New Method to Calculate the Level of Consistency of the Pauli & Kraepelin Tests

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February 2018

Paper DOI: 10.17605/OSF.IO/TY326

Citation: Haryadi, S., & California, S. H. (2018, March 14). New Method to Calculate the Level of Consistency of the Pauli & Kraepelin Tests. Retrieved from osf.io/preprints/inarxiv/ty326

Abstract

In this paper, we proposed a modification of the measurement of the personality consistency level of the Pauli & Kraepelin Test in the field of psychology, using the formula made in April 2016, by Sigit Haryadi, and named "the Harmony in Gradation" or "the Haryadi Index". The purpose of this proposal is because the existing formula uses only the mean value of the deviation, which leads to the possibility that the result of consistency measurement on people whose facts are different levels of consistency will be considered to have the same consistency level, on the other hand, the proposed method will be more accurate and precise in terms of providing an assessment of the level of personality consistency of a person.

1. Calculation of Consistency Level of Human Personality on Pauli & Kraepelin Test using "Haryadi Index"

Emil Kraepelin was a psychiatrist of the late 19th century, who invented the psychological test kits to obtain information to diagnose human brain disorders of Alzheimer's and Dementia. Then, in 1938, Richard Pauli, Wilhelm Arnold, and Vanmethod renewed the Kraepelin test into a "check method". Then, Pauli refined, allowing the test results to be interpreted into a data about human personality. This test is now called the Pauli & Kraepelin test and measures the Speed, Accuracy, Consistency, and Endurance when one computes a simple summation mathematical problem, then interprets it into a measure of the personality of a person undergoing a test. The time required for a Pauli test is 60 minutes with a time span of 3 minutes, so there are 20 time periods, but especially for consistency measurements, which is used only test results for 16 time periods, i.e. at the 3rd time until the 18th.

This paper only proposes modifications to the measurement of consistency scores on the Pauli & Kraepelin tests, which psychologists would interpret into information about the stability of human emotions.

Without the use of complex mathematical sciences, it can be proven that existing methods contain weaknesses. For example, there are two people who have test scores over the 3rd to 18th period as follows: A = {5, 7, 5, 7, 5, 7, 5, 5, 7, 7, 5, 5, 5, 7, 7, 7} and B = {4, 8, 6, 6, 6, 4, 8, 4, 8, 6, 6, 6, 4, 8, 6, 6, 4, 8}. Thus, using the existing formula, the consistency score of A and B is the same, since both have the same average deviation. In fact, instinctively A should be judged more consistent than B because B produces many values that are too small and too large compared to average values. In addition, the scores obtained by A and B using the existing method are too high.

This paper proposes a method of measurement of consistency scores on the Pauli & Kraepelin test, using a formula made in April 2016, by Sigit Haryadi, and named as "the Haryadi Index", as an alternative to the existing method, where the use of "Haryadi Index" will preferably because in its formula it also contains "the Harmony" and "the Gradation, on the other hand, the existing formula of the Pauli & Kraepelin Tests contains only one element, namely" the Gradation ".

In the above calculation example, due to the existing formula which only takes into account the gradations on the values of the 16 test periods, A and B by the existing method are considered to have the same consistency, whereas inter-harmony should be taken into account, as would be done by the method in this paper, the new method will give a higher consistency score of A than B.

The formula of "the Harmony in Gradation" is written as follows:

$$HiG = \frac{1}{[N * \{(\sum_{i=1}^N S_i^2) + (\sum_{i=1; i > j}^N \sum_{j=1}^N (S_i - S_j)^2)\}]}$$

The Harmony

The Gradation

Where: HiG is "the Harmony in Gradation" of a random variable (or set) which has a sample population (or subset) = N, and Si is "the Share" of each sample (or subset) = comparison between strengths or the value of each sample (or subset) with the total strength of the random (or set) variable.

Examples of the Haryadi Index or the harmony in Gradation formulas are as follows: (a) for a random variable (or set) that has two samples (or subsets): HI (2), (b) for a random variable (or set) which has three samples (or subset): HI (3), (c) for a random variable (or set) that has four samples (or subset): HI (4)

$$HI (2) = 1 / [2 \{S_1^2 + S_2^2 + (S_2 - S_1)^2\}]$$

$$HI (3) = 1 / [3 \{S_1^2 + S_2^2 + S_3^2 + (S_2 - S_1)^2 + (S_3 - S_1)^2 + (S_3 - S_2)^2\}]$$

$$HI (4) = 1 / [4 \{S_1^2 + S_2^2 + S_3^2 + S_4^2 + (S_2 - S_1)^2 + (S_3 - S_1)^2 + (S_4 - S_1)^2 + (S_3 - S_2)^2 + (S_4 - S_2)^2 + (S_4 - S_3)^2\}]$$

2. Internet Calculator

To facilitate an understanding of this method, an "internet calculator" will be created, which is a website that provides a field, where we can fill in the values of the test participants, then get the calculation results of the consistency index. But the calculator does not limit the test that has 16 sample measurements, as it did with the original Pauli & Kraepelin test, but we are allowed to include a smaller or larger sample measurement sample of 16. This facility is prepared to anticipate if any psychologist wishes to perform the test with a test time of less or more than one hour. And, it is guaranteed that this new method will remain accurate for any sample size.

Internet calculator that will be made there at <http://sigitharyadi.net/> website and then click on the link "Consistency Test".

3. Calculation Explanation

- a) First, calculate the share of a sample measurement = S_i = (the value of a sample of measurement divided by the total value of all sample measurements).
- b) Then, calculate the consistency index using the following formula "Haryadi Index":

$$HI = \frac{1}{[N \{ \sum_{i=1}^N S_i^2 + \sum_{i=1}^N \sum_{j=1}^N (S_i - S_j)^2 \}]}; i > j$$

- c) Then determine the level of consistency as follows:
 - i. The index between 0.95 to 1.00 corresponds to "Very Consistent".
 - ii. The index between 0.75 and 0.94 corresponds with "Good consistency".
 - iii. The index between 0.60 to 0.74 corresponds with "Almost Less Consistent".
 - iv. The index between 0.50 and 0.59 corresponds to "Less Consistent".
 - v. The index is less than 0.50 is consistent with "Inconsistent".

Note

In order to better understand the concept of "Harmony in Gradation" or "Haryadi Index" which became the spirit of this calculator is welcome to read the papers and books contained in the bibliography as follows

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