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The Profile of Students with Moderate Initial Statistical Thinking Ability in Analyzing and Interpreting Data

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Abstract

Statistical thinking is a thinking process related to the ability to understand how to describe, organize, reduce, present, analyze and interpret the data that apply the statistical understanding in real problems. Most students had a difficulty in analyzing and interpreting data. They claimed that analyzing and interpreting data is a difficult and complicated assignment since it needs high level skill, accuracy, careful consideration and objective attitude. If the data is analyzed and interpreted well, we will draw the correct conclusion. Mooney's research states that there are five levels of statistical thinking in a statistical thinking framework, including: level 1: Idiosyncratic; level 2: Transitional; level 3: Quantitative; level 4: Analytical, and level 5: Extended Analytical. This research aims to describe the profile of the level of statistical thinking of students with moderate initial abilities in analyzing and interpreting data. The subjects of this research were two eighth graders with moderate initial abilities in Junior High School of 1 Walisongo, Semarang. Think Aloud method is applied to collect data. The results showed that the level of students with moderate initial statistical thinking abilities was at level 2: Transitional, in which students tried to present their ideas through quantitative and subjective thinking, indicated by naive thinking, hesitant, incomplete responses in counting, and only focus on one aspect of the data display.

Keywords: *Statistical Thinking; Statistical Thinking Level; Analyzing and Interpreting Data Process*

Introduction

In this modern era, every day Indonesian people use technology facilities with high intensity and number-based information (BPS, 2017). For example, BPS data is widely used by data users every day as much as 89.37%. This makes people have to face statistical information in their daily problems in which the information is presented in the form of data sets. This problem requires a thinking process to make a decision in dealing with the problem. Statistical thinking plays a very important role in dealing with community problems related to data sets and events in everyday life. In this research, the term statistical thinking is used to describe students' thinking in responding to statistical problems.

Wild and Maxine (1999), Jones et al. (2000), Mooney (2002), Garfield (2003) and Groth (2003) conducted a research on statistical thinking. Garfield stated that there are three steps in the statistical thinking process: (1) understanding: seeing a particular problem as a problem, (2) planning and

implementing: applying the right method to solve the problem, (3) evaluating and interpretating: interpreting the results related to the initial problem (Garfield, 2003). According to Chan and Ismail (2014), statistical thinking is the ability to understand statistical processes as a whole and apply statistical understanding to real problems by providing criticism, evaluation, and making generalizations in terms of describing data, organizing data, representing data, analyzing and interpreting data. This is in line with the opinion of Ulusoy and Altay (2017) which states that there are four processes/ constructs in statistical thinking based on the framework of Jones et al. (2000): describing data, organizing data, representing data, analyzing and interpreting data. The first process, describing data, indicates that someone is able to read the complete data presented in the data display. The second process, organizing and reducing data, reveals that a person can group data into classes in various ways and can explain the size of data concentration and distribution. The third process, representing data, states that someone is able to present the data with a variety of different data displays. The fourth process, analyzing and interpreting data, shows that someone is able to provide contextual responses and make conclusions or predict the characteristics of the population/ sample based on data (Ulusoy & Altay, 2017). In this research, statistical thinking refers to students' cognitive activities that reveal the ability to understand how to describe, organize and reduce, represent and analyze, and interpret data, which is implemented in real problems.

This research is adapted from a research conducted by Mooney (2002). In Mooney's research, it is explained that statistical thinking has four processes/ constructs: describing, organizing, representing, analyzing and interpreting data. This research focuses on the process/ construction of analyzing and interpreting data: the process of statistical thinking by combining patterns and trends from a data display, determining the value both among data (interpolation) and outside data (extrapolation), and making conclusions or predictions about the characteristics of the population/ sample based on data (Meylasari, Sujadi & Subanti, 2020). According to Mooney (2002), it focuses on the process of analyzing and interpreting data, while the indicators used in this research include: (i) A1: the subject is able to respond to the data or data set displayed, (ii) A2: the subject is able to compare data between several data or data sets, and (iii) A3: the subject is able to draw conclusions based on contextual problems presented in the form of data displays. Statistical data is more meaningful when presented in context. Therefore, statistics require a different way of thinking. Understanding the context of the problem while interpreting data and making conclusions plays an important role in statistical thinking (Ulusoy & Altay, 2017).

Mooney (2002) states that there are five levels of statistical thinking: level 1: Idiosyncratic; level 2: Transitional; level 3: Quantitative; level 4: Analytical; and level 5: Extended analytical.

Table 1. Characteristics of Statistical Thinking Level developed by Mooney (2002)

Level	Characteristic
1. 1st level: Idiosyncratic	Subjects use thinking with subjective ideas (an assessment of the subject's idea that is not directly on the subject matter).
2. 2nd level: Transitional	Subjects try to present their ideas through quantitative and subjective thinking, indicated by the students' naive thinking, hesitating, incomplete responses in calculating and representing data and only focuses on one aspect of data display (for example, the subject knows the values that often appear).
3. 3rd level: Quantitative	Subjects use quantitative information in solving statistical problems; the subject is more effective and complete in presenting his ideas.
4. 4th level: Analytical	Subjects are characterized by emerging analytical and quantitative thinking skills about data, being able to explain various perspectives based on the data obtained, make appropriate relationships between various aspects of data, and use numerical measurement.
5. 5th level: Extended	Subjects are able to evaluate the effectiveness of the data display provided in the form of tables/ graphs/ diagrams based on the special characteristics of the

Analytical	displays with various perspectives; subject uses appropriate and valid steps and calculations to determine the value of the size of the data modus and distribution according to the data provided; subjects can make various valid and accurate data displays (in the form of graphs/ diagrams), and subjects can make conclusion from various perspectives.

The finding of Jones' research shows that 20 elementary school students of first to fifth graders which is the subject of the study, 80% of them are at the 3rd level: Quantitative. The finding of Mooney's research explained that among 12 student from sixth to eighth graders were under the 4th level which means that the highest was only at the Quantitative level. The results of Martadiputra and Tapilouw's research shows that the ability to think statistically of mathematics study programs and mathematics education students who had or had not graduated from undergraduate program in state university in Bandung is not optimal because it has only reached the Quantitative level, and only a small part (less than 10%) who belongs the Analytical level. Regard to the ability to think statistically with a focus on analyzing and interpreting data, no one reached the Analytical level. Abdullah and Maheran, in their research on 149 high school students majoring in Science in the 4th semester in the area of Ledang, Malaysia, found that the students' statistical thinking level was still low, in the first level, Idiosyncratic, proven by some facts. First, students had irrelevant characteristics in describing, representing and analyzing dataThis is in line with Masjudin's (2020) research results on the subject of eighth graders in Junior High School of 3 Lingsar which found that that the students' statistical thinking ability in the process of analyzing and interpreting data was categorized as low level. Research conducted by Muslimah (2019) in the process of analyzing and interpreting data, with ninth graders in State MTs of Gresik found that the subject with the independent field cognitive style was at the analytical level, while the subject with the field dependent cognitive style was at the transition level. Based on the results of these studies, it shows that students' statistical thinking ability are still relatively low.

Whereas in NCTM (2000) states that starting from Pre Kindergarten to twelfth graders, statistics learning materials have been provided. In addition, NCTM includes content on five Mathematics topics that students must understand: numbers and their operations, algebra, geometry, size, data analysis and probability (Martadiputra & Suryadi, 2012). Of the five topics in this research, it focuses on data analysis. Data analysis is a part of statistics. Apart from NCTM, other organizations such as NCSS (1994) and NCTEIRA (1996) also state that statistical thinking ability are needed in their respective disciplines. The SCANS stated that (1991) statistical thinking ability were needed in class VIII to provide a benchmark for continuing development in ninth to twelfth graders. This agrees with the statement of Bolster et al. (1994), Chapin et al. (1997), and Charles et al. (1998) which stated that the development of statistical thinking ability is part of the secondary school mathematics curriculum. The Ministry of Education and Culture has established the current Education Curriculum in Indonesia, which has provided statistical learning materials from elementary schools to tertiary institutions, which are integrated into mathematics subjects (Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 37, 2018). This indicates that statistics are important things that students need to learn.

By considering the importance of statistical thinking in statistics learning, there is a need to research the ability to think statistically at every level of education in Indonesia. Statistical thinking ability can be found in all areas of Mathematics and are important in everyday life, as noted by H.G. Wells (Suriasumantri, 2003), that one day statistical thinking will become a necessity for humans as well as reading and writing. Therefore, through the ability of thinking statistically in mathematics learning, it is expected that learning activities stimulate students to use logical, analytical, systematic, and creative thinking skills, and to use the ability to draw conclusions and simplify problems. Therefore, this research describes the level profile of statistical thinking in analyzing and interpreting data on eighth graders of junior high school students with moderate initial abilities related to statistical problems.

This research is a research adapted from Mooney's (2002) research. In his research, Mooney uses research subjects from sixth graders to eighth graders with the material of collecting, organizing and representing data. This research aims to produce a statistical thinking framework for junior high school students with four processes: describing data, organizing and reducing data, representing data, analyzing and interpreting data, and used task-based methods and interviews to collect data. In this research, the subjects used were eighth graders with moderate initial abilities who had studied statistical material.The purpose of this research was to describe the profile of the level of statistical thinking of students with initial abilities in the process of analyzing and interpreting data, and in collecting data using the Thinking Aloud method.

The researchers conducted a pre-survey related to the level of statistical thinking of eighth graders in solving statistical problems in the construct of analyzing and interpreting data. In this pre-survey, the selected subjects were students with high initial abilities. The pre-survey results showed that these students have the characteristics of thinking statistically at level 3: Quantitative. Then, to get maximum results about the students' statistical thinking level, the researcher is interested in conducting further research on the level of statistical thinking related to statistical problems in students with moderate or low abilities. On this occasion, this research was limited to two eighth graderswith moderate initial abilities as research subjects and focused on statistical thinking processes/ constructs in analyzing and interpreting data.

Methodology

This qualitative research examines the level of statistical thinking of students with initial abilities in the construction to analyze and interpret data related to statistical problems. This research involved two eighth grade students of Junior High School of 1 Walisongo, Semarang who had moderate initial abilities, who were given the initials Subject A and Subject B. The research subjects were selected through purposive sampling, by selecting students who had the ability to communicate their ideas in writing or orally. Certain considerations for choosing a subject are as follows: this selection is made because the student has received a lesson in statistics material. Other considerations in selecting subjects are based on the classification of moderate initial abilities, and teacher recommendations.In addition, the selection of research subjects was based on the recap of the eighth graders report cards of Junior High School of 1 Walisongo, Semarang in the first semester of Mathematics in the 2019/2020 academic year. The criteria for categorizing students who have moderate initial abilities are shown in the following Table 2.

Table 2. Criteria of Students with Moderate Initial Ability Categorization

Level of Students Initial Ability	Score
Moderate	$\left(\bar{x} - s\right) \leq X \leq \left(\bar{x} + s\right)$

(Arikunto, 2018)

Explanation:

X : The score in report card semester I in Math Subject in 2019/ 2020 academic year

$\bar{x}$: The scores average in report card in semester 1 in Math Subject in 2019/ 2020 academic year

s : The standard deviation of scores in report card in semester I in Math subject in 2019/ 2020 academic year

The Think Aloud method is used to collect data. In this research, there were two types of instruments used to collect data. the main instrument is the researcher himself, and the supporting instrument in the form of a set of problems containing statistical problems, and semi-structured interview guidelines. This supporting instrument had been previously validated. The data were obtained by asking

students to work on statistical problems accompanied by verbal expressions about the ideas the subject thought about. Time triangulation is a technique for checking the validity of data. According to Sugiyono (2008), time triangulation is a technique of checking data by means of interviews, observations, or other techniques in different times and conditions.

The researchers took data twice to get valid data. Valid data compared with indicators of statistical thinking ability. The data collected was then analyzed. The data analysis process in this research refers to Miles and Huberman (1994), which is carried out in the following steps: (i) data reduction; (ii) data disclosure; and (iii) conclusion and verification. The data analysis data in each statistical thinking refers to Mooney's Theory (2002), and will be explained in Table 3.

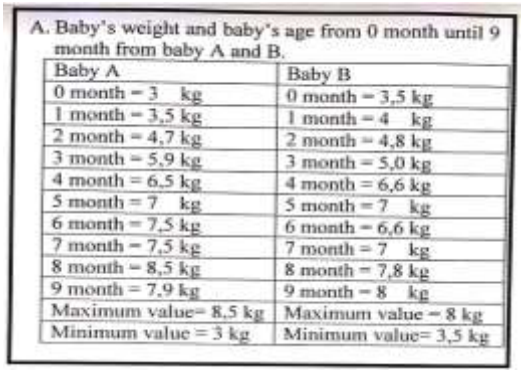
Table 3. The statistical Thinking Framework with focus on analyzing and interpreting data

Process \ Levels	**1st level: Idiosyncratic**	**2nd level: Transitional**	**3rd level: Quantitative**	**4th level: Analytical**
Analyzing and interpreting data (A)	a. Give responses that are not available based on the data.	a.Give a single correct responses to available based on data	a. Give several correct and appropriate responses to the data provided.	a. Give global responses/ correct responses based on data and related with the context data.
	b. Makes no or incorrectcomparisons betweendata sets.	b. Makes a single correctcomparison or a set ofpartially correctcomparisons betweendata sets.	b. Makes a comparison of the several data, but they were not able to compare the data as a whole.	b. Makes global comparisons between data sets correctly.
	c. Makes conclusions that are not based on the data, or conclusions are based on irrelevant contextual issues.	c. Makes conclusions that are primarily based on data, some conclusions may be only partially reasonable/ correct.	c. Makes reasonable/ correct conclusions based on the data, even though the subject have not been able to make an overall conclusion.	c. Makes reasonable/ correct conclusions based on the data, and the context using multiple perspectives.

Table 2 describes the indicators of students' statistical thinking in the process of analyzing and interpreting data adopted from the concept of Mooney (2002). This indicator is in line with Curcio (1987), which explains that reading between data and reading outside of data is part of the process of analyzing and interpreting data, including making comparisons within and between data sets, and the latter includes making conclusions from data sets.

Findings and Discussion

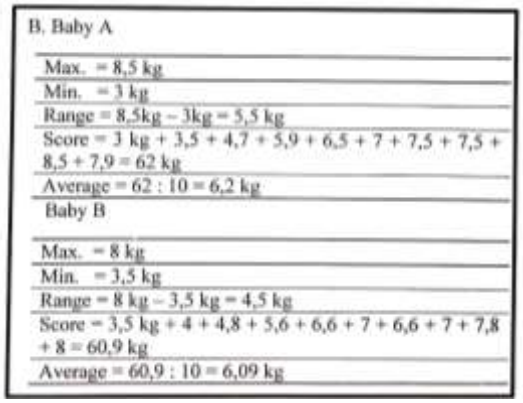
In the answer sheet, subject answers the questions related to the statistical problem and explain ideas orally the following figures are written data description and verbal transcript of subject A and subject B.



A. Baby's weight and baby's age from 0 month until 9 month from baby A and B.

Baby A	Baby B
0 month = 3 kg	0 month = 3,5 kg
1 month = 3,5 kg	1 month = 4 kg
2 month = 4,7 kg	2 month = 4,8 kg
3 month = 5,9 kg	3 month = 5,0 kg
4 month = 6,5 kg	4 month = 6,6 kg
5 month = 7 kg	5 month = 7 kg
6 month = 7,5 kg	6 month = 6,6 kg
7 month = 7,5 kg	7 month = 7 kg
8 month = 8,5 kg	8 month = 7,8 kg
9 month = 7,9 kg	9 month = 8 kg
Maximum value= 8,5 kg	Maximum value = 8 kg
Minimum value = 3 kg	Minimum value= 3,5 kg

Figure 1. the answer of subject A in giving response on data or set of data presented



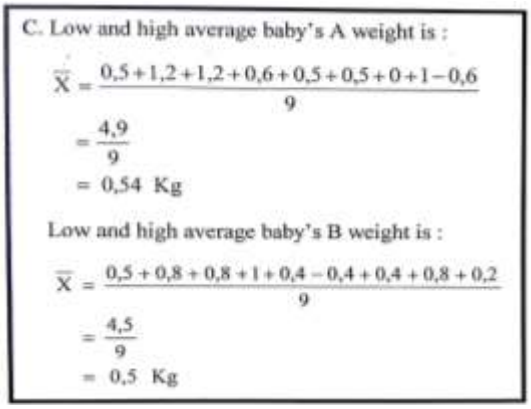
B. Baby A

Max. = 8,5 kg
Min. = 3 kg
Range = 8,5kg – 3kg = 5,5 kg
Score = 3 kg + 3,5 + 4,7 + 5,9 + 6,5 + 7 + 7,5 + 7,5 + 8,5 + 7,9 = 62 kg
Average = 62 : 10 = 6,2 kg

Baby B

Max. = 8 kg
Min. = 3,5 kg
Range = 8 kg – 3,5 kg = 4,5 kg
Score = 3,5 kg + 4 + 4,8 + 5,6 + 6,6 + 7 + 6,6 + 7 + 7,8 + 8 = 60,9 kg
Average = 60,9 : 10 = 6,09 kg

Figure 2. The answer of subject A who compared some data or set of data presented



C. Low and high average baby's A weight is :

$$\bar{X} = \frac{0,5+1,2+1,2+0,6+0,5+0,5+0+1-0,6}{9}$$

$$= \frac{4,9}{9}$$

$$= 0,54 \text{ Kg}$$

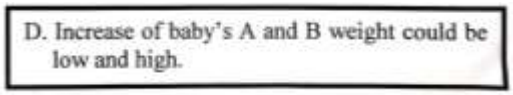
Low and high average baby's B weight is :

$$\bar{X} = \frac{0,5+0,8+0,8+1+0,4-0,4+0,4+0,8+0,2}{9}$$

$$= \frac{4,5}{9}$$

$$= 0,5 \text{ Kg}$$

Figure 3. The answer of subject A in estimating the out of data score (extrapolation) when calculating the average increase or decrease of data



D. Increase of baby's A and B weight could be low and high.

Figure 4. The answer of subject A in drawing conclusion based on contextual problem presented in data display

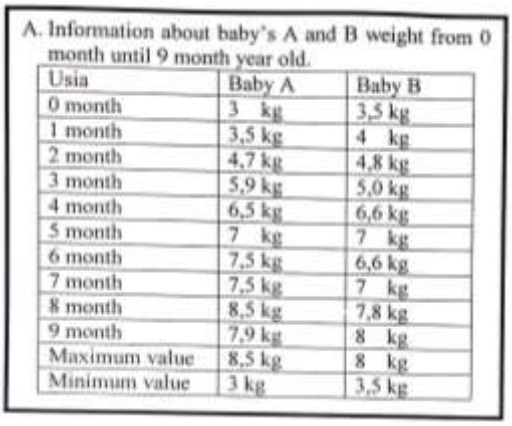
Figure 1 shows that when responding to the data or data set displayed, subject A was able to state the information he obtained based on the data and read the data correctly, but subject A's statement shows the subject's hesitant thoughts. This condition is reflected in the results of verbal data quotations. Subject A explained, "The information is about the baby's weight and the age from 0 months to 9 months, right ma'am ... I also informed the maximum value, minimum value and details of the weight data of the two babies from 0 months to 9 months of age". This was obtained by subject A only by observing the diagrams and data values, so that the response given by subject A was incomplete.

Figure 2 shows that when comparing data between several data or data sets, subject A was only able to make one correct but incomplete comparison, namely the subject only made the average comparison between the two data. Subject A knows the formula and has the necessary procedural knowledge in relation to calculating the average data. To calculate the average of the two data, Subject A tried to calculate the weight value of the baby's lightest, heaviest, range, and total score. This condition is reflected in the results of verbal data quotations. Subject A said, "The average weight of baby A is greater than the average weight of baby B. It is enough for me to compare just the average body weight.

Figure 3 shows that when estimating out-of-data values (extrapolation), Subject A had difficulty in estimating the baby's weight at 10 months of age. The first step at this stage, subject A first observes the relationship between the data, and compares them to decide whether there is an increase or decrease or is constant. The next step, subject A is looking for the average increase or decrease in data, but the subject doubts the calculation. Subject A repeatedly asked the researcher about his calculations, true or false. The next step, subject A had difficulty estimating the value outside the data. This condition is reflected in the results of verbal data quotations. The subject explained, "To calculate the baby's weight at 10 months of age, I first looked for the average weight gain and loss for baby A and baby B. I'm confused about the next step, Mom, to find a baby's weight at 10 months ... Emm .. ". This shows subject A's hesitant thinking, and an incomplete counting response. Subject A also did not explain how the average increase or decrease in data can affect values outside the data (extrapolation). Subject A has the necessary procedural knowledge in relation to calculating the average increase or decrease in data. The subject knows the formula, but the subject was not able to make a relationship between the average increase or decrease in the data with the value outside the data (extrapolation) to interpret the data.

Figure 4 shows that subject A was able to make conclusions that are only partially correct based on contextual problems presented in the form of data displays. This is stated by the subject in the verbal data citation. The subject said, "I think in conclusion, the development of baby A and B's body weight can go up and down. The reason, perhaps because of the up and down line ". Because the subject was not able to estimate the value outside the data, the subject has not concluded as a whole.

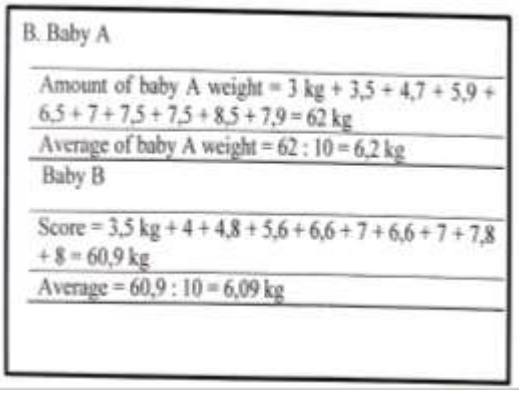
The data from written answers and verbal data then analyzed and triangulated to obtain valid data. It is found that subject A tried to present his ideas through quantitative and subjective thinking in solving statistical problems, the subject is able to make one data comparison correctly, but has not been able to predict the possibility of future data, so the subject was only able to make conclusions that are partially correct based on the contextual problem.



A. Information about baby's A and B weight from 0 month until 9 month year old.

Usia	Baby A	Baby B
0 month	3 kg	3,5 kg
1 month	3,5 kg	4 kg
2 month	4,7 kg	4,8 kg
3 month	5,9 kg	5,0 kg
4 month	6,5 kg	6,6 kg
5 month	7 kg	7 kg
6 month	7,5 kg	6,6 kg
7 month	7,5 kg	7 kg
8 month	8,5 kg	7,8 kg
9 month	7,9 kg	8 kg
Maximum value	8,5 kg	8 kg
Minimum value	3 kg	3,5 kg

Figure 5. The answer of subject B in giving response on data or set of data presented



B. Baby A

Amount of baby A weight = 3 kg + 3,5 + 4,7 + 5,9 + 6,5 + 7 + 7,5 + 7,5 + 8,5 + 7,9 = 62 kg

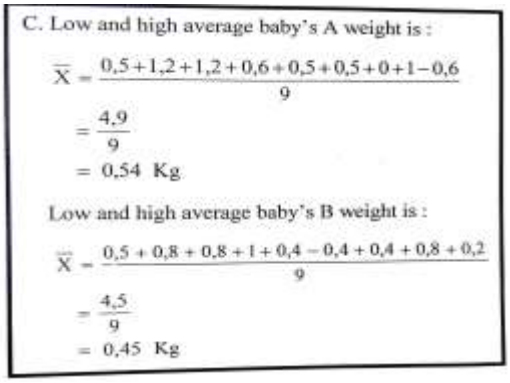
Average of baby A weight = 62 : 10 = 6,2 kg

Baby B

Score = 3,5 kg + 4 + 4,8 + 5,6 + 6,6 + 7 + 6,6 + 7 + 7,8 + 8 = 60,9 kg

Average = 60,9 : 10 = 6,09 kg

Figure 6. The answer of subject B in comparing data or set of data presented



C. Low and high average baby's A weight is :

$$\bar{X} = \frac{0,5+1,2+1,2+0,6+0,5+0,5+0+1-0,6}{9}$$

$$= \frac{4,9}{9}$$

$$= 0,54 \text{ Kg}$$

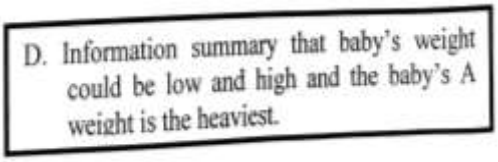
Low and high average baby's B weight is :

$$\bar{X} = \frac{0,5+0,8+0,8+1+0,4-0,4+0,4+0,8+0,2}{9}$$

$$= \frac{4,5}{9}$$

$$= 0,45 \text{ Kg}$$

Figure 7. The answer of subject B in estimating the out of data score (extrapolation) when calculating the average of data increase and decrease



D. Information summary that baby's weight could be low and high and the baby's A weight is the heaviest.

Figure 8. the answer of subject B in drawing conclusion based on contextual problem presented in data display

Figure 5 shows that subject B was able to respond according to the data or data set provided. Only by observing the diagrams and data values, subject B was able to explain what was known in reading the data correctly, but the subject's thinking was still in doubt. This condition is reflected in the results of verbal data quotations. Subject B explained, "The information is about the weight of babies A and B along with their ages from 0 months to 9 months. It seems so right ma'am ... I also mentioned the details of the weight data of the two babies. I also mention the maximum, minimum and detailed weight data for the two babies ".

Figure 6 shows that subject B was only able to make an average comparison of the two data. The average value of each data was obtained by subject B through the calculation of finding the value of the total score and the amount of data. Subject B knows the formula and has the necessary procedural knowledge in relation to calculating the average data. This condition is reflected in the results of verbal data quotations. The subject said, "So the heavier baby weight is baby A, it means that the average weight of baby A is greater than the average weight of baby B, right ma'am ... Emmm ... I am comparing the average weight." . This shows that subject B was able to make a correct but incomplete comparison between some data or data sets that have been provided.

Figure 7 shows that subject B was able to look for the average increase or decrease in data and estimate values outside of the data (extrapolation). Subject B previously observed the relationship between data, and compared them to decide whether there was an increase or decrease or was constant. When subject B was looking for a calculation of the average increase or decrease in data, the subject repeatedly asked the researcher about the calculation, true or false. Subject B also did not explain how the average increase or decrease in data could affect values outside the data (extrapolation). Subject B has the necessary procedural knowledge in relation to calculating the average increase or decrease in data.Subject B knows the formula, but subject B was not able to make a relationship between the average increase or decrease in the data and the value outside the data (extrapolation) to interpret the data. This condition is reflected in the results of verbal data quotations. Subject B said, "The average of baby's A increase and decrease weight = 0.54 kg, and baby B = 0.5 kg. The calculation is looking for the increase and decrease weight. Is it true or not... Next, what should I do? Wait mom ... I am confused ma'am ... what should I dp next, ma'am? ". This statement shows that subject B was doubtful with his calculations and had difficulty in estimating the value outside the data when estimating the baby's weight at 10 months of age. This shows subject B's hesitant thinking, and an incomplete counting response.

Figure 8 shows that subject B was able to make conclusions based on contextual problems presented in the form of data displays. Because subject B was not able to estimate the value outside the data and gives an incomplete response in calculating, subject B has difficulty in making overall correct conclusions. Although subject B could not make an overall correct conclusion, subject B was able to make conclusions that were only partially correct based on contextual problems presented in the form of data displays. This is stated by the subject in the verbal data citation. The subject explained, "In conclusion, I think the development of baby A and B's weight can increase and decrease. Um...because the line goes up and down, ma'am .. ".

Based on the data from written answers and verbal data, it was then analyzed and triangulated to obtain valid data. It is found that subject B tries to present his ideas through quantitative and subjective thinking in solving statistical problems, the subject is able to make one data comparison correctly, but has not been able to predict the possibility of future data, so the subject was only able to make conclusions that are partially correct based on the contextualproblem.

Based on the valid data, it is used to figure out the students' statistical thinking ability. The valid data is explained in the followong Table 4.

Table 4. The Valid Data from Subject A and Subject B

Subject A	Subject B
1. Subject A was able to read the data, by observing the line diagram, observing the value of the data, and the subject informs the maximum & minimum value, but subject A gave the response hesitantly and incompletely.	1. Subject B was able to explain what is known in reading the data correctly, by observing the line diagram, observing the value of the data, and the subject informs the maximum & minimum values, but the subject's thinking is still doubtful and incomplete.
2. Subject A was able to make one correct comparison that is to compare the average data by first looking for the maximum, minimum, range, total score values in both data.	2. Subject B was able to make a correct but incomplete comparison between some of the data or data sets that have been provided, that is, compare the mean values of the data doubtfully. To compare these averages, the subject first determines the value of the total score.
3. Subject A was not able to predict the value outside of the data (extrapolation), but Subject A was not able to determine the average increase or decrease in the data. Subject A showed doubtful thinking, and an incomplete counting response.	3. When predicting the value outside the data, subject B was able to look for the value of increase or decrease in the data based on its average value, then the subject was not able to predict the value outside the data completely. The subject repeatedly asked the researcher about his true or false calculations.
4. In the data, subject A has not been able to conclude the data as a whole, but the subject was able to make conclusions that are only partially correct based on contextual problems presented in the form of data displays.	4. In concluding the data, subject B was able to make conclusions that are only partially correct based on the contextual problems presented in the form of data displays.

Based on Table 4, the researcher compare the result with the indicator of statistical thinking explained by Mooney (2002). The result is as follows:

When responding to the data or data set displayed, subject A and subject B have a level of statistical thinking at level 2: Transitional, because subject A and subject B give correct and appropriate responses to the data or data set provided, but the response is delivered hesitantly and incompletely;

When comparing data between several data or data sets, Subject A and subject B have a level of statistical thinking at level 2: Transitional, because subject A and subject B make only one correct comparison, namely comparing the average of the data, and unable to compare data as a whole;

The step before the subject makes conclusions based on the problem presented is the subject must be able to estimate the value outside the data. In this step, subject A and subject B could not predict the value outside of the data (extrapolation), but with hesitation, the two subjects could only determine the average increase or decrease of the data and the incomplete response in calculating. Therefore, in making conclusions based on the contextual problems presented, subject A and subject B have a level of statistical thinking at level 2: Transitional, because subject A and subject B were only able to make conclusions that are only partially correct based on the contextual problems presented in form of data display, and the subject has not been able to make an overall conclusion.

Conclusion

Based on the results and discussion, it can be concluded that the level of statistical thinking of students with the ability to analyze and interpret the data is as follows; When giving a response to the data or data set displayed, subject A and subject B gave correct and appropriate responses to the data or data set provided, but the response was conveyed hesitantly and incomplete; When comparing data between several data sets or data sets, subject A and subject B made only one correct comparison and could not compare the data as a whole; Subject A and subject B could not predict the value outside the data (extrapolation), were hesitant and gave incomplete responses in calculating; In making conclusions based on the contextual problems presented, subject A and subject B was only able to make conclusions that are only partially correct based on the contextual problems presented in the form of data displays, and the subject has not been able to make conclusions as a whole. This means that subject A and subject B come up with ideas which are one of the characteristics of the level of statistical thinking which is called Transitional, because subject A and subject B try to present their ideas through quantitative and subjective thinking, indicated by students' naive thinking, doubt, response which is incomplete in calculating.

The interesting thing in this research is that based on the results of Think Aloud that have been done, moderate capable subjects seem quite capable in the process of finding answers, are quite capable of applying concepts that have been learned and used in finding answers, and are sufficiently able to explain the steps to finding answers but sometimes the subject experienced confusion when explaining because of the lack of understanding of the concept. This is in accordance with research conducted by Nazariah and Abidin (2017) which states that students with moderate initial abilities usually use long strategies and the results are sometimes less accurate.

Suggestion

Based on the results and discussion of this research, there are several suggestions for further research including; For other researchers who want to carry out similar research, it is better to examine more deeply the students' level of statistical thinking and use other forms of questions that are more varied with a higher level of difficulty or other forms of questions that contain the entire statistical thinking process in sequence. This research focuses on students with moderate initial abilities and on pre-survey with students with high initial abilities in analyzing and interpreting data related to statistical problems. Therefore, it is necessary to do further research on the level of students' statistical thinking with other criteria.

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