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The Effect of Metacognitive and Cognitive Strategy Instructions on the Learners' Reading Comprehension Viewed from their Learning Autonomy

## Abstract

Metacognitive and Cognitive Strategies Instructions are crucial for foreign language learners. This paper investigated the metacognitive and cognitive strategies Instruction of the fourth semester English department students in academic reading at State Institute for Islamic Studies Salatiga in Indonesia. The quantitative data were collected through a reading comprehension tests and a questionnaire which is used to classify students' in high and low level of learning autonomy. The 3x2 factorial design analysis used to measure students means scores which are acquired from the training. The results revealed the overall metacognitive and cognitive strategy instruction improve students both in low and high level of learning autonomy.

Keywords: Metacognitive, Reading, Learning autonomy

## Introduction

In recent periods of years, there has been perpetual attention in promoting reading as a significant benefit of language development for foreign language learners (Susser & Robb: 1990) as quoted by Anjomshooa (2012). The importance of reading for second or foreign language learners is to lead them as skillful users of the target language. The students of the

English department at the State Institute for Islamic Studies (IAIN) Salatiga as foreign language learners are required to be able to read English texts. One of the reasons college students in Indonesia, is that they want to acquire the ability to read textbooks, and online papers which are usually available in English. They also need to learn this skill as it is one of the main skills tested in international language proficiency tests such as TOEFL.

Tavakeoli (2014) argued that the main purpose of reading is comprehension and everything related to reading is ended in comprehension. McNamara (2007) as written by Tavakeoli (2014) gave statement that comprehension is how the readers go beyond the words in order to achieve understanding of a text.

Readers in this study are focused on the college students who must be trained the reading strategies in comprehending the text. As Taraban, Kerr, and Rynearson, (2004) as cited by Cubukcu (2008) state that the prior research supports the view that college students need to choose the suitable reading strategies that are oriented on their success in academic assignments and tasks.

Carrel (1989) as mentioned by Pei (2014) claimed that reading strategies is well applied when the awareness or knowledge of the user toward the strategies is existed. Other authors such as Widera (2008), Lin (2008) and Zittle, Johari, & Eastmond (2005) as written by Nosratinia and Mardi (2013) gave explanation that in improving students' reading abilities, effective strategies should be concerned.

O'Malley and Chamot (1990) in Sahan (2012) asserted that effective learning can be achieved through three commonly strategies. They are cognitive, metacognitive and social or affective strategies. Cognitive strategies employs as the steps or procedures used in learning for problem solving and they require direct analysis, transformation, or extracting the learning materials. Metacognitive strategies are used as the higher order executive skills which are followed by planning, monitoring or evaluating the success of a reading task. This study focuses only on the use of cognitive strategy, metacognitive strategy and the combined of cognitive and metacognitive strategy.

There is study related to the combined metacognitive and cognitive strategies on learning which is conducted in Iran done by Gazhorhani et al (2014) showed that the combined strategy is effective on improving the students' learning performance. It can be concluded that students who learn cognitive and metacognitive strategies and use them effectively, they can achieve progress in learning and doing assignments.

Holec (1981) in Ustunluoglu (2009) claimed that learning autonomy is the ability to take charge of one's own directed learning. Confessore & Park (2004) in Ng, Yusoff, Azis,

Confessore and Lajis (2011) described that functional learning autonomy is a range of capability and intention to engage in selecting and constructing learning experiences in which the learner may function independently or collaboratively with others. Besides, the level to which an individual is participated in functional learning autonomy is expressed in the extent that the learner actuates the learning process by making efficient and appropriate use of their personal resources and the resources of others.

## **Theoretical Framework**

### **Reading Comprehension**

McNamara (2007: 4) asserted that comprehension is not effortless and fast. When novice readers struggle over individual words, reading is slowed to a near halt and deeper levels of comprehension are seriously compromised. Purposeful, conscious, effortful, time-consuming strategies are applied to reconstruct or elicit a reading component that is not intact will be employed by the successful reader (McNamara, 2007: 4).

RAND Reading Study Group (2002: 11) defined reading comprehension as the process of simultaneously extracting and constructing meaning through interaction and engagement with written language. The words 'extracting' and 'constructing' is asserted to emphasize both the importance and the insufficiency of the text as a determinant of reading comprehension. There are three elements of comprehension. They are the reader who is doing the comprehending, the text that is to be comprehended, and the activity in which comprehension is part.

### **Guided Reading as the Ideals of Teaching Reading Comprehension**

Guided reading is a crucial approach in literacy education. Applied equivalently by other approaches such as shared reading, reading aloud, and independent reading, guided reading facilitates teachers in terms of the availability of effective support for students' literacy learning (Pacific Learning, 2002).

A teacher supports for learners in guided reading approach are: 1.) to select a text that is appropriate for a particular group of students who have similar reading ability, 2.) to introduce the text being talked to the students which is about the relevant experiences that they may have had, and 3.) to provide sensitive support for the students to "talk, read, and think their way purposefully through" the text as cited by Pacific Learning (2002).

### **Stages in Reading Lesson (Pre reading, During Reading and Post Reading)**

Reading teachers commonly interpret three well-defined stages in the reading lesson namely the pre-reading, during reading (while reading or guided reading) and postreading (after reading) stages (Hedgcock and Ferris (2009), Laverick (2002) as cited by (Grabe and Stoller, 2013: 247). It is appropriate that the reading stage offers a definite set of instructional purposes which followed by attention to specific strategies used by skilled readers in every stage. (Hedgcock and Ferris (2009), Hudson (2007) as cited by Grabe and Stoller, (2013: 248).

The purpose of Pre-reading stage is to activate the student's knowledge of the subject, to provide any language preparation that required in coping with the passage and to motivate the learners in intention read the text (Celce-Murcia, 1991) as quoted by Alemi and Ebadi (2010). The stage called as 'during reading' is reading stage that have to be concerned as well as 'pre reading' and 'post reading' stage. Last stage particularly post reading question unluckily deprive the teacher from a realistic assessment of students' reading abilities and steal students from developing their reading and critical thinking abilities from reading comprehension and the experience is having to be accountable for learners' reading and responses (Grabe and Stoller, 2014: 253).

### **Learning Strategy Instruction**

McNamara (2007: 4) claimed that reading strategies are also important for many adults who want to be considered as skilled readers. There are basically three arguments to shore up the claims why reading strategy is important. First, many readers do not know whether they are adequately comprehending text. Second Baker (1985); Otero & Kintsch, (1992) as stated by McNamara (2007: 4) explained that many readers have a false impression of comprehension when they read text because they insist on low levels of analysis as a criterion for adequate comprehension. McNamara (2007: 5) later added the third argument that nearly all adults have trouble in comprehending technical expository text at deep levels even though they are skilled readers.

Boulware-Gooden, Carreker, Thornhill, and Joshi (2007) as cited by Pressley et al. (1998) found that when students read many kind kinds of paper without strategy their comprehension was not enhanced. Boulware-Gooden, Carreker, Thornhill, and Joshi (2007) cited Pressley et al. (1998) stated that they proved it by conducting how one strategy affects the students reading comprehension.

O'Malley and Chamot (1995:210) suggested that CALLA is based on suggestion that language is a complex cognitive skill. It needs extensive practice and feedback in order to operate at an autonomous level. CALLA concentrate on acquisition and use of procedural skills

that facilitate academic language and content learning also on the learning to understand and communicate in the language to lead students be more proficient in the language. The most critical feature in cognitive theory incorporated in the CALLA model is the identification and training of learning strategies.

O'Malley & Chamot (1995: 203) propose three components of CALLA model in instructional design: topics from the major content subjects, development of academic language skills, and direct instructional in learning strategies for both content and language. They also propose that in CALLA language is used functional as a tool for learning academic subject matter. Students need instruction on how to transfer previously learned language skills to English. They put more attention in the third development of CALLA system, the instruction in learning strategies. The use of learning strategy instruction in CALLA seem to be as effective for learning a language as they are for learning in other areas. O'Malley and Chamot classify learning strategies into three types (1995: 207); Metacognitive strategies; Cognitive strategies; Social / affective strategies. In this study social / affective strategies does not include in the research.

### **Cognitive Strategy**

The term cognitive strategy refers to learners' cognitive actions that are completed in order to attain a particular learning aims or to bring about a learning task at hand (Mayer, 1988); Paris et al. (2001); Schneider & Weinert (1990) as cited in Saloovara (2005). Cognitive strategies are intentionally produced by the person and involve activity and control rather than senseless following rule. (Paris et al, 2001); Paris, Lipson & Wixton (1983) and Wade.

Consequently, in the best possible situation, cognitive learning strategies are deliberately chosen in accordance to the demands of the task at hand, and they followed by cognitive skill and motivational will. Hadwin and Winne (1996) as stated by Saloovara (2005) explained the intentionality issue by making a connection between goals and strategy use. They designated that the term 'strategy use' related to occurrence when learner define their own short-term purpose and general aims for learning, select, and manage their alternative study tricks. They are employed in order to support the learning goals achievement.

O'Malley and Chamot (1990) said that the cognitive strategies are closely related to specific learning tasks and they are used in the learning process, including repetition, translation, grouping, resourcing, note-taking, deduction, elaboration, imagination and inferencing. They (1990: 44) also define cognitive strategies as "operating directly on incoming information, manipulating it in ways that enhance learning." The cognitive strategies that are

applied in reading activities are entailed by including the related new words to a word in memory or writing down the main idea; outlining key points or making a short summary of the text. Those activities are completed in order to gain the comprehension of the texts.

Cognitive strategy is the use of the mind to solve a problem or complete a task and it enables student to perform a task. Cognitive strategies are useful tools in assisting the students.

### **Metacognitive Strategy**

Sen (2009) quoted Ashman & Conway (1993), stated that metacognitive strategies are associated on how the reader think and learn. As quoted by Cross & Paris (1988), Sen (2009) claimed that metacognitive strategies followed three skill techniques. They are planning, monitoring and evaluation.

Before starting any reading assignment, students must be informed on how to improve and use their planning, monitoring and evaluation skills. Hung and Thao (2014) explained that planning strategies in terms of reading are used before reading. Almasi, (2003) and Israel (2007) as quoted by Hung and Thao (2014), described that activating learners' background knowledge to make them prepared for reading is an example of planning strategies. It includes: previewing a title, picture, illustration, heading, or subheading can help readers grasp the overview of the text. Readers may also preview the general information in the text and its structure (Almasi, 2003); Paris et al. (1991) as quoted by Hung and Thao (2014).

Israel (2007) and Pressley (2002) as quoted by Hung and Thao (2014) explained that monitoring strategies happen during reading. Some examples of monitoring strategies are comprehension of vocabulary, self-questioning (reflecting on whether they understood what they have read so far), summarizing, and inferring the main idea of each paragraph.

Hung and Thao (2014) later proposed that evaluating strategies are performed after reading. For example, after reading a text, learners may think about how to apply what they have read to other situations.

O'Malley and Chamot (1990) point out that metacognitive strategies is higher order executive skills which involve knowledge about cognitive processes, regulation of cognition, self-management, planning for learning, monitoring and self-evaluating after the learning activities have been completed. Oxford (1990: 136) considers metacognitive strategies as "actions which go beyond purely cognitive devices, and which provide a way for learners to coordinate their own learning process". He says that metacognitive strategies are essential for successful language learning.

## **Learning autonomy**

Ustuluoglu (2009) offered the definition based on Holec (1981) which stated that learner autonomy is the ability of learners to take charge of their own directed learning. Ustuluoglu (2009) also claimed that this process followed by several variables which in accordance to Little's statements (2003), learning autonomy requires insight, a positive attitude, a capacity for reflection, and a readiness to be proactive in self-management. He claimed that it is the process of taking personal responsibility for one's own progress, and captures that this process requires self assessment in order to determine one's level of knowledge and skills. In this process, the learner is perceived as a decision maker, developer of and the possessor of the capacity to select the tools and resources appropriate to the task (Holec, 1985) and Dickinson (1995) as cited by Ustuluoglu (2009).

Imani (2014) later claimed that learning autonomy might be described as the stage to which learners are liberated to select their own learning materials and strategies, to practice language as far as they need, and to generate written or spoken form of language when they get ready. In addition, learning autonomy achieved through learner training and strategy training which have been described as methods of developing the skills that learner need for autonomy. (Benson, 2001) as quoted by Dafei (2007).

## **Research Methodology**

### **Participants**

The participants in this sixteen weeks training were 77 students of the fourth semester of the English Education Department from the Teacher Training and Education Faculty of the State Institute for Islamic Studies (IAIN) Salatiga. Simple random selection of participants was taken from the third semester of the 2015 academic year. The participants were then classified based on the scores of the questionnaire in which the results were counted using Likert scale. The participants are divided into three groups of trainings; cognitive strategy instruction consist of 27 students which is classified into 13 students in high level of learning autonomy and 14 students in low level of learning autonomy, metacognitive strategy instruction consist of 25 which classified into 11 students in high level of learning autonomy and 14 students in low level of learning autonomy; and the combined cognitive and metacognitive strategy instruction trainings consist of 25 students which are classified into 14 students in high level of learning autonomy and 10 students in low level of learning autonomy. There were three

research collaborators who taught academic reading and supported the research; they used different reading strategy instructions.

### **Instruments**

The reading comprehension test which is taken from the reading section of the TOEFL-Like test was used to assess students in pre-test and post-test. There were 50 items in a multiple choice format. Learning autonomy questionnaire was used to classify the students learning autonomy level. The questionnaire was adapted in part from Zang and Li (2004).

### **Research Procedures**

In the beginning and at the end of the study the participants took the reading comprehension pre-test and post-test. In each of reading class activities there were three stages including the pre-reading, while-reading and post reading. Each teacher trained the students using different strategy instructions. In each of strategy training; it took for about 100 minutes which lasted for 16 weeks including the pre-test and the post-test. The texts used for the treatments are taken from the printed authentic materials in the TOEFL-Like reading.

### **Data collection and analysis**

#### **A. Quantitative Analysis**

A quantitative-type of analysis is used to answer questions related to quantitative data. In this research, questions number 1 to 4 should be particularly analyzed using a statistical model. Two-way ANOVA is preferably used considering that there are two independent variables that account for one dependent variable. The independent variables are learning strategy instructions (cognitive, metacognitive, and the combined of cognitive-metacognitive) and level of learning autonomy (high and low), while the dependent variable is students' reading comprehension test scores. Thus, the factorial design in this analysis is 3 x 2 since there are three categories in strategy instructions and two categories in learning autonomy. The factorial design is represented in the following matrix.

Table 1: A 3 x 2 Factorial Design

	Learning strategy instructions		
Learning autonomy	Cognitive (X <sub>1.a</sub> )	Metacognitive (X <sub>1.b</sub> )	Cognitive-Metacognitive (X <sub>1.c</sub> )
High (X <sub>2.a</sub> )	X <sub>1.a</sub> + X <sub>2.a</sub>	X <sub>1.b</sub> + X <sub>2.a</sub>	X <sub>1.c</sub> + X <sub>2.a</sub>
Low (X <sub>2.b</sub> )	X <sub>1.a</sub> + X <sub>2.b</sub>	X <sub>1.b</sub> + X <sub>2.b</sub>	X <sub>1.c</sub> + X <sub>2.b</sub>

Following the factorial design, the obtained data will be analyzed through three steps, which are analyzing their descriptive statistics, assessing statistical model assumptions, and testing the significances.

### 1. Descriptive Statistics

Descriptive statistics are useful to give initial impressions of the obtained data. The sample size table shows that the number of sample size in each group of the learning strategy instructions is not equal. The sample sizes in cognitive strategy instruction, metacognitive strategy instruction, and the combined of cognitive-metacognitive strategy instruction are respectively 27, 25, and 25. These different sample sizes should not become a problem in a one-way ANOVA because this method can accommodate calculating groups with different sample size.

**Between-Subjects Factors**

	Value Label	N
ReadGroup	1 Cognitive	27
	2 Metacognitive	25
	3 Combination	25
LAGroup	1 Low	45
	2 High	32

The mean and standard deviation of learning strategy instructions and learning autonomy can be inspected in the following table.

**Descriptive Statistics**

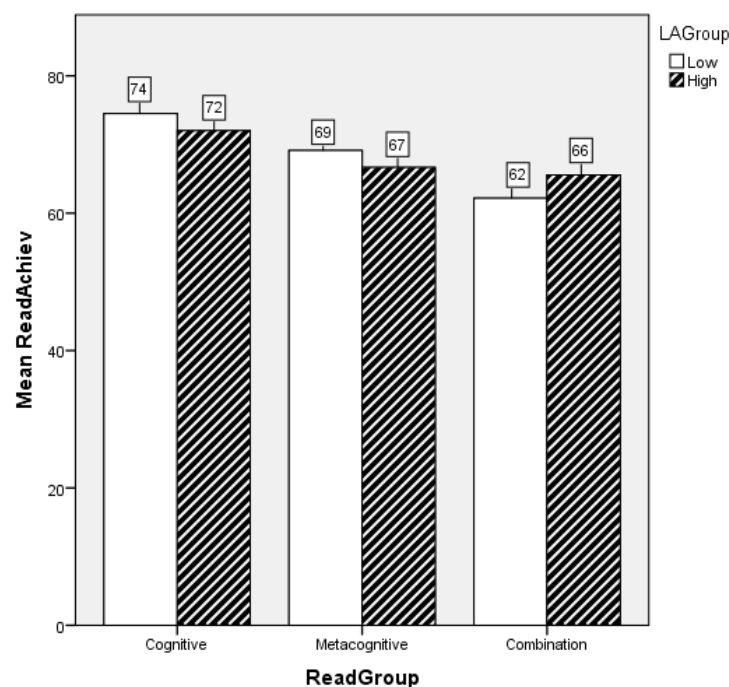
Dependent Variable: ReadAchiev

ReadGroup	LAGroup	Mean	Std. Deviation	N
Cognitive	Low	74.50	5.205	18
	High	72.00	6.764	9
	Total	73.67	5.765	27
Metacognitive	Low	69.12	6.459	16
	High	66.67	7.365	9
	Total	68.24	6.753	25
Combination	Low	62.18	4.600	11
	High	65.57	6.173	14
	Total	64.08	5.693	25
Total	Low	69.58	7.291	45
	High	67.69	7.036	32
	Total	68.79	7.201	77

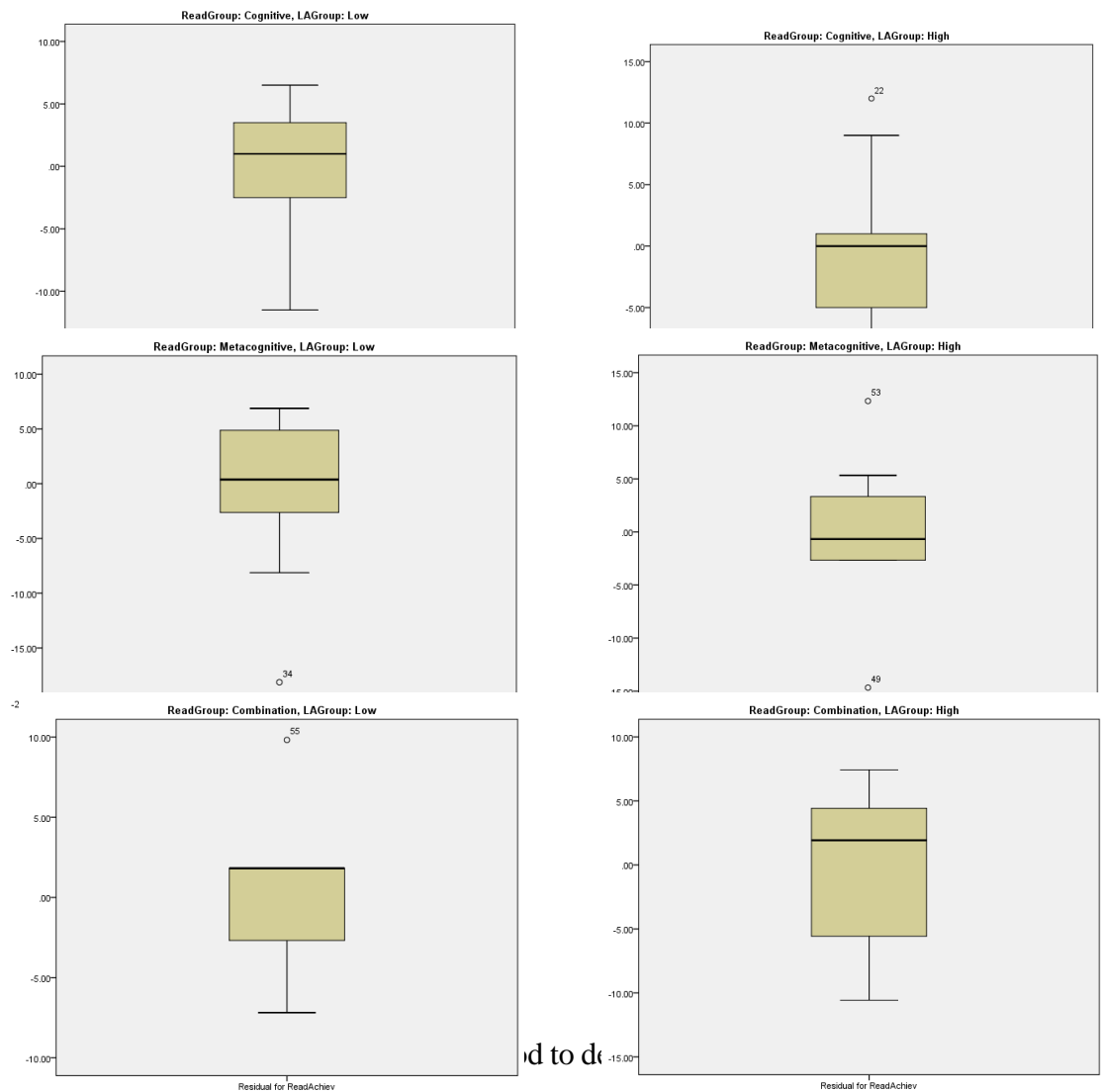
Inspecting the means is very essential because these means will be mainly used to determine whether the independent variables have any effects on the dependent variable. The table shows that students in cognitive and low learning autonomy score the highest mean among other groups (74.50). Interestingly, the mean of combined cognitive and metacognitive strategy instruction and low learning autonomy is the lowest among the others (62.18). Overall, the means in the combined of cognitive-metacognitive group are the lowest compared to the other reading groups. This may give a hint that we should suspect whether the combined strategy instruction is really better than the other learning strategy instructions in improving students' reading achievements. The graph below summarizes the means comparison across the independents variables.

## 2. Assumptions

Two-way ANOVA has three main assumptions that need to be considered. These assumptions must be met in order for two-way ANOVA to be accurately used. These three assumptions are discussed below.



### a. No Extreme Outliers



of outliers, which are common outliers and extreme outliers. Common outliers are illustrated by circular dots, while extreme outliers are illustrated by asterisks. The boxplots above show that there are several common outliers in the data. These outliers are more than 1.5 box-lengths from the edge of the box. Fortunately, ANOVA is robust against common outliers. In other word, the first assumption of extreme outlier is not violated.

### b. Normality

Normality test is used to assess whether data is normally distributed in each cell of the design. The most common normality test is Shapiro-Wilk test of normality. The rule of thumb in checking this assumption is if the p-value in each

cell is less than 0.05, the assumption is violated. Conversely, if the p-values is greater than 0.05, the assumption is not violated.

**Tests of Normality**

ReadGroup	LAGroup		Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
			Statistic	df	Sig.	Statistic	df	Sig.
Cognitive	Low	Residual for ReadAchiev	.194	18	.072	.897	18	.052
	High	Residual for ReadAchiev	.219	9	.200*	.923	9	.415
Metacognitive	Low	Residual for ReadAchiev	.189	16	.129	.865	16	.023
	High	Residual for ReadAchiev	.248	9	.119	.936	9	.538
Combination	Low	Residual for ReadAchiev	.255	11	.043	.905	11	.210
	High	Residual for ReadAchiev	.211	14	.093	.899	14	.107

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

than 0.05. The only group with p-value less than 0.05 is the metacognitive with low learning autonomy group (0.023). Regardless this one group, most data are normally distributed as assessed by Shapiro-Wilks' test ( $p > 0.05$ ). Additionally, ANOVA is robust against very minimum deviations from normality. Therefore, the assumption of normality is not violated.

**c. Homogeneity of Variances**

This assumption assesses whether variances of the dependent variable are equal in all combinations of groups of the independent variables. More specifically, Levene's test of equality variances is used to test the assumption.

**Levene's Test of Equality of Error Variances<sup>a</sup>**

Dependent Variable: ReadAchiev

F	df1	df2	Sig.
.403	5	71	.845

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + ReadGroup + LAGroup + ReadGroup \* LAGroup

The Lever

5) is greater than 0.05. Thus,

the variances are not significantly different. In other word, it can be said that the assumption of homogeneity of variances is not violated.

**3. Two-Way ANOVA Test of Significance**

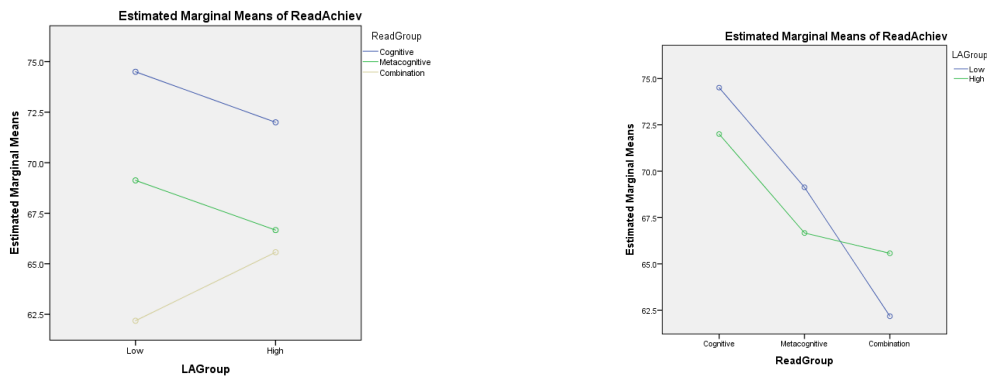
Two-way ANOVA is preferably used because it can help determine whether there is an interaction between two independent variables, in this case learning strategy instructions and students' learning autonomy. More specifically, the researcher is interested in determining whether the effect of learning strategy instructions on

students' reading comprehension is different for students with high and low learning autonomy.

Initial impression of whether there is an interaction between two independent variables can be obtained by visually inspecting the profile plots. When plotted, there are a number of ways in which two independent variables can be related. Simply put, if the lines are not parallel (e.g. the lines have different patterns, or cross each other, or overlap each

other), an interaction effect may exist. Alternatively, if the lines are parallel, an

int



The profile plot on the right shows that the two lines are not parallel and do in fact cross one another. When lines cross, they are called a disordinal interaction. These lines indicate that there may be an interaction effect between learning strategy instructions and learning autonomy on reading achievements.

On closer examination, students with low learning autonomy seem to have better reading comprehension achievements after being taught with cognitive strategy instructions and metacognitive strategy instructions. At the same time, students with high learning autonomy seem to achieve better after being taught with the combination of cognitive-metacognitive strategy instructions. However, it should be noted that this is only an initial impression. To better determine whether the two variables have a statistically significant interaction effect, Test of Between-Subjects Effects should be carried out. This test is part of two-way ANOVA procedures.

Tests of Between-Subjects Effects

Dependent Variable: ReadAchiev

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1347.360 <sup>a</sup>	5	269.472	7.378	.000	.342
Intercept	334523.808	1	334523.808	9158.622	.000	.992
ReadGroup	1073.933	2	536.966	14.701	.000	.293
LAGroup	4.896	1	4.896	.134	.715	.002
ReadGroup * LAGroup	139.259	2	69.630	1.906	.156	.051
Error	2593.315	71	36.526			
Total	368333.000	77				
Corrected Total	3940.675	76				

a. R Squared = .342 (Adjusted R Squared = .296)

The “Sig.” column presents the significance value (p-value) of the interaction effect. The p-value for the interaction effect of learning strategy instructions and learning autonomy is 0.156. This value is greater than 0.05, which means that there is no statistically significant interaction effect. In other word, the effects of learning strategy instruction on reading comprehension achievement do not depend on level of learner autonomy. In a more comprehensive report, it can be stated that there is no statistically significant interaction between learning strategy instructions and level of learning autonomy for reading achievements test scores,  $F(2, 71) = 1.906, p > 0.05, \text{partial } \eta^2 = 0.051$ .

It is customary to interpret and report the main effects when a statistically significant interaction effect cannot be reached because the main effects consider the effect of one of the independent variables on the dependent variable ignoring the levels of the other independent variable. In this case, learning autonomy is ignored and learning strategy instructions are considered to find any main effects on reading achievements, or vice versa. Additionally, Type III Sums of Squares Analysis should be conducted because this method is arguably the safer analysis to conduct than Type II Sums of Squares. In order to obtain the main effects values, another general linear model of two-way ANOVA will be revisited.

#### a. Main Effects of Learning strategy instructions on Reading Achievements

Before jumping into the main effects table, marginal means among learning strategy instructions should be considered to give a hint on further main effect values. Table below presents the marginal means of the learning strategy instructions.

**Estimates**

Dependent Variable: ReadAchiev

ReadGroup	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Cognitive	73.250	1.234	70.790	75.710
Metacognitive	67.896	1.259	65.385	70.406
Combination	63.877	1.218	61.449	66.304

ation of cognitive-metacognitive are respectively 73.25, 67.896, 63.877. These values imply that, on

average, reading scores are higher in cognitive method than in the other two methods. Additionally, the mean of reading scores in the combination method is the lowest among the learning strategy instructions. To confirm that these different values are significant, the main effects table needs to be inspected.

The table below presents the main effects values for each independent variables on the dependent variable.

**Tests of Between-Subjects Effects**

Dependent Variable: ReadAchiev

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1347.360 <sup>a</sup>	5	269.472	7.378	.000	.342
Intercept	334523.808	1	334523.808	9158.622	.000	.992
ReadGroup	1073.933	2	536.966	14.701	.000	.293
LAGroup	4.896	1	4.896	.134	.715	.002
ReadGroup * LAGroup	139.259	2	69.630	1.906	.156	.051
Error	2593.315	71	36.526			
Total	368333.000	77				
Corrected Total	3940.675	76				

a. R Squared = .342 (Adjusted R Squared = .296)

The values from the table show that there is a statistically significant main effect of the learning strategy instructions on the reading achievement test scores,  $F(2,71) = 14.701, p < 0.05, partial \eta^2 = 0.293$ . It can be concluded that the marginal means of learning strategy instructions are significantly different.

However, the main effects values do not inform where the differences in mean score between education levels lie. These differences between marginal means are presented in the following table.

**Pairwise Comparisons**

Dependent Variable: ReadAchiev

(I) ReadGroup	(J) ReadGroup	Mean Difference (I-J)	Std. Error	Sig. <sup>b</sup>	95% Confidence Interval for Difference <sup>b</sup>	
					Lower Bound	Upper Bound
Cognitive	Metacognitive	5.354 <sup>*</sup>	1.763	.010	1.032	9.676
	Combination	9.373 <sup>*</sup>	1.733	.000	5.123	13.623
Metacognitive	Cognitive	-5.354 <sup>*</sup>	1.763	.010	-9.676	-1.032
	Combination	4.019	1.751	.074	-.275	8.314
Combination	Cognitive	-9.373 <sup>*</sup>	1.733	.000	-13.623	-5.123
	Metacognitive	-4.019	1.751	.074	-8.314	.275

Based on estimated marginal means

\*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

The results show significant differences between cognitive vs combination, and metacognitive vs combination. Based on this, three conclusions drawn include:

- 1) Cognitive method is associated with a mean “reading achievement” score 5.354 (95% CI, 1.032 to 9.676) points higher than metacognitive method, a statistically significant difference,  $p < 0.05$ . This means that, on average, students taught with cognitive strategy instruction achieve better reading scores than those taught with metacognitive strategy instructions.
- 2) Cognitive strategy instructions is associated with a mean “reading achievement” score 9.373 (95% CI, 5.123 to 13.623) points higher than the combination of cognitive-metacognitive instructions, a statistically significant difference,  $p < 0.05$ . This means that, on average, students taught with cognitive method achieve better reading scores than those taught with the combination of cognitive-metacognitive strategy instructions.
- 3) Metacognitive method is associated with a mean “reading achievement” score 4.019 (95% CI, -0.275 to 8.314) points higher than the combination of cognitive-metacognitive method, however with no statistically significant difference,  $p > 0.05$ . This means that, on average, students taught with metacognitive strategy instructions do not achieve better reading scores than those taught with the combination of cognitive-metacognitive strategy instructions.

### b. Main Effects of Learning autonomy on Reading Achievements

Marginal means on the levels of learning autonomy should be considered to give a hint on further main effect values. Table below presents the marginal means of the levels of learning autonomy.

**Estimates**

Dependent Variable: ReadAchiev

LAGroup	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Low	68.602	.921	66.766	70.438
High	68.079	1.092	65.903	70.256

The mean values for low and high learner autonomy are respectively 68.602 and 68.079. These values imply that, on average, reading scores are slightly higher in low learning autonomy group than in high leaning autonomy group. To confirm that these different values are significant, the main effects table needs to be inspected.

**Tests of Between-Subjects Effects**

Dependent Variable: ReadAchiev

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1347.360 <sup>a</sup>	5	269.472	7.378	.000	.342
Intercept	334523.808	1	334523.808	9158.622	.000	.992
ReadGroup	1073.933	2	536.966	14.701	.000	.293
LAGroup	4.896	1	4.896	.134	.715	.002
ReadGroup * LAGroup	139.259	2	69.630	1.906	.156	.051

The values from the table show that there is no statistically significant main effect of the levels of learning autonomy on the reading achievement test scores,  $F(1,71) = 0.134, p > 0.05, \text{partial } \eta^2 = 0.002$ . It can be concluded that the marginal means of the levels of learning autonomy are not significantly different. Therefore, the pairwise table for the levels of learning autonomy is unnecessary.

The quantitative analyses have revealed quite interesting facts regarding the effect of learning strategy instructions and learning autonomy on students' reading comprehension achievement. Statistics provide values to address each of the research questions.

1. Is the use of combinations of Metacognitive and Cognitive Strategy instruction Trainings more effective than Metacognitive Strategy Training in teaching reading comprehension?

The use of the combination of cognitive-metacognitive method is not more effective than the use of metacognitive method in improving students' reading achievements,  $I-J = -4.019$  (95% CI, -8.314 to 0.275),  $p > 0.05$ .

2. Is the use of combinations of Metacognitive and Cognitive Strategy Trainings more effective than Cognitive Strategy Training in teaching reading comprehension?

Quite the opposite, the use of cognitive method is more effective than the use of combination of cognitive-metacognitive method in improving students' reading achievements,  $I-J = 9.373$ , (95% CI, 5.123 to 13.623),  $p < 0.05$ .

3. Do the fourth semester students of the English department who are in high learning autonomy have better reading achievement than those who are in low learning autonomy?

Students who have high learning autonomy do not have better reading comprehension achievements than those who have low learning autonomy,  $F(1,71) = 0.134, p > 0.05, \text{partial } \eta^2 = 0.002$ .

4. Is there any interaction between strategy trainings and learning autonomy in teaching reading comprehension of the fourth semester students of the English department at IAIN Salatiga in the academic year 2015/2016?

There is no statistically significant interaction between learning strategy instructions and levels of learning autonomy for reading achievements test scores,  $F(2, 71) = 1.906$ ,  $p > 0.05$ ,  $partial \eta^2 = 0.051$ .

### **Pedagogical Implications**

It is recommended that EFL Indonesian students must be trained using the learning strategy instructions to improve their reading comprehension. In this way, they could develop their reading comprehension skills. The success of strategy instruction training in this study depended on the initiatives of teachers who understood the students' learning autonomy level and the teachers' mastery on the strategy instructions. Teachers should be able to train them by creating an active learning environment based on the procedures of the learning strategy instructions.

Students should be motivated to take responsibility for their own learning in order that they could learn independently and, ultimately, become autonomous learners. Therefore, proper training was the key. The students should learn how to apply learning strategies instructions in selecting suitable reading materials and developing good reading habits.

### **Conclusion**

This study investigated students' use of learning instruction strategies including metacognitive strategy instructions and cognitive strategy instructions and the combined metacognitive and cognitive strategy instruction on students' reading comprehension. The findings showed that trainings on learning strategy instructions improve significantly students' reading comprehension, both for low and high level of learning autonomy students.

By the end of sixteen-weeks program, the students had better understanding of learning strategies instructions and, from their reading experience, could draw what steps they should take to achieve their reading goals. Once students could be responsible for their own learning, they were ready to become autonomous learners sooner or later.

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