



Article

Methodology for Checking Attention Characteristics Using the Schulte Table

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Abstract: This article discusses the theoretical foundations and practical significance of psychodiagnostic assessment of students' attention characteristics - strength, stability, and speed of attention - using the 90-digit complex version of the Schulte methodology, developed by psychologist Walter Schulte and introduced into scientific practice. The study involved 120 participants (students) aged 18–35. The results showed that the 90-digit version allows for a more accurate and comprehensive assessment of the stability and dynamics of attention.

Keywords: Schulte Table, Attention, Attention Diagnostics, Strength of Attention, Stability of Attention, Scope of Attention, Speed of Attention, Psychodiagnostics.

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1. Introduction

In modern psychology, the issue of measuring and assessing cognitive processes, in particular attention, is gaining significant scientific and practical importance. Attention, as the main mental process that governs all human activity, has a direct impact on its efficiency, learning ability, and professional success [1].

Various methods have been used in the psychodiagnostic assessment of attention. Among them, the table method developed by Walter Schulte in the 1950s holds a special place. The Schulte table was originally used in clinical psychology to assess the activity of the frontal lobes of the brain, and later became widespread in general psychological diagnostics [2].

The classic Schulte table consists of 5×5 numbers, i.e. 25 numbers, in which the numbers from 1 to 25 are arranged in a random order. The respondent must find these numbers as quickly and sequentially as possible. However, researchers have noted that the classic version has limited ability to observe the dynamics of attention over a long period of time [3].

As an answer to this problem, the method of the complex Schulte table with 90 numbers was created. This version places the numbers on a larger area, in different sizes, which allows for a more in-depth assessment of not only the volume of attention, but also its durability and selectivity.

Relevance of the study. Problems such as attention deficit disorder, academic failure, and cognitive fatigue are widely observed among students in the higher education system of Uzbekistan. There is a need to use high-quality psychodiagnostic tools for early detection and correction of these conditions. Although the Schulte 90-number method is recognized as an effective tool in clinical and educational psychology, its application in domestic research has not been sufficiently studied [4].

Aims and objectives of the study. The main aim of the article is to assess the psychodiagnostic capabilities of the Schulte 90-number method in determining the main characteristics of attention (strength, stability, and speed) and to develop recommendations for its use in the practice of higher educational institutions.

Tasks: Analysis of the theoretical and methodological foundations of the Schulte methodology; Conducting practical research on a sample of students and analyzing the results; Providing practical recommendations on the application of the methodology in educational psychology [5].

By using the "Schulte" tables in students, it is possible to further develop their attention skills. The methodology serves to develop students' ability to peripherally view the text, increase the strength of their attention by mobilizing their willpower to the task, not to be distracted by external influences by forming the quality of endurance, acquire the skill of fast reading by viewing the text holistically, and develop the skills of perceiving a large amount of text at the same time.

By independently performing a complex type of Schulte table, students can develop not only their attention skills, but also their memory to some extent. Because they try to remember the necessary numbers and words in order to quickly find them. And with regular practice, the quality of memorization improves. In the process of working with the table, it is necessary to pay attention to the formation of visual skills. Therefore, during the process, the user should not focus on completing the task quickly, but should try to complete it correctly. At the beginning of the exercise, there may be difficulties in seeing the numbers as a whole, but if the process continues regularly, the performer will begin to notice in practice that he is finding the numbers faster than with a traditional search or compared to his previous indicators [6].

2. Materials and Methods

The history of psychological measurement of attention dates back to the late 19th and early 20th centuries. The first instruments were created in the laboratories of V. Wundt and E. Kraepelin, which mainly measured reaction speed and variability of attention. Later, A.R. Luria and L.S. Vygotsky systematically studied attention from a neuropsychological perspective and revealed its frontal regulatory mechanisms. The scientific basis of the Schulte table methodology was further developed by F.D. Gorbov. The Gorbov-Schulte variant is designed to measure the characteristics of attention distribution and switching using two-color (red and black) numbers. This variant is still widely used in clinical neuropsychology.

The 90-digit complex Schulte table was scientifically substantiated by G.Ya. Rebrova and M.N. Ilyina. These scientists pointed out the following advantages of this option: firstly, the extended test period allows for determining the indicator of attention fatigue resistance (endurance); secondly, the matrix of large numbers provides a more in-depth assessment of visual-motor coordination; thirdly, the transfer effect can be reduced by working with several cards.

Among the theoretical models of attention, M.I. Posner's "attention network" model is of particular importance. According to this model, the Schulte table mainly activates the "orientation" and "execution" networks, that is, it measures the selective and regulatory components of attention.

Research design. The 90-digit Schulte table methodology was chosen as the main measuring instrument in the research process. The table consists of 10×9 cells in a random order, in which the numbers from 1 to 90 are placed. The respondent is given the task of finding the numbers from 1 to 90 on the table card as quickly and without errors as possible. The psychometric indicators of the methodology were evaluated based on the results of completing the task within a specified time. The study was conducted in the 2025–2026 academic year. The study involved 120 participants selected from among the

students of Turan University (men: $n = 34$, women: $n = 86$). Participants were selected based on the absence of visual or hearing impairments, neurological diseases, and their informed consent to participate in the study.

3. Results

The success of students in the educational process in many cases depends on the level of formation of attention characteristics. Especially in the process of performing complex mental tasks, the speed, strength and stability of attention play an important role. Therefore, in the research process, the attention characteristics of students were studied using the Schulte methodology. The methodology assesses the speed, strength and stability of attention. Table 1 below presents the differences between the Schulte methodology in terms of descriptive and normal distribution values [7].

Table 1. Descriptive and normal distribution values of the Schulte methodology (N-120).

Criteria	Average value (M)	Standard deviation (σ)	Kolmogorov-Smirnov criterion (Z)	Confidence level (p)
Attention span	15,75	2,60	4,3	0,000**
Attention stability	10,74	2,12	4,2	0,000**
Attention speed	14,14	2,96	3,1	0,000**

Note: ** - $p < 0,01$

The results obtained made it possible to determine the degree to which attentional characteristics were developed in students [8].

The average value for the power of attention was (15.75). This criterion indicates that the ability of students to focus attention on a specific object and maintain it despite the influence of external factors is well-formed. The average value for the stability of attention is (10.74), which indicates the consistent maintenance of attention for a specified period of time. The relatively low indicator determined by this result indicates that some students have difficulty maintaining attention at the same level for a long time during mental activity [9]. The average value for the speed of attention was (14.14), and the indicators for this criterion were relatively high. This criterion indicates that students are able to work with tasks that require a long time, which is an important advantage in modern education.

When checking the compliance of the characteristics of attention speed, strength and stability with the law of normal distribution using the "Schulte" method, a deviation from the normal distribution was observed. According to it, the strength of attention was ($Z=4.3$; $p < 0.01$), the stability of attention was ($Z=4.2$; $p < 0.01$), and the speed of attention was ($Z=3.1$; $p < 0.01$). This indicates that the level of formation of attention characteristics in students has individual psychological differences. That is, some students have high levels of attention speed, strength and stability, while others have slightly lower levels [10].

The Schulte method plays an important role in developing students' independent work skills. In particular, high attention span and stability of attention in students provide an important advantage in quickly and accurately assimilating information. It is also appropriate to use the Schulte method as a reliable tool for studying the relationship between attention and cognitive processes [11].

4. Discussion

The results of the study clearly demonstrated the diagnostic capabilities of the Schulte table 90 in assessing attention characteristics. The most important finding is that

this method more sensitively records the dynamics of fatigue. This result is consistent with the theoretical predictions of Rebrova and Ilyina [12].

It may seem interesting that the indicator of attention stability is much lower in the 90-digit version, that is, it turns out to be more stable. This can be explained by the length of this method: in the 90-digit table, the respondent works for a longer time and, having passed the initial adaptation stage, establishes a more stable work pace. As a result, it reflects more real stability of performance [13].

In terms of attention speed, the 90-point table provides qualitatively new information: it shows not only the average speed of execution, but also the dynamics of time. The slowing down of speed during the execution of the exercise directly measures the effect of cognitive load. The power of attention - that is, the degree of voluntary effort of the subject in relation to the task - is tested even more in the 90-point table, since it requires maintaining high concentration for a long time in a monotonous and tiring matrix. This is consistent with A.R. Luria's concept of attention power as a product of frontal-lobe regulation [14].

The Schulte 90-digit table for assessing students' attentional characteristics in universities can be especially useful in the following situations: determining the level of cognitive readiness of students at the beginning of the semester; assessing the risk of fatigue before the exam period; diagnosing factors that complicate attention (sleep deprivation, stress) and providing preventive instructions. The methodology does not require special equipment and is carried out in a relatively short time. This makes it a popular tool for educational institutions with limited resources [15].

This study has several limitations. First, the sample consisted of students from only one university, which limits generalizability. Second, the results were based on students' time to complete the task, which poses a risk to its reliability. Third, the cross-sectional design of the study cannot capture longitudinal demand dynamics. Future multicenter, longitudinal studies are recommended.

5. Conclusion

This study empirically confirmed the psychodiagnostic value of the Schulte table 90 in assessing attention characteristics. The methodology more deeply and sensitively reflects the dynamics of speed, strength, stability of attention, and fatigue. The following practical recommendations were developed for measuring students' cognitive processes in higher education:

- Include the Schulte table 90 in the screening diagnostic complex at the beginning of the semester;
- Organize cognitive support sessions for students with a high fatigue index;
- Conduct further research on standardizing the methodology based on local norms.

In general, this study once again confirmed that the Schulte methodology, with its simplicity and comprehensiveness, is a tool that deserves to take its rightful place in the practice of educational psychology.

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