between mastery levels of think alouds and overall reading comprehension, critical comprehension, and interpretive comprehension. This underscores the role of metacognitive strategies such as think alouds as a determinant factor of reading comprehension. The pedagogical implications call for deliberate instruction in the applications of think alouds strategies in order to

improve readers' comprehension of written discourse as suggested by Carrell (1989) and Young (1993).

The second question was about whether training in think alouds would affect reading comprehension as measured according to the different types of reading comprehension (literal, interpretive, critical, creative). The results indicated that there was a significant difference between the experimental and the control groups by treatment. More specifically, the univariate analysis indicated that students in the experimental group scored higher on critical comprehension whereas students in the control group scored higher on literal comprehension. This contradicts the findings of Silven & Vauras (1992) and those of Gordon & Day (1996) who reported that training in think alouds improves gist comprehension and main idea identification. One possible explanation of these findings is that the think alouds strategies promote readers' reflection skills on their comprehension, thereby improves understanding of reading aspects that require reflection and monitoring of own learning.

On the other hand, the results showed that students in the control group scored higher on literal comprehension than their counterparts in the experimental group. Literal comprehension requires recognition and understanding of information and cause-effect details that are directly stated in the text as well as placing story events in order. As such, it could be that reading instruction that involves teacher explanation and question/answer exercises improved the literal comprehension of the control group. This suggests that reading instruction and teaching practices should be planned and determined based on the reading program objectives and instructional needs of the learners, which calls for an eclectic approach that utilizes a variety of instructional techniques that range from teacher explanation and question/answer to metacognitive strategies.

Finally, further research is needed in order to determine the relative role of metacognition as a determinant of literal and higher-order comprehension. It is also equally important to investigate the effect of training in think alouds and other metacognitive strategies on reading comprehension in various cultural and linguistic contexts.

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