

Cognitive Failure and its Relationship to Problem-Solving Ability Among a Sample of University Students:-A Field Study at the University Laghouat, Algeria-

Farsi Ibrahim Elkhail

Faculty of Social Sciences, Department of Psychology And Education Sciences And Orthophonie, Laboratory of Guidance Psychological Development Tools Measurement In the Middle School, University of Amar Telidji - Laghouat (Algeria), E-mail: ibk.farsi@lagh-univ.dz

Received: 03/2024, Published: 10/2024

Abstract:

This study aimed to identify the level of cognitive failure and problem-solving, recognize the nature of the relationship between them, and determine if there are statistically significant differences at the significance level (0.05) in cognitive failure and problem-solving among university students attributed to gender variables. Two measurement tools were used, one specific for cognitive failure and one for problem-solving. They were distributed to a random sample of 100 individuals from the study population, adopting the descriptive correlational approach for its suitability to the present study. After subjecting the results to SPSS statistical processing, the results showed:

- The level of cognitive failure among sample individuals was low.
- The level of problem-solving among sample individuals was low.
- There were no statistically significant differences in cognitive failure among a university student sample attributed to the gender variable.
- There were statistically significant differences in problem-solving among a university student sample attributed to the gender variable.
- There was a statistically significant correlational relationship between cognitive failure and problem-solving among a university student sample.

In light of the researcher's findings, the study was concluded with a conclusion and recommendations were proposed.

Keywords: Cognitive failure - Problem-solving - University students.

Introduction:

No human on earth is free of problems encountered in his life. The nature of human existence requires such circumstances to complete the human experience through them. Thus, the ability to solve problems becomes a major and essential demand in an individual's life. There are many daily situations of great complexity

and intricacy where problem-solving ability is one of the most significant and employed forms of human behaviour among individuals of varying levels, categories, professions, etc. Among these individuals are university students who learn problem-solving to be capable of making sound decisions in their lives and achieving their designated roles appropriately. However, life is ever-changing and complex - all we can predict is that it will not remain as it is now. In such a world, an individual's ability to adapt and solve problems is extremely significant. The problem-solving ability style utilizes an individual's previous information and acquired skills to address an unusual situation they face. Problem-solving skills require the ability to analyze and structure elements of the new situation faced by the individual. A problem is a condition or circumstance that confronts the individual, arousing feelings of anxiety and tension, where he desires to overcome that situation with available means.

Consequently, the ability to problem-solve is the individual's capacity to overcome obstacles and difficulties in social situations from long ago, relying on two main factors: previous learning and arousal level. Psychologists have added the term "cognitive transfer" based on previous learning experiences in problem-solving. With continued practice, an individual's accuracy improves in selection. Furthermore, some fundamental skills are developed, such as focus of attention and the ability to grasp and follow problem principles and concepts. Besides, our senses receive many sensory stimuli during our activities. The individual receives these sensory stimuli from various sources - externally from their surrounding environment and internally from their internal organs, muscles and joints due to various movements (Al-Zayat,1995, p79). The failures an individual experiences in daily life are called "cognitive failures" as Martin argues that cognitive failure is errors that hinder an individual from easily accomplishing an important task employed to perform at other times (Marten,1983,p97). Thinking is one of the most studied topics in psychology, particularly cognitive psychology. It has been addressed by all philosophical, intellectual and educational schools to help individuals become more capable of facing difficulties and problems that arise in all fields of life, whether social, economic, educational, ethical or otherwise (Al Atoum, 2004, p187). The present era of psychology is an era of thinking and the need to experiment with new, non-traditional problem-solving methods, particularly as we live in a fast-paced time with numerous challenges and difficulties—problems (Al-Arsan,2006, p89). The ability to problem-solve is the individual's capacity to overcome obstacles and difficulties in social situations from long ago, relying on two main factors: previous learning and arousal level. Many psychologists have added the term "cognitive transfer" based on prior learning experiences in problem-solving. With continued practice, an

individual's precision in selection improves, along with the development of fundamental skills such as attention concentration and the ability to understand and follow problem principles and concepts (Al-Adel , Abdul Wahab, 2003, p186). Problem-solving requires an individual whose role in the problematic situation is not merely recording available information. It includes processing, modifying, transforming, and reformulating information to construct a structured approach towards a solution. Problem behaviour also necessitates discovering and retrieving realistic and procedural knowledge from long-term memory (Al-Zayat,1995, p386).

1- Problem Statement:

A problem-solving approach is classified within cognitive modification methods, which involve developing problem-solving skills through appropriate general strategies to deal with problems and find solutions in different situations. Problem-solving style in psychotherapy literature is defined as cognitive behaviour because it attempts to develop general methods of dealing with problems rather than focusing on specific behaviours. Advocates of this therapeutic model believe that maladaptive behaviour results from an individual's inability to solve problems in an organized manner (Al Awan, 2009, p31). Individuals are exposed daily to thousands of sensory stimuli through the five senses, and their physical and mental abilities do not allow them to deal with all these stimuli simultaneously. Attention helps individuals select desired stimuli and isolate others as if they do not exist. Limiting the number of stimuli entering the processing system makes perception possible and efficient. It conserves mental and physical effort, as attention requires significant mental and physical energy (Al Atoum, 2004, p67). The variable of cognitive failure has gained significant interest from researchers as a potential force causing many cases of maladjustment in various fields, social, academic and others. Researchers link the concept of cognitive failure during adolescence to mental processes and their impact on academic achievement, which must be viewed with significance and dealt with caution, particularly as students' academic achievement shapes their future to a large extent, making the developmental stage very important (Al-Kaabi, 2008, p41). Robertson (1997) found that cognitive failure is related to both the type and quantity of multiple tasks performed by individuals as well as their anxiety and discomfort levels, all influencing self-organization. Robertson emphasizes that cognitive failure is part of everyone's life - some are annoying but harmless, like forgetting something, and some are very dangerous, causing car and workplace accidents by lapses and mistakes during job performance, posing safety risks (Robertson, 1997,p7). This agrees with Broadbent's indication- that cognitive failure can indicate an individual's information processing ability, potentially affecting their task performance. He

clarified that some people were prone to errors and lapses, recording a relatively higher number of memory lapses and instances of negligence than others (Broadbent, 1982, p1-16). Problem-solving is a directed cognitive mental activity organized systematically and planned according to an organized, purposeful strategy. In this type of thinking, the representation of previous experiences and elements of situations individuals face (with their ensuing obstacles and problems arousing motivation) is organized to fulfil the goal of overcoming obstacles and solving problems (Mahmoud,2001, p318). Problem-solving includes mental processes occurring according to organized thinking free of rigid assumptions. Psychologists agree that a problem is a situation or question arousing perplexity or confusion requiring a solution. Problem-solving is one thinking capacity known as directed thinking, usually associated with an individual's mental abilities, operations, and problem-solving strategies.

Among factors leading to studying problem-solving ability is an individual's non-use of mental capacities (attention, thinking, perception...) helping reach suitable solutions. Based on the above and the problem statement at hand, the idea of conducting the current study emerged to address the following questions:

- What is the level of cognitive failure among a sample of students at Amar Telidji University in Laghouat?
- What is the level of problem-solving among a sample of students at Amar Telidji University in Laghouat?
- Are there statistically significant differences in cognitive failure between male and female students at Amar Telidji University in Laghouat?
- Are there statistically significant differences in problem-solving between male and female students at Amar Telidji University in Laghouat?
- Is there a statistically significant relationship between cognitive failure and problem-solving among a sample of students at Amar Telidji University in Laghouat?

1.2. Study hypotheses:

- The level of cognitive failure is high among a sample of students at Amar Telidji University in Laghouat.
- The level of problem-solving ability is low among a sample of students at Amar Telidji University in Laghouat.
- There are statistically significant differences in cognitive failure between male and female students at Amar Telidji University in Laghouat.

- There are statistically significant differences in problem-solving ability between male and female students at Amar Telidji University in Laghouat.
- There is a statistically significant relationship between cognitive failure and problem-solving ability among a sample of students at Amar Telidji University in Laghouat.

1.3. Study objectives:

- Revealing the level of cognitive failure and problem-solving among students at Amar Telidji University in Laghouat.
- Investigating the differences in cognitive failure and problem-solving between students at Amar Telidji University in Laghouat.
- Examining the relationship between cognitive failure and problem-solving among a sample of university students.

1.4. Study importance:

- Study the variables of cognitive failure and problem-solving and their effect on humans, positively or negatively.
- Research the psychological difficulties faced by university students in finding solutions and solving problems compared to others.
- The significance of this study also lies in clarifying the role of cognitive failure in university students' lives and their ability to solve problems they may face.

1.5. Study terminology:

1.5.1 Cognitive failure: An individual's failure to deal with information they encounter, whether in the process of attention to it, realization, remembering the related experience, or employing it to perform a task (Broadbent et al.,1982,p.114).

The researcher defines it procedurally as failure to organize information received by the individual at a given moment or the process of interpreting and organizing sensory data received by our senses to raise awareness of our surroundings, represented by the score obtained by the student on the cognitive failure scale.

1.5.2. Problem-solving: The ability to derive results from given premises, a type of performance where the individual progresses from known facts to discover unknown facts by understanding and perceiving causes and overlapping factors in problems being solved (Al-Adel & Abdul Wahab, 2003, p. 198).

The researcher defines it procedurally as: the learner's ability for good attention and fast thinking to encounter events and overcome them, illustrated by the total score

obtained by respondents through answering scale items employed in the present research.

1.5.3. University students: A group of academically successful individuals who passed the baccalaureate threshold by succeeding in the exam, separating the two stages. They represent the elite and forefront of society, qualifying to hold leadership positions in various sectors and varied jobs to fulfill society development and movement forward tasks (Al-Jaf, 1962, p40).

The researcher defines them procedurally as a group of students who responded to study tools and agreed to be a sample in the present study.

2- Method and tools:

2.1. Study Methodology:

The research approach is a fundamental element of the scientific research process, given its role in identifying the method by which the researcher will collect, analyze, discuss and interpret data. It also aids in judging research quality (Msaad Al-Nouh, 2004, p121). The descriptive comparative approach was used since it will address relationships and differences between two variables (cognitive failure and problem-solving), expressing these quantitatively and qualitatively. It is a research method that qualitatively studies phenomenon characteristics and quantitatively studies volume and changes (Atwi Jawdat, 2007, p173).

2.2- Study sample and population:

Samples have become a major part of many theoretical and scientific studies as researchers adopt them, saving time, effort, and money. This study relied on a random sample concerning a sample of university students selected randomly from the Amar Telidji University - Laghouat faculties. The present research population includes university students ages 20-35 studying at Amar Telidji Laghouat University under the Ministry of Higher Education and Scientific Research, totalling 100 male and female students distributed across five faculties. The basic sample distribution is shown in the following table:

Table 01: Shows basic sample distribution by location and gender

College	Site	Number	Ratio%	Gender
Faculty of Social Sciences	Pole 2	15	15%	Female
		15	15%	Male
Faculty of Humanities	Pole2	20	20%	Female
		20	20%	Male

Faculty of medicine	Pole2	15	15%	Female
		15	15%	Male
Total		100%		

Source: (Prepared by the researcher)

- Study delimitations:

The current study delimitations are:

A- Temporal delimitations: The period for the study extended approximately five months from January 2023 to May 2023, divided into two parts:

First phase: We collected the most data associated with the subject to understand and familiarize ourselves with the study's problem statement and conduct a survey study. It extended over two months, from January 2023 to March 2023.

Second phase involves implementing tools, analyzing results and drawing conclusions about the selected sample. It lasted approximately three months, from March 2023 to May 2023.

B- Spatial delimitations: Represented by faculties of Amar Telidji Laghouat University.

C- Human delimitations: A sample of university students consisting of 100 individuals ages 24-30.

2.4. Study tools:

To measure the research variables (cognitive failure) and (problem-solving), we followed the appropriate steps for each tool as follows:

2.4.1. Cognitive failure scale: Employed the cognitive failure scale containing the following steps:

- The researcher was introduced to Broadbent's (1980) English version of the cognitive failure scale and translated it into Arabic.

- The researcher used Abbas's (2017) cognitive failure scale, which developed Aldouri's (1012) scale, adopting Broadbent's (1980) definition. The scale includes 40 items distributed over four areas (Distraction - memory failure - utilization failure - perception failure). Each item has three alternatives: "fully applicable, sometimes applicable, never applicable," carrying weights of (1-2-3). All items on the scale are negative, with the highest score being 120, showing complete possession of cognitive failure by the students. The lowest score on the scale is 40, illustrating a lack of cognitive failure. The hypothetical mean for the scale was 80.

2.4.2. Problem-solving scale:

The scale prepared by Alawan in 2009 based on Gilford's perspective includes 64 items, with five alternatives before each item ("always", "often", "sometimes", "rarely", and "never") with scores (3,2,1) respectively. Gilford defined problem-solving ability as an intellectual skill reflecting a learner's mental abilities through the ability to quickly classify things, find common relationships, deduce previous requirements for the situation, and solve problems.

3- Results and discussion:

Results presentation: After implementing the test to the studied sample, obtaining data and processing it, and adopting the SPSS statistical packet for social sciences, the results presentation and analysis stage comes next. The data for each study hypothesis will be presented and subjected to the appropriate statistical analysis.

3.1. Presentation of the Results for the First Hypothesis: The level of cognitive failure among a university student sample is high. Individual responses on the cognitive failure scale were entered and statistically analyzed to answer this question. The mean is regarded as the standard in determining low and high levels of the variable.

Table 02 indicates means and standard deviations for study sample individual estimations on cognitive failure scale dimensions

	Sample	Hypothetical mean	Mean	sd	df	Value 't'	Sig	Level
Cognitive failure	100	80	77.71	7.8951	99	8.02-	.000	low

Source: (Prepared by the researcher)

It is clear from the above table that the mean reached 77.71 while the standard deviation was 17.895, degrees of freedom were 99, and the t value was 8.02- at a significance level of 0.00.

Through presenting the results of the first hypothesis, it is apparent that the level of cognitive failure among university students is low. Thus, the hypothesis was not confirmed. These results can be explained by the fact that sample individuals do not suffer from cognitive failure but rather enjoy cognitive ability - information processing represents an organized, harmonious series of mental activities starting from sensation, then attention, perception, memory and other mental activities. University students possess these cognitive skills, and cognitive failure, as an inherent strength, can lead to many cases of life incompatibility in different areas of professional, social, and academic life. Researchers link cognitive failure in adolescence to mental processes and their effect on academic achievement, which must be considered and dealt with carefully. Academic achievement for students is a

focal point of interest in shaping their future, particularly since this stage is where mental, ethical, and social tendencies are most apparent. An individual's future is largely determined, providing significant importance, particularly regarding the diversity in cognitive performance styles among adolescents regarding form and content (Al-Kaabi, 2007, p.41).

3.2. Presentation of the Results of the Second Hypothesis: The level of problem-solving among a sample of university students is high. To answer this question, the responses of the sample individuals on the study scale were recorded and analyzed statistically. To identify the level of problem-solving, the mean is regarded as a criterion for determining the level of the variable, whether it is low or high.

Table 03 indicates means and standard deviations for study sample individual estimations on scale dimensions

	Sample	Hypothetical mean	Mean	sd	df	Value 't'	Sig	Level
Problem Solving	100	128	105.3	11.6	99	25.86	.000	low

Source: (Prepared by the researcher)

It is clear from the above table that the hypothetical mean equals 128, while the mean reached 105.3, the standard deviation was 25.86, the degrees of freedom were 99, and the t value was 25.86 at a significance level of 0.00.

This result gives the impression that students cannot solve problems, possibly due to a deficiency of experiences gained through their general life field and experiences throughout university years, in addition to not enjoying traits suitable for their age phase. It may also be due to the fluctuating nature of academic, pedagogical, and social relationships linking students, reducing their life experiences and helping them solve their problems.

Students must be introduced to problem-solving methods, as problem-solving is classified within cognitive modification, which involves developing problem-solving skills through appropriate general strategies for dealing with problems and finding solutions in confrontation. Problem-solving in psychotherapeutic literature is defined as cognitive behaviour that seeks to develop general methods of dealing with problems instead of focusing on specific behaviours, believing non-adaptive

behaviour results from the inability to solve problems in an organized manner (Alawan,2009, p31).

3.3 Presenting results of the third hypothesis: There are statistically significant differences in cognitive failure among a university student sample attributed to the gender variable. To verify this hypothesis, the researcher subjected it to statistical processing, and the table below shows the resulting analysis.

Table 04 indicates significance of differences between genders on cognitive failure scale

	Gender	Sample	Mean	SD	Value-t	DF	Sig
Cognitive failure	Male	49	48.05561	7.9151	0.269	99	0.79
	Female	51	47.28571	8.1471			

Source: (Prepared by the researcher)

Reviewing results of the third hypothesis, which indicated that there are no statistically significant differences at significance level ($\alpha=0.05$) in emotional empathy between genders, results showed differences between means of study sample individual responses on tools were very close - mean was (148.0556) for males and (147.2857) for females, with standard deviation of (17.915) for males and (18.147) for females, indicating no differences between genders in cognitive failure.

3.4. Presentation of the Fourth Hypothesis Results: There are statistically significant differences in problem-solving among a university student sample attributed to the gender variable. To verify this hypothesis. The table below illustrates the results obtained from the statistical processing.

Table 05 illustrates significance of differences between genders on problem-solving scale

	Gender	Sample	Mean	SD	Value-t	DF	Sig
Problem Solving	Male	49	107.81	4.88	1.66	99	0.885
	Female	51	108.71	4.62	1.67		

Source: (Prepared by the researcher)

Reviewing results of the fourth hypothesis, which indicated that there are no statistically significant differences at the significance level ($\alpha=0.05$) in problem-solving between genders, results showed differences between means of study sample individual responses on tools were very close - mean was (107.81) for males and

(108.71) for females, with a standard deviation of (4.88) for males and (4.62) for females, indicating no differences between genders in problem-solving ability.

The researcher explains this result that gender may not impact university students' ability to confront problems. This could be explained by the fact that Amar Telidji Laghouat University male and female students experience the same conditions and have similar, comparable cognitive experiences progressing within one system. Both genders share common goals and motivations. Even if there is an obstacle between the individual and the goal, the individual makes some attempts to reach the goal, as problem-solving requires high-level thinking skills like analysis and induction. Therefore, no significant differences were observed between males and females in their problem-solving abilities, illustrating that the capability to solve problems and think critically depends more on the individual's personality than their gender.

3.5. Presentation of the Results of the Fifth Hypothesis: Recalling the hypothesis - a statistically significant correlational relationship exists between cognitive failure and problem-solving among a university student sample. To verify this hypothesis, the researcher calculated the Pearson correlation coefficient between study variables and the results obtained from the statistical analysis are illustrated in the tables below.

Table 06 indicates the relationship between cognitive failure and problem-solving.

** Significant at 0.01 * Function at 0.05	Sample	Mean	sd	Correlation coefficient
Cognitive failure	100	57.7191	17.89	0.55
Problem Solving	100	89.091	14.90	

Source: (Prepared by the researcher), **** Significant at 0.01.**

This result can be explained by stating that cognitive failure is one-factor affecting problem-solving. It is regarded as an inherent force that leads to many life dissatisfactions in different professional, social, academic, and other life domains. Researchers have linked cognitive failure in adolescence to cognitive processes and their effect on academic achievement, highlighting the significance of addressing and handling them carefully. Academic achievement is a focal concern as it significantly shapes their future. This phase is where cognitive, moral, and social tendencies crystallize, defining an individual's future to a large extent. The diversity in cognitive performance styles among adolescents in form and content becomes more evident during this stage (Al-Kaabi, 2007, p.41).

Concerning problem-solving abilities, an individual's role in a problematic situation goes beyond merely recording available information. It includes processing,

modifying, transforming, and restructuring information, forming a framework that guides them towards a solution. Problem-solving behaviour also requires discovering and retrieving realistic or factual knowledge and procedural knowledge from long-term memory (Al-Zayat, 1995, p.386).

4- Conclusion:

Most long and short-term research was related to studying cognitive failure, as it is a tangible, measurable outcome. At the same time, problem-solving is neglected despite being the bridge between concepts and their application. In the present study, we reached a set of theoretical facts confirmed by the obtained results.

In light of achieved results, a set of proposals were put forth calling overall for:

- Higher education institutions must deepen models of cognitive failure avoidance skills and problem-solving ability through awareness days, seminars, and study days.
- Consolidate awareness of cognitive failure and problem-solving ability due to their effect in facing pressing events experienced by university students.
- Study the relationship between problem-solving ability and other variables like achievement motivation, self-efficacy and others among students from different educational stages.

References:

1. Al-Adel, Adel Abdul Wahab Saleh (2003) Problem-solving ability and meta-cognitive skills among ordinary and intellectually gifted, *Journal of the College of Education*, Issue 27.
2. Al-Zayat, Fathi Mustafa (1995), *Cognitive foundations of mental formation and information processing*, Al-Wafa House, Mansoura: Egypt.
3. Al-Atoum, Adnan Youssef (2004): *Cognitive psychology, theory and application*, first edition, Al-Maysera Printing and Publishing House, Amman, Jordan.
4. Al-Arsan, Ibrahim (2006): *Foundations of general psychology*, first edition, Nahda Library and Dar Al-Shorouk Publishing and Distribution, Jeddah, Saudi Arabia.
5. Alawan Musaab Muhammad Chaabane (2009) *Information processing and its relationship to problem-solving ability among secondary school students*, unpublished master's thesis, College of Education, Islamic University, Gaza.
6. Al-Kaabi, Kadem Mohsen (2008) *Environmental preferences among preparatory stage students*, higher diploma thesis in psychological counseling and educational guidance.
7. Mahmoud Abdel-Halim (2001) *Introduction to Educational Psychology*, Dar Al-Maarefa University, Alexandria, Egypt
8. Al-Jaf, Rashdi Ali (1992) *Helping behavior among university students and its relationship to some variables* (unpublished master's thesis) College of Arts, University of Baghdad.

9. Atawi Jawad Aziz Atawi, (2007), Scientific research methods, 1st Edition, Dar Al Thakafa, Amman,
10. Msaad Ben Abdullah Al-Nouh (2004) Principles of Educational Research, 1st Edition, University of Riyadh, Kingdom of Saudi Arabia.
11. Martin, M. (1983): Cognitive failure: Every day and laboratory performance, Bulletin of Psychonomic Society.
12. Broadbent, D. E., Cooper, P. F., Fitzgerald, P., & Parkes, L. R. (1982): The Cognitive Failures Questionnaire (CFQ) and its correlates, British Journal of Clinical Psychology.