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The Role of Metacognition (Metacomprehension) and Inferential Ability on Reading Comprehension Ability

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Abstract. In this study, the researchers explored the role of the metacognition component on reading comprehension ability and the role of reading comprehension ability in predicting the level of accuracy of metacomprehension. The first stage of research used experimental research to see the effect of inferential ability and metacognition on the reading comprehension ability. The second stage of research using the correlational method is used to study the relationship between the independent and dependent variables. This study involved 300 primary school students from 10 schools with a composition of 200 students involved in the first phase of research and 100 students involved in the second phase of research. Samples were taken randomly. The results show that the individual's reading comprehension ability can predict the level of metacomprehension accuracy. Metacognitive strategies that are carried out through planning, monitoring and evaluation have a significant impact on students' reading comprehension skills. Inferential-based questions have a significant impact on the accuracy of metacomprehension. In addition, the metacognitive component (metacomprehension), and inferential ability can improve students' reading comprehension skills, especially increasing inferential understanding. The implication of this research is that teachers can consider these aspects as well as optimise the role of these variables to enhance students' reading comprehension skills.

Keywords: reading comprehension; metacognition (metacomprehension); textual and inferential question; inferential ability

1. Introduction

The ability to read comprehension is currently needed by students along with the changing nature and pattern of questions that mostly measure high-level cognitive abilities, for example in PISA and ordinary school exams. Students who have good reading comprehension skills are able to solve problems that are at a

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high level. This reading comprehension ability can be improved by optimising the role of students' metacognition and inferential abilities (LaRusso et al., 2016; Ozturk, 2017). Metacognition is the ability for planning, monitoring, and evaluating the learning process and consists of two fundamental aspects, namely monitoring and control. The concept of metacognition began to develop following its introduction by Flavel (1979) with other researchers strengthening the concept of metacognition cognitive knowledge and cognitive regulation (Hayashi et al., 2018; Zhou et al., 2020). There is some knowledge involved in the metacognition process, including declarative knowledge which is used as an introduction to learning strategies, procedural knowledge as necessary steps, and conditional knowledge. Cognitive regulation is a process for monitoring and controlling learning and includes the planning process, information management, debugging strategies, evaluation, and monitoring the level of student understanding (Tarchi, 2017; Wulfemeyer, 2019). In this study, researchers focused on the understanding (metacognitive) monitoring regulatory sub-process.

Monitoring this understanding involves the skills of monitoring learning tasks and controlling learning activities to achieve goals accurately and efficiently. Monitoring and regulating these learning activities becomes a reciprocal process in the context of learning. In this study, the accuracy of cognitive monitoring was defined as the level of desire to know (Hadianto et al., 2021; O'Shea & O'Shea, 1994). Learners can be assessed through assignments, tests or exams as prospective assessments to predict student performance in the future. Global or holistic measurement is an alternative that can be used to interpret students' metacognitive monitoring abilities (Young et al., 2019). The suitability of an individual's assessment of his own performance with the student's original ability is known as the accuracy of monitoring or comprehension accuracy, while the discrepancy between self-assessment and student performance is called metacomprehension bias and is caused by overconfidence or lack of confidence. The accuracy of this metacomprehension used to measure cognitive monitoring is assessed using absolute and relative assessments in order to obtain detailed assessment results (Hadianto et al., 2022; Lim, 2020).

Cognitive monitoring is widely used in several domains. However, in this study, researchers focused on reading ability. Reading comprehension ability is an adequate mental representation skill generated through text and used to understand reading. Reading comprehension involves various cognitive aspects including word understanding, relationships between sentences and paragraphs, and the ability to understand the meaning of the text as a whole (Allen & Hancock, 2008; Banks, 2012). When students process texts, they enter into two levels, namely basic understanding (text-based) and inferential understanding. The success of this stage depends on the ability to relate the ideas in the text. Through this process, students elaborate on previous knowledge to understand new meanings in the text. Metacomprehension in reading involves a metacognitive process to optimise text understanding (Fletcher, 2009; Gier et al., 2009). The reader evaluates his level of understanding and mental representations through the reading process. Therefore, through this study, the researcher studied the absolute accuracy of metacomprehension, self-reporting of reading strategies, and reading results.

An efficient reader is aware of what she/he already knows and what she/he doesn't when reading new information. That's when readers understand specific actions that can optimise the efficiency of their understanding of new information. Awareness of this process is called metacognitive and is the most important aspect in supporting the success of the learning process. The ability of the teacher to monitor the learning process is an important point of metacognition so that the teacher can determine the level of students' understanding of the material being studied as to whether it meets the criteria or not. When individuals know their shortcomings, they will be better able to regulate their own actions to optimise their understanding. A reliable reader knows when they have gained adequate knowledge of the text. If the reader understands that his level of understanding of a text is not sufficient, the reader will be involved in the next process, namely the monitoring stage and the controlling stage. This stage is the most important stage in reading metacomprehension. Metacognitive strategies can be said to be effective if readers have the right understanding of their level of understanding of a text (Cantrell & Carter, 2009; LaRusso et al., 2016).

When readers reach that level they have already reached a high level of metacomprehension. However, when the reader does not yet have a poor level of metacomprehension, the reader will not be able to properly manage their efforts. For example, if a student has poor metacomprehension skills, when they face an exam they may spend a lot of time studying, but they are not able to measure their level of understanding or mastery of the topic or material being studied, so they are not sure of their abilities. This can also happen to students who are too confident when studying, so that during exams they get poor results because they are unable to measure the adequacy of their learning.

The phenomenon that describes the low level of student metacomprehension in Indonesia is that there are still many students who study hard but have not been able to achieve their targets, for example, passing exams satisfactorily or passing college entrance exams and this happens in almost all parts of Indonesia, including the Ciamis area. This phenomenon occurs because the teacher has not been optimal in conveying effective reading methods and, at the same time, how to measure students' own reading results, so that students have an awareness of the ability of the reading results. So, this research is very important because, through metacognition or metacomprehension, students can measure the results of reading themselves and are able to gain inferential ability to understand difficult questions or instructions (Ness, 2011; Ozturk, 2017). This has been investigated by several previous studies. The main goal of learning to read is to achieve a good level of metacomprehension and to develop methods or interventions to improve students' reading skills. There are several previous studies examining various methods to improve reading ability (Mulyati & Hadianto, 2022; Lim, 2020; Zhou et al., 2020). However, in this study, the researcher focuses on two aspects of readers' metacomprehension. First, the researcher studied the metacognitive component that can predict reading comprehension which was tested through questions with a basic level of understanding (text-based) and questions that required deeper understanding (inferential reasoning).

Furthermore, the researcher studied the relationship between reading comprehension skills and the level of accuracy of metacomprehension, textual and inferential. Through the focus of this research, researchers can obtain information about the relationship between reading comprehension and metacognitive, for example, the skill of evaluating level of understanding. Although, several previous studies provide evidence of the benefits of metacognitive knowledge, it is still unclear how it relates to reading comprehension skills. Previous studies including research on the role of verbal cues to see the relationship between metacognition and reading strategies are still unclear and have no impact (Banks, 2012; Bui & Fagan, 2013; Kane et al., 2014). In addition, another study found that interventions used to improve metacomprehension had no significant impact on reading comprehension skills, while another found that the relationship between reading comprehension tests and reading awareness tests was weak. These studies still do not clearly describe the role of metacomprehension in reading comprehension. Before the researcher formulates the literature review of the effect of metacognition on reading comprehension, we will explain the conceptualisation of monitoring comprehension. In monitoring understanding, there are different processes, namely evaluation and regulation. Based on this view, reader monitoring can be said to be successful when readers realise that they have not fully comprehended some parts of the text, then they will make serious efforts to improve their understanding, for example, by repeating reading. Thus, there is a difference between the monitoring process (evaluating understanding) and regulation (improving understanding). The researcher adopted this concept to study metacomprehension and its effect on reading comprehension.

2. Literature Review

2.1 Metacomprehension Accuracy

Based on previous studies that have been carried out, the current metacomprehension accuracy of students is still low. This is due to the fact that the teacher has not been optimal in delivering reading strategies that can measure the results of reading by the readers themselves. Several studies involving students to make predictions on the results of reading prove these predictions are still weak. Although predictions are made at a basic level, the results obtained are still low in accuracy (LaRusso et al., 2016; Ozturk, 2017). Measurement of metacomprehension accuracy uses students' ability to predict overall understanding and predict the results of information contained in the text and is conceptual, for example, definitions. The relationship between prediction and performance is used as a measurement evaluation. Students can be said to be successful in evaluating their level of understanding when they are quite accurate in predicting their level of understanding.

Several researchers conducted an analysis of the relationship between evaluation and reading comprehension (Lim, 2020; Ozturk, 2017; Pacello, 2014). The result of the findings based on 40 previous studies is the correlation between evaluation and reading comprehension level is at 0.30. This low correlation explains that there may be distortions that cause the relationship between predictions and reading comprehension scores to have a low level of precision in the evaluation.

Other studies have shown that there is an increase in the accuracy of metacomprehension when text elements are part of the comprehension assessment. The assessment must also ask for all the information contained in the text. So, the researcher can conclude that, to measure the level of reading comprehension ability, it must include the components of the text as well as the relationship between these components. When comprehension assessments focus on a specific material, the relationship between prediction and performance decreases (Ness, 2011; Yousuf et al., 2021). Metacomprehension can also be affected by the length of the text. Long texts will make it difficult for readers to make accurate predictions about their understanding and cause low metacomprehension accuracy. These studies use a relative accuracy index, while in this study the measurements were carried out using absolute accuracy.

Another aspect that interferes with the low level of metacomprehension accuracy is that teachers may use different ways of assessing students' understanding levels. Distraction level theory assumes that, when a reader assesses his or her own understanding, it is influenced by cues that originate from the reading disorder (Majumdar et al., 2021; Martins & Capellini, 2021). Based on inferential assumptions, the metacomprehension assessment was carried out based on the example of the disorder. There are several factors that interfere with students' reading comprehension, including foreign words, pronouns, incomplete understanding and so on. The more distractions, the teacher tends to conclude that the text has been misinterpreted by the reader. Metacomprehension assessment serves to study the extent to which the primary assessment describes predictive reading comprehension test performance. The reader concludes that long text will affect the results of the reading test (Lim, 2020; Muijselaar et al., 2017). If length is related to the level of difficulty, the accuracy of the assessment will be high. However, this is not always the case. So, interference can occur at various levels, namely in the text and the situation. The assumption of representation becomes very important in metacomprehension. This is the focus of this research.

2.2 Level of Representation and Metacomprehension

There are three levels in processing information while reading, namely the linguistic level, the text-based level, and the situation level. The linguistic level is the level of reading which in the process involves knowledge of the meaning of words or terms and understanding of syntactic relationships between sentences (Bui & Fagan, 2013; Connor et al., 2018). The text-based level is the level of the reading process by capturing meaning through integration between paragraphs. The third level is the level of the situation model. This level involves combining textual information with schemata or previous knowledge that the reader already has (Ghaemi & Ghaemi, 2011; Mckee, 2012). So it can be concluded that reading comprehension is a constructed mental operation. In the reading process, the reader involves an inferential process by involving the reader's schemata to produce a deeper understanding of the text he reads. This happens because the reader involves a semantic component into the mental representation of new information in the text. Thus, conclusions have an important role in the quality of mental representations.

Several previous studies demonstrated that better inferential ability will have a significant impact on reading comprehension ability. This is in accordance with the phenomenon in the field that students who have difficulty in understanding the text will find it difficult to conclude. This good inferential ability requires prior knowledge and information from the reader to draw conclusions from the reading results. Other studies have also shown that teaching inferential skills has a significant impact on reading comprehension skills. For example, research to develop Self-Explanation Strategy Training (SERT) which aims to teach reading strategies to students by involving self-explanation and encouraging students to produce general conclusions. Another study also shows that there is a positive relationship between drawing conclusions from text elements and performance as measured through reading comprehension questions. So, the reader's meta-understanding ability is greatly influenced by his inferential skills (Bohlmann & Downer, 2016; Bracken & Fischel, 2008).

Specifically, metacomprehension assessment requires careful evaluation. Readers with good and poor inferential skills will base their reading judgements on different information. For example, readers with high inferential skills are likely to encounter interference at the level of representation of the situation model. Readers with high inference abilities are more intense in drawing conclusions and obtaining information by involving prior knowledge. Readers like this will be better able to get a deeper understanding. Readers who have low inferential skills tend to draw few conclusions and do not notice disturbances at the level of representation of the situation model, but will have more difficulty at the text-based level or gain knowledge based on the text. Other research confirms that the quality of mental representation has a positive influence on the accuracy of metacomprehension (Cabell et al., 2021; Curenton & Justice, 2008). If the reader can draw the right conclusions, they have better metacomprehension accuracy because they use signs at the level of the situation model rather than at the text-based level.

This concept is supported by several previous studies which state that the accuracy of metacomprehension can be improved using certain methods during or after reading. This is done to develop a mental representation that is more-complete and easy to obtain (Lim, 2020; Tarchi, 2017). This method can be in the form of ranking keywords, explaining to yourself while reading, and constructing a concept map. This concept can be related to the Kintsch model which states that the reader will find it easier to access a more complete model of the text situation if they make a summary after reading. This can also happen to readers who make keywords; the reader's metacomprehension assessment will be more in line with reading comprehension tests. This allows students to be able to make valid assessments. In the study of Anderson and Thiede (2003), the value of metacomprehension accuracy was higher for the group that made a summary than the group that did not make a summary. This study was re-examined on long and short texts with the result that the reader's mental representation had an effect on students' metacomprehension. In addition, mental representations also encourage readers to engage in inferential processes, which can increase the accuracy of metacomprehension.

Based on the preliminary explanation and theory above, through this research, the researcher focuses on studying the role and relationship of metacognitive knowledge with the level of understanding of readers at various levels, namely linguistic level, text level and situation level. By focusing on the object of this research, the researcher formulated this research in two studies, namely the role of metacognition (planning, monitoring, and evaluation) on reading comprehension skills at the text-based and inferential levels, the second study looking at the role of reading comprehension performance on the absolute accuracy level metacomprehension. Based on the research objectives, the researchers formulated the following research questions:

1) What is the role of metacognition (planning, monitoring, and evaluation) performed by students on students' understanding levels at the textual and inferential levels?
2) What is the difference in the role of metacognition on the level of understanding at the textual and inferential levels?
3) What is the role of reading comprehension in predicting absolute accuracy of metacomprehension?
4) How is the relationship between absolute accuracy of metacomprehension and reading comprehension performance based on inferential and textual question types?

3. Methodology

Based on the formulation of the problem proposed, this study divides the method based on two phases. The first study is used to answer the formulation of the first and second problems, namely 1) What is the role of metacognition (planning, monitoring, and evaluation) performed by students on students' understanding levels at the textual and inferential levels? 2) What is the difference in the role of metacognition on the level of understanding at the textual and inferential levels? while the second study was used to answer the third and fourth problem formulations, namely 3) What is the role of reading comprehension in predicting absolute accuracy of metacomprehension? 4) How is the relationship between absolute accuracy of metacomprehension and reading comprehension performance based on inferential and textual question types? Researchers used different methods and samples at both stages of this research because they adjusted to the formulation of the problem posed and avoided bias in the research results. This study uses the same text material so that it allows bias from reading results if using the same student sample.

The first phase of research used experimental research to see the effect of inferential ability, metacognition on reading comprehension ability. The second stage of research uses the correlational method to study the relationship between the independent and dependent variables.

3.1 The Research Method of the First Study

3.1.1 Participants

The first study research involved 200 primary school students with 100 female students and 100 male students drawn from 10 schools in the Ciamis City area. The age of students is in the range of 5-7 years (M=13.05, SD=1.20). The first phase of research used experimental research to see the effect of inferential ability,

metacognition on reading comprehension ability. The schools involved in this study were public and private schools. Students selected in the sample are students who have relatively the same or close to national exam scores.

3.1.2 Measuring Metacomprehension Skills

Students' metacomprehension skills were measured using a reading awareness scale commonly used for students aged 5-7 years. The reading awareness measurement scale consists of 56 multiple choice questions with three choice answers to assess three dimensions of metacomprehension, namely planning, monitoring, and evaluation. This measurement scale was adopted to measure students' metacognitive competence by providing opportunities for students to self-assess. Questions on the planning dimension are used to determine the selection of reading strategies, the monitoring dimension to determine the ability to adjust attention and effort during reading, and the evaluation dimension to determine whether students' understanding levels have met the criteria or not. Questions to measure reading awareness are listed in Table 1. The measurement dimension of reading awareness is related to the concept of regulation while reading, while the evaluation dimension is related to self-assessment related to reading comprehension. The measurement of reading awareness has been tested for reliability and validity. The empirical reliability test was carried out on students, while the validity test was carried out through expert judgement conducted by six reading experts with doctor qualifications. From the test results, Cronbach's internal consistency reliability coefficient meets the criteria for use with a value (α = .69, Planning; .72, Monitoring; .74, Evaluation: 75). The instrument used in this study is the result of the conversion of the theory of reading comprehension concepts from Pacello (2014) and Hayashi, Seta, and Ikeda (2018).

Table 1. Measurement of Reading Awareness of Each Dimension

Metacognition Dimension	Question and Point
Planning	What do you do before reading? a) I don't plan anything before reading. [0] b) I consider the important points of the text before reading. [2] c) I choose a comfortable place and position to read. [1]
Monitoring	What do you do while reading a book when you come across a difficult passage? a) I pause and think about the passage to understand it [2] b) I stop reading because there are parts I don't understand. [0] c) I keep reading and delay to understand the passage until the end. [1]
Evaluation	Is evaluation important in carrying out reading activities? a) I think it is useful to assess the extent of my understanding. [2] b) I think evaluating understanding is good but it should be done by the teacher [1] c) I think that evaluating does not improve my understanding. [0]

3.1.2 Measurement of Reading Comprehension Test

The level of understanding of students' reading results was evaluated by using texts about social phenomena in this study. Discourse is made by collaborating with discourse experts and validated by expert judgement. Questions to measure understanding used the construction-integration model. This model is used to classify questions. The questions consist of 20 questions with a composition of 10 questions for basic text-based and 10 inferential questions. For text-based questions (textual), the answers are contained in the text explicitly. However, the inferential question, the answer requires the ability to draw the right conclusions because it is not explicitly stated. The researcher uses a rubric to assess the correct answer. The score ranges from 0-2. 0 for wrong answer, 1 for correct answer but incomplete or still weak, 2 for correct and complete answer. The average length of the text is 450 words. The total score range obtained is 0-40. Each student gets a score according to the performance of the reading results, namely being able to answer textual and inferential questions. Students who have a coherent mentality during or after reading will be better able to solve inferential questions. However, students who are only able to answer textual questions, their level of understanding is still limited. Cronbach's reliability coefficient value meets the criteria with values: textual questions: 0.75; inferential questions: 0.84.

The reliability test of the reading comprehension test instrument was conducted empirically on students and the validity test was carried out through expert judgement conducted by six reading experts with doctoral qualifications. From the test results, Cronbach's internal consistency reliability coefficient meets the criteria for use with a value ($\alpha = .89$). The instrument used in this study is the result of the conversion of the theory of reading comprehension concepts from Pacello (2014) and Hayashi, Seta, and Ikeda, (2018).

3.1.3 Procedure

The research was conducted with the permission of the relevant institution. After obtaining permission, data collection began by completing a 50-minute reading awareness test. After that, students were given an expository text about social phenomena. Students had 50 minutes to read. After the reading process was complete, a reading comprehension test was carried out. The results of this test were then processed and presented in the form of descriptive statistics on the results.

3.1.4 Data Analysis

The researcher selected the deviant data obtained from the reading awareness scale, reading comprehension test, and evaluated them before the analysis was carried out. This deviation analysis found 14 deviations (six in the planning stage, eight in the evaluation stage of the reading awareness scale). These deviations were identified through casewise diagnostics in regression by determining the standard residuals outside the three components of the standard deviation. From the number of samples assessed, the researcher eliminated the deviant data and then analysed the data on 186 other results. The data were then tested for normality, homogeneity, and linearity. Descriptive statistics are presented using the reading awareness and reading comprehension performance scales in Table 2 in the results section. To answer the formulation of the first problem, the

researcher calculates the zero-order Pearson correlation coefficient and the results are presented in Table 3. To answer the second problem formulation, a series of simultaneous tests or standard least squares regression was carried out. Comprehension performance was recorded on each metacomprehension component on the proportion of variance. This was done to adjust the p-value reasoning by adjusting it with Bonferroni's analysis.

3.2 Research Methods Second study

3.2.1. Participants

The sample from the first study was selected to be 100 students from five primary schools in the Ciamis area consisting of public and private schools. The second stage of research used the correlational method to study the relationship between the independent and dependent variables. Different students were involved in the second phase of the study to avoid bias in the results. Students were randomly selected to participate in the study. The composition of the sample is 50 male and 50 females with an average age of 12.50 (SD = 0.80).

3.2.2 Measurement of Reading Comprehension Test

Students' reading comprehension ability was measured using two texts, namely about natural phenomena (natural disasters) and social phenomena (social gaps). This text is used to assess the accuracy of metacomprehension as well. The text has an average length of 350 words and contains both textual and inferential questions. There is a total of 20 questions from two texts with a composition of 10 textual questions and 10 inferential questions. Internal reliability coefficient using Kuder-Richardson 20 with test results showed social phenomena text: 0.75 and natural phenomena text 0.70.

3.2.3 Metacomprehension Accuracy Measurement

Assessment of metacomprehension accuracy was carried out after finishing reading by asking students to do a thorough assessment of the number of questions they believe will be answered correctly on the test. This method is carried out on textual and inferential questions separately. In the literature, this metacognitive monitoring is known as global prospective trust in performance appraisal. This global assessment is done by analysing per item. This analysis will provide more optimal results. The results of this assessment are juxtaposed with the results of students' real performance on each type of question (textual and inferential) separately, so that researchers can produce an absolute monitoring accuracy index for each type of question. The researcher chose to use the absolute accuracy approach because this assessment was considered more comprehensive and precise. The score was calculated by comparing students' global predictions regarding performance assessment (when finished reading and the test had not been carried out) with the results of students' actual scores on each set of textual and inferential question types with a total of 5 in each text. A score of 0 is used to indicate a perfect or precise curation, the higher the value or the farther from the number 0, the worse the level of accuracy of the metacomprehension. The researcher uses absolute accuracy measure because this accuracy can measure metacomprehension precisely. Students who are good at predicting future performance will have a greater ability to take appropriate action in learning to read. So, if students get good calibration, they will be better able to optimally

understand the material they are studying because these students can take appropriate action.

3.2.4 Procedure

When students finish reading the first text, students make predictions about their reading results. Next, students answer the questions according to the text they read. Students repeat the process for the next text. The study lasted about 60 minutes. The texts were presented alternately in this second study for balance. Grade 7 students were asked to read and immediately asked to make a performance assessment of the results of reading texts about natural phenomena, then carried out on social phenomena texts.

3.2.5. Data Analysis

Before analysing the data, the researcher conducted data filtering. The data obtained were tested for normality and linearity. In this study, the researcher did not find deviant data, so all data were included for analysis. Researchers conducted a standardised least squares regression test simultaneously on each metacomprehension accuracy score (textual and inferential social phenomena texts and textual and inferential natural phenomena texts). In the final session, the researcher studied the effect of textual and inferential question types on students' reading comprehension results and students' metacomprehension accuracy in each text. Researchers analysed the data using MANOVA separately so that the effects of performance and metacomprehension accuracy could be described more clearly. The researcher controlled for the reduction in error rate using the Bonferroni adjustment.

4. Result

Descriptive statistics of students' reading comprehension results are presented using a reading awareness scale to answer the formulation of the first problem, namely what is the role of metacognition (planning, monitoring, and evaluation) performed by students on students' understanding levels at the textual and inferential levels? Of the three dimensions of metacognition, the highest average is owned by the planning dimension, followed by the monitoring dimension, and finally the evaluation dimension. This indicates that almost every student does planning when they are going to read. The role of metacognition (planning, monitoring, and evaluation) on reading comprehension outcomes is shown in Table 2. Reading results tested with textual (M=8.78) and inferential (M=11.79) questions illustrate that the role of metacognition in reading comprehension is very important and has a significant impact on improving inferential reading comprehension skills because, through metacognition, the reader can control his reading ability before, during, and after reading. To answer the second problem formulation, namely what is the difference in the role of metacognition on the level of understanding at the textual and inferential levels? the correlation between variables is explained as shown in Table 3. The correlation between variables shows a positive correlation. It is interesting that the planning metacognition component correlates more strongly with questions to test inferential understanding than with textual questions. Based on the results of simultaneous regression, it shows that the metacognition component (planning, monitoring, and evaluation) is a strong predictor of inferential understanding

F(3.170) = 7.38, p = .001, R2 = .12, but not a strong predictor of textual questions F(3.170) = 2.45, p = 0.06. Questions that are textual in nature are influenced by the monitoring dimension. The monitoring dimension has a significant impact on the textual reading comprehension results (p = .07) as listed in Table 4. Based on the results of the simultaneous regression, the dimensions of monitoring and evaluation are significant predictors of inferential understanding, but the strongest predictor is the evaluation dimension. Questions about students' self-evaluations were effective in predicting students' inferential understanding abilities.

Table 2. Descriptive statistics of awareness and performance scales on textual and inferential reading comprehension

Component	M	SD	Min	Maxi	Skew	Kurtosis
Reading Awareness						
Planning	38.41	5.78	26.00	49.00	−0.20	−0.40
Monitoring	23.87	4.41	16.00	31.00	−0.38	−0.45
Evaluation	18.58	3.70	14.00	27.00	−0.30	−0.28
Reading Comprehension						
Textual	8.78	4.12	2.00	13.00	−0.41	−1.12
Inferential	11.79	4.30	0.00	18.00	−0.48	−0.54

Study 1.
N = 200

Table 3. Correlation matrix between question types and metacognitive dimensions

Component	1	2	3	4	5
1. Textual	–	.64**	.15*	.17*	.19*
2. Inferential		–	.24*	.11	.32**
3. Planning			–	.43**	.34**
4. Monitoring				–	.26*
5. Evaluation					–
Skew	−0.40	−0.38	−0.48	−0.80	−0.50
Kurtosis	−1.08	−0.45	−0.05	0.34	0.48

Study 1.
N = 200
* p < .05
** p < .01 (one-tailed)

Table 4. Standard regression of reading comprehension, textual and inferential, based on cognitive dimension

Predictor	B+ (CI95%)	β−	T	p
Textual Performance				
Planning	0.04 (−0.09, 0.15)	0.07	0.75	0.48 ns
Monitoring	0.13 (−0.05, 0.30)	0.15	1.50	0.16 ns
Evaluation	0.13 (−0.07, 0.32)	0.12	1.28	0.23 ns
Inferential Performance				
Planning	0.15 (0.03, 0.30)	0.17	2.03	0.040*
Monitoring	−0.05 (−0.26, 0.18)	−0.05	−0.40	0.75 ns
Evaluation	0.46 (0.20, 0.70)	0.30	3.55	0.002**

The metacomprehension accuracy scores of each text are presented to answer the third and fourth problem formulations, namely what is the role of reading comprehension in predicting absolute accuracy of metacomprehension? and how is the relationship between absolute accuracy of metacomprehension and reading comprehension performance based on inferential and textual question types? Descriptive statistics on reading comprehension are presented in Table 5. Based on Table 5, it was found that the type of text greatly influences the type of textual (text-based) questions. Metacomprhension accuracy scores for each type of question and type of text are presented in Table 6. Pearson's zero-order coefficient correlation is presented in Table 7. The relationship between reading results and metacomprehension accuracy shows a negative correlation as listed in Table 7. This shows that the ability to read comprehension greatly impacts on the accuracy of metacomprhension. The higher the reading comprehension ability, the lower the calibration error. This is a function of the method used, namely calculating absolute metacomprehension accuracy. The correlation coefficient value in Table 7 explains that the accuracy of metacomprehension is closely related to the type of question, both inferential and textual. Text-based reading performance (textual) has a stronger correlation with metacomprehension scores than inferential reading performance. Based on the standard regression results, inferential questions on social inequality texts are significant predictors of metacomprehension accuracy with values of F(4.84) = 43.12, p = .001, R2 = .54. The performance of textual questions on social inequality texts is able to predict the accuracy of metacomprehension, but it is not too significant with a value of (F=4.51) = 25.13, p = .001, R2 = .38. This pattern is also shown in the text of natural disasters. The performance of inferential questions can better predict students' metacomprehension accuracy. The performance of inferential questions has a value of F(4.84) = 30.41, p = .001, R2 = .43, while the performance of textual questions has a value of F(4.71) = 29.45, p = . 001, R2 = 0.41. The results of the standard regression model are listed in Table 8.

Table 5. Descriptive statistics of performance based on the type of questions and text

Question Type	Natural Disasters				Social Inequality			
	M	SD	Skew	Kurtosis	M	SD	Skew	Kurtosis
Inferential	1.78	1.05	0.61	0.30	1.91	1.18	0.30	0.04
Textual	2.50	1.34	0.10	−0.94	3.01	1.55	−0.30	−1.05

Study 2.
N = 100

Table 6. Descriptive statistics of metacomprehension accuracy based on types of questions and texts

Question Type	Natural Disasters				Social Inequality			
	M	SD	Skew	Kurtosis	M	SD	Skew	Kurtosis
Inferential	2.17	1.15	0.50	0.20	2.10	1.20	0.15	−0.55
Textual	1.60	1.15	0.40	−0.45	1.55	1.12	0.89	1.04

Table 7. Correlation of reading comprehension performance and metacomprehension accuracy

Text	1	2	3	4
1. Natural Disasters Performance	–	.20*	−.71**	.02
2. Social Inequality Performance	.94**	–	−.10	−.62**
3. Natural Disasters	−.65**	−.55**	–	−.07
4. Social Inequality	−.64**	−.75**	.40**	–

N = 100

Based on Table 7, students' reading comprehension ability depends on their level of understanding whether it is deep or still not optimal. To answer the fourth problem formulation, from Table 7 we can see that the relationship between the results of reading comprehension and metacomprehension accuracy shows a high correlation on inferential level questions (r value = 0.34-0.94. This pattern does not occur in textual questions. The relationship between reading comprehension results and metacomprehension accuracy on textual questions is lower with a value of r = 0.07-0.064. Based on the accuracy index, a high value means that it has a larger calibration error and a negative correlation indicates that the higher the comprehension performance, the lower the calibration error. One-way MANOVA test on the ability to read text comprehension Natural Disasters and Social Inequality found that the type of textual or inferential questions significantly affected students' reading outcomes with a value of F(2.180) = 18.34, p < .001, 2 = .170. The improvement of reading ability based on the type of question includes 1) the result of reading comprehension on Natural Disasters text obtained the value (1.180) = 16.70, p <.001, 2 = 0.090, while the results of reading comprehension on the Social Inequality text obtained the value of F(1.175) = 33.20, p <.001, 2 = 0.160. The reading comprehension performance of students on textual questions in both texts (Natural Disasters (M = 2.50, SD = 1.34) and Social Inequality (M = 3.01, SD = 1.55) was superior to the performance of students' understanding of the type inferential questions (natural disaster, M = 1.78, SD = 1.05; social inequality, M = 1.91, SD = 1.18) To answer the fourth problem formulation, Table 8 showing the results of the calculation of the standard ability regression test present reading comprehension of students on each type of question and both types of text.

Table 8. Standard regression results of textual and inferential reading comprehension performance in both texts

Predictor	B+ (CI95%)	β−	T	p
Textual Absolute Accuracy				
Social Inequality Performance				
Inferential	0.10 (−0.07, 0.26)	0.09	1.20	0.25 ns
Textual	−0.45 (−0.56, −0.32)	−0.63	−6.98	0.001**
Natural Disasters Performance				
Inferential	−0.09 (−0.30, 0.11)	−0.09	−0.93	0.40 ns
Textual	−0.52 (−0.68, −0.40)	−0.63	−7.20	0.001**
Inferential Absolute Accuracy				
Social Inequality Performance				
Inferential	−0.73 (−0.90, −0.60)	−0.75	−9.60	0.001**
Textual	0.01 (−0.12, 0.14)	0.15	0.20	0.90 ns

Natural Disasters Performance				
Inferential	−0.70 (−0.90, −0.52)	−0.70	−7.65	0.001**
Textual	0.04 (−0.13, 0.20)	0.05	0.43	0.70 ns

Study 2.
N = 100 *p < .05 **p < .01 ns Non-significant

Based on the results of the metacomprehension test, the type of question (textual and inferential) had a significant impact on the accuracy of metacomprehension in all multivariates with a value of F(2.182) = 9.60, p <.001, 2 = .103. Based on the results of the univariate test, the type of question also has a significant effect on the Natural Disasters text having a value of F(1.183) = 10.95, p = .001, 2 = 0.063 and the Social Inequality text F(1.180) = 11.01, p = .001, 2 = .062. When compared from the two texts, the metacomprehension accuracy of students in the textual type (Natural Disasters, M = 1.60, SD = 1.15; Social Inequality, M = 1.55, SD = 1.12) was higher than the inferential type. Based on these findings, it can be concluded that the accuracy of students' metacomprehension on the textual question type is consistently better than the metacomprehension accuracy on the inferential question type. This pattern is found in both texts.

5. Discussion

In the phase 1, the researcher revealed the role of metacognition (planning, monitoring, and evaluation) on the level of reading comprehension by looking at students' performance in answering textual and inferential types of questions. Metacognition monitoring is done by self-reporting. In the second phase, the researcher conducted an absolute global metacognitive assessment on the level of students' reading comprehension which was carried out after reading the text (Chen et al., 2016; Susantini et al., 2021). The first research findings include the level of knowledge in evaluating students' reading which is assessed by reading awareness and there is a significant relationship to students' ability to answer inferential type questions. This finding shows that evaluative reading comprehension, which includes planning, monitoring, and evaluation, is an important aspect in supporting students' reading comprehension level, especially in improving inferential understanding. This finding relates to the students' knowledge of reading strategies, which greatly affects understanding. The reading strategy can be applied to every metacognitive phase (planning, monitoring and evaluation) so that the level of students' understanding of the text is optimal. Planning is included as a significant predictor of the performance of inferential understanding. This finding indicates that students need skills in planning strategies before reading is carried out so that text understanding is deeper, especially in complex texts and texts that require inferential understanding (Martins & Capellini, 2021; Samiei & Ebadi, 2021). So, it can be concluded that readers who have high reading planning skills can produce quality or deeper understanding and conclusions about texts than students who do not do reading planning.

In the second study, it was found that the absolute global metacomprehension accuracy showed different performance relationships in the textual and inferential question text types. Metacomprehension accuracy on inferential questions shows

a higher relationship than textual questions. Students who are better at answering inferential questions have global absolute metacomprehension accuracy and tend to have better cognitive abilities. This indicates that the students' reading comprehension ability depends on their ability to process the text. This finding is in accordance with the level of interference theory from Lim, (2020). Students gain reading comprehension based on the level of interference obtained. Therefore, students who get a lot of conclusions from the results of reading the text can estimate their level of understanding based on their ability to make conclusions. However, readers who are not able to make a lot of conclusions (less reading skills) assess their level of understanding at different levels (Hayashi et al., 2018; Yousuf et al., 2021; Mulyati & Hadianto, 2022)

). Metacomprehension is done so that students are aware of their own level of understanding. Therefore, adequate inferential abilities are needed for students to be able to predict their own reading success rate. It can be concluded in the first study, based on monitoring the global absolute assessment, that inferential ability and the level of students' impairment had a significant effect on students' metacomprehension.

The difference in performance on metacomprehension accuracy proves that there are different uses of cues in assessing the level of reading comprehension itself. According to the level of distraction theory, readers predict their level of understanding based on cues from impaired reading flow, inferential assumptions, assumption accuracy, and perceived representation. In addition, interference can also occur at the level of text representation. If interference occurs at a certain level, the reader's assessment of metacomprehension accuracy tends to be based on the textual level rather than conclusions that require quality reasoning abilities (Curenton & Justice, 2008; Solheim & Lundetræ, 2018; Lim, 2020). Thus, readers who have better reading comprehension skills tend to understand the text based on the explicit information in the text and the relationship between adjacent ideas in the text. However, the textual reader also has limitations because explicit information also involves several dimensions, for example, detailed explicit ideas that require a high level of understanding.

Another study that strengthens this finding is that students' internal factors are very strong predictors of their metacomprehension accuracy (Loh et al., 2020; Ptacek, 2016). Inferential readers understand reading texts using more sophisticated cues such as self-explanation and elaboration. So, it can be concluded that mental representations with good inferential understanding performance involve coherent text representations so as to produce alignment between performance assessments and students' actual performance (better metacomprehension accuracy) (Hadianto et al., 2021b, 2021a. Metacognitive abilities greatly affect the reading process and the results of students' reading comprehension. Metacognition plays a very important role in selecting relevant information or not with an appropriate text representation. Cohesive text is very helpful for less skilled readers but an obstacle for skilled readers (Johansson, 2013; Zhou et al., 2020). This finding is very interesting because it proves that metacognition greatly affects students' reading comprehension outcomes and the specific metacognition used by students can be different depending on the ability

of the reader, as found in this study. The results of the study prove that inferential readers have less accurate monitoring of explicit information and make it difficult for them to gain access to inferential text representations.

6. Conclusion, Limitation and Recommendation

Based on the results of the study, it can be concluded that students with good inferential skills have better metacognitive abilities, especially regarding reading evaluation skills. Readers with this profile try to adjust the mental representation of the text with their understanding. In addition, they have good metacomprehension accuracy in the level of inferential understanding. However, readers with textual skills have good metacomprehension accuracy at the textual level only. So, both findings indicate that inferential and metacognitive skills of reading strategies and evaluation of learning play an important role in facilitating students to achieve optimal levels of reading comprehension. A reader must have regulatory skills so that they can guide their reading skills and can help students to continue to excel in the future. The implication of this research is that the teacher must emphasise inferential reasoning skills in the learning process because this reasoning ability not only helps in understanding the text or material but also improves metacomprehension abilities. Students who have the ability to monitor their own learning tend to be more independent and successful in the future. Interventions that can train students' inferential and metacognitive skills are suggested in learning to read.

This study has several limitations, including samples taken from elementary schools and junior high schools, so it needs to be tested on a sample of high school students, not paying attention to gender; research on early reading abilities is not measured, so the progress of students' reading skills is not visible in detail. In addition, the measurement of metacomprehension accuracy is carried out through self-reporting where there may be students who are dishonest and do not assess as objectively as possible on metacognition. Despite the shortcomings of this study, the researcher believes that this research contributes to the teaching of reading to be more effective. Based on the limitations of this study, further research should pay attention to the suggested variables, namely paying attention to gender, measuring ability not only relying on tests but looking at it from the perspective of the parents of students, and the results of the study should be further strengthened by deeper qualitative analysis.

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