The Relationship of the Habits of Mind, Creative Thinking, and the Tendency towards Swimming among Students, Using the Path Analysis Model

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1-1 Research introduction and its importance:

The habits of the mind are among the important variables related to the emotional and cognitive aspects of thinking. Their practice by the individual is necessary to produce his various thinking skills. The mental habit of a particular individual means that he prefers a certain thinking style over other patterns, and it also contributes to the regulation of the individual's practices of thinking skills and make them. More flexible, and among the most important of those skills is creative thinking.

Since the study of personality is completed by studying the measurement of emotions, and the integration of personality in its various dimensions represents an integrated unity, we need to know the tendencies of the individual just as we need to know the level of his intelligence, abilities and preparations, as the individual has the intelligence and abilities that qualify him for success in a certain area, but not He tends to her and does not like her.

Modeling by structural equation represents the most effective and reliable method among the known methodologies in social and human sciences studies to treat and study various phenomena, especially psychological and educational studies, by developing and designing theoretical models and testing their validity, in describing the intertwining relationships and connections between the problematic elements of the phenomenon or between it and other phenomena. A quantitative description, and its interpretation of a comprehensive, objective interpretation without fragmentation of the interconnected relationships.

The importance of the current research lies in the representation of the relationship between the habits of the mind and creative thinking and the tendency towards swimming in middle school students, and simulating that relationship through a theoretical model, which is an artificially symbolic expression or conception of the problem of the current research in a way that helps good visualization as a basis for appropriate decision-making.

1-2 Research Problems

Through this study, the researchers will try to answer the following question: (Is it possible, through the collected data, to arrive at the form of direct and indirect relationships between the research variables - habits of the mind, creative thinking, tendency towards swimming - and thus build a model that determines the effect of important variables on the tendency towards swimming?.

1-3 Research Objectives:

The current research aims to arrive at the form of direct and indirect relationships between the research variables (habits of mind, creative thinking, tendency towards swimming) among first intermediate students in Uruk National School, by building a model that determines the effect of important variables on the variable of the tendency towards swimming in light Search data.

1-4 Research fields:

- ✓ The human field: Intermediate first grade students at Uruk National School for the academic year (2019-2020).
- ✓ The temporal domain: for the period from (1/11/2019) until (1/2/2020).
- ✓ Spatial domain: Uruk National School Building, College of Open Education Theater.

1-5 Research methodology:

The researchers used the descriptive approach - the survey style: where they analyzed the relationships existing between the studied phenomena (habits of mind, creative thinking, tendency towards swimming) and their interpretation and standing on their implications, in order to control and control them.

1-6 Research Community:

The statistical community of current research includes first graders at Uruk National School for the academic year (2019-2020). The size of this community (127 (students divided into five departments according to the number)) 25 (students within departments (A, B, E) and) 26 students within departments (C and D).

1.8 Data Collection Methods:

The researcher adopted the Wen measurement test as a primary method for collecting data, after reviewing many research variables in the relevant literature (habits of mind, creative thinking) and she was selected on the following criteria:

1. The Habits of Mind Scale: I counted this scale (Samah Hussein Saleh Al-Jafri) (1).
2. The Creative Thinking Scale: This scale was prepared by (HodaBurhanSaif Al-Din) (2).

As well as the decision leaning towards swimming that has been built.

1-8 Procedures for building a propensity to stigmatic questionnaire

First - Logical analysis of paragraphs:

The two researchers prepared (23) paragraphs to measure the tendency towards swimming, and to verify the validity of these paragraphs, they were presented to a group of experts and specialists in educational and psychological sciences, measurement and evaluation, whose number reached (14) thousand. An expert, and in light of their observations and opinions, some minor amendments were made to some paragraphs, and paragraphs (2, 10, 19) were merged. The wording or concept is repeated, so that the questionnaire becomes (20) paragraphs.

To determine the validity of the paragraphs to measure the tendency towards swimming, the (Lush) method (*) was used and the experts agreed on (19) paragraphs, while one paragraph (Paragraph No. 23) was deleted because there is no agreement between the experts' opinions on its validity, and therefore it was deleted, so that The number of paragraphs becomes (19) paragraphs.

Second-the discriminatory power of paragraphs:

The scores of the members of the statistical analysis sample were arranged from the highest overall score to the lowest overall score, then the grades were divided into two parts, the grades that represent the highest group by (33%) and the grades, which represent the lowest group by (33%) so that each group includes 42 A student then used the Mann Whitney test for two independent samples to find out the significance of the difference in the scores of each paragraph between the two extremes in the total score, and since all Z scores (the accompanying Whitney test) are 1.96, the Mann Whitney statistic is significant when (0.05> 0.05). PT This indicates that all paragraphs have the ability to distinguish.

Third-Paragraph validation parameters (internal consistency factor):

The researcher adopted the coefficient of correlation wen (Spearman) between the scores of each paragraph and the overall score of the scale in calculating the validity factor for each paragraph of the scale after excluding the jerk paragraph from the total score, and it became clear that. That all the transactions approved in terms of statistical items (0.001), except for paragraph (9), are statistically significant at the level of (0.01).

Fourth-consistency of test results:

The researcher adopted the medium-term segmentation Wen method to verify the stability of the scale, where the paragraphs were divided into two halves (paragraphs bearing odd numbers and paragraphs bearing even numbers) and then extracted the correlation coefficient between the sums of the half-scores of the questionnaire using the simple correlation coefficient (Pearson), which reached (0.741). In order to obtain the stability of the questionnaire as a whole, the equation was used, where the value of the overall reliability coefficient was (0.847) where E (the coefficient of stability is actually the coefficient of correlation with the same scale) (3) the

reliability coefficient is high because the square of its value is equal to (0.72). This value lies between (0.5 - 0.75), so a high correlation and a strong relationship were made. The value was within this indicator (4).

Table No. (1) The value of the stability coefficient and the value of the Gutmann coefficient

The value of the coefficient (Getman)	variance			Coefficient of stability		
	Macro	the other half	Half of a well	Macro	the other half	First half
0. 704	46.264	13.943	16.031	0.545	0.692	0.725

Fifthly - the final image of the scale:
After completing the procedures for building the questionnaire, it becomes ready to be applied to the research community in its final form consisting of (19) paragraphs to be answered by choosing one of the following alternatives: (Yes, I do not know, no) and therefore the highest score that the student can obtain in the questionnaire is: (60 thousand) A degree, and the lowest possible score to obtain it is: (zero)).

1-9 Procedures for codifying the creative thinking test (formalism - repeated shapes activity):
First - Verify the results of the activity:
The researcher adopted the validity of the results of the calculation activity (circles) as one of the important indicators of validity, and it is calculated using the (t) test of two independent groups, to find out the significance of the difference between the two extremes. Groups because the T-value computed to indicate the difference between the two extreme groups in the overall score represents the discriminatory validity of the activity.
To achieve this, the total scores obtained by the students were arranged from highest to lowest, and the two extremes were identified in the total score ((50% in each group, then use the t-test for two independent samples) to find the significance of the difference in the degree of activity of the two extremes. , The value of the differential honesty was statistically significant, because the value of the level of significance associated with the value of (t) calculated and exaggerated (0.000) it was less than the level of significance (0.05) and this is an indication of the sincerity of the activity.
Second - stability of the results of the activity:
The researcher used the analysis of variance for repeated measurements of the degree of activity, and the psychometric properties of the sample to verify the stability of the results of the activity, and the results of the analysis of variance referred to in Table No. (8) according to the coefficient of stability with Hoyt's equation that was presented in the same table.

Table (2) the results of the analysis of variance for repeated measurements and the activity invariance factor

Stability coefficient	Average of squares MS	Degree of freedom	Sum of squares SS	The source of the contrast
0.75	10.701	156	1669.400	Interact (error)
	42.805	39,000	1669.400	Between individuals

And since the reliability coefficient is a correlation coefficient of some kind - the reliability coefficient is, in reality, the coefficient of correlation of the test with itself - and since the common interpretation coefficients of stability mentioned in Table (5) are greater than (50%) therefore, the reliability coefficient is considered good, as The stability coefficient is good if its common interpretation coefficient is greater than (50%).

1-10 Procedures for Legalizing Habits of Mind Test:
First - Verify the validity of the test results:
Researcher Wen used the double correlation coefficient to find the honesty inherent in the habits of mind involved in the current research. This coefficient was calculated by finding a link between the averages of the highest grade (50%) of the students, and the lower grades (50%) of the students. After applying the inherent double correlation equation, it appeared that the value of the validity factor ranges from (0.76 - 0.83) (a statistical function with a degree of freedom) 38, the level of significance is (0.05).

Table (3) the Discriminatory Validity Factor for Habits of Mind Test

The value of the validity factor		Standard deviation of the group as a whole	Arithmetic mean		Mental habit
Tabular	Calculated		Lower group	The top group	
0.325	0.829	2.443	5.3	9.35	perseverance
	0.824	2.646	5.8	10.16	Interactive thinking
	0.789	2.472	5.25	9.15	Think flexibly
	0.761	2.629	5.25	9.25	Questioning and posing problems
	0.831	2.649	5.4	9.8	Perception, innovation and renewal
	0.792	10.664	28.9	45.8	The test as a whole

Second - consistency of test results:
The researcher, Wayne, used analysis of variance for repeated measurements of the degree of activity, and psychometric properties to calculate the sample to calculate the reliability coefficient, and to analyze the variance results indicated in the table by the reliability coefficient equation (Hewitt), which was presented in the same table.

Table (4) results of analysis of variance for repeated measurements, stability parameters, and activity sensitivity index

Stability coefficient	Average of squares MS	Degree of freedom	Sum of squares SS	The source of the contrast
0.75	2.566	156	400.230	Interact (error)
	10.262	39,000	400.230	Between individuals

Since the reliability coefficient is a correlation coefficient of some kind - the reliability coefficient is, in fact, the coefficient of correlation of the test with itself - and since the common interpretation coefficients for stability mentioned in Table (5) are greater than (50%) therefore, the reliability coefficient of the test is considered good, where The reliability coefficient is good if its common interpretation coefficient is greater than (50%).

1-11 Statistical methods used in the research:

The researcher used the following statistical programs to extract the results:

1- Statistical Program (SPSS).
2- Statistical Program (AMOS).
3- Statistical Program (Excel).

1-12 Study and analysis of the theoretical model of the relationship between the independent variables (habits of mind and creative thinking) and the dependent variable (the tendency towards swimming).

1-13 Building Models (Path Analysis Model):

The theoretical constructive model (constructive equation) can be verified for the general model that illustrates the relationships between research variables, and the following diagram represents a path analysis model for linking relationships between research variables (habits of mind, creative thinking, tendency towards swimming).

The efficiency of the model will be estimated by analyzing the path of relationships and correlations between those variables, as the results of the field study led to the visualization of the following model (scheme -1) relationships in the structural equation. Model was processed with (AMOS v.24).

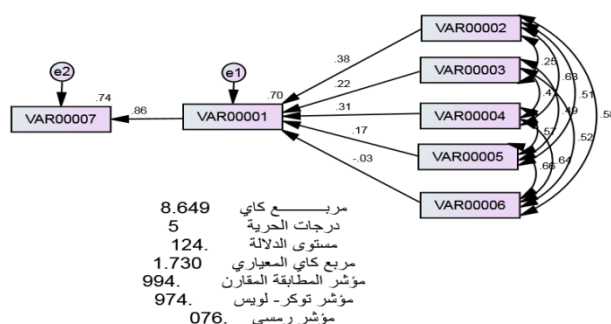| مربـــــــع كاي | 8.649 |
درجات الحرية	5
مستوى الدلالة	.124
مربع كاي المعياري	1.730
مؤشر المطابقة المقارن	.994
مؤشر توكر ـ لويس	.974
مؤشر رمسي	.076

Figure (1) the model suggested by the researcher and N.

Going to the analysis values extracted by the program, it becomes clear that the data matches the model well, and this can be verified by comparing the values of the calculated indicators with the good matching criteria as in the table.

Table (5) Indicators of good compatibility with the model of relationships between (habits of mind, creative thinking, tendency to swim) before improvement

The test of acceptance	The computed value	Pointer	No
Form Acceptance Evidence Indicators			
Not d	8.649	Chi-square Chi –Square	1
-	5	Degrees of freedom	2
0.05>	0.124	Indication level	3
≤ 2 df/X ^{2}	1.730	Standard chi-square) df/X ^{2}(	4
Indicators of absolute conformity			
0.90 > GFI	0.981	Matching QualityGFI	5
0.90 >AGFI	0.896	Adjusted Match QualityAGFI	6
0.08 <RMSEA	0.076	Square root of the mean approach error – nominalRMSEA	7
Increased matchmaking indicators			
0.90 >TLI	0.974	Lewis TuckerTLI	8
0.90 >NFI	0.986	Standard MatchNFI	9
0.90 >CFI	0.994	Comparative MatchingCFI	10

Table No. (5) for indicators of good compatibility with the model of relationships between research variables (habits of mind, creative thinking, tendency towards swimming) shows the suitability of the hypothetical model for the data, where we note that the values of all indicators came within the agreed limits except for the modified Match Quality Index (AGFI). Below the standard required for matching, and since all indicators have good match values, the model is acceptable.

1-14 Estimating the efficiency of the model (path analysis) after improvement:

At this stage, the researcher assesses the efficiency of the model by analyzing the path of relationships and correlations between the variables and studying the role of the influencing variable (habits of mind) and the mediating variable (creative thinking) in the dependent variable. (Tendency towards swimming).
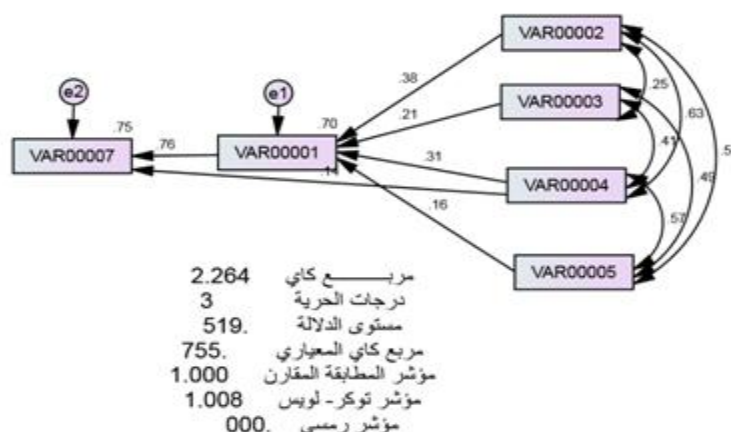

Figure 2.The model proposed by the researcher after improvement

The above diagram shows the path analysis model after excluding the fifth mind habit (applying previous knowledge to new situations) and creating the path of the relationship between the third mental habit and the tendency towards swimming, where the model is compared with its counterpart in the event that the variable (the fifth mental habit) is not deleted from the model and not entered The new track.

Table (6) Indicator values match the default model with the data after optimization

The test of acceptance	The computed value	Pointer	No
Form Acceptance Evidence Indicators			
Not d	2.264	Chi-square Chi –Square	1
-	3	Degrees of freedom	2
0.05>	0.519	Indication level	3
≤ 2 df/X^2	0.755	Standard chi-square df/X^2	4
Indicators of absolute conformity			
0.90 > GFI	0.994	Matching QualityGFI	5
0.90 >AGFI	0.959	Adjusted Match QualityAGFI	6
0.08<	0.000	Square root of the mean approach error - MSIRMSEA	7
Increased matchmaking indicators			
0.90 >TLI	1.008	Lewis TuckerTLI	8
0.90 >NFI	0.995	Standard MatchNFI	9
0.90 >CFI	1.000	Comparative MatchingCFI	10

It is clear from Table No. (6) for indicators of good conformity to the model that it has the best values for all indicators, and this means that the model is suitable for an acceptable fit of the data, as all indicators came within the agreed limits, which will be presented as follows:

First - Indicators of the Model Acceptance Guide:

It seems that the value of (chi-square) came at (2.264) and that the value of the associated significant level was by (0.519) which is greater than (0.05). This means accepting the null hypothesis that says: (There is no difference between the theoretical model and the data) and thus it indicates good compatibility Between the observed and expected variance matrix, and the value of (chi-square criterion) was smaller than (2). This confirms what was mentioned above that the model matches the data.

Second - Indicators of Absolute Conformity:

The values of the two indicators (match quality, adjusted match quality) were greater than (0.90) and this is an indicator of data matching the model well, in addition to the (Ramsay) index, which is one of the most important indicators in the model - this indicator measures the difference between the variance matrix of the sample that was sampled. From him and the community, and preferably less than (0.08) the lower the better, and the closer it is to zero, the higher the percentage of congruence - that is, the value of the (Ramsey) index as shown in the table () came at $ 0.00 and this means that there is an exact match. .

Third - Increasing conformity indicators:

That all the values of the increased match indicators are: (Tucker Lewis, Standard Match, and Comparative Match (were greater than the criterion)) 0.90).

With these results, it can be said that there are correlations between the model variables, and that the model moves away from the zero pattern, and the pattern is acceptable.

In general, the values of good match indicators for the second model (after improvement) increased than for the first model (before improvement), and this indicates a preference for the second model.

Table (7) standard and non-standard estimates of the paths of relationships between research variables

Indication level	Values (t) Statistic	Standard error	Estimates		variable		
			Normative	Non-standard	Internal	The direction of the relationship	Outer
***	4.441	0.503	0.306	2.233	Creative thinking	<---	The third mental habit
***	3.740	0.426	0.213	1.594	Creative thinking	<---	The second mental habit
0.013	2.497	0.535	0.163	1.335	Creative thinking	<---	Fourth mental habit
***	5.850	0.487	0.377	2.849	Creative thinking	<---	The first mental habit
***	11.810	0.109	0.762	1.288	Tilt towards swimming	<---	Creative thinking
0.034	2.116	0.795	0.137	1.683	Tilt towards swimming	<---	The third mental habit

It is noticed from Table (7) that all model estimates indicate that all correlations are statistically significant, because the values of the significance level are related to statistical values (t) smaller than (0.05) and this means rejecting the null hypothesis that states that there are no relationships between the external variables (independent)) And the (dependent) internal variables, and acceptance of the alternative hypothesis that states the existence of these relationships.

A positive sign of the paths of relationships between variables indicates that when the values of the external (independent) variables increase (decrease), there is an increase (decrease) in the values of the internal (dependent) variables.

When estimating and estimating the value of the relationship between the two variables (influencing and affected), we find that when the values of the habits of the mind (third, second, fourth, first) increase by (1.00) the value of (creative thinking) increases by (0.306, 0.213, 0.163, 0.377) in a straight line. And when the value of (creative thinking) increases by (1.00 (the value of (propensity to swim) increases by 0.762), and when the value of (the third mental habit) increases by (1.00 (the value of (tendency))) it increases (by) 0.137).

We also note from the same table that the percentage of error in the values of the relationships or regressions between the variables (influencing and affected) is small.

Table (8) Values of standard and non-standard estimates of the relationships between habits of mind

Indication level	Values (t) Statistic	Standard error	Estimates		variable		
			Normative	Non-standard		The direction of the relationship	
***	5.090	0.052	- 0.018	0.266	The first mental habit	<-->	Fourth mental habit
***	5.952	0.061	0.210	0.366	The first mental habit	<-->	The third mental habit
0.006	2.747	0.052	0.386	0.144	The first mental habit	<-->	The second mental habit
***	4.237	0.057	0.016	0.241	The second mental habit	<-->	The third mental habit
***	4,938	0.052	0.313	0.258	Fourth mental habit	<-->	The second mental habit
***	5.594	0.056	0.308	0.311	Fourth mental habit	<-->	The third mental habit

It is noticed from Table No. (8) that all the correlations between the four habits of mind are statistically significant, because the values of the significance level associated with the statistical values (t) are smaller than (0.05) and this means rejecting the null hypothesis that says that there are no relationships between the habits of the mind, and accepting the hypothesis The alternative that says the existence of these relationships.

The negative sign of the relationship between the first mental habit and the fourth mental habit indicates that when one habit increases in value, the other decreases in value. Positive evidence of relationships between other habits of mind indicates that an increase in the value of one habit is matched by an increase in the value of the other.

Table (9) the value of the relationship between the variables, direct and indirect

Creative thinking		Habits of Mind								Variables
		The third		the second		The fourth		First		
Indirect	directly	Indirect	directly	Indirect	directly	Indirect	directly	Indirect	directly	
0.000	0.000	0.000	0.306	0.000	0.213	0.000	0.163	0.000	0.377	Creative thinking
0.000	0.762	0.233	0.137	0.163	0.000	0.125	0.000	0.287	0.000	Tilt towards

								swimming

It is clear from Table No. (9) that the values of the direct relationships between the four habits of the mind and creative thinking are greater than the values of the direct relationships between the habits of the mind and the tendency towards swimming. It also appears that the values of the indirect relationships between the four habits of mind and creative thinking are smaller than the values of the indirect relationships between the habits of the mind and the tendency towards swimming. The previous results indicate that the creative thinking variable plays the role of the mediating variable between the four habits of the mind and the tendency towards swimming.

To confirm this, we go to the Sobel Test to find out the importance of the mediating role of a variable (creative thinking) as a condition (for a tendency to swim).

Table (10) Sobel test results

| The level of confidence 95% | | Standard error | Values z | Track ab | Track b | Track a | Intermediate variable | Independent variable |
highest value	less value							
-0.139	-0.249	0.028	1.96	-0.194	0.508	-0.382	Creative thinking	The first mental habit
-0.807	-1.113	0.078	1.96	-0.960	1.457	-0.659	Creative thinking	Fourth mental habit
-0.851	-1.157	0.078	1.96	-1.004	1.453	-0.691	Creative thinking	The second mental habit
-0.279	-0.589	0.079	1.96	-0.434	1.452	-0.299	Creative thinking	The third mental habit

It is clear from the above table that zero is outside the limits of confidence (it does not fall between the highest value and the lowest value), which means that there are indirect relationships between the four habits of the mind, the tendency variable towards swimming, and the overall effect of the mediating variable (creative thinking).

Conclusions, recommendations and proposals:

First- Conclusions:

1- The proposed theoretical model matches the field data. In other words, the sample data supports the theoretical model.
2- Creative thinking plays a mediating role in the model, that is, the role of creative thinking as a mediating variable is a condition for propensity to swim.

Second - Recommendations:

1- In light of the results of the research and its conclusions, the researcher recommends the following:
2- Human development institutions should train the low-skilled in creative thinking either directly or in the mental habits most closely related to it, which have been identified through current research.
3- Take advantage of advanced statistical methods (methods of multivariate analysis) such as path analysis in the fields of physical education.
4- Conducting more research on direct and indirect relationships to know the most influential variables to develop the necessary procedures and solutions.

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