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# Measuring Multidimensional Conceptual Integration in University Students

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## Abstract

The aim of the current paper was to identify the multidimensional conceptual integration of university students, and the differences in it according to the variable of gender, academic specialization and stage of study, and the research sample consisted of (400) students of Wasit University for morning preliminary studies, and for the scientific and humanitarian specialization, and the first and fourth stages were selected by random class equal method, and to achieve the objectives of the research, the researcher has built a multidimensional conceptual integration test by two parts, one of which is called (verbal conceptual integration), The other is called (conceptual formal merging), adopting the theory of conceptual integration of both (Faucónier and Turner, 2003), and after the researcher extracted the descriptive properties of the test, she applied it to the members of the research sample, and after collecting the data and processing them statistically using the statistical bag spss, it became clear through the results of the research that the university students have a weak ability in conceptual integration in both dimensions (verbal and formal), The results also indicated that there were no statistically significant differences in conceptual integration that could be attributed to both the gender variable and the school stage, while there were significant differences depending on the variable of the study specialization and in favor of the scientific specialization, and in the light of the results and conclusions of the current research, the researcher made a number of recommendations and suggestions.

## Chapter One: Definition of Research

***Research Problem:*** **-** Our current era is witnessing an acceleration and complexity in events and information that may reflect negatively or positively on various areas of life, including education, which is the main pillar of any society, especially university education, as university students are the pillar of the nation, and future leaders, the more stimuli on the student's mind the impact on his ability to represent them properly in his cognitive structure, The verbal, visual, and abstract representations they contain fall within his cognitive experience, which he must develop by increasing his linguistic knowledge, and by linking those symbols and the different mental elements in them to make everything that is just closer to understanding, and to bring about all that is new from different meanings, and since one of the most important goals of researchers in psychology is to work on improving and developing the processes of teaching and learning, There are a number of variables that may affect these processes, and thus the cognitive output of learners negatively or positively, including the so-called conceptual integration.

Conceptual integration is a cognitive process that contributes to dealing with multiple forms of meaning, as filling lexical and grammatical gaps can be considered one of the important functions of the conceptual integration process, which is an essential tool in everyday mental life, which we use in the formation of basic explanations of all facts and situations, whether linguistic, social or scientific, the queen of conceptual integration is characteristic of human beings in the manufacture of scientific knowledge. Artistic and technical, including discoveries and inventions, including pure mentality, or practical mentality, material, such as the fact that peoples and cultures make material objects that are the best evidence of integrated concepts, including time-measuring machines, money, and manifestations of conceptual integration in many fields such as learning, moving images, caricature and advertising, including the composition of images in which conceptual integration is visual (Al-Azhar, 1999: 235-237).

According to Fauconnier (2002), meaning arises through networks of conceptual integration associated with mental structures that are built through mental diagrams stored in memory, and he argues that conceptual integration is responsible for complexity and creativity in our linguistic lexicons, in our ability to perform logical processes, and to perform many necessary cultural and social functions, although it includes creative outputs. But the theory of conceptual integration is not similar to theories of creativity (Barczewska, 2017: 428), as the process of conceptual integration leads to the production of new meanings, and to the occurrence of total clairvoyance, and conceptual pressure that contributes to the process of remembering, and to dealing with the different forms and faces of meaning, the basis of this process is the construction of a partial correspondence between two types of inputs or mental spaces, and the establishment or selective formation of a new integrated mental space, This ability to carry out the complex integration of vital abilities of both thought and language (Fauconnier, 2002, 1), and essentially has an important role in linguistic development, the mechanisms of conceptual integration have the ability to create multiple meanings, and to understand the true meaning of words, (Fauconnier & Turner, 2003: (80 , E) It is considered as a state of brainstorming that gives a bright picture of mental activity compared to a lengthy or realistic description, and it also has the ability to build, shape and define reality, it is among its effects that it allows us to understand and acquire new knowledge because it stimulates the corresponding mechanisms and included in the information and experiences acquired in the past, and connects them with new information and experiences, so new ideas, assumptions, opinions and plans arise through those associations, It then allows the evolution of humans, and contributes to the progress of the species. (Goatly, 1997: 149)

Therefore, the problem of research is to try to identify the nature of conceptual integration among university students, and the differences in it according to several variables.

***The importance of research:*** - The study of conceptual integration after it is one of the basic cognitive tools, and to address his theory by study and analysis is important, because that theory is one of the complex theories that are frequently debated because of the new concepts it contains, and because of its relevance to modern cognitive linguistic trends that take language as a basic material for it, as Fauconet believes that the greater the ability of the individual to conceptually integrate and produce new meanings, the more extensive his linguistic knowledge

will be, The active mind often tends to activate the principle of closure, addressing the lack of linguistic information available in context (Roig, 2020: 2).

Faucunier and Turner tested the relationship between conceptual integration and formal linguistic expression, showing that there is a process of formal integration at the level of expression with another similar in general characteristics of the conceptual integration process at the level of thinking, but it is worth noting that concepts integrated into the field of thinking are rarely considered a reflection of formally integrated concepts in the field of language. (Turner, et al, 1995: 3)

The study of this modern variable allows us to identify what human achievements can achieve, or reach complex levels of cognitive development, such as those found in the field of education and art, science, religion, language, and other human exploits (Rosa, 2010: 41-46), since the applications of conceptual integration in many areas of our lives are facts that have been absent from the eyes of experts. Because conceptual integration presents many different manifestations in a variety of areas that researchers have not unified into a general principle (Fauconnier & Turner, 2002: 15), including the field of education, since the framework of conceptual integration views the learning process as a process of selective projection, linking knowledge from different mental spaces, as conceptual integration allows the organization of the parts of knowledge that are in the mind of the learner. The use of the conceptual integration framework has been expanded to be used in analyzing the student's ability to inference mathematical and scientific, as Zandi (Zandieh& et al, 2017) applied the theory of conceptual integration to illustrate how university students build mathematical evidence or evidence, and used both (Bing& Redish, ) The theory of conceptual integration to make a model on how the student relates to physical and mathematical knowledge in building solutions to physical problems, and both pointed out that the difficulties faced by students are not due to the lack of knowledge required in advance, but through the inappropriate integration of mental spaces, and according to both Faucñer and Turner, learners have to find a way to integrate their knowledge with different mental spaces to create meaning for new information. (Hu& Rebello, 2018: 2-4)

From the foregoing, the study of this type of variable in the university environment allows the possibility of identifying the extent to which students are able to generate different mental spaces and integrate them to produce different linguistic and formal meanings that contribute to the learning process in various fields.

***Research Objectives:*** _The aim of the current research is to identify the multidimensional conceptual integration of university students, and to know the differences in it according to the variable of gender, specialization and stage of study.

***Research Limits:*** - The current research is determined by the students of Wasit University for scientific and humanitarian disciplines and ofboth sexes (males - females) from the initial morning studies for the academic year (2021-2022).

***Terminology*** Definition: Faucunier andTurner (2002) defines conceptual integration as such:

"A set of cognitive processors that integrates thoughts, words, and images within a

network of mental spaces in order to generate meaning, be embedded in many abstract levels, and influence the way we deal with objects and events." (Fauconnier, 2002, 1)

## Chapter Two: -Theoretical Framework and Previous Studies

***Theoretical framework:*** We as human beings without realizing sometimes try to link several areas through our conversation in order to express a new meaning that differs from all the meanings contained in those areas, and perhaps the truest example of this, and for thousands of years man has embodied his daily experiences, psychological projections, emotions, beliefs, thoughts, wars, heroisms, using the images of a plant found in nature, Or an animal, or stars, or a sun, or a moon, or others to connect them trying to express all of the above, and an example of this is the statue of (the winged bull) in Iraq made by the Assyrians and how several fields were combined in it, namely the field of (the bull), the field (the bird), and the field of (man), with all the elements and mental meanings that those fields carry at the time, to come up with a new meaning that differs from all those meanings all of them although it contains some of its elements, The reason behind all is our ability to integrate conceptually.

The concept of conceptual integration is also called (conceptual or conceptual synthesis), or (conceptual integration), or (mental linkage), and is mainly related to the concept of conceptual or mental metaphor, which means that we express an abstract concept with another physical concept that is known to us to facilitate the understanding of the first, but the integration is broader than just that and the metaphor is part of it, through which the individual transforms a question that can sometimes be similar to a puzzle into a kind of new understanding to facilitate its perception, And to understand them, so he tries to answer many questions such as how we can be human, that is, how those strange human minds can enable us to produce new meanings in different fields, it provides a fertile ground for understanding the ability of man with a complex and disparate cognitive structure, integration occurs extensively through language, human art, science, religion, mathematics, Culture, through anything that human beings do, follows a set of foundational principles that govern it. (Turner, 2006: 111)

***Theory of conceptual integration:-*** Also known as (Theory of Conceptual Integration), a theory of human knowledge developed recently, as it was circulated by the West a few years ago, but the interest of Arabic studies in it is recent, and all of them were in the field of language without psychology, (Marashi and Takhti, 2016: 135), and Fauconnier (2000) is the main developer of this theory and is a professor of cognitive sciences at the University of California, Santiago, as Mark Toner (2001) is the other founder of this theory, and serves as Dean of the Faculty of Arts and Sciences at Case Western University), each of which sought a framework for clarifying the phenomenon (cognitive-linguistic), such as (symmetry, synonymy, metaphor, euphemism, and factual reasoning) that was built on the basis of the theory of mental metaphor, or conceptuality, and the theory of mental spaces, and the theory of conceptual integration focuses on the field of language as well as the field of thinking and imagination, It examines the explanation of the ability of humans to regenerate rapidly, as it considers that many types of human thought are formed by the integration or integration of mental spaces or spaces, and that this ability to perform certain types of integrated concepts is what distinguishes humans

from all other beings, and the knowledge of modern man about the first forms of knowledge of Neanderthals, as each of them tried to apply this theory in several areas, including (cognitive, Neurosciences, cognitive linguistics, literature, mathematics, art, music, discourse analysis) and others, the theory of conceptual integration is a general theory of knowledge that assumes that the hypothetical elements and relationships of different situations are integrated into a sub-process (the process of conceptual integration).

***The main concepts in the theorization of conceptual integration***

***First: Mental spaces:*** or called mental spaces, where Fauconet sees mental spaces as mental bundles or packages that are built when talking or thinking about perceptions and imaginations, and about all past, present, or future situations (Marashi and Takhti, 2016: 137) for the purposes of understanding and specific action, and there are internal connections between them, and they can be updated during the process of thinking and dialogue. They can take root in long-term memory and are built through cognitive frameworks and models. (Buthelezi, 2008: 186-187)

***Second, input spaces, or inputs, or inputs blend*** are mental spaces or spaces used for conceptual integration inputs.

***Third: Generic spase:*** This mental space contains the most common contents of input spaces, the elements within the public space are matched by their counterparts in the input spaces, and the network of conceptual integration is gradually developed through this space, and this mental space is in turn formed by mental abstraction in contrast to the input spaces, most of which display sets of experimental data even if they are created for specific and temporary purposes.

***Fourth: Mental frames:*** It is a long-term planning structure that includes the information that we know beforehand, which is the one according to which mental spaces are related, and who organizes them, the individual has in his mind different systems of concepts related in the same way, and to understand which of them it is necessary to understand the overall structure that suits them, when there are some things that have the same cognitive structure through text or dialogue, All other things will be available automatically (Fillmore, 1982: 1)

***Fifth: The blended space:*** It is also called the combined space, which is a mental space, but it is the space that arises through the projections resulting from the input spaces, as this projection is selective, that is, not all elements of the input spaces are dropped within the combined space, and in fact there are strong restrictions on the projections resulting from the input spaces on the combined space, The Umbrella Space has two functions:Reflects certain buildings and systems that are often abstract.

(b) Shows between the silver or mental spaces of central interdependence. (Bin Dahman, 2021: 404)

***Sixth: Emergent structure:*** It is the structure that does not exist in the input spaces but is generated through structure (i.e., placing elements that are not in the input spaces together. (Turner, 2001: 17)

***Seventh: Vital relations:*** These are the conceptual relationships that emerge many times during

the compression process that permeates the merge process, which are the relationships between the elements of the input spaces that are compressed within the merged space, and the most common virtual relationships are: (change, identity, time, space, cause-result, part-whole, representation, probability, role, symmetry, classification, intentionality). (Fauconnier& Turner, 2002: 101)

***The processes that*** make ***up conceptual integration:*** **-** Conceptual integration consists of several processes:

***First:*** Composition: It is a partial selection of elements and structures of the mental spaces entered, and their projection on the space or the combined space for the purpose of creating new relationships, concepts and situations. (Buthelezi, 2008: 186-187)

***Second,*** Completion: It means bringing additional information from the individual's cognitive background to the synthetic concept, in order to enrich the relationships, situations, or scenes of the combined concept (Buthelezi, 2008: 186-187).

***Third,*** elaboration: It reveals what the combination of new meanings that are not available in the two input spaces but have no effect on them. (Pereira& Cardoso, 2001: 2)

***Principles of Conceptual Integration Theory:*** - The theory of conceptual integration has several principles, the most important of which are:

1. Compression: This concept does not provide for physical reduction in size, or reduction in time, but rather this concept is more extensive for conceptual pressure, and it refers to the transformation of scattered or sagging conceptual structures, which are less capable of human understanding, to become more reasonable to understand, and better compatible with human standards, and their own ways of thinking. Gill, 2010:28)
2. Incorporation: It states that the combined mix or concept must be integrated elements and has an integrated unit that handles total processing.
3. Stability of relationships: This principle stipulates that each element in the combined space shall have the same relationships as its counterpart of the constituent elements of the input space.
4. Intensity of communication: This principle entails the need to maintain the connection between the integrated space and the input spaces, so that the proportionality between the contents is possible, without the need for inference.
5. Decomposible: It means the ability to break down the embedded space after it is formed into its primary elements.
6. Justification: This principle provides that each element contained in the mixed space shall have a reason or justification for its existence by having a meaning, purpose or means of justifying its existence in it. (Marashi and Takhti, 2016: 137-140)

***Types of conceptual integration: Conceptual integration has several types, the most important of which are***

- ***Single-scope blending:*** It contains mental spaces entered with different regulatory frameworks, and only one of those frameworks is projected into the merged space, as the regulatory framework of one of these input spaces then becomes the regulatory framework for the merged space.
- ***Double scope blending:*** It contains input spaces with different frameworks, but the regulatory framework of the merged space includes parts of each of those frameworks, and has its own formative structure, and the idea of (desktop) in the field of computer is an

example of binary integration, and both Faucunier and Turner pointed out that dual-field conceptual integration is a unique ability for our species, This ability to perform bilateral integration is particularly determined by the field (art, religion, and science), each of which depends on the process of imagination. (Fauconnier& Turner, 2002:131)

***Conceptual blending dimensions***

Conceptual integration falls within two basic dimensions depending on the areas of its use in life, and these two dimensions or areas are: verbal conceptual integration, and visual or formal conceptual integration, and Yus (2009) refers to the difference between them from a cognitive point of view is the way in which we perceive each of them, as there are clear differences between the recoding of linguistic messages, and visual messages, but he pointed to the existence of similar types of mental actions called (adaptation of mental information). (Setala, 2016: 17)

## Chapter Three: Research Procedures

***First: Reaserch Methodology***

The researcher used the descriptive relational approach that is based on monitoring and explaining the phenomenon.

***Second: Population of the Research***

The current research community consisted of Wasit University students| Morning study of males and females and of the scientific and humanitarian specialties of (16215) students distributed among (15) colleges, including (8) colleges with scientific specialties with a total of (5748) students constituting (35.5%) by (2736) students and (3088) female students, and (7) colleges with humanitarian specialties with a total of (10467) students constituting (64.5%) by (5226) students and (5241) female students.

***Third: Sample of Research***

The research sample was selected by the method of stratified random sampling with equaldistribution, and this method is used when the study population is homogeneous and can be divided into separate layers according to the variables of the study and consider each layer as one unit, as the research sample consisted of (400) students from the research community Distributed among (8) faculties randomly selected from Wasit University / Morning study by four faculties, including in the scientific specialization and the same in the humanitarian specialization, and the representation of the variables of gender, specialization and stage was equal, with (200) males and (200) females, and (200) students from humanitarian disciplines, (200) students from scientific disciplines, and (200) students from the first stage, and (200) students from the fourth stage.

***Fourth: Building the Conceptual Integration Test***

Procedures for building a conceptual integration test:

***A- Defining the concept of conceptual integration***

The researcher relied on the theory of conceptual integration of both Faucunier and Turner (2003) in defining this variable and defining its fields, as conceptual integration is defined as: "A set of cognitive processors that integrate ideas, words and images within a network of mental spaces in order to generate meaning."(Fauconnier, 2002, 1)

***B. Identification of areas of conceptual integration***

According to the theory adopted, there are two factors, or areas of this variable, namely both the verbal conceptual integration factor and the formal conceptual integration factor.

***C. Formulation of Test Items***

The researcher formulated a number of paragraphs amounting to (38) paragraphs distributed over two areas, and (21) paragraphs for the factor (verbal conceptual integration from 1-21), and (17) paragraphs for the factor (conceptual formal integration from 21-38) respectively.

***D. Alternatives to Answer: Alternative Response***

The researcher adopted the test formula of the type of multiple choice with four alternatives, and a correction key (1, 0), where the correct answer is given one score, and the wrong answer is zero.

***(e) Validity of the paragraphs of the conceptual integration test***

The test paragraphs in their initial form were presented to a number of experts specialized in the field of language, educational and psychological sciences to express their opinions on their validity and the validity of alternatives.

***F. Statistical analysis of test paragraphs***

The researcher extracted both the discriminating force, the relationship of the paragraph to the total scale, as well as the extraction of the difficulty coefficient of the test paragraphs, and the effectiveness of alternatives or camouflages as follows:

***The discriminatory power of the paragraphs***

The discriminating power of the paragraphs of the conceptual integration test was extracted by the method of terminal comparison, and the researcher used the method of the two terminal groups, and the relationship of the degree of the paragraph to the total degree as appropriate procedures in the process of analyzing the paragraph, as follows:

***Extreme Groups Method***

After extracting the discriminatory strength of each of the test paragraphs, it became clear that all the test paragraphs were distinctive except for the paragraphs (9-13-14-30-31-34), as they were not distinguished, and Table (10) shows this:

**Table (10)** *Conceptual Integration Test Recognition Parameters*

| Paragraph | Discriminatory power | Result | Paragraph | Discriminatory power | Result |
|---|---|---|---|---|---|
| 1 | 0.54 | function | 20 | 0.39 | function |
| 2 | 0.22 | function | 21 | 0.33 | function |
| 3 | 0.26 | function | 22 | 0.29 | function |
| 4 | 0.42 | function | 23 | 0.44 | function |
| 5 | 0.42 | function | 24 | 0.46 | function |
| 6 | 0.31 | function | 25 | 0.21 | function |
| 7 | 0.34 | function | 26 | 0.43 | function |
| 8 | 0.42 | function | 27 | 0.29 | function |
| 9 | 0.07 | Gerdala | 28 | 0.35 | function |
| 10 | 0.39 | function | 29 | 0.26 | function |
| 11 | 0.23 | function | 30 | 0.03 | Gerdala |
| 12 | 0.20 | function | 31 | 0.19 | Gerdala |
| 13 | 0.18 | Gerdala | 32 | 0.24 | function |
| 14 | 0.12 | Gerdala | 33 | 0.25 | function |
| 15 | 0.25 | function | 34 | 0.19 | Gerdala |
| 16 | 0.27 | function | 35 | 0.31 | function |
| 17 | 0.34 | function | 36 | 0.31 | function |
| 18 | 0.21 | function | 37 | 0.24 | function |
| 19 | 0.34 | function | 38 | 0.26 | function |

***Second: The relationship of the paragraph to the total total***

The relationship of the paragraph to the total sum of the scale was extracted between

the scores of individuals on each paragraph or situation and their overall scores on the test, and all of them were a function except paragraph (30) where it was not a function, and it also fell in advance because it was not distinguished, and Table (11) shows this:

**Table (11)** *Paragraph correlation coefficients with the total sum of the paragraphs of the conceptual integration test*

| Paragraph | Correlation coefficient | Result | Paragraph | Correlation coefficient | Result |
|---|---|---|---|---|---|
| 1 | 0.402 | function | 20 | 0.333 | function |
| 2 | 0.178 | function | 21 | 0.325 | function |
| 3 | 0.217 | function | 22 | 0.216 | function |
| 4 | 0.335 | function | 23 | 0.361 | function |
| 5 | 0.322 | function | 24 | 0.357 | function |
| 6 | 0.235 | function | 25 | 0.148 | function |
| 7 | 0.308 | function | 26 | 0.370 | function |
| 8 | 0.340 | function | 27 | 0.279 | function |
| 9 | 0.110 | Non-function | 28 | 0.326 | function |
| 10 | 0.319 | function | 29 | 0.309 | function |
| 11 | 0.162 | function | 30 | 0.024 | Non-function |
| 12 | 0.122 | function | 31 | 0.212 | Non-function |
| 13 | 0.130 | Non-function | 32 | 0.206 | function |
| 14 | 0.142 | Non-function | 33 | 0.199 | function |
| 15 | 0.221 | function | 34 | 0.168 | Gerdala |
| 16 | 0.251 | function | 35 | 0.273 | function |
| 17 | 0.310 | function | 36 | 0.278 | function |
| 18 | 0.163 | function | 37 | 0.233 | function |
| 19 | 0.310 | function | 38 | 0.289 | function |

***Third: Difficulty of the paragraphs***

It was clear by extracting the difficulty coefficients Bthat all the test paragraphs were of moderate difficulty except paragraph (9) which was omitted in the distinction, and Table (12) shows this:

**Table (12)** *Difficulty coefficients of the paragraphs of the conceptual integration test*

| Paragraph | Paragraph difficulty | Result | Paragraph | Paragraph difficulty | Result |
|---|---|---|---|---|---|
| 1 | 0.44 | function | 20 | 0.47 | function |
| 2 | 0.49 | function | 21 | 0.61 | function |
| 3 | 0.38 | function | 22 | 0.47 | function |
| 4 | 0.37 | function | 23 | 0.66 | function |
| 5 | 0.49 | function | 24 | 0.49 | function |
| 6 | 0.23 | function | 25 | 0.62 | function |
| 7 | 0.29 | function | 26 | 0.37 | function |
| 8 | 0.40 | function | 27 | 0.65 | function |
| 9 | 0.17 | Non-function | 28 | 0.38 | function |
| 10 | 0.49 | function | 29 | 0.22 | function |
| 11 | 0.44 | function | 30 | 0.20 | Non-function |
| 12 | 0.24 | function | 31 | 0.25 | Non-function |
| 13 | 0.61 | Non-function | 32 | 0.50 | function |
| 14 | 0.76 | Non-function | 33 | 0.31 | function |
| 15 | 0.36 | function | 34 | 0.51 | Gerdala |
| 16 | 0.54 | function | 35 | 0.44 | function |
| 17 | 0.51 | function | 36 | 0.35 | function |
| 18 | 0.28 | function | 37 | 0.71 | function |
| 19 | 0.38 | function | 38 | 0.20 | function |

***Fourth: The effectiveness of alternatives (camouflages)***

The researcher calculated the effectiveness of camouflage (wrong alternatives) and found that alternatives attracted 15% of the lower group, so it was decided to keep the alternatives unchanged.

***Psychometric properties of conceptual integration test:***

***First: Validity:***

Honesty in the current scale has been achieved through the following two methods:

***A. Face Validity***

The researcher verified the apparent honesty of the conceptual integration test by presenting it to a group of experts and specialists in educational and psychological sciences.

***B- ConstructValidity***

The researcher verified the sincerity of the construction to test the conceptual integration by extracting the coefficients of distinguishing paragraphs, and finding the relationship of the degree of the paragraph to the total degree of the scale, as well as its use of the best types of honesty, which is the working honesty of both types (exploratory and affirmative), where the researcher used exploratory factorial analysis, and also used the affirmative factorial analysis, and the following is an explanation of both types:

***1- Exploratory Factorial Honesty***

The researcher used exploratory factorial analysis in the manner of the main components in order to verify the nature of the factorial structure of the conceptual integration test consisting of (38) paragraphs, as she subjected (400) forms to the factorial analysis, and table (13) shows this:

**Table (13)** *Kaiser and Bartlett test value to measure the validity of the conceptual integration test for factorial analysis*

| KMO and Bartlett's Test | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .586 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 1225.319 |
| | Df | 703 |
| | Sig. | 0.000 |

The results of the exploratory factorial analysis of the components of the test after the orthogonal rotation of the axes by the method of varimax found the existence of two basic factors whose saturation ranged between (0.494-0.223) The number of paragraphs of the first factor (16) paragraphs whose saturation with the factor ranged between (0.494 - 0.225), and the number of paragraphs of the second factor (13) paragraphs with saturations ranging between (0.497-0.223), and according to the results of the analysis with its factors and paragraphs, the first factor was named as verbal conceptual integration It consists of (16) paragraphs, and the second factor is the conceptual formal merging and consists of (13) paragraphs, and paragraphs (9-13-14-16-25-30-31-34-37) were deleted because they did not obtain a sufficient degree of saturation in the factorial analysis, noting that paragraphs (9-13-14-30-31-34) fell into discrimination and paragraph (9) in difficulty, while paragraph (30) fell by correlation coefficient as well, and table (14) shows this:

**Table (14)** *Exploratory factorial analysis of the test of conceptual integration and its saturation on domains*

| Paragraph string | Field or Worker | Saturation | Paragraph sequence | Field or Worker | Saturation |
|---|---|---|---|---|---|
| 1 | The first | 0.498 | 17 | Second | 0.497 |
| 2 | The first | 0.476 | 18 | Second | 0.481 |
| 3 | The first | 0.468 | 19 | Second | 0.398 |
| 4 | The first | 0.444 | 20 | Second | 0.374 |
| 5 | The first | 0.434 | 21 | Second | 0.366 |
| 6 | The first | 0.393 | 22 | Second | 0.358 |
| 7 | The first | 0.380 | 23 | Second | 0.340 |
| 8 | The first | 0.364 | 24 | Second | 0.316 |
| 9 | The first | 0.357 | 25 | Second | 0.284 |
| 10 | The first | 0.320 | 26 | Second | 0.283 |
| 11 | The first | 0.315 | 27 | Second | 0.275 |
| 12 | The first | 0.314 | 28 | Second | 0.258 |
| 13 | The first | 0.292 | 29 | Second | 0.223 |
| 14 | The first | 0.255 | | | |
| 15 | The first | 0.253 | | | |
| 16 | The first | 0.225 | | | |

***2- Confirmatory Factor Analysis:*** In order to verify the validity of the theoretical model adopted in the research, evaluate its degree of validity, and ensure the extent of its conformity with the data obtained from the sample, the method of confirmed factor analysis was used, and table (15) shows the indicators of the emphasizing factor analysis:

**Table (15)** *Indicators of Emphastic Factor Analysis for Conceptual Integration Test*

| Pronounced like t | Conformity Quality Index | Indicators | Cutting Grade Value (Acceptance Criterion) |
|---|---|---|---|
| 1 | Kai Square $(\chi^2/df)$ | 1.336 | Its value must be less than 5 i.e., non-functional. A value of zero means perfect matching |
| 2 | GFI Good Conformity Indicator | 0.921 | The value of the indicator is equal to or greater than 0.90 |
| 3 | AGFI Good Conformity Indicator Patcher | 0.908 | The value of the indicator is equal to or greater than 0.80 |
| 4 | RMSEA square root of the average approach line | 0.029 | The value of the indicator is equal to or greater than 0.05 |
| 5 | TLITucker-Lewis indicator | | The value of the indicator is equal to or greater than 0.90 |
| 6 | AIC Test Information Likek | 620276 | The value of the supposed model is less than its value for the saturated model |
| 7 | ECVIConsistent Test Information Test for LEIC | 1.555 | The value of the supposed model is less than its value for the saturated model |
| 8 | RMR root pointer average residual squares | 0.012 | The value of the indicator is equal to or greater than 0.1. A value of zero means perfect matching |
| 9 | PGFI Economic Good Conformity Index | 0.796 | The value of the indicator is equal to or greater than 0.50 and the best is 0.60 |
| 10 | NFI Standard Conformity Indicator | 0.417 | The value of the indicator is equal to or greater than 0.90 |
| 11 | PNFI Economic Standard Conformity Index | 0.386 | The value of the indicator is equal to or greater than 0.50 and the best is 0.60 |

From all the above indicators, it can be concluded that most of the indicators of conformity indicate the existence of a complete conformity with the model, which

means that the theoretical model was confirmed to be identical to the community by measuring the sample data for the statistical indicators adopted in the confirmed factor analysis.

***Second: Stability of the Conceptual Integration Test***

The coefficient of stability of the conceptual integration test was extracted by the methods of retesting and the Cronbach alpha equation, where the value of the coefficient of stability was in the Cronbach alpha method (0,617), while its value was (0,785) in the retest method, and the two values indicate that the conceptual integration test has a good stability coefficient, and Table (16) shows this:

**Table (16)** *Conceptual Integration Test Stability Coefficients*

| Method | Coefficient of stability | Level of significance |
|---|---|---|
| Alpha Cronbach's Alpha | .617 | D |
| Re-test | 0.785 | D |

***Conceptual integration test in its final form***

After extracting the psychometric characteristics of the conceptual integration test, the test in its final form became valid for final application, as it consists of (29) paragraphs, and falls within two areas (verbal conceptual merging, and formal conceptual merging), and the total score of the respondent is calculated by adding the scores obtained by each of the test paragraphs, thus being the highest score obtained by the respondent (29), and the lowest score (0), The theoretical average is (14,5).

# Chapter Four: Presentation, Discussion and Interpretation of Results

***First: Identify the conceptual integration and its most common dimensions among university students***

For the purpose of achieving this goal, the researcher applied the conceptual integration test to the research sample of (400) students from scientific and humanitarian disciplines, and for the first and fourth stages, and thearithmetic average of conceptual integration was calculated as a general factor, as the T test was used for one sample, where the T value of the significance of differences for conceptual integration as a general factor (-13,110) is greater than the tabular value of (1,960) at the level of significance (0.05), The degree of freedom (399), but in the opposite direction, which means that the significance of the differences between the averages was a function, and that the research sample does not have a good conceptual integration, as for the dimensions of the conceptual integration in the sample, the calculated T value of the conceptual verbal integration (-10,448), which is greater than the tabular value, which means that the significance of the differences between the averages was a function, and that university students do not have a good ability to integrate the verbal conceptual, The calculated T value of the dimension of formal conceptual consolidation (-10,135), which is greater than the tabular value, indicates that the significance of the differences between the averages was also a function, and that this indicates that the sample does not also have a good ability to visualize the formal conceptual merge, and Table 30 shows this:

**Table (30)** *Test T for one sample to measure conceptual integration and its dimensions in university students*

| Variable | Arithmetic average | Standard deviation | Hypothetical average | The value of the t test to indicate the differences | Result |
|---|---|---|---|---|---|
| Conceptual integration | 11.860 | 4.02752 | 14.5 | -13.110 | function |
| Verbal conceptual integration | 6.510 | 2.85223 | 8 | -10.448 | function |
| Conceptual Formal Integration | 5.350 | 2.26944 | 6.5 | -10.135 | function |

The researcher attributes this result to the nature of the era of technology and the Internet, which is a double-edged sword, and among its negative consequences is the tendency of students to ready-made information and concepts without trying to exert more effort in linking each other to come up with new meanings, whether in the verbal or formal field.

***Second Objective: Toidentify the differences in the conceptual integration of university students according to the variable of gender, specialization and stage of study***

***A- Differences in conceptual integration and its dimensions are defined among university students according to the gender variable***

To achieve this goal, the T test was used fortwo independent samples, and it turned out that the differences in conceptual integration in general were not functional, as the calculated T value was (0,446), which is lower than the tabular value of (1,960), at the level of significance (0.05), and the degree of freedom (398), while for the significance of the differences in the dimensions of conceptual integration was also non-functional, the calculated T value of the dimension of verbal conceptual integration (0,490), It is lower than the tabular one, which means that there are no differences between males and females in this dimension, as well as after the conceptual formal merge, the calculated T value is (0,176) and is also non-function being less than the tabular value, and Table (31) shows this:

**Table (31)** *Test T for two independent samples to identify differences in conceptual integration and its dimensions depending on the gender variable*

| Variable | Sex | Number | Arithmetic mean | Standard deviation | The value of the T test | Result |
|---|---|---|---|---|---|---|
| Conceptual integration | Male | 200 | 11.950 | 4.23167 | 0.446 | Non-function |
| | Female | 200 | 11.770 | 3.82101 | | |
| Verbal conceptual integration | Male | 200 | 6.580 | 2.91997 | 0.490 | Non-function |
| | Female | 200 | 6.440 | 2.78842 | | |
| Conceptual Formal Integration | Male | 200 | 5.370 | 2.42746 | 0.176 | Non-function |
| | Female | 200 | 5.330 | 2.10553 | | |

The researcher explains this finding that since conceptual integration has two dimensions, one verbal and the other morphological, and since most of the previous literature in the field of language indicates the superiority of females in verbal abilities, and the literature in the field of spatial abilities indicates the superiority of males in those abilities, as well as studies in the neural field that indicate that the increased concentration of gray matter in the brain in males makes them more spatial ability than females, The increased concentration of

white matter in the brain in females makes them more linguistically capable than males, so this may be the reason why both of them are equal in the conceptual integration abilities that carry both abilities (Imran, 2016: 97).

***B- Differences in conceptual integration and its dimensions are defined among university students according to the variable of academic specialization***

To achieve this goal, the T test was used for two independent samples, and it turned out that the differences in conceptual integration in general were a function and in favor of students of scientific specialization, where the calculated T value (7,316), which is greater than the tabular value of (1,960), at the level of significance (0.05), and the degree of freedom (398), as for the significance of differences in the dimensions of conceptual integration was also a function and in favor of the scientific specialization, If the calculated T value of the dimension of verbal conceptual integration (4,675), which is greater than the tabular one, as well as after the formal conceptual merge, the calculated T value was (6,839), which is also a function being greater than the tabular value, which means that the students of the scientific specialization enjoy a higher conceptual integration than the students of the human specialization and in both dimensions, and Table (32) shows this:

**Table (32)** *T test of two independent samples to identify differences in conceptual integration and its dimensions depending on for the study specialization*

| Variable | Specialization | Number | Arithmetic mean | Standard deviation | The value of the T test | Result |
|---|---|---|---|---|---|---|
| Conceptual integration | Scientific | 200 | 13.245 | 4.03066 | 7.316 | function |
| | Humanitarian | 200 | 10.475 | 3.52441 | | |
| Verbal conceptual integration | Scientific | 200 | 7.160 | 2.85397 | 4.675 | function |
| | Humanitarian | 200 | 5.860 | 2.70499 | | |
| Conceptual Formal Integration | Scientific | 200 | 6.085 | 2.21865 | 6.839 | function |
| | Humanitarian | 200 | 4.615 | 2.07807 | | |

The researcher can attribute the above result to the nature of the subjects of study of the scientific specialization because their study can employ and develop many high-level abilities and can also provide a wider scope for the formation of broad mental spaces, and various types of dual-field and multi-field conceptual integration, which can explain the superiority of the students of this specialization in the ability of conceptual integration in its dimensions.

***C- Differences in conceptual integration and its dimensions are defined among university students according to the variable of the stage of study***

To achieve this goal, the T test was used for two independent samples, where the calculated T value for the significance of the differences (-0,149), which is lower than the tabular value of (1,960) at the level of significance (0.05), and the degree of freedom (398), which means that there are no significant differences between the first and fourth stage in the conceptual merger as a general factor, and for the dimensions of the conceptual fusionP The significance of the differences was non-functional, because the calculated T value (-0,420) was smaller than the tabular value, which means that both the students of the first and fourth stages do not differ in this dimension or factor of conceptual integration, the calculated T value (0,264) of the factor of conceptual conceptual integration is less than the tabular value, which means that there are no differences in this factor either, This indicates that the level of conceptual integration as a general and two-dimensional factor does not vary relatively depending on the variable of the stage of study, and Table (33) shows this:

**Table (33)** *Test T for two independent samples to identify differences in conceptual integration and its dimensions depending on a variable School Stage*

| Variable | Stage | Number | Arithmetic mean | Standard deviation | The value of the T test | Result |
|---|---|---|---|---|---|---|
| Conceptual integration | The first | 200 | 11.830 | 4.00892 | -0.149 | Non-function |
| | Fourthly | 200 | 11.890 | 4.05588 | | |
| Verbal conceptual integration | The first | 200 | 6.450 | 2.67456 | -0.420 | Non-function |
| | Fourthly | 200 | 6.570 | 3.02504 | | |
| Conceptual Formal Integration | The first | 200 | 5.380 | 2.34158 | 0.264 | Non-function |
| | Fourthly | 200 | 5.320 | 2.20041 | | |

The researcher attributes the reason to the fact that the ages of the students in the research sample are rather close, and at the mental level their thinking falls within the same stage of mental development, which is the stage of abstract thinking, which is reflected in their ability to integrate conceptually with its verbal and formal dimensions.

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