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Stress Tolerance in Probabilistic Thinking: A Case Study Abdul Taram*, Fariz Setyawan Universitas Ahmad Dahlan, Yogyakarta, Indonesia abdul.taram@pmat.uad.ac.id*, fariz.setyawan@pmat.uad.ac.id Abstract: Probabilistic thinking is a structure of thinking characterized by scenarios that allow one to explore reality. Therefore, the characteristic of probabilistic thinking is a problem-oriented that will occur in a future full of uncertainty.

Nevertheless, there are few studies whichfew studies explore examine the students' students' probabilistic thinking level based on the Stress Tolerance dimensions. Thus, in this study, researchers aim to describe the students' students' probabilistic thinking level based on the Stress Tolerance dimension in solving probability problems. It is shown that the smallest Stress Tolerance (ST)-Student's Students consider in confirming that the first solution is trueaccurate.

In contrast, the students who haveith the highest score in ST-dimensions tend to make a simple steps in solving the problem. The students' students' answers in to probability problems characterize authentic risk-based decision decision-making. When we deal with probabilistic situations in everyday life, we all use a series of decision decision-making in our everyday estimation of probabilities, and this decision makingwhich sometimes leads to biases. However, the level of the probabilistic thinking depends on the stress tolerance of the students.

The students who have with the smallest score in stress tolerance score tend to get level 4 of in probabilistic thinking. In contrast, the students who have the highest score in stress tolerancith the highest stress tolerance score tend to get reach level 1 of in probabilistic thinking. INTRODUCTION Each student has their own motivation to study.

Students’ Students' motivation has an impact not only on their learning outcomes but also for on their mental processes (Kasdhan, 2018). A motivation to study occurs if the students are curious about the information or experiences as a motivatione to learn something. In a world where people are deluged with information and can attain novel experiences with only a few keyboard clicks, curiosity becomes a potent psychological strength (Kashdan, et al., 2018). Kashdan said that curiosity is about seeking information and experiences for their own sake through self-directed behaviour.

Curiosity is broadly defined as a desire for acquiringa desire to acquire new knowledge and new knowledge and new sensory experience that motivates exploratory behaviour (Litman, 2005; Berlyne, 1954, 1960; Loewenstein, 1994). A recent set of studies suggests that being curious about other people’s people's feelings, thoughts, and behaviour is distinct from observing other people surreptitiously to acquire new information (e.g., Litman & Pezzo, 2007; Renner, 2006).

Students are required to be able to develop their higher higher-order thinking skills as the learning objective of a concepts given at school. Some researchers defined probabilistic thinking as formal thinking characterized by abstraction, hypothetical, deductive, inductive, and logical thinking (Pfannkuch, et al., 2016; Savard, 2014; Borovcnik & Kapadia, 2014).

Pfannkuch characterized probabilistic thinking as to how one views and thinks about probability, whether from a classical, frequentist, or Bayesian perspective, has been presented as crucial to how one engages in probabilistic thinking. Borovnick & Kapadia (2014) described probabilistic thinking as a structure of thinking characterized by scenarios that allow one to explore reality.

Therefore, the characteristic of probabilistic thinking is a problem-oriented that will occur in a future full of uncertainty. Jones et al. (1997, 1999) suggested four levels of probabilistic thinking, namely subjective, transitional, informal quantitative, and numerical. Furthermore, Polaki (2002) developed the Jones’ Jones' probabilistic thinking level in more detail for several subjects or materials in probability theory.

In determining the level of probabilistic thinking ability indicators, using the probabilistic thinking rubric as shown in Table 1. No. _Level _Indicators _ _1 _Level 1 (Subjective) _Students are always bound to a subjective reason _ _2 _Level 2 (Transitional) _Students think naively and often change. _ _3 _Level 3 (Informal Quantitative) _Students can harmonize and quantify their thoughts about the possibilities that will occur.

_ _4 _Level 4 (Numerical) _Students can make precise relationships about between the sample space and its probabilities and use numerical measurements appropriately to describe the probability of an event. _ _Table 1. Level of Probabilistic Thinking (Adopted from Taram, et al., 2019; Polaki, 2002) However, there are few studies which explore the students' students' probabilistic thinking level based on the The Five-Dimensional Curiosity Scale Scale-Revised (5DCR) curiousitycuriosity dimensions. The 5DCR distinguishes between experiences of curiosity that differ in emotional valence.

The degree to which someone is curious depends on two cognitive judgments. Initially, a person must recognize that an event is interesting exciting and warrants attention. Mysterious, novel, complex, uncertain, and/or ambiguous events tend to elicit interest (e.g., Berylne, 1954, 1960; Silvia, 2008a).

If a person notices that an event has novelty potential, curiosity is initiatedCuriosity is initiated if a person notices that an event has novelty potential. A person will only be curious, however, if they also believe they can sufficiently cope with the distress that arises from exploring the novelty potential of a situation (Silvia, 2005, 2008a). If a person believes that a situation case has novelty and coping potential, a person is said to be curious in at the moment (i.e.,

state curiosity). People who endorse novelty and coping potential with high frequency, intensity, and/or longevity are said to be highly curious (i.e., trait curiosity) (e.g., Silvia, 2008b). From this work on the appraisal components of curiosity, the 5DCR instrument measures a dimension of curiosity referred to as Stress Tolerance—the dispositional tendency to handle the anxiety that arises when confronting the new.

Thus, in this study, researchers aim to describe the students' students' probabilistic thinking level based on the Stress Tolerance dimension in solving probability problems. METHOD This research was conducted at a university in Yogyakarta, Indonesia. Furthermore, the study was held in May 2022. The number of subjects involved in this study is 10 ten students of 2nd 2nd-semester students in the mathematics education department.

The subject is chosen by purposive sampling based on the dimensions of curiousitycuriosity. There are two instruments used in this studyis study uses two instruments: 1) 5DCR Questionnaire of CuriousityCuriosity and 2) the ProbablisticProbabilistic Thinking Test. The data was analyzed qualitatively.

The researchers give the descriptive explanation about the profile of the students' students' probabilistics thinking based on their Stress Tolerance dimension. Stress

Tolerance Questionnaire The Stress Tolerance questionnaire is a part of a five-dimensional curiousitycuriosity-revised (5DCR) Iinstrument. It is adopted from the Kasdhan, et al. (2018). 5DCR instrument is It consistsconsisting of 24 questions. There are 4 statements for Stress Tolerance (ST) dimension.

The students choose their preferences in the questionnaire from scale 1 (one) to 7 (seven). Scale seven indicates that the statement does not describe him/her at all. In contrast, scale ones mean the statement completely describe his/herself. The scale indicates the degree to which statements accurately describe his/herself.

Probabilistics Problem Test In this case the researcher uses an intrument test to determine the level of students' probabilistic thinking, the researcher uses an instrument test to determine the students' probabilistic thinking level. The test is an essay. It is containing three (3) questions that have been validated by 2 validators.

The students write the answer directly in the answer sheet that is given and did the test for 60 minutes. First question of the test is asking the number of possibilities of a code can be made. Second is asking about the possibility of taking 3 colour balls simultaneiously form from a pocket.

Third question of the test is asking the possibility of head-tail event from tosing a coin and prime number occursasks about the possibility of a head-tail event from tossing a coin and prime number when tosingtossing a die. The probabilistic problems test is shown in Figure 1. Translate in English: A food factory gives a code for their products, consisting of 2 letters and 3 numbers (for example, ZX123).

If the letters and numbers used were not allowed to be repeated, then how many codes can be made; A bag contains 2 white, 3 red, and 1 green ball(s). Three balls are drawn one after the other without replacement. Determine: the number of the elements of sample space all possible event occurs, the probability that the balls are drawn is white, red, and green, what is the probability of the most possible event, what is the probability of the less possible event; A coin and a die are tossed once.

What is the probability of getting the head of the coin and the prime number of dice? Interview Interview were conducted by researchersResearchers interviewed the students to confirm the students' their answers. The researchers ask the students about what, why and how the step of the probablisticprobabilistic thinking level. This interview is conducted after the researchers give the test of probabilistic thinking.

RESULT AND DISCUSSION In each dimension of curiousitycuriosity, the researchers choose one student who represents their work in solving probablisticprobabilistics problems. The score of Stress Tolerance dimension were interviewed and described as their probablisticprobabilistic thinking profile. The smallest vs the highest ST score of student's student probabilistic thinking The student who has the smallest score in ST dimension score write down the number of possibilities of a code can be made by the combination ofith a minor in ST dimension score writes down the number of possibilities of a code that can be made by combining the alphabetics and numerical code. It's It's shown in Figure 1 that students write the solution of first problem in detail. Figure 1.

The smallest ST-Student's Student's solution in number 1 When the researchers interviewed the student about the solution, the student can could explain his idea about how he gets got the solutionanswer. He can distinguish the combination of the letters and the numbers for the code of the productproduct's code. It is similar with the solution in number 2 thatSimilar to the solution in number 2, the subject made precise relationships about the sample space and its probabilities and use numerical measurements appropriately to describe the probability of an eventappropriately used numerical measurements to describe an event's probability (see in in Figure 2).

Figure 2.

The smallest ST-Student’s Student's solution in number 2 The smallest score of ST-student made solution in number 3 of the probabilistic test shown showed that there was not only one solution derived to determine the probability of the event occurs in tosingtossing a coin and a die. The student gives two alternatives to find the probability of event head-tail and prime number in tosingtossing a coin and a dice consecutively.

The first solution is written by determining the probability of each coin and die. The first solution of the smallest strees tolerence students is illustrated in Figure 3.

Figure 3. The smallest ST-Student's Student's solution for in Nnumber 3 (First Solution)
Furthermore, the subject ST student gives two alternative solutions in to solving problem number 3 problems.

Tthe secondd answer shown that the smallest ST-Student's consider in confirms that he considers confirminging that the firstprevious solution is true. The student wrote the sample space of the event by mentioning the elements of it, one-by-one, as a set of the probable events (See in Figure 4). In the last of the second solution, the student counts the number of the elements of the sample space then determines the probability of the event.

As the result the level of probabilistic thinking of the subject is categorized in level 4.
Figure 4. The smallest ST-Student's Student's solution in number 3 (Second Solution)
Besides, another student who has the next-to-the smallest score of ST-dimension was writing in detail all the solutionith the next-to-the smallest score of ST-dimension was writing the solution in detail.

She wrote the diagram to ensure the the coin has two possibilities (head and tail) events (sSee in Figure 5). Both of them bound to a subjective reason, think naively and often change, harmonize and quantify their thoughts about the possibilities that will occur, and also, make precise relationships about the sample space and its probabilities and use numerical measurements appropriately to describeare bound to a subjective reason, think naively and often change, harmonize and quantify their thoughts about the possibilities that will occur, make precise relationships about the sample space and its probabilities, and use numerical measurements appropriately to describe the probability of an event. Figure 5.

Another smallest score of Stress Tolerance-Student's Student's solution in number 3 In contrast, the students who hasith the highest score in ST- dimensions tend to make a simple steps in solving the problem. She wrote the simplest way to find the solution of to the problem. For example, the solution key of to the number 3 wasn't wasn't written noted in on the answer sheet. She claimed that the problem is difficult for her.

She doesn't doesn't know how to start and how to resolve it. It can be seen in the solution of number 2 that she crosses out the first answer. The first solution is shown in Figure 6.

Figure 6. The highest ST-Student's Student's solution in number 2 (first solution) - First attempt However, the revised answer was only mentioningonly mentioned the sample space without determining the possibility of taking three balls simultaneously.

The highest ST studentShe wrote the number of the sample space but not the elements of it (see in Figure 7). After the interviewed, the subject was only mentioningonly mentioned that she does did not worry about the result. In other words, she does not know the number of possibilities of the event.

As the a result, the level of probabilistic thinking of the subject is categorized in as level 1. Figure 7. The highest ST-Student's Student's solution in number 2 (revised solution) – Second attempt Stress Tolerance in Probabilistic Thinking Stress Tolerance was found to have the strongest most vital links to dispositional mindfulness, work engagement (vigour, dedication, and absorption), and low levels of work burnout, as well as being moderately linked to work-related curiosity and a willingness to defy social norms and express opposing viewpoints.

In addition, stress tolerance also had the strongest most vital inverse relationship with negative emotionality, as well as and positive relationships with extraversion and conscientiousness, respect and trust, psychological needs satisfaction, and the humility to separate intellect and ego (Kasdhan, et al., 2018). However, the relation between stress tolerance and probablisticprobabilistic thinking was on the structure of thinking characterized by scenarios that allow one to explore reality. Mysterious, novel, complex, uncertain, and/or ambiguous events tend to elicit interest (e.g., Berylne, 1954, 1960; Silvia, 2008a).

If a person notices that an event has novelty potential, the stress tolerance occured. The students will only be stressful, however, if they also believe they can sufficiently cope with the distress that arises from exploring the novelty potential of a situation (Silvia, 2005, 2008a).

All probabilistic analysis is based on the idea that (suitably trained and intelligent) people can at least recognize good probabilistic arguments presented by someone else, or discovered or thought of by themselves, but not necessarily generate good assessments. The very fact that there was correspondence about the gambles – and occasionally some disputes about them – indicated that people do not automatically assess probabilities in the same way, or accurately (e.g., corresponding to relative frequencies, or making good gambling choices).

Unlike the typical research finding, which sets out to identify underlying the level of

probabilistic thinking,. tThe researchers note that this research is founded upon ''clinical'' methods where the problem to which subjects answer in probability problems characterize authentic risk-based in decision making.

The basic conception is that we all use a series of decision making in our everyday estimation (explicit or implicit) of probabilities, and this decision making sometimes lead to biases. Just as associational thinking serves us well in many contexts, however, so do the decision making. When we deal with probabilistic situations in everyday life, we can often ''muddle through,' ' but occasionally not appreciating the comparative nature of valid probabilistic thinking can lead to judgmental disasters.

These systematic deviations may be linked to thinking in terms of associations, whereas excellent probabilistic judgment always necessitates comparative thinking. CONCLUSION The smallest Stress Tolerance-Student's Student's consider in confirming that the first solution is true. In contrast, the students who has the highest score in ST-dimensions tend to make a simple step in solving the problem.

The students' students' answer in probability problems characterize authentic risk-based in decision making. When we deal with probabilistic situations in everyday life, we all use a series of decision making in our everyday estimation (explicit or implicit) of probabilities, and this decision making sometimes lead to biases. The level of the probabilistic thinking depends on the stress tolerance of the students.

The students who have the smallest score in stress tolerance tend to get level 4 of probabilistic thinking. In contrast, the students who have the highest score in stress tolerance tend to get level 1 of probabilistic thinking. REFERENCES Berlyne, D. E. (1954). A theory of human curiosity. British Journal of Psychology, 45, 180 -191. Berlyne, D. E. (1960). Conflict, arousal, and curiosity. New York: McGraw-Hill.

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