PSYCHOLOGY AND EDUCATION (2024) 61(12):1797-1819
ISSN: 1553 6939

An Interactive Psycho-Structural Approach to Study the Effect of Sleep and Attention Factors on Building Mathematics Competencies for Third-Year Primary School Pupils according to Structural Equations Modeling

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Received: 22/07/2024 **Accepted: 08/11/2024** **Published: 27/12/2024**

Summary:

The current study aimed to test hypotheses about the influence of attention and sleep on the construction of third-year students' learning in mathematics. The sample size was estimated at 124 male and female students from the third-year primary schools and 178 male and female teachers distributed in the schools of Setif municipality, who were selected randomly.

The hypotheses were verified using F.Testu's number-crossing scales in four different formats, a questionnaire distributed to parents to monitor their children's sleep and time they wake up, then at the end of the semester we obtained the students' quarterly results, and we distributed an observation grid to the teachers of the third year primary students, namely the attention scale, the sleep scale and the SCI socio-constructive and interactive model, all these tools in order to verify the direct and indirect hypotheses of the study.

After processing the hypotheses, the first hypothesis and the second hypothesis, which addresses attention, were realized, while the hypothesis that addresses sleep was not realized, however as a concluding that there is an apparent effect of attention, while the effect of sleep did not appear in this study.

Keywords : chronopsychology – psychological pace –biological pace – basic learning

1- Problematic:

The concept of chronopsychology takes the temporal dimension in the scientific study of pupils behaviour, as it relates to the different ways in which pupils adapt to these changes. We adapt at the present time to the cyclical changes in the environment, then: the main goal of

chronopsychology is to study the periodic behavioral changes of the pupil[1]; Where it is concerned with the frequency of psychological activities of children in school and with the appropriate times or conditions for students to learn in order to raise their cognitive effectiveness by improving the effectiveness of education through better use of time in the short term and combating school failure[2].

Educational practice has become complicated to the extent that it is necessary to realize the articulations between the educational act and the cultural and social variables, which means that following this situation educationally requires a cognitive effort and knowlege, related to understanding the goals of the educational system, as well as determining the immediate and strategic requirements for the desired pedagogical goal.

The effective pedagogical approach is not experiential, but rather an exploration of the strengths and imbalances in a specific educational process, and the basis for the learner's status.(as a human being) At the core of pedagogical interest, as "Gaston Millary" says: a human being or a human condition (As is the case with the conditions of education) only the center of a fabric of dialectical relations(Which constitute a portion of the content and form)Perhaps this perception constitutes the basis of all pedagogies that bet on building the individual after understanding him, and because of that we know the necessity to develop educational programs in their formative dimension, and in relation to the desires of the individual and keeping pace with the developments of society.[3]
With the development of knowledge in didactic and human sciences, attention shifed to the didactic contract, strategies and positions, as it is the new vision of teaching methods that reflects the approaches and paradigms of the current time.

Didactic is every pedagogical situation that interconnected with the student, the teacher, and the contents, and these parties interact to give us three processes that are called tripolar interaction, this interaction is known as the didactic triangle.

The systemic model has a distinctive vision of the pedagogical triangle, as it is characterized by a dynamic in communication and pedagogical adjustment between the parties in the positions, and it shows the active role of the learner, and the teacher is a mediator of a process of participatory construction of knowledge, From this point of view, it is possible to conclude the constructive model of the dedactic, where the teacher formulates it, and acts as a companion. As for the pupil, he seeks the task of building his learnings by investing his resources, plans, and strategies. The process, then, is formative, and logic is constructive.[4]

[1] Testu François, Rhythms of life and school rhythms: Chronobiological and chronopsychological aspects. Issy-les-Moulineaux: Elsevier-Masson, 2008, p 33.
[2] Louisa Maarouf: The effect of the school time organization pattern on attention, behavior, duration of night sleep, and activities outside school among primary school students (sixth year), doctoral dissertation, Abu Al-Qasim Saadallah University - Algeria 2 -, Algeria, 2008, p. 134
[3] Abdel Latif Al-Khamsi: Pedagogical approaches and the renewal of educational practice, Education and Training Notebooks, Morocco, No. 2, May 2010, p. 31.
[4] Mohamed Bouzidi: The social perceptions of secondary teachers about evaluating competencies in integration pedagogy - a field study in some secondary schools in the state of Jijel - an unpublished master's thesis, Constantine 2, Algeria 2013/2014, pp. 75-76.

And because the basic learning is structured in a systematic, continuous and dynamic way, the Algerian legislator defined it in three main activities, which are: the Arabic language, math subject, and the French language. and since each activity has its own goals and didactic, this study deals mathematics first and for most for being one of the basic learning and because of its importance in the scientific journey of pupils, and based on the principle of " mathematics for all" this study tries to contribute, even in a simple way, to make it a right for everyone and to overcome the didactic, psychological and educational difficulties in order to help the student in acquiring it and the teacher in teaching it easily , by addressing it from the angle of the school pace, and from it, the main variables in the current study are: attention, sleep and building the knowledge of Third year primary pupils in mathematics.

The teaching of mathematics has been continuously developed, both in terms of the contents of the activity and in terms of the pedagogical approach and teaching methods, and so we have moved from the traditional methods of teaching and presenting mathematical concepts in their final and ready form, to the current stage, during which the approach of competencies was adopted as a pedagogical option that concerns all subjects, including mathematics.

Unlike the rest of the activities, the pedagogical approches for teaching mathematics subject have relied on the approach of teaching mathematical activities that allow the pupil to be a creator of his learning and an essential factor in his education. and this choice was adopted based on the progress of research and studies that are of interest to cognitive psychology and the dialectic of mathematics. Based on the foundations and hypotheses of Constructivism and socio-constructive theories, which later form the theoretical underpinning of the competencies approach.[5]

If we initially want to define the concept of socio-constructive, from a general point of view, the term socio-constructivism contains the word "constructivism", which expresses the idea that all knowledge results from a construction process according to the principle that the active is the learner, or the word "socio", which defines the importance of social interactions that affect on this process.

The interactive and the socio-constructivism perspective includes three integrated fundamental dimensions, which are: the constructive dimension: in which the individual develops a reflexive activity around his own knowledge. the dimension related to social interactions: in which the individual learns with his peers and with the teacher; and the dimension related to interactions with the environment: in which the individual learns a specific content in the situations in which he is in At the same time a source and a criterion of knowledge.

Either conceptually, knowledge is built according to socio-constructivism perspective by the individual learner in a situation linked to a particular social and professional context that allows him during the activity to interact with others and adapt them to the requirements of the situation; learning from this perspective becomes a dynamic and adaptive process that is

[5]A Didactic Formula for Mathematics in Rehabilitation Secondary Education: A fragment for the professor of rehabilitative secondary education, the Moroccan Ministry of Education, the Central Unit for Training Frameworks, 2009, p. 25.

meaningful for construct and develop one's knowledge in an actual situation within specific socio- occupational context[6].

All these factors and indicators determine for us, within the framework of this study, a reference paradigm for the field of thinking and action, which focused on the interactive socio-constructivism model "SCIT" to build pupil learning the third primary for math subject, as well as the effect of each of the psychological pace (Attention) biological pace (sleep) on the construction of these learnings. the current study came to find out the direct effects of both attention and sleep on pupil achievement in mathematics subject, whether it is a direct relationship with the pupil, or the relationship as seen by their teachers, so we ask the following questions:

- Does attention and sleep contribute improving the achievement grades of mathematics subject for third-year primary school pupils?
- Does attention directly affect the socio-constructivist interactive model to build the learning of the third year elementary school pupils in the mathematics subject according to their teachers' responses?

2- Study hypotheses:

- **The first main hypothesis:**
- Both attention and sleep contribute to improving pupils math achievement grades for the third primary year.
- **The second main hypothesis:** The conceptual model of the second main hypothesis stems from the general model and the general perception of the study. It aims to know the various direct effects of the independent variable -attention and sleep- on the various dimensions of the model. "SCI" This model includes the following partial hypotheses:

1. Attention affects the socio-constructivist interactive model to build the kowledge of third year primary pupils in the mathematics subject according to their teachers' responses.
2. Sleep affects the socio -constructivist interactive model to build the knowledge of the third year elementray pupils in the mathematics subject according to their teachers' responses.

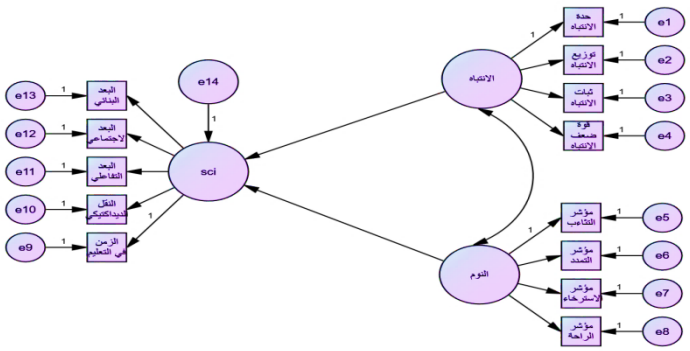


Figure (1): shows the conceptual model of the hypothesis

3- Terminology of study:

[6] Belkacem Belqidoum: A critical contribution to the uses of the term competencies in the educational field from a theoretical and epistemological perspective, Journal of Social Sciences, Setif, Algeria, issue 21 December 2015, pp. 19-20.

3-1- approach: It is the conceptualization and construction of an achievable work or a project, by making a plan or strategy that takes into account all the interrelated factors in achieving effective performance, and the appropriate results in terms of method ,tools, place, time, learner characteristics, the environment and pedagogical theories[7]. The technique and strategy of this study is to approach and compare the results of the hypotheses of the pupil with the results of the hypotheses of the teachers of the primary stage (comparing between the two main hypothesis), and to come up with explanations for the subject of the school pace from several sides.

3-2- School pace:

The concept of the school pace (rhythem) can refer to the pupil's learning speed in the school situation, that is, the learning rhythm is the result of the physiological processes, the psychological and physical aspects of children and adolescents, within the framework of the pupil's natural rhythm[8]. The school pace is included in our current study through its impact on building mathematics activity learning (knowledge) for third-year elemenrty school pupils.

3-3- Chronopsychology:

It is interested in studying the behavioral changes of the pupil, And the frequency of psychological activities for children in school and the times or the appropriate conditions for pupils to learn in order to increase their cognitive effectiveness by improving the effectiveness of education through better use of time in the short term and combating school failure [9].in this study the behavioral changes are restricted to the attention and sleep of the pupils.

3-4- Attention:

We cannot see a psychological process such as attention. We observe it through the behavior of the child while he is learning, or by observing his performance during the measurement process using the standardized test[10]. The process of measuring attention in this study is by crossing out numbers for the researcher "F.Testu" and a test distributed to the teacher that measures the indicators of pupil's attention during learning mathematics subject.

3-5- Sleep:

Sleep provides the body with the opportunity to regulate and restore internal activity and mobilize energy to practice daily life. It is necessary to maintain daily life balance , and that because it is a psychophysiological and chemical process that restores the human organism to its physiological balance [11] . The process of measuring sleep in this study is through a questionnaire distributed to parents of pupils in order to write the exact time of sleeping and waking up of their children, and a test distributed to the teacher that measures the indicators of the pupils sleep state during the learning of the math subject.

4- The socio-constructivist interactive model SCI:

[7] Farid Haji: Teaching and evaluation, according to the competency approach, Dar Al-Khaldounia, Algeria, second edition, 2013, p. 10.
[8] The sense of rhythm: School, biological and psychological rhythms of children and adolescents, Brussels, Federation of Parents' Associations of Official Education (FAPEO), Coll. "FAPEO Analyzes", July 2008, p 6.
[9] Louisa Marouf: previously mentioned reference, p. 134.
[10] Abeer Abdel Hamid Al-Najjar: Learning difficulties and early intervention in kindergartens, Egypt, Publishing House, 2017, p. 58.
[11] Zakaria El-Sherbiny: Psychological Problems in Children, Dar Al-Fikr Al-Arabi, Egypt, 2002, p. 117.

It means that the learner builds his knowledge with his peers and his teacher, and these learnings are not the main goal, but rather the major goal is learning within the framework of interaction with his peers, and the measurement was based on a scale proposed by "Philip Jr". and that's by observating, in an attempt to match between the perception and the reality.

- The significance of the study: The importance of the study is:

- Providing scientific suggestions to specialists and workers in the educational field and exploiting them in order to help the pupil building his knowledge in a good way, especially in the math subject.
- The information that this study provide about the effect of the school pace on the pupils' achievement and the building of his learning in the mathematics activity.
- Providing scientific suggestions to specialists and workers in the educational field and exploiting them in order to help the pupil build his learning in a good way, especially in the math activity.

- Objectives of the study:

- Attempting to compare the pupil's pace with the teachers perception of the school pace, and from it make conclusion about the different effects to dive more into this topic.
- Constructing a clearer picture of the subject of the school pace and its direct and indirect effects on academic achievement and building basic knowledge in general and the subject of math in particular.
- Applying an interactive psycho-constructive approach to study the effect of sleep and attention factors on building mathematics competencies for third-year primary pupils according to constructual equations modeling.

5- Previous studies:

5-1- A study by Maarouf, Douka, Khalfan, Tamjat 2010 entitled: "The impact of new measures related to the use of school time on the school performance of primary school pupils "

The study aimed to identify the daily features of attention and performance in the classroom, and also to know the evolution of the average sleep times during the week. and to analyze the activities of pupils outside the school. the study applied to pupils(11 years old) in the fifth year of elemetary school; distributed over four schools from the state of Tizi-ouzou (Algeria) .they relied on the descriptive approach in this study, using a range of data collection methods including: 4 cross out numbers tests for F.TESTU in order to determine the feature of attention changes, the observation net work was used to observe the behaviors of low alertness, indicators of hyperactivity, a questionnaire directed to parents and children distributed to them in order to study sleep , and another questionnaire to analyze the out of class avtivities of pupils. the study has reached a set of results we review the most important :

- The lack of adequate educational structures within the Algerian school and even structures in society that allow the childto grow and respect his physiological and psychological pace, which leads to psychological imbalance, including school failure.
- The need to improve the quality and performance of the Algerian educational system by respecting the biological and psychological pace of children inside and outside the school.
- Offer schedules more appropriate to their biological and psychological requirements.

Through these results, a set of recommendations were presented within the framework of this study:

- Rethink school timin.
- Review the timeline of the Algerian schools
- Respect the duration of night's sleep.
- Rethink the entry and exit times for the pupils aged between 10- 11 years old.
- Take these recommendations cautiously in the framework of their methodological limitations.[12]

5-2- A study by Ibn Abdel Malek Abdel Alaziz in 2013, entitled: " School pace and social perceptions" – an analytical study on a group of primary school teachers.

This study aimed at a set of objectives, the most important of which are: identifiying the social perception of primary school teachers from the percpective of educational content, as well as identifying similarities and differences in social perception in order to identify potential characteristics and identify the nature perceptions about the school pace .research tools, including the interview and the survey, as well as a set of reports, and the researcher relied mainly on the synthetic card to study social perceptions, the method of recall " VERGES" the basic cognitive structures, and the study concluded a set of results, the most important of which are: the social center nucles of primary school teachers is absenteeism and there are secondary aspects : which are non – functional represented in boredom and anxity, poor psychological conditioning accompanied by the fatigue and weakness, which makes the daily life in school hard , the large number of school content is a problem that reflects information density necessarily leads to school fatigue, and the researcher concluded his study with some proposals, the most impotant of wich are follows:

- Daily and weekly planning for the school pace, also taking into account the psychological and biological pace of pupils.
- Targeting times of intensity in attention and alertness in building basic learning, and moments of less intensity for learning are less important.
- Considering the factors affecting the psychological and physiological pace, such as the age of the children and the taskes.
- The pupils Internal clock coincides with the social practices of school time.
- Encouraging researches in the field of chronobiology and chronopsychology, in order to identify appropriate learning and educational methods dependent on the time factor and other psychological variables.[13]

5-3- Study of Morlaix Sopie 2000 : titled " the search for a better scheduale of school time in primary education to enhance school success ."

[12] Marouf (L), Khelfane (R), Douga (A), Tamdjiat (A): Impact of new measures concerning the use of school time on the academic performance of students in the primary cycle, INRE 2009 Project, National Research Institute in Education, Algiers, May 17, 2010.
[13] Abdelaziz Benabdelmalek: School rhythm and social representations - Analytical study centered on a conglomerate of core referents from a random population of primary school teachers -, Doctorate of Science Thesis, Mentouri University of Constantine, 2010/2011.

_ The study aimed to reveal the diversity in the uses of educational schedule and impact on the sixth year learners , the acquisition of the competencies reviewed at the end of primary education , as the researcher applied the study to a sample of 1000 learners distributed over 70 row in the region of (COTE D'OR) taking into account each of their social , demographic , and educational characteristics the researcher relied on a network application (Budget/time) that were analyzed using the modeling method using program (LISREL) , the researcher concluded the following results :

- There is a difference and diversity in the use of educational time with a somewhat low level in sixth year of primary school.
- The presence of an output with a significant effect among the results (Mathematics), the end of the year of primary education and the amount of time given to learners, especially in each of (mathematics, and French language)
- The existence of a result with a significant impact on practices of the educational time in relation to the learners acquisition of the competencies reviewed logical competencies in contrast to creative competencies [14].
- **Commeting on previous studies:**

the current study shares with the previous studies in terms of it's main topic and general objective , as well as in formulating the problem and defining the hypotheses , the approach used the tools used in data collection and the statistical methods used .as well as the results reached in general , and our current study also shared with the study of Bin Abdul Malik in terms of the idea of organizing school time in order to build basic learning at appropriate times for that , and our study also relied on third year primary pupils from 8 to 9 years.

In addition to trying to complete what the previous studies came up with, this is clearly evident in that this study addressed a multi-faceted scientific gap by addressing the issue of the school pace from two sides: the first side is the student, and the second side: the teacher, and this is done by using the modeling method with structural equations to analyze the study data in a systematic way.

6- Basic study limitations:

- **Time limits:** The primary study was conducted during the school season 2018/2019, in the second semester, beginning with 18 January to 25 January 2019.
- **Spatial and human boundaries:** The basic study was conducted with two teachers from the municipality of Setif for the sample of pupils, and a group of schools from the municipality of Setif for the sample of the teacher.
- **Epistemological boundaries:**

This study consisted in studying the effect of attention and sleep on building the learning of third-year primary school pupils, because the pupils of this stage are in the period of deepening basic learnings, which in turn requires the pupils to be very alert and attentive, without addressing other variables that are no less important than the variable of sleep and attention, such as: diets, intelligence, memory. and others, all of which directly affect the pupil's

[14] Morlaix Sophie: Seek a better distribution of school time in primary school to promote success in middle school In: Revue française de pédagogie, volume 130, The administration of education, 2000.

biological and psychological pace, so our study was satisfied with studying attention and sleep only and knowing its effects in isolation from other variables that have other tools specific to each variable, and the study was applied to a sample of Pupils and a sample of teachers, and we also touched in our study on schools that apply the one-shift system, without addressing the schools that apply the two-shift system, because the methodology of field work and the tools available for measurement require us to work on the one-shift system.

7- Study Approach:

The current study relied on the "descriptive approach" as it is a comprehensive statistical approach to test hypotheses and relationships between latent and observed variables, and as it relies on quantitative analyzes interested in discovering facts, describing phenomena accurately, and quantitatively and qualitatively defining their characteristics. Reaching its current state, trying to predict the future, it is an understanding of the past, present and future of the phenomenon[15].

8- Study population:

The population of the current study consisted of the pupils of the second stage schools; The level of the third year of primary school, and the teachers of the third year of primary education in the municipality of Setif during the school year 2018/2019 distributed on 88 Elementary school, and 213 groups, including the total number of teachers in the third year of primary school 213 teachers .

9- The study sample and how to choose it:

The size of the sample is one of the important things that must be taken into account in any study, and due to the large size of the original community of students and the shortening of time, we applied the study tools to four cohorts from two schools, distributed in the state of Setif in a random way, where the sample size was estimated at 124 Male and female pupils from the third year primary departments distributed over the “Mohamed Saleh Sfaxi” school and the “karis Yahia” school. These schools depend on the one-time system that for the pupils sample.as for the teachers sample of the third year in the state of Sétif in 213 the representative sample of this complex, was calculated it in the following way:

10- Study sample account:

In order to calculate the study sample, we used the Stephen Thompson equation Stephen _ Thompson using the statistical program Excel 2013 And we got the following results:

Table(1): shows the values of the Stephen Thompson equation

213	**community sizeN**
137,2552335	**So the sample size=**

[15] Ammar Bouhouche: A researcher’s guide to methodology and writing university theses, National Book Foundation, Algeria, first edition, 1990, p. 125.

$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$	**Steven thampson equation**

11- How to collect data:

Data were collected by applying cross-digit test by "Testu" to pupils studying in the third primary section, in writing and collectively, all at once and the duration of passing (distribute) is estimated about 30 seconds. The test was distributed to third year primary school pupils both at " sfaxi Mohamed saleh" elemantry school and " karis lakhder" primary school in order to know the attention grades of the pupils While a questionnaire was distribute directed for parents to know the hours of sleep of the pupils during the study, and at the end of the second semester, we obtained the results of the pupils , and we also distributed the observation network to teachers distributed to the schools of the state of Sétif in order to have a greater representation of the category of teachers of the third year of primary school.

12- Description of study tools:

12-1- Attention scale (Crossing out numbers test for F. Testu):

To study the pupils' attention grades, we applied four tests to cross out numbers for the researcher "F. Testu" It is the task of visual discrimination and it works to assess the degree of attention, these tests contain 149 Numbers for crossing out and they are scattered in nine lines with three numbers for crossing out in each line, and to avoid the effect of the transfer of learning and boredom that may result from the repeated scrolling or (passing) process during the day and week. These tests were presented in different forms, means in (different and equal numbers) and before starting the application of these tests, the researcher provided a set of instructions in order to ensure the accuracy of the deletion and the speed of execution, the execution period was estimated at thirty seconds.

12-2- Study of the duration of the night sleep:

By presenting a questionnaire (survey) to the parents of the pupils, to record the sleeping and waking hours of their children, for a full week.

12-3- observation network (Measures to measure attention, sleep and build learning by the teacher):

Our perception of this model was based on 3 Scales built by the researcher through the theoretical framework and previous studies, in a way that is consistent with the current study. We intended to have the educational qualification variable and the seniority variable in the first part of the tool research in order to answer the study's hypotheses and achieve its objectives. In the second part of the tool, the scale came the first: the pupil's attention during the construction of his learnings represents the indicators of the psychological aspect of the pupil, while the second measure came: the indicators of the state of sleep of the primary school pupil during the construction of his learnings represent the indicators of the biological side of the pupil. the third scale was the interactive sociostructural model for building learning, it's a scale proposed by "Philip Jonayer",The observation network is distributed to a teacher's sample and from it the teacher is required to monitor some pupils in order to conduct an observation network on them for a whole week in order to collect as much data as possible on the topic.

13- Description of the attention scale: This scale is concerned with the attention of the primary school pupils "third year" during the construction of his learning (18 item) these

items are divided into 4 dimensions that represent aspects of pupils attention in the classroom, which are:

- **The first dimension:attention intensity :** The largest nervous energy that can be lost during the activity in which the psychological process that occurs accurately, clearly and rapidly takes place, and may be from 4 items.
- **The second dimension: the distribution of attention:** Psychological processes and activities directed towards several things or activities simultaneously and it consists of 4 items.
- **The third dimension: stability of attention:** It is to maintain acute attention as long as possible and lead to the individual acquiring a motor impression of neurological processes[16], and it contains 5 items.
- **The fourth dimension: times of strength and weakness of attention:** They are the times when attention in the school day is at its peak, and times when attention is weak and it consists of 4 items.

14- Description of sleep scale:

This scale is concerned with the indicators of the state of sleep of the primary school pupils "third year" during the construction of his learning. and it may be 26 item, these items are divided into 7 dimensions that represent the manifestations and state of sleep for the pupil in the classroom. These dimensions were inspired by the study of "Maarouf Louwizah", in which indicators of the state of sleep were presented, and they were represented in 3 Indicators, yawning indicator and it consists of 5 Clauses, extensibility index and it was made up of 5 items, relaxation index and it contains 5 items, and other dimensions have been added through previous studies, including the dimension of stability of acumen, which consists of two items, and after times of weakness and strength of the pupil's acumen, and it consists of 5 items, convenience index and it contains 4 items, these items were attached to times known from previous studies in which intelligence indicators are high and others are low.

15- Description of the interactive socio-structural model scale for building learning:

This scale is concerned with building learning through an interactive socio-constructive model, and we took mathematics as a model as one of the basic learnings, and this scale was based on the model proposed by "Philip Jonayer".

16- Verify that the tool is valid:

16-1- Psychometric properties of the observation network scales:

16-1-1-Structural validity using confirmatory factor analysis:

Table(2) : shows conformance criteria for the assertive factorial model of the attention scale.

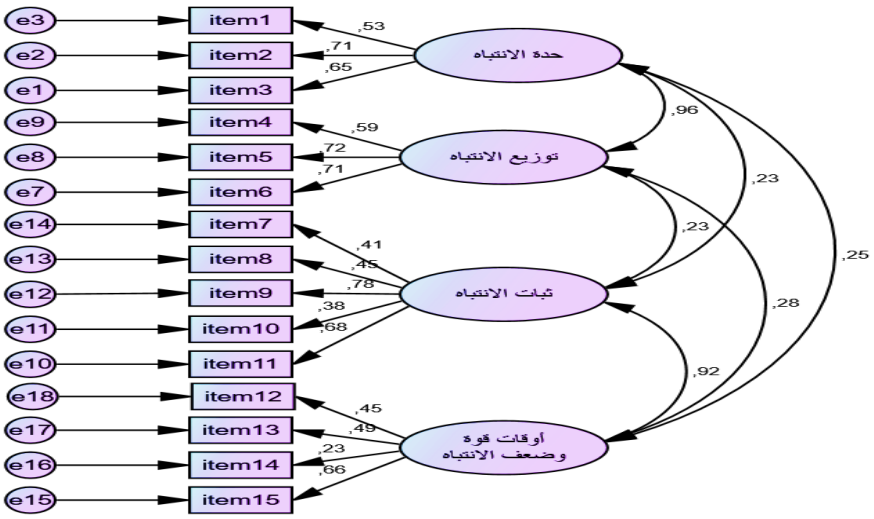
Typical indicator values	its calculated values	Pointer/ indicator
Indicators of absolute conformityAbsolute fit indices		
0≤NC ≤ 3	1,831	**K-square degree of freedom ratiodf/X2**
0.1 ≤ SRMR ≤ 0.08	0.064	**Root mean square standard residual index SRMR**

[16] Adel Muhammad Adel: Cognitive processes and information processing, Dar Al-Kitab Al-Hadith, Cairo, first edition, 2012, p. 19.

0 ≤ RMSEA ≤ 0.08	0.069	**Square root of the mean approach error RMSEA**
Indicators of lack of economy Parcimony Correction Indices		
The value of the current model is smaller than the value of the independent or zero model indicator.	Current form: 225,791 Independent model: 703,086	**The consistent information touchstone for ikik AIC**
The indicator value of the current model is smaller than the value of the independent or zero model indicator.	Current form: 1.276 Independent model: 4.125	**expected intersectional validity index ECVI**
Indicators of comparative or incremental conformity: Comparative/ incremental Fit Indices		
0.90 ≤ CFI	0.883	**comparative conformity index CFI**
0.90 ≤ TLI	0.853	**Non-normative conformity indicator, Writaker-Lewis TLI**

Table(2): The results of the conformity criteria for the confirmatory factorial model of the attention scale, and through the results shown above, most of the conformity indicators indicate good conformity to the model shown in Figure No.(2),

After the process of estimating the proportion of the model matching the data, we come to estimate the model and examine the values of its parameters and the saturations of the items on their factors, as well as the correlations between the axes. This is illustrated by the following diagram:



Figure(2): shows the values of the standard parameters of the confirmatory factorial model of the attention scale.

It is illustrated by Figure No(2) above: the values of the standard parameters " standardized regression weight " That all items are saturated on their factors with relatively acceptable values, and although some items had low saturation values on their factors, they were all a function at the level of 0.05 This is illustrated by the following table, which represents the values of the non-standard parameters " unstandardzed regression weight" And its

significance, that is, by using the original units, because the significance and remainder appear only in the case of the original units.

The following table shows the results of conformity indicators after making some adjustments:

Table(3): shows conformance criteria for the confirmatory factorial model of the sleep scale after modification.

Typical indicator values	its calculated values	Pointer/ indicator
Indicators of absolute conformity " Absolute fit indices"		
0≤NC ≤ 3	1,969	**K-square degree of freedom ratio df/X2**
0.1 ≤ SRMR ≤ 0.08	0.091	**Root mean square standard residual index SRMR**
0 ≤ RMSEA ≤ 0.08	0.074	**Square root of the mean approach error RMSEA**
Indicators of lack of economy Parcimony Correction Indices		
The value of the current model is smaller than the value of the independent or zero model indicator.	Current form: 338,143 Independent model: 1002.724	**The consistent information touchstone for ikik AIC**
The indicator value of the current model is smaller than the value of the independent or zero model indicator.	Current form: 1,910 Independent model: 5,665	**expected intersectional validity index ECVI**
Indicators of comparative or incremental conformity : Comparative/ incremental Fit Indices		
0.90 ≤ CFI	0.851	**comparative conformity index CFI**
0.90 ≤ TLI	0.818	**Non-normative conformity indicator, Writaker-Lewis TLI**

Table No(3): The results of the conformity criteria for the confirmatory factorial model of the sleep scale after modification, and through the results shown above, most of the conformity indicators indicate an increase in their status improvement when making the four adjustments, and from this they indicate good conformity to the model shown in Figure No.(3),

After the process of estimating the proportion of the model matching the data, we come to estimate the model and examine the values of its parameters and saturations of the items on their factors, as well as the correlations between the axes after the modification. This is illustrated by the following diagram:

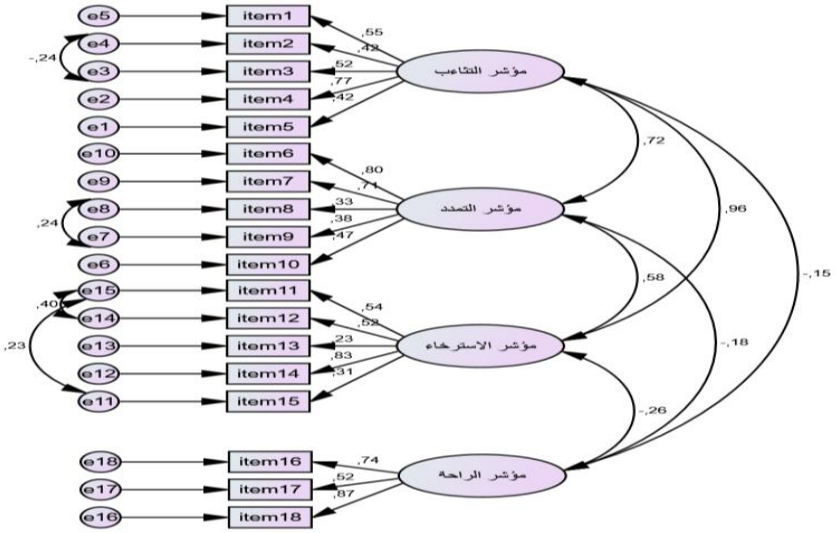


Figure (3): shows the values of the standard parameters of the confirmatory factorial model of the sleep scale after modification.

It is illustrated by Figure No(3): the values of the parameters of the model after making the modification, in addition to the change that occurred in the indicators of the modification, we also notice a change in some of the parameters of the model, which began with the emergence of new values in the model (The variance between the remainder), to changes in the saturation values of some items on the total factor, as well as a decrease in the degree of freedom by four degrees after setting 4 New parameters where it becomes equal to 125 The changes were as follows:

Table No. (4): shows conformance criteria for the confirmatory factorial model of the interactive socio-constructivist scale after modification.

Typical indicator values	its calculated values	Pointer/index
Indicators of absolute conformity "Absolute fit indices"		
0≤NC ≤ 3	2,278	**K-square degree of freedom ratiodf/X2**
0.1 ≤ SRMR ≤ 0.08	0.973	**Root mean square standard residual index SRMR**
0 ≤ RMSEA ≤ 0.08	0.085	**Square root of the mean approach error RMSEA**
Indicators of lack of economyParcimony Correction Indices		
The value of the current model is smaller than the value of the independent or zero model indicator.	Current form: 851.222 Independent Form: 1,785,611	**The consistent information touchstone for ikik CAIC**

The indicator value of the current model is smaller than the value of the independent or zero model indicator.	Current form: 3,564 Independent model: 9,586	**expected intersectional validity index MECVI**
Indicators of comparative or incremental conformity "Comparative/ incremental Fit Indices"		
0.90 ≤ CFI	0.799	**comparative conformity index CFI**
0.90 ≤ TLI	0.767	**Non-normative conformity index, Writaker-Lewis TLI**

Table No(4): The results of the conformity standards of the confirmatory factorial model of the socio-structural interactive scale after the modification, and through the results shown above, most of the conformity indicators indicate an increase in their status improvement when making the three amendments, and from this they indicate a good conformity with the model shown in Figure No.(4), After the process of estimating the proportion of the model matching the data, we come to estimate the model and examine the values of its parameters and the saturations of the items on their factors, as well as the correlations between the axes after the modification. This is illustrated by the following diagram:

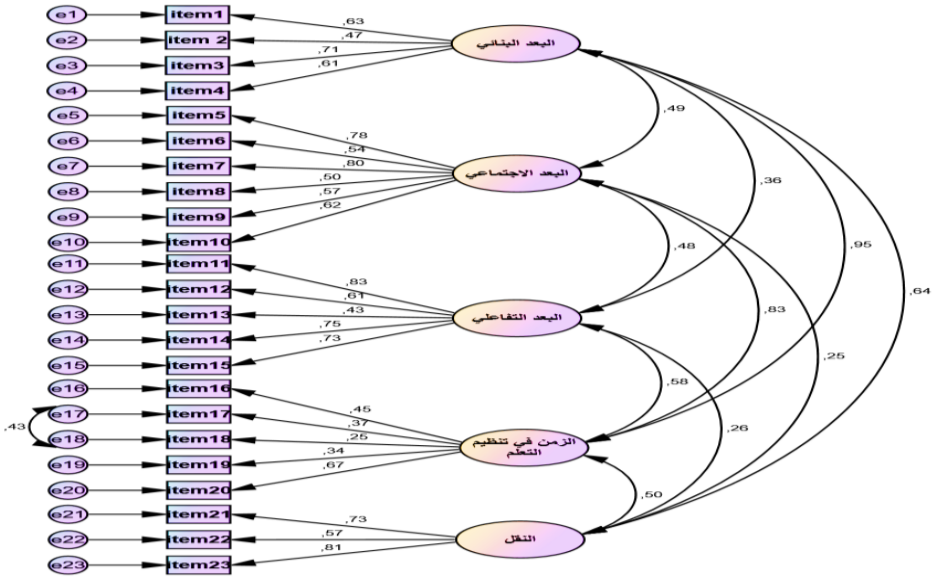


Figure No. (4): shows the values of the standard parameters of the confirmatory factorial model of the interactive socio-constructivist scale after modification.

It is illustrated by Figure No(4): the values of the parameters of the model after making the modification, in addition to the change that occurred in the indicators of the modification, we also notice a change in some of the parameters of the model, starting with the emergence of new values in the model(The variance between the remainder), to changes in the saturation values of some items on the total factor, as well as a decrease in the degree of freedom after setting a new parameter, as it became equal to 221The changes were as follows:

17- Stability of the global structure of standards:

Table (5): shows a comparison between the stratified alpha coefficient, the composite reliability coefficient, and the weighted omega coefficient.

Stability coefficient Ωω	Stability coefficient cr	Stability coefficientα	scales
0.901	0.877	0.845	**Attention scale (15 items)**
0.935	0.883	0.877	**Sleep scale(18 items)**
0.968	0.930	0.916	**Scale SCI(23 item)**

Table No(5): The total values of the stability coefficients, alpha stratification, the composite reliability coefficient, and the weighted omega coefficient for the attention scale, the sleep scale, and the socio-constructivist interactive scale, and all the values were high, so that all of them indicate the stability of the scales.

18- Statistical methods used in the study:

Based on the problematic, hypotheses, and objectives of the study, we collected data through standards and tests, after verifying the validity of the standards used. This is in order to test the validity of the hypotheses and achieve the objectives of the study. All of this had to be used by various programs, namely:

- **Program Excel 2013:**We used this program to calculate:

− Sample size by Stephen Thompson equasion as well as doing some mathematical operations to help calculate the stability and validity of the scales.

- **Program Spssv25:** The researcher used several statistical processes, including:

− Cronbach's alpha coefficient.

− Stratified coefficient alpha.

− Calculating variance.

− Multiple linear regression to measure the first hypothesis.

- **Program Spss Amos v 25:** We use it to perform the following operations:

− Composite reliability coefficient.

− Weighted omega coefficient.

− Confirmatory factor analysis.

− Testing the integrated model using the group comparison method.

19- Analyzing and discussing the results in light of the study hypotheses.

- **The first main hypothesis:**

− Attention and sleep contribute to improving he achievement grades of mathemathics subject for the pupils of the third primary school.

- **H1:** Attention and sleep contribute to improving the achievement grades for mathematics subject for pupils of the third primary year.
- **H0:** Attention and sleep do not contribute to improving achievement grades for mathematics for the pupils of the third primary year.

The first study hypothesis was tested by multiple linear regression equation, in order to determine the value of the predictive relationship between the independent variable that expressed by the symbol (x) and the dependent variable that is represented by the symbol (Y).

The value and significance of the analysis of variance test to test the suitability of the model were as follows:

Table (6): shows the analysis of variance test values to estimate the suitability of the multiple linear regression model for the first main hypothesis.

Variance analysis						
Sample		**sum of squares**	**degrees of freedom**	**mean of squares**	**Fvalue**	**indication**
	Regression	95,541	2	47,770	12,029	,000b
	residuals	480,529	121	3,971		
	the total	576,070	123			

Table No(6): The analysis of variance value is equal to F=12.029It is a statistically significant value at a level 0.01; where as**(p-value=0.000<0.01),**This means that the model that contains the independent variable is able to predict the dependent variable better than the model that does not contain a predictor variable, so we can make sure that there is a relationship between the independent variable represented by sleep and the dependent variable represented by degrees of achievement of mathematics for pupils of the third primary year.

- Estimating the parameters of the first main hypothesis model:

❖ The values of the correlation coefficient, the coefficient of determination, the modified coefficient of determination, and the standard error of the measurement were among the independent variable represented by(sleep)and the dependent variable of(achievement)As follows:

Table (7): shows the values of the correlation coefficient, coefficient of determination, and standard error of the first main hypothesis model. ❖

Form summary				
Sample	**R correlation coefficient**	**R-deux The coefficient of determination**	**R-deux ajusté Modified coefficient of determination**	**Erreur standard standard error**
1	,407a	,166	,152	1,9928

Table No (7): The value of the correlation coefficient estimated by **R=0.407,** It expresses an acceptable correlation value between the independent variable represented by sleep and the dependent variable represented by achievement; The value of the coefficient of determination is **R-deux= 0.166;** This means that the model is able to explain how much16%of the change in the dependent variable(achievement).

We now come to examine the values of the model parameters, in order to determine the equation of the multiple linear regression model. The parameters of the first main hypothesis model are as follows:

Table (8): shows the values and significance of the parameters of the multiple linear regression model for the first main hypothesis

Sample		**Coefficients are non-standardised**		**Coefficients standardisés**	**t**	**Sig.**
		B	**Erreur standard**	**beta**		
1	**(Constant**	-8,663	4,013		-2,159	033

	Attention	,212	,064	,281	3,300	,001
	sleep	,020	,007	,237	2,782	,006
Variable dependent: degrees of achievement						

table no(8): The value of the constant in the linear regression equation for the regression of the attention variable on the achievement variable, where its value is -8,663 the significance of this value is tested by using t-test where the significant difference of the value of the constant is tested for the value of (0), where did the t-test value come from -2.159 it is a statistically significant value at a level 0.005 this indicates the significance of the constant value in the regression equation. The table also shows the value of the attention variable parameter (the independent variable) which was estimated by 0.212 it is also tested through a test intended to test the significance of the difference of the slope parameter from a value (0) Which means that there is an effect between the two variables, where its value is 3,300 it is also a statistically significant value at a level 0.05, which indicates the significance of the parameter as well as indicates the association of the attention variable with the achievement variable; The table also shows the value of the constant in the linear regression equation for the regression of the sleep variable on the achievement variable, as its value was -8,663 the significance of this value is tested by using T. Test Where the significant difference of the value of the constant is tested for the value of (0), where the t-test value come from -2.159 it is a statistically significant value at a level 0.005 This indicates the significance of the constant value in the regression equation. The table also shows the value of the parameter of the sleep variable (the independent variable) which was estimated by 0.020 it is also tested through a test intended to test the significance of the difference of the slope parameter from a value (0) Which means that there is an effect between the two variables, where its value is 2,782 it is also a statistically significant value at a level 0.05, which indicates the significance of the parameter as well as indicates the association of the sleep variable with the achievement variable; Since the values were positive, this means that the relationship between the independent variable and the dependent variable is a direct relationship, this means that an increase of one degree in the independent variable represented by attention/sleep will contribute to increasing the achievement of the third year primary pupils in 0.212 and 0.020 degrees with a standard error of 0.064 and 0.007.

The first major hypothesis came: Attention and sleep contribute to improving achievement grades of mathematics for pupils in the third primary year, is statistically significant, and from it we accept the alternative hypothesis H1 and we reject the null hypothesis H0 the interpretation of the model for this hypothesis about achievement in mathematics 16% explained by form factors and 84% it is explained by other factors. Of course, the factors affecting achievement are very much, including intelligence, memory, revision...etc., and they are among the factors that have a direct impact. Therefore, this result is considered very logical in explaining achievement with these two variables, as they undoubtedly play a role in achievement and building Learning, as confirmed by the "Tishreen Magdiche" study in 1997,and "Maarouf Lwiza" , "Rachide Khalfan", " Ahmed Douka" , "Testu" in 2013 , "Morlaix Sophie" study in 2000 , "François Testu" 1986 and from it we will compare the results of this hypothesis with the results of other hypothesis to know the various contradictions , positives and negatives in this study and try to interpret and draw conclusions from them in order to reach convincing explanations on the topic of chronopsychology .

- **The second main hypothesis.**

The conceptual model of the second main hypothesis stems from the general model and the general perception of the study. It aims to know the various direct effects of the independent variable attention and sleep on the various dimensions of the model SCI.

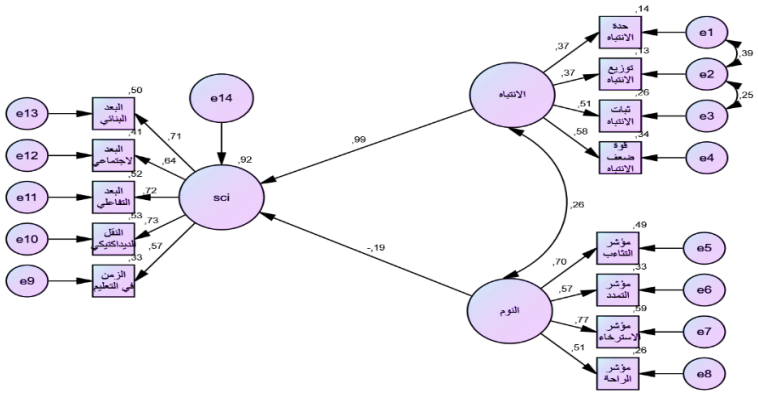


Figure No. (5): shows the indicators of direct hypothesis testing of the overall model of the study.

Figure No(5):To test the validity of the direct hypotheses of the overall model adopted in the study, as we proceeded from the assumption of two basic hypotheses:

1- Attention affects the socio-constructive interactive model to build the learning of third-year primary pupils in the mathematics activity according to their teachers' responses.

- H1: Attention affects the socio-constructive interactive model to build the learning of third year primary pupils in the mathematics subject according to their teachers' responses.
- H0: Attention does not affect the socio-constructive interactive model to build the learning of the third year primary pupils in the mathematics activity according to their teachers' responses.

2- Sleep affects the socio-structural interactive model to build the learning of the third year primary pupils in the mathematics activity according to their teachers' responses.

- H1: Sleep affects the socio-structural interactive model to build the learning of the third year primary pupils in the mathematics activity according to their teachers' responses.
- H0: Sleep does not affect the socio-constructive interactive model for building the third year primary pupils' learning in the mathematics activity according to their teachers' responses.

Figure No(5): value of the link box R2 for the dependent factors, which was estimated at0.92, and the various values of trajectories and their direct standard regression weights in the overall model as we will explain in the following table.

Table (9) shows the values of the standard regression weights for the direct hypotheses of the overall model.

R2	indication	Appreciation	The relationship
92%	(***)0.00	0.991	Attention<----The socio-constructive interactive model for building learning
/	0.90(ns)	-0.191	sleep<----The socio-constructive interactive model for building learning

(1.96=0.05) p<0.05*/ (2.58=0.01) p<0.01**/ (3.29=0.001) p<0.001***

Using structural equations modeling software “Spss amos v 25” We obtained the results shown in Table No(9):They are the values of the standard regression weights and the level of significance of the direct relationships, and the first relationship between the independent variable attention and the dependent variable the socio-structural interactive model for building learning of Mathematics, and the effect was around 0.991It is a statistically significant value at the level of significance 0.001, we accept the alternative hypothesis H1 Say: Attention affects the socio-constructive interactive model to build pupils' learning the third primary year in activity of Mathematics according to their teachers' responses, and we reject the zero hypothesis H0 As for the second hypothesis, between the independent variable sleep and the dependent variable, the socio-constructive model is an interactive model for building learning of Mathematics, the effect was estimated to be negative -0.191it is a non-statistically significant value 0.090 compared to the level of significance 0.05, we accept the null hypothesis H0, and we reject the alternative hypothesis H1, and since the first hypothesis was statistically significant, the model's interpretation of this hypothesis was about building mathematics learning 92% explained by model factors 8% explained by other factors.

Based on the assumption that: Attention affects the socio-constructive interactive model to build the learning of third-year primary pupils in mathematics according to their teachers' responses 1.00 the value of building learning increases with 0.991 in other words, there is a direct positive effect between attention and the socio-constructive interactive model for building learning Mathematics, the correlation square has been reached 92% Indicates the size of the influence in this relationship, which is a very high value, which shows the importance of attention and its value in the educational learning process, in general, and building basic learnings in particular. It is not always high, as many foreign and local studies have shown that attention has times of strength and times of weakness. Among these studies, we mention studies “F. Testu”About the school pace, “Tishreen Magdiche “study 1997 ”Marouf Lozieh” study 2008 Study of “ Nofal and Maarouf “2015, “Maarouf and Messislieh” study in 2018 These and other studies show the daily and weekly profile of pupils' attention, and the case study pupils' attention profile is similar to the classical feature that almost all studies have reached. Through these data, educational actors must realize the point of its concepts that building basic learnings takes place in times of strong attention and alertness of pupils. While the times of low attention and vigilance are for subjects that are less important than the basic subjects, this is shown by the study of “Ibn Abdel-Malik Abdel-Aziz” in 2013 while conducting a study on: school time and the development of basic learning, he concluded that the pupil is the strong link between the educational process, so that he referred all reforms or thinking about school time.taking in consideration the biological and psychological pace of the pupil, as confirmed by the study of Sophie Morlaix in 2000. The serch for a better distribution of school time in primary education to enhance school success .

While the results of the second hypothesis came as follows :

Sleep affects the socio-structural interactive model to build the learning of the third year primary pupils in mathematics according to their teachers’ responses.

the value of constructing learning decreased by -0.191, from which we say that there is no effect between sleep and the socio-constructive interactive model for building learning of mathematics, so we say here that the responses of teachers about this hypothesis that sleep does not affect the educational process in general and the building of basic learnings in particular,

were the opposite of the results of previous studies, including " Maarouf and Douka and also F.Testu "study titled by :the impact of new measures related to the use of school time on the the school performance of primary school pupils .this study emphasized the need to rethink school time review the school time of Algerian schools , respect the duration of night sleep , rethink the entry and exit times of pupils that ranging from their ages between 10 – 11 years old , as we find the study of Maarouf douka and testu titled : " the duration of night sleep among Algerian pupils"- chronopsychological study – has confirmed that half day's rest (Tuesday evening)during the school week it's very important for the pupils plus given the regular duration of their night sleep and the weekend allows to remedy the fatigue resulting from the end of the school week .

So when approching and comparing the results of the first main hypothesis : Attention and sleep contribute to improving the grades of mathematics for pupils of the third primary school which was applied to the pupils , according to the results of the direct hypotheses :Attention affects the socio-constructive interactive model to build the learning of third year primary pupils in the math subject according to their teachers' responses.,Sleep affects the socio-constructive interactive model to build the learning of third year primary school pupils in the mathematics according to their teachers' responses. We find that the school pace with the variable of attention and sleep has a direct effect in the first model.(The first main hypothesis) by 15%, which was confirmed by the second main hypothesis with its model of the attention variable, and refuted by the model of the sleep variable according to the teachers', in other words attention has an important role in building learnings, and there is agreement in the two models, while sleep did not confirm it's importance by the teachers in building learnings, these results It has justifications according to the opinion of the researcher* so that there is a defect in the perception of the teachers on the subject of the school pace, and also here the teacher is not responsible for the pupil's sleep, but rather the responsibility rests on the parents, and those who do not monitor the duration and quality of their children's sleep, almost the same conclusion reached by the researcher "Bin Abd Malek Abdelaziz" in 2013 titled : "School Pace and Social Perceptions" - an analytical study on a group of primary school teachers -, which, based on the results of his study, proposed a set of suggestions that we mentioned in previous studies (see the study of Bin Abdel Malik).

Suggesting such proposals indicates the lack of clarity in the field of chronobiology and chronopsychology in the educational field, whether by the teachers or educational staff. in this context we do not only hold teachers the full responsibility of all that but only a part of it. their responsibility here is not to see this field and not benefit from it and it's educational applications. Which has proven great results in various countries that depend on the field of schooling while the greatest responsibility comes at the parents, because education is within the framework of paradigm, each system is influenced by another, and the family is the most important system in this paradigm. this accusation is based on medical / scientific studies that have proven that the quantity and the quality of sleep it has a great importance in the educational life of the child or the general development of the child itself so we find it also warns of the impact of the over use of technology on children's sleep .in the sense that exposure to screen light hours before bedtime changes the child's pace and secretes melatonin. In addition, the blue light emitted from smart screens increases the level of activity and awakening, which in turn delays sleep. Those of us in Algerian homes do not suffer from these negative phenomena,

which parents see as normal and do not throw it is important, but using it excessively and at inappropriate times has many negative effects, especially on the quality of sleep, which in turn leads to intellectual and physical fatigue during the school day, which in one way or another leads to school failure. the teacher may not pay attention to this , so the role of the family is very important here, and from it we say that the process of learning and teaching is an integrated system, each with its role in order to build sound learnings for educational outcomes of high quality.

- **Conclusion:**

The following hypotheses of the study were fulfilled: the first hypothesis, and the second hypothesis, including that in the direct hypotheses, we found the effect of attention and sleep on the achievement and construction of learnings, while sleep did not have any effect, and thus we concluded that our study proved that attention and sleep have an effect on pupils' achievement in Mathematics, and that teachers are aware of the importance of attention while not realizing the importance of sleep.

- **Study suggestions:**

- The necessity of respecting the psychological and biological pace of the pupil.
- Focus on teaching basic learning in times of strong attention and alertness (at morning for example)
- Teaching the scientific subjects in the first hours of the school day, when pupil's attention is high.
- Taking into account the daily and weekly features in order to match the child's psychological and physical abilities.
- Educating all the main school staff, including teachers and parents, about the issue of the pupil's school pace, so that efforts are intensified to bring the child to the highest levels of attention and good achievement.
- Respect children's sleep time.
- The need to add the field of chronopsychology to the fields of training teachers, whether in the university, high schools, or training institutes, due to its importance in the educational and learning process.
- The need to educate parents about the issue of the school pace by conducting explanatory meetings and seminars.
- Educating pupils about the importance of sleep.