A Comparative Study Of Adolescent (13-18 yrs) And Middle Adulthood (40-59 yrs) On Mental Speed In Mizo-Population.

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Abstract
This paper is about the study of digit symbol substitution test (i.e., to measure mental speed) between the adolescent (13-18 years) and Middle adulthood (40-59 years). The main objectives of the present study is to find out the descriptive statistics of mental speed of adolescent and middle adulthood; to compare the statistically difference between adolescent and middle adulthood on mental speed; to compare the mean bar diagram on mental speed (i.e., time score in second) and error score. Trying to fulfill these objectives, the investigators randomly selected a sample of seventy-one participants (i.e., adolescence thirty-five; middle adulthood thirty-six) from the normal Mizo Population residing in the Aizawl area. The age ranges are 13-18 years and 40-59 years respectively. Results are evaluated by using mean, standard deviation, one way analysis and mean bar diagram of both participants on mental speed. The result has indicated that mental speed i.e., time factor in second between adolescence and middle adulthood are found to be statistically significant but in error score, they are found to be insignificant. From the figure I and II, both time and error score, adolescence has less mean score as compared to middle adulthood.

Keywords: Mental speed; middle adulthood; adolescent; digit symbol substitution test.

Introduction:
Tests of speed may be categorized into those of motor speed and mental speed. There are several brain structures mediating motor speed (Joseph, 1996). The prefrontal cortex mediates motor planning, the supplementary motor area mediates initiation of motor acts, while the pre motor cortex, basal ganglia and the cerebellum mediate fine motor control. Motor speed therefore requires integration among, the multiple centres, which mediate movement. Motor speed reflects the efficiency of the integration. Mental speed is a composite measure, which requires rapid processing of information. In any given modality, even at low levels of stimulus complexity, information processing, speed requires coordination of different areas of the brain. The measures of speed are useful in documenting the efficiency of motor processes and the rate of information processing.

Digit symbol substitution test is a test of visuomotor coordination, motor persistence, sustained attention and respond speed. It measures mental speed. Rapid information processing is required in order to substitute the symbols accurately and quickly.

A fronto-parietal network for rapid visual information processing in digit symbol substitution test. This test is not sensitive to the location of brain damage (except for damage comprising part of the visual field i.e., occipital lobe).
Digit symbol substitution test is a neuropsychological test sensitive to brain location, dementia, age and depression. The test is not sensitive to the location of brain damage (except for damage comprising part of the visual field. The **occipital lobes** are much less clearly demarcated by anatomical landmarks than the other three parts of lobes, but they are usually considered to be formed of three regions, which may be characterized by the type of cell contained in each. These cytoarchitectonic regions are BRODMANN’S AREA 17,18 and 19, and these numbers are often used to refer to the three occipital regions. More common, perhaps, is the use of the terms STRIATE (because of its striped appearance when sectioned), PARASTRIATE AND PERISTRIATE, for regions 17,18 and 19 respectively. Fig

**Some functions of the occipital lobes:**

Primary visual sensation (Points of light, simple forms) Completion.

Visual perception: Contours; magnitude; orientation; depth; stereopsis; brightness; colour; and movement. Semantic connotations of visual objects; Reading.

**Adolescence:**

The Term adolescence comes from the Latin word adolescere, meaning “to grow” or “to grow to maturity.” The term adolescence includes mental, emotional, and social maturity as well as physical maturity. It is customary to regard adolescence as beginning when children become sexually mature and ending when they reach the age of legal maturity.

**Early adolescence** extends roughly from thirteen to sixteen or seventeen years, and late adolescence covers the period from then until eighteen, the age of legal maturity. Late adolescence is thus a very short period.

**Middle age** is generally considered to extend from age forty to age sixty. The onset is marked by physical and mental changes, as is the end. At sixty, there is usually a decline in physical vigor, often accompanied by a lessening of mental alertness. The increasing trend toward voluntary or involuntary retirement at age sixty rather than age sixty-five also justifies considering sixty to be the boundary line between middle and old age. Because middle age is a long period in the life span, it is customarily subdivided into early middle age, which extends from age forty to age fifty, and advanced middle age, which extends from age fifty to age sixty. During advanced middle age, physical and psychological changes that first began during the early forties become far more apparent.

Researchers like Gary E. Swan; Dorit Carmelli; Asenath Larue (1st January 1995) have found in their study that if age-related slowing of information processing is a marker for aging of the central nervous system, then people with lower digit symbol scores may be “older.”
Objectives of the study:
The objectives of the present study is:
1. To study the descriptive statistics of time score in second and error mean of digit symbol substitution test (which measures mental speed) between adolescence and middle adulthood;
2. To compare the significance difference of time score in second and error score of digit symbol substitution test (which measures mental speed) between adolescence and middle adulthood;
3. To compare the mean diagram of time score in second and error score of digit symbol substitution test (which measures mental speed) between adolescence and middle adulthood.

Method:
The present study has been designed to investigate “A Comparative Study Of Adolescence(13-18 Yrs) And Middle Adulthood (40-59yrs) On Mental Speed In Mizo- Population”. For this study, a sample of seventyone participants are randomly selected from Aizawl area. All the participants are administered digit symbol substitution test to measure mental speed.  

Participants:
Sample: (N= 71 i.e., adolescence = men and women=35; Middle adulthood= men and women=36 ) for the present study was drawn randomly from Aizawl area. The selected participants are administered digit symbol substitution test. The testing is made in individual setting.

Instrument:
The following test is used for the present study: Mental speed (digit symbol substitution Test):
The Digit Symbol Substitution Test (Wechsler,1981) is a test of visuo motor coordination ,motor persistence, sustained attention and response speed. Rapid information processing is required in order to substitute the symbols accurately and quickly. The test consists of a sheet in which numbers 1-9 are randomly arranged in 4 rows of 25 squares each. The subject substitutes each number with the symbol using a number-symbol-key given on the top of the page. The first ten squares are for practice.

Variables:
Independent: age of the participants i.e., adolescence and middle adulthood;  
Dependent: Response to the Mental speed of digit symbol substitution test.  

Procedure:
The subject is seated comfortably and the test sheet is placed in front of him or her. The principle of substituting symbols for digits is explained. Practice is given for the first ten squares after which the test commences.

Instruction:
The following instruction is given to the subject:
“ please sit comfortably. There are 4 rows of digits in this sheet. Beneath each row of digits there is a blank row. Each digit has a symbol. You have to substitute a symbol for each digit. You have to go row by row. (Demonstration for substitution is given for the first three digits by the examiner). You can start now. Yes that is correct. Have you understood? Please start now. Do as fast as you can.”

Scoring of the test:
The time taken to complete the test forms the score. Errors made are noted down.

Duration of the test: The test takes about 7 minutes.

Statistical Analysis:
Data can be analyzed quantitatively. The obtained data is processed to obtain the following information:
1. Mean and standard deviation of the adolescence and middle adulthood of mental speed included in the study;
2. One way analysis for the comparison of adolescence and middle adulthood included in the study;
3. Mean bar diagram comparison between adolescence and middle adulthood on mental speed.
Result:
The result tables for the present study are as follows:

**Table-I**

*Mean and standard Deviation of time score in second and error score of Mental speed (digit symbol substitution test) of adolescence and middle adulthood.*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Subjects</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Adolescence</td>
<td>35</td>
<td>157.11</td>
<td>25.47</td>
</tr>
<tr>
<td></td>
<td>Middle adulthood</td>
<td>36</td>
<td>268.02</td>
<td>68.33</td>
</tr>
<tr>
<td>Error</td>
<td>Adolescence</td>
<td>35</td>
<td>0.5143</td>
<td>0.701</td>
</tr>
<tr>
<td></td>
<td>Middle adulthood</td>
<td>36</td>
<td>0.583</td>
<td>0.840</td>
</tr>
</tbody>
</table>

**Table-II**

*Summary of ANOVA of significance difference between adolescence and Middle adulthood on mental speed (Digit symbol substitution test) i.e., time score in second and error score.*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between groups</td>
<td>218313.68</td>
<td>1</td>
<td>218313.682</td>
<td>81.210</td>
<td>.000</td>
</tr>
<tr>
<td>Within groups</td>
<td>185490.52</td>
<td>69</td>
<td>2688.268</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>403804.20</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between groups</td>
<td>.085</td>
<td>1</td>
<td>.085</td>
<td>.141</td>
<td>.709</td>
</tr>
<tr>
<td>Within groups</td>
<td>41.493</td>
<td>69</td>
<td>.601</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41.577</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure-I**

*(Mean Time in seconds of adolescence and middle adulthood on digit symbol substitution test i.e., mental speed).*

Mean Time in seconds of adolescence and adulthood on digit symbol substitution test.
Discussion:

The results are discussed in the following ways. The result Table-I shows mean, standard deviation; and Table –II shows F value of the variables i.e., mean time score in seconds and error score of digit symbol substitution test (which measures mental speed) included in the present study for all the participants. The mean value of time score in second between adolescence and middle adulthood are found 157.11 and 268.02 respectively and F value between groups (F= 81.210) are found to be statistically significant.

The mean value of error score between adolescence and middle adulthood are found .5143 and .583 respectively and F value between groups (F=.141) are found to be insignificant.

The figure 1 in the result chapter indicates that middle adulthood have more mean time on mental speed than the adolescence.

In the figure 2, middle adulthood have more error mean value on mental speed than the adolescence.

Mental speed is a composite measure, which requires rapid processing of information. In any given modality, even at low levels of stimulus complexity, information processing speed requires coordination of different areas of the brain. The measures of speed are useful in documenting the efficiency of motor processes and the rate of information processing. The prefrontal cortex mediates motor planning, the supplementary motor area mediates initiation of motor acts, while the premotor cortex, basal ganglia and the cerebellum mediate fine motor control. Motor speed therefore requires integration among the multiple centres, which mediate movement. Motor speed reflects the efficiency of this integration.

Conclusion:

In conclusion part, the investigator found very interesting about the mental speed between the adolescence and middle adulthood and suggested to do this test with other test so that it can able to reflect more information in relation to this test.

Acknowledgement:

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References:
Gaertiner E.; Wagner M; Luck T; Buttery AK; Fugh J; Busch MA (June 2018). Normative data for the digit symbol substitution test in a population-based sample aged 65-79 years: Results from the German Health interview and examination survey for Adults (DEGS1). Clinical Neuropsychology, 1-19.