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Article

The Mediating Role of Cognitive Complexity in the relationship between Psychological Hardiness and the Decision Loop (OODA): Analytical research for in the Thi-Qar Health Department

Sinan Fadil Hamad[1]*, Marwa Abd Mahmood[2]

1. Ministry of Higher Education and Scientific Research, Administrative and Financial Department, Iraq
*   Correspondence: rfgsnase@gmail.com
2. Ministry of Higher Education and Scientific Research, Department of Studies, Planning and Follow-up, Iraq

Abstract: The research aimed to identify the mediating role of cognitive complexity in the relationship between psychological hardiness among decision-makers and the application of the decision loop (OODA) model. The focus was mainly on the role of managers as decision makers, the basis for the success of organizations, and the maintenance of psychological hardiness among decision makers, enabling them to perceive environmental events and process information in a correct way to make decisions in the face of complex events in a changing environment. The research was applied to the community of (Thi-Qar Health) departments through an intentional sample consisting of (83) directors, who hold the positions of general manager, sector manager, hospital director and head of the department. The questionnaire was adopted as a measurement tool, to collect the necessary data. The data was processed using a set of statistical methods, including (arithmetic mean, standard deviation, coefficient of variation, Pearson correlation coefficient, confirmatory factor analysis). The research came out with a set of results, including the availability of the components of psychological hardiness and cognitive complexity in a good percentage among the research sample, with an increase in the effect of psychological hardiness in the decision loop (OODA) with the presence of the mediating variable, cognitive complexity.

Keywords: Psychological Hardiness, Cognitive Complexity, Decision Loop (OODA)

1. Introduction

Today, organizations face a new phase filled with increasingly complex and uncertain challenges, witnessing a decline in the ability to predict both the internal and external environment. This state of uncertainty is due to technological and cognitive developments, in addition to the impact of unstable political and economic conditions. Hence, it becomes necessary to react quickly to environmental changes in a timely manner, in order to anticipate and prepare for events before they occur, and make quick decisions to confront changes and events. All of this leaves those responsible and decision makers facing pressures that have formed a stone. The corner to build other pressures affecting workers, which requires reducing them with mental health resistance methods, and the concept of psychological hardiness, or what is sometimes called resistance when receiving crises and shocks, is only one of these methods that enable individuals to adapt to the different situations they face, and protect individuals from Psychological and health symptoms. In addition to Cognitive Complexity, which includes complex cognitive capabilities that include successfully processing information received from the external environment, which helps the leader perceive, evaluate, understand, and deal with daily events and situations.

1.1. The problem of the research:

Health organizations are currently facing great challenges, which requires rapid awareness of new and embarrassing matters and confronting and responding to these circumstances, by creating organizational changes that include all practical and administrative aspects of the organization, and also facilitate integration in the structure of functional and technical tasks. Therefore, there is a need for leaders who make decisions. They possess psychological hardiness, with strong psychological endurance for administrative leaders within a diagnostic framework for treatments with a healthy mentality and broad perceptions, with the help of (cognitive complexity) for these leaders, which enables them to analyse what is happening in a cognitive structure that includes interrelations for multiple categories, dimensions, and perspectives, distributed over the cognitive space of the mind. These leaders, both material and social, in order to interpret and understand it, to employ the decision loop (OODA) as a contemporary, unconventional approach in making decisions that are appropriate to the circumstantial situation and what health organizations are going through in the face of accelerating changes. The research problem can be expressed by a set of questions:

1. What is the level of availability of psychological hardiness elements among the studied sample of decision makers in the Thi-Qar Health Department?
2. What is the level of cognitive complexity of decision makers in the Thi-Qar Health Department?
3. Can decision makers in the Thi-Qar Health Department make decisions by going through the OODA decision loop chain?
4. Does cognitive complexity play an influential mediating role in the relationship between psychological hardiness and the decision-making cycle, Thi-Qar Health Department?

1.2. The Importance of the research:

The importance of the research is as follows:

1. The importance of the research is to diagnose the research variables in the Thi-Qar Health Department by diagnosing their field level and whether they have an influential role in the work of the department or not.
2. The researched organization's definition of the value of the research variables and their impact on the effectiveness of its overall performance in facing challenges and crises.
3. The importance of field research is highlighted in its selection of the Thi-Qar Health Department for its important role in providing services of important social value to citizens. As well as its role in rehabilitating a society free of infections and diseases in the governorate.

1.3. The objectives of the research:

The research aims to achieve the following:

1. An attempt to direct the attention of the researched sample to the nature of the variables and dimensions (psychological hardiness, cognitive complexity) and their role in enhancing the application of the OODA decision-making loop.
2. Determine the level of influence of psychological hardiness on the OODA decision loop.
3. Detecting an increase in the influence of psychological distress on the OODA decision loop in light of cognitive complexity.

1.4. Hypothetical research plan:

A hypothetical diagram was prepared for the research to give a preliminary perception of a set of relationships between the research variables, as shown in Figure (1).
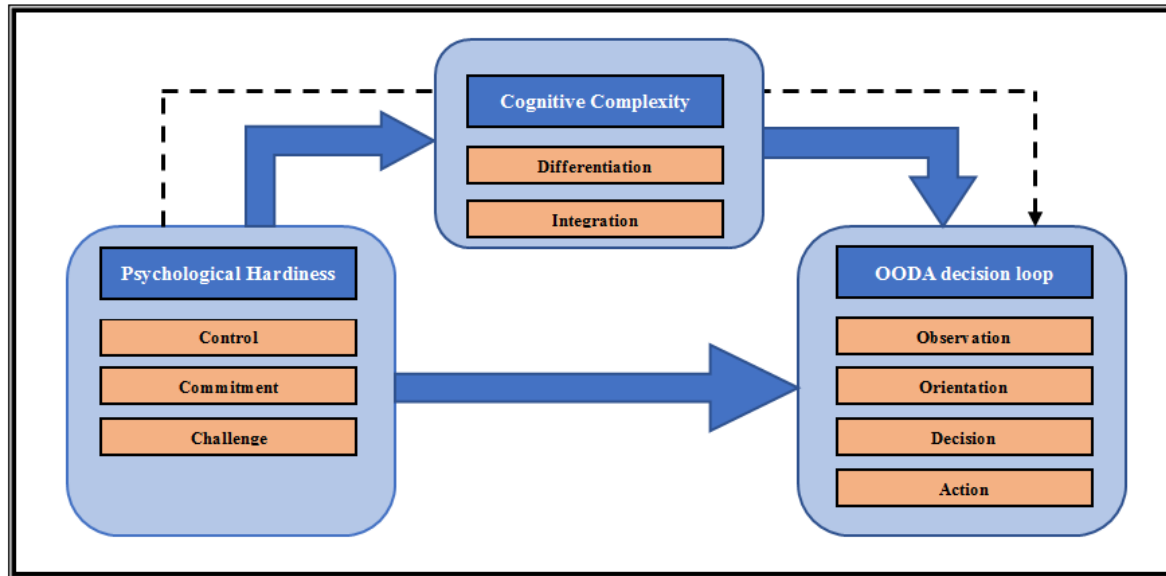

Figure 1. Hypothetical model of search

1.5. The hypotheses of the research:

1. There is a statistically significant effect of psychological hardiness on cognitive complexity.
2. There is a statistically significant effect of cognitive complexity in the OODA decision loop.
3. There is a significant effect of psychological hardiness in the OODA decision loop through the mediating role of cognitive complexity.

1.6. The methodology of research:

The researcher adopted the (descriptive-analytical) approach based on a survey of the sample members' opinions about the variables of the research, as it is an approach characterized by a comprehensive view and description of what exists and its interpretation.

Limitations of the research:

1. Spatial boundaries: The research was tested in its hypothetical model in Thi-Qar health departments, and as a field of application.
2. Human limits: represented by managers who have the authority to make and take decisions (general director, sector director, hospital director, and department head).
3. Time limits: Data was collected for the practical aspect for the period between 2/7/2019 and 6/4/2019.

1.7. Research population and sample:

To test the research hypotheses in the field, the Thi-Qar Health Department was chosen, due to its importance in providing health services to the people of the governorate. A random sample of department and division directors and health center directors was chosen. (90) questionnaire forms were distributed, and the retrieved and valid ones for analysis were (83). questionnaire, and thus the research sample settled on (83) people. This sample was chosen because they represent decision-makers in their organizations, and Table shows the characteristics of the sample.

Table 1. The characteristics of the sample

Details	Gender		Total	Education		
	Male	Female		Institute	Bachelor	Postgraduate
	60	23	83	43	35	5
	72%	28%	100%	52%	42%	6%
	Job Experience			Age			
	Number	Ratio	Total	30 or less	Number	Ratio	Total
6 – 10	26	31%		31-40	29	35%	
11 – 15	32	39%	100%	41-50	35	42%	100%
16 or more	25	30%		51 or more	19	23%	
Total	83	100%			83	100%	

1.8. Data collection methods:

1. The theoretical aspect: Arabic and foreign sources related to the research variables and published research, articles, and letters published on the Internet were used.
2. The practical aspect: A questionnaire consisting of (36) items was used, covering three variables and nine sub-dimensions. The answers to the questionnaire items were based on a five-point Likert scale, which includes weights ranging from (1) to (5), with phrases describing the degree of agreement such as: "completely agree", "agree", "neutral", "disagree", and "completely disagree". The (Falin, 1994) scale was used to measure the dimensions of psychological hardiness, while the cognitive complexity was used to measure the (Da'as et al. 2019) scale, and the dimensions of the decision loop (OODA) were measured based on (Canter, 2000).

1.9. Statistical methods:

1. (Statistical description) and includes (standard deviation, coefficient of variation, arithmetic mean, and relative importance).
2. Tests of conformity of the scale were used (Cronbach's alpha test to determine the validity of the content of the questionnaire and a normal distribution test based on the Kolmogorov-Smirnov test and confirmatory factor analysis).

2. Conceptual Framework of the Research Variables

2.1. Psychological Hardiness:

2.1.1. The concept and importance of psychological hardiness:

Cobaza is the first to define a concept of psychological hardiness through her studies to determine the role of this protective variable. According to Cobaza, the concept of psychological hardiness is "a set of personal traits and life coping methods that lead to personal strength. Psychological hardiness represents a general belief in the individual in his ability to use. "Its internal and environmental resources to confront stressful life events and difficult circumstances and deal with them objectively and realistically." It consists of three dimensions: commitment, control, and challenge [1]. It is defined as "a personal variable that helps develop hardiness, which is a set of traits or tendencies that motivate the individual to a certain type of action." Positive actions that help transform personal tragedy into developing experience. In this flexible process, stress and pressure will be reduced, and performance and health will be enhanced instead of being undermined. The reason for this is the motivation and encouragement of the qualities of psychological hardiness that help activate the most effective patterns in converting stress into benefits, which are more beneficial. Difficulty in activation when resorting to the method of confrontation

through denial, avoidance, or exaggeration in destructive competition, overprotection, and indulging in self-deprivation for psychological considerations [2].

2.1.2. Dimensions of psychological hardiness:

Hardiness is described as a combination of three attitudes (control, commitment, and challenge) that together provide the courage and motivation needed to transform stressful circumstances from potential misfortunes into opportunities for personal growth. These dimensions are illustrative of the following [2]:

1. Control: It is the belief that life events and their consequences can be predicted and controlled. It is also defined as the belief that the events that take place in an individual's life are influenced by his own behaviors and are not the result of environmental influences.

2. Commitment: It is the efficient commitment and coexistence with the world, the sense of meaning in life, which is the opposite of isolation. The phenomenon of commitment in solidity was built on the researcher (Antonevsky, 1974): "the sense of cohesion" that included commitment and coexistence with others, which gave meaning to resistance to influences. And the pressures. Commitment to solidity provides a sense of balance and inner confidence, which are important for realistic assessment of difficult and threatening circumstances [3].

3. Challenge: Challenge reflects the state in which individuals accept difficult situations on the basis that they are challenges rather than threats [4].

2.2. Cognitive Complexity

2.2.1. The concept and importance of cognitive complexity:

Cognitive complexity is a construct that aims to explain the way individuals perceive their environment. It is based on Kelly's personality structure theory (1955), which was founded on the premise that individuals have a certain number of personal structures or dimensions to "perceive events in their social world." It confirms on the nature of the constructs and the differences between individuals in the types and numbers of constructs they use when evaluating their external environment [5]. Cognitive complexity expresses "the individual's ability to formulate and understand social behaviors in a multidimensional way" [6] and [7] defines it as "the ability to operate the cognitive aspect." The individual's mind processes information through the components of the cognitive structure (differentiation and integration). A cognitively complex individual can perceive structures, people, or situations from many different perspectives, while cognitively simple individuals use fewer perspectives when describing people or events. It has been proven that cognitive complexity is necessary to understand the complex environment faced by organizations. Cheng & Chan (2010) indicated that higher levels of cognitive complexity may provide leaders with the more complex strategic processing ability required by such environments. Also, leaders who have higher levels of cognitive complexity may provide leaders with the ability to process more complex strategies that such environments require. High in cognitive complexity are more effective in enhancing organizational processes (such as leading change, strategic processes, and participating in decision making [5].

2.2.2. Dimensions of cognitive complexity:

Most research on cognitive complexity focuses on the dimensions of differentiation and integration, such as (Green, 2004) and (Dodd: 2009) [5]:

1. Differentiation:

Differentiation explains how individuals perceive their environments and interact with them in an analytical and organizational manner, then transform them into meaningful patterns within the individual's cognitive structures that match his special needs and

psychological make-up, and he then perceives his social and natural environment. Differentiation is linked to individual, organizational, and other social variables. At the individual level, differentiation can be considered a dimension of... The dimensions of cognitive complexity refer to the ability to perceive different and multiple dimensions of stimuli instead of one dimension (Chio, 2010). As for the social level (social complexity), differentiation is a sub-dimension of it and is defined as "a function of the ability of the individual (the leader) to distinguish current and potential patterns of relationships." Social skills and his ability to regulate his own feelings and easily recognize the feelings of others [8].

2. Integration:

Integration refers to an individual's ability to see connections between disparate viewpoints or between different characteristics (Suedfeld, 2010:2). Individuals with high cognitive complexity are more capable of integrating information more efficiently, more able to adapt to ambiguity, more inclined to search for large amounts of information, and more capable of integrating and integrating acquired information into the decision-making process. They may be among the best strategic planners compared to people with complexity. Less cognitive [5].

2.3. OODA Decision Loop:

2.3.1. The concept of the OODA decision loop:

This model has been adopted over time in other military services as well as large businesses, becoming an approved model due to its simplicity and accuracy, and the speed it achieves in decision-making, taking into account time constraints and uncertainty in the environment and information. The decision loop (OODA) is an analytical and synthetic tool for dealing with the environment and a strategic theory of how to do so. It is an expanded biological metaphor for reactions and a diagram of the way action works. It is simple, elegant and comprehensive, capable of describing, explaining and predicting [9]. The decision loop (OODA) is described as "the process of continuous improvement for strategic decision making," and according to this definition, it requires taking into account two basic issues [10]:

1. The nature of the organization, and how it differs by giving a set of organizational options available.

2. What are the obligations within the organizational options available to the organization?

These two issues represent a practical and theoretical challenge that organizations seek to gain a comprehensive understanding of the structure of organizational decision-making.

2.3.2. Stages of the decision loop (OODA):

The first stage: Observation: It refers to the importance of those concerned being aware and informed through directed and careful attention to what is happening in the circumstances in which the organization operates. Investigating events within the environment of the individual or organization determines the change or lack of change around them, and when collecting data comes the step of analyzing it and transforming it into Information that can be used.

The second stage: Orientation: It is the most important component of the model. While the observation stage provides the data, the orientation is the formation, filtering, and filtering of the data to transform it into sensitive information that can be used in decisions. This functional structure provides an effective, urgent, and effective constructive context. And the determinant of the dimensions of the phenomenon. It also represents a stage for complex processes of cognition, as it involves analyzing input from observations

aided by inherited abilities, concepts of organizational procedures, and previous knowledge reflected from memory to generate action.

The third stage: Decision: [11] believes that in the decision stage, a choice is made from among the existing hypotheses about the environmental situation and the possibility of responding to it, guided by the internal feedback received from the orientation stage, and providing internal feedback to the observation stage, and this means that at the end of each stage One of the stages of the decision loop (OODA) provides internal feed back to the previous stage, which enhances the accuracy of the decision taken and the resulting reasoning.

The fourth stage: Action: This stage represents the chosen response to the situation through interaction with the environment, and it does not stop at a certain limit. It is necessary to continue the monitoring process in order to collect more information and continue the cycle of operations through feedback for each stage of the decision loop (OODA) stage [12].

3. Results and Discussion
3.1. Validity of the measuring tool:
3.1.1. Consistency of the components of the scale (Cronbach Alpha):

The consistency of all components of the scale is evident, as their values are higher than (Cronbach Alpha), which requires the minimum acceptance threshold (0.70). This supports the consistency of the components of the research scale and thus the required stability when repeating the test. As shown in Table (2).

Table 2. Consistency results between scale components

	Dimensions	Cronbach's Alpha Coefficient	Variable Cronbach's Alpha Coefficient
Psychological Hardiness	Control	0.811	0.874
	Commitment	0.884	
	Challenge	0.863	
Cognitive Complexity	Differentiation	0.901	0.858
	Integration	0.839	
Decision Loop (OODA)	Observation	0.904	0.911
	Orientation	0.918	
	Decision	0.900	
	Action	0.907	

3.1.2. Structural validity to test sample adequacy:

The KMO scale values all appeared to be greater than (0.50) at the level of the nine dimensions representing the three research variables, in addition to the second condition related to the (Bartlett) test for correlation coefficients, in which the results proved acceptable in light of the significance of the (Chi-Squar) with respect to the research dimensions, was at a significance level of (0.00), which is less than the significance level of (0.05)," as shown in Table (3).

Table 3. KMO test and Bartlett's test for research dimensions

Main variables of the research	Dimensions	Number of paragraphs	KMO Test	Bartlett Test based on Chi-Squar value	Sig.
Psychological Hardiness	Control	4	0.682	155.720	0.000
	Commitment	4	0.718	182.317	0.000
	Challenge	4	0.732	189.993	0.000
Cognitive Complexity	Differentiation	4	0.731	162.303	0.000
	Integration	4	0.816	176.993	0.000
Decision Loop (OODA)	Observation	4	0.799	142.171	0.000
	Orientation	4	0.654	164.892	0.000
	Decision	4	0.738	170.027	0.000
	Action	4	0.713	175.066	0.000

3.1.3. Construct validity of the scale tool:

3.1.3.1. Confirmatory factor analysis:

In order to verify the confirmatory construct validity of the measurement tool, the researcher used confirmatory factor analysis through the statistical program (Amos, v, 22). According to the matching quality indicators shown in Table (4).

Table 4. Indicators and Ratios of the Goodness of Fit Rule for Structural Modeling Equation

Indicators	Quality of match ratio
Ratio of x^2 values and degrees of freedom (df)	Less than 0.05
Comparative Fit Index (CFI)	More than 0.90
Incremental Fit Index (IFI)	More than 0.90
Tucker-Lewis Index (TLI)	More than 0.90
Root Mean Square Error of Approximation (RMSEA)	Between 0.05-0.08

Source: Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). "Multivariate Data Analysis." 7th ed., Prentice Hall, Upper Saddle.

3.1.3.2. Construct validity of the main variable (psychological hardiness):

It is clear that the construct validity of the items of the psychological hardiness variable is greater than (0.50). This supports the validity of the statements that make up the dimensions, and that all the fit indicators, according to the recommendations of the modification indicators, are close to the indicators of the quality of standard fit (Goodness of Fit). This is a good indicator. As shown in Figure (2).
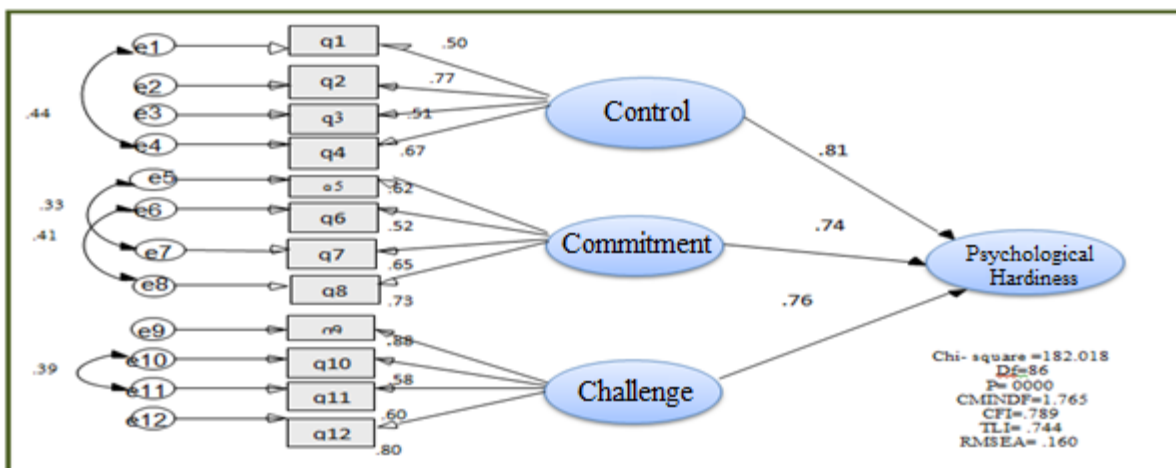
Figure 2. Confirmatory factor analysis of the independent variable (psychological hardiness), final model

Source: Prepared by the researcher using (Amos, v, 22).

3.1.3.3. Structural validity of the mediating variable (cognitive complexity):

In light of the results of the confirmatory factor analysis according to the (Modification Indices) indicator, it is clear that all dimensions achieved values higher than (0.50), so they are consistent with goodness of fit. As explained in Figure (3).
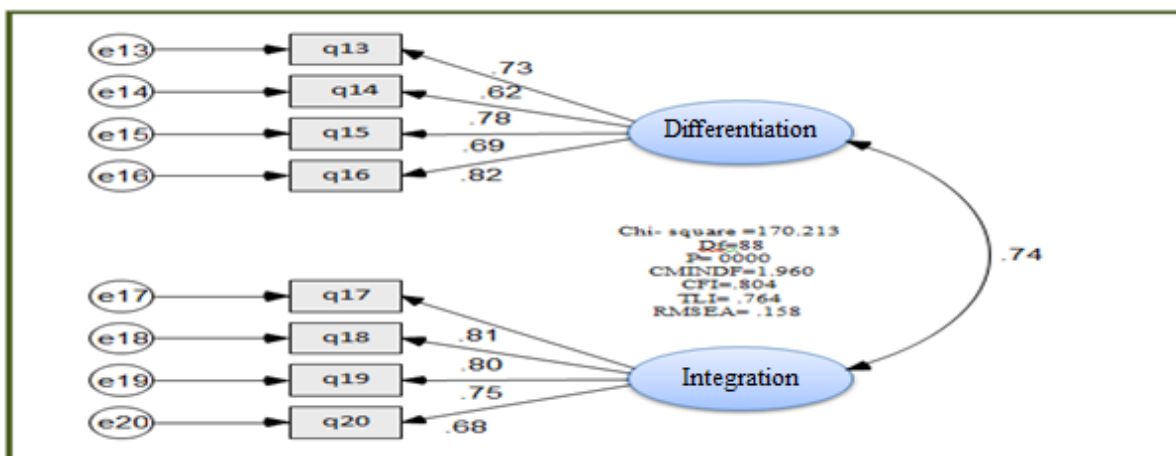

Figure 3. Factor analysis of the variable (cognitive complexity)

Source: Prepared by the researcher using (Amos, v, 22).

3.1.3.4. Construct validity of the dependent variable (OODA decision loop):

It is clear that the construct validity of all items of the decision loop (OODA) variable is greater than (0.50). This indicates the truthfulness of the statements and that all indicators are identical according to the recommendations of the modification indicators, which are close to the indicators of the quality of standard conformity (Goodness of Fit). It is a good indicator. As in Figure (4).
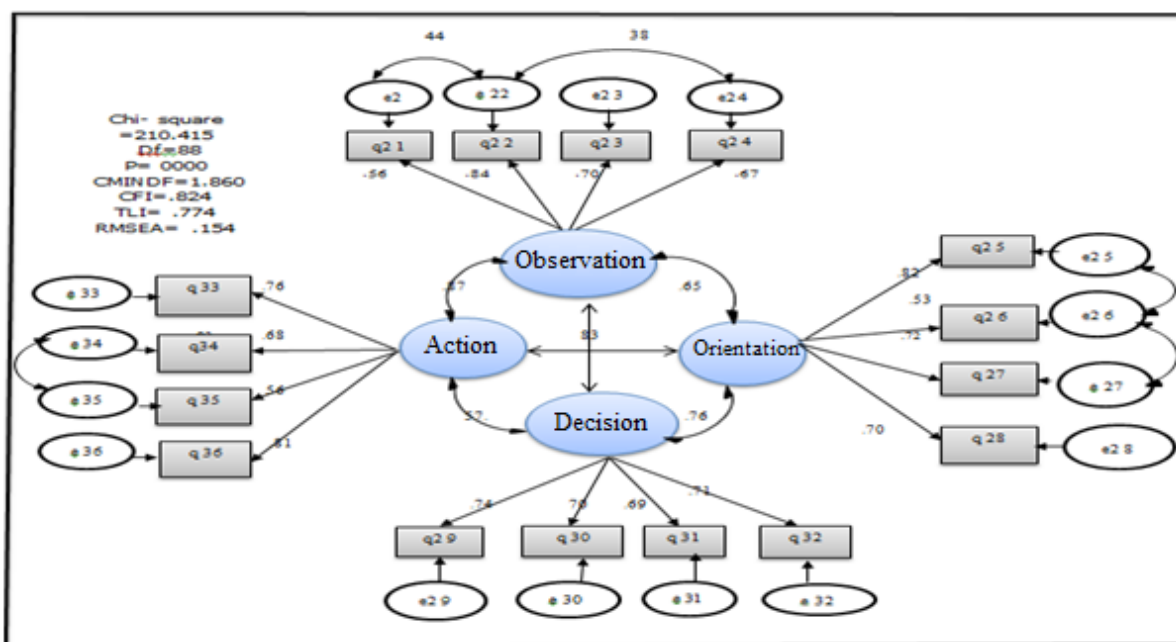
Figure 4. Confirmatory factor analysis of the dependent variable (OODA decision loop), final model

Source: Prepared by the researcher using (Amos, v, 22).

3.2. Normal distribution of data:

The researcher used the normal distribution test (Kolmogorov-Smirnov) since the sample size is greater than 50. According to the decision rule, the data is accepted as following a normal distribution if the value of (Sig) is greater than 0.05. If the value is less than 0.05, the data does not follow a normal distribution. In addition, the value of (Z) indicates the dispersion of the data, and is acceptable if it falls within the range (+2, -2) for the test of skewness and kurtosis. As in the table (5).

Table 5. Significant values for testing the normal distribution of variables and their dimensions

Variables	Sig.	SKEWNESS	KURTOSIS
Psychological Hardiness	0. 181	- 0.212	- 0.366
Control	0.124	-0.371	- 0.321
Commitment	0.164	- 0.268	- 0.388
Challenge	0.179	0.345	- 0.434
Cognitive Complexity	0.192	0.704	- 0.571
Differentiation	0.158	0.321	- 0.602
Integration	0.183	0.322	- 0.526
Decision Loop (OODA)	0.131	- 0.321	- 0.148
Observation	0.154	0.114	- 0355
Orientation	0.122	0.102	- 0.137
Decision	0.198	0.026	- 0.393
Action	0.182	0.112	- 0.139

3.3. Descriptive analysis of research variables:

3.3.1. Psychological hardiness:

The overall arithmetic mean of this variable was (3.85), indicating a good level. It had a standard deviation of (0.84) and a coefficient of variation of (18.282). Additionally, this variable ranks second in importance among the research variables. This indicates that the research sample (decision makers in the health department) enjoyed Thi-Qar had a good level of psychological hardiness in terms of control, commitment, and challenge in dealing with the events they face in their work. The dimension of (commitment) achieved the highest arithmetic mean of (3.96), indicating a good level, with a standard deviation of (0.62) and a coefficient of variation of (15.877). This dimension ranked first in terms of relative importance among the dimensions of psychological hardiness.

3.3.2. Cognitive complexity:

The overall cognitive and computational complexity achieved (3.87) indicating a good level. It had a standard deviation of (0.70) and a coefficient of variation of (16.663). Additionally, this variable ranks first in importance among the research variables. This demonstrates the availability of the components of cognitive complexity for the leaders of the Thi-Qar Health Department and their ability to process information. Analyzing it into different dimensions and categories, as well as integrating it into associative structures within the cognitive structure to achieve the appropriate response to environmental stimuli. The dimension of (Integration) within the variable of (Cognitive Complexity) recorded the highest arithmetic mean of (3.94), which reflects a good level. It had a standard deviation of (0.74) and a coefficient of variation of (18.238). This dimension ranked first in terms of relative importance.

3.3.3. OODA decision loop:

The variable (OODA Decision Loop) recorded an arithmetic mean of (3.57), indicating a good level, with a standard deviation of (0.95) and a coefficient of variation of (20.682). It ranked third among the research variables, indicating that the Thi-Qar Health Department's leaders rely on the decision circle stages in making decisions related to facing challenges and crises. As for the dimensions of the (OODA Decision Loop), the dimension of (Orientation) achieved the highest arithmetic mean of (3.82), reflecting a good level, with a standard deviation of (0.64) and a coefficient of variation of (16.228). This dimension ranked first in terms of relative importance among the dimensions of this variable. As shown in Table (6).

Table 6. "Arithmetic Mean", "Standard Deviation", "Coefficient of Variation" and "Relative Importance" of the main research variables and their sub-dimensions N=83

Main dimensions and their sub-variables	Arithmetic Mean	Standard Deviation	Coefficient of Variation	Relative Importance
Psychological Hardiness	3.85	0.84	18.282	Second
Control	3.71	0.82	20.461	3
Commitment	3.96	0. 62	15.877	1
Challenge	3.89	0.75	17.510	2
Cognitive Complexity	3.87	0.70	16.663	First
Differentiation	3.81	0.79	20.743	2
Integration	3.94	0.74	18.832	1
Decision Loop (OODA)	3.57	0.95	20.682	Third
Observation	3.54	0.77	19.978	2

Orientation	3.82	0.64	16.228	1
Decision	3.48	0.85	19.861	3
Action	3.46	0.87	22.847	4

3.4. Testing research hypotheses:

This paragraph describes the influence of the research variables on each other and outlines the direction of these relationships.

3.4.1. Testing the first research hypothesis:

"There is a statistically significant effect between psychological hardiness and cognitive complexity."

The direct and indirect (mediator) effect was tested using the structural model through structural equation modeling via the (Amos V.22) statistical program. This method is considered one of the most advanced methods for clarifying the influence relationships between variables, as it shows the extent to which the data fit the hypothesized model.

Figure (5) illustrates the structural model depicting the independent variable (psychological hardiness) and the mediating variable (cognitive complexity), and the one-way arrow from the psychological hardiness variable to the cognitive complexity variable illustrates the influence relationship of one variable on the other, called "standard coefficients" used for hypothesis testing. The value displayed above the cognitive complexity variable illustrates the coefficient of determination (R^2), indicating that the psychological hardiness variable can explain (65%) of the variations in cognitive complexity within the Thi-Qar Health Department. The remaining (35%) of the variance is attributed to other factors not included in the research model, as shown in Figure (5).
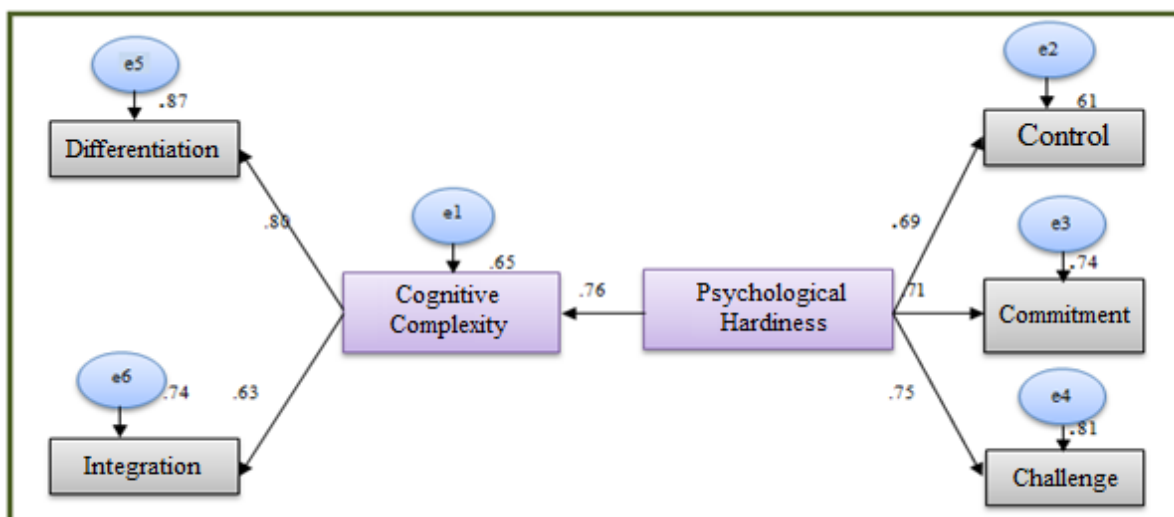

Figure 5. Path of Regression for the first research hypothesis as determined through structural equation modeling

Source: Prepared by the researcher using (Amos, v, 22).

Figure (5) clearly indicates that the regression coefficient has reached (0.76), a significant value. This is supported by the critical ratio (C.R.) of 16.25, as shown in Table (6), which is also significant. Consequently, a one-unit increase in psychological hardiness will lead to a (76%) increase in cognitive complexity, thereby supporting and validating the acceptance of the first hypothesis. Additionally, Table (7) summarizes the analysis related

to testing the first hypothesis, demonstrating that the model estimates and the critical ratio (C.R.) are significant at the level of (P<0.01), meeting the required criteria.

Table 7. Estimates of the influence model between psychological hardiness and cognitive complexity

Med. Variable	Path	Indep. Variable	S.R.W	Estimate	S.E.	C.R.	P
cognitive complexity	→	psychological hardiness	.76	.70	.05	16.25	***

Regression Weights (Group number 1 - Default model)

3.4.2. Testing the second research hypothesis:

"There is a statistically significant effect between cognitive complexity and the decision loop (OODA)."

The direct and indirect effects were examined using the structural model through structural equation modeling with the (Amos V.22) statistical program.

Figure (6) illustrates the structural model featuring the mediating variable (cognitive complexity) and the dependent variable (decision loop OODA). The one-way arrow from the cognitive complexity variable to the decision loop (OODA) variable represents the influence relationship between these variables, as indicated by the standard coefficients used for hypothesis testing. The value displayed above the decision loop (OODA) variable denotes the coefficient of determination (R^2), which indicates that the cognitive complexity variable accounts for 58% of the changes in the OODA decision loop variable within the Thi-Qar Health Department, while the remaining percentage, which is (42%), is due to other variables not included in the research model. As shown in Figure (6).
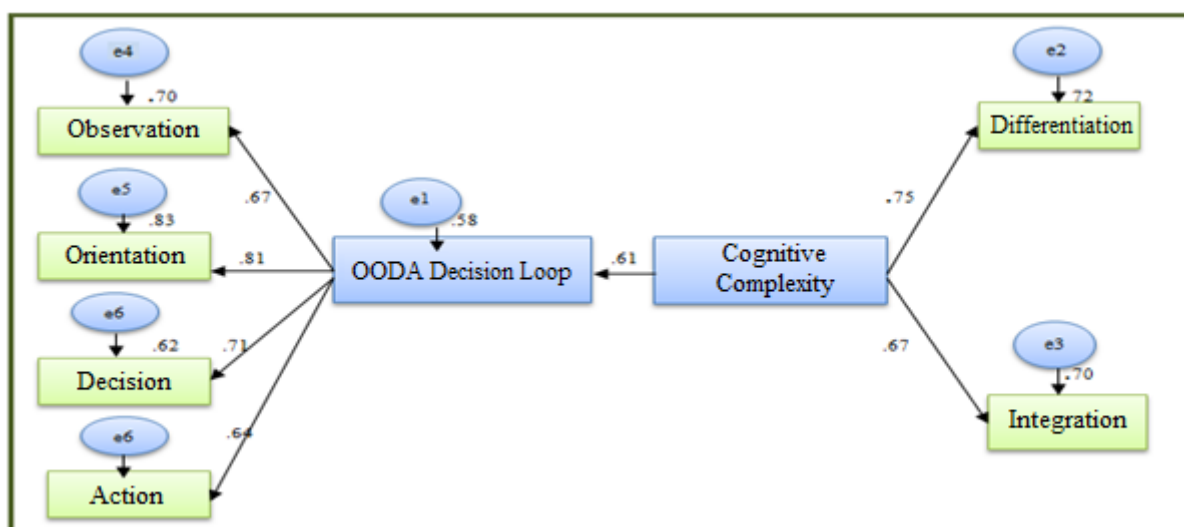

Figure 6. Demonstrates that the regression coefficient is (1.6)

Figure (6) demonstrates that the regression coefficient is (1.6), a significant value. This is corroborated by the critical ratio (C.R.) of (11.24), as detailed in Table (8), which also indicates significance. Consequently, a one-unit increase in cognitive complexity results in a (61%) increase in the OODA decision loop, thereby supporting the acceptance of the second hypothesis. Additionally, Table (8) summarizes the analysis related to testing the fourth hypothesis, showing that both the model estimates and the critical ratio (C.R.) are significant at the (P<0.01 level), meeting the required criteria.

Table 8. Estimates of the influence model between cognitive complexity and the OODA decision loop

Med. Variable	Path	Indep. Variable	S.R.W	Estimate	S.E.	C.R.	P
decision-making (OODA)	→	cognitive complexity	. 61	.74	.06	11.24	***

Regression Weights (Group number 1 - Default model)

3.4.3. Testing the third research hypothesis:

"There is a statistically significant effect of psychological hardiness in the OODA decision loop through the mediating role of cognitive complexity."

The path analysis method was employed to determine and compare both direct and indirect influence relationships using structural equation modeling with the (Amos V.22) statistical program.

Figure (7) illustrates the paths of the standard regression and (R2) values for both the direct influence of the independent variable (psychological hardiness) on the dependent variable (OODA decision loop) and the indirect effect of the independent variable (psychological hardiness) on the dependent variable (OODA decision loop) through the mediating variable (cognitive complexity), as it is clear that the structural model has achieved a perfect fit based on the values of the model fit indicators, as in Figure (7).
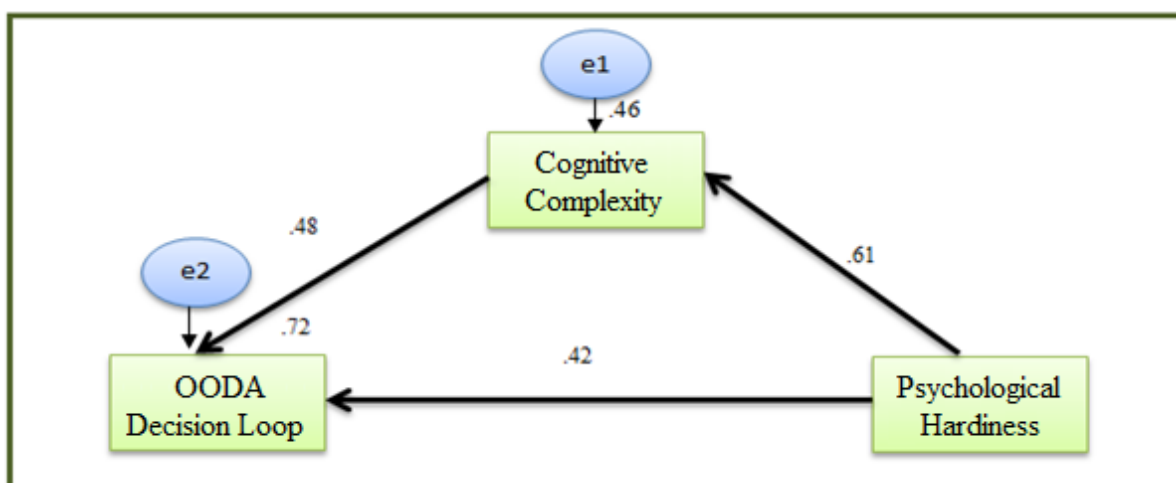

Figure 7. Direct and indirect impact paths for testing the third research hypothesis
Source: Prepared by the researcher using (Amos, v, 22).

As it is clear from Table (9), there is a direct effect of psychological hardiness in the decision loop (OODA), as its value reached (.42). It is evident that there is an indirect effect of psychological hardiness on the OODA decision loop through cognitive complexity, with a value of (0.44), as shown in Table (9). Furthermore, the coefficients for both the direct and indirect effects are statistically significant, as indicated by the critical ratio (C.R.) and the (P-value) provided in Table (10).

Table 9. Values of direct, indirect and total effect for testing the fifth hypothesis

Relation Between Variables	Direct Effect	Indirect Effect	Total Effect	R^2
Psychological Hardiness → decision-making (OODA)	.42	-	.86	.72

Psychological Hardness → Cognitive Complexity → decision-making (OODA)	-	.44

Table 10. Estimates of the influence model of psychological hardiness in the decision loop (OODA) through cognitive complexity

Variables	Path	Variables	Estimate	S.E.	C.R.	P
Psychological Hardiness	→	Cognitive Complexity	.688	.064	12.202	***
Psychological Hardiness	→	Decision-making OODA	.613	.061	14.577	***
Cognitive Complexity	→	Decision-making OODA	.540	.058	19.162	***

Thus, a change of one unit in psychological hardiness directly affects the decision loop (OODA) by (0.42) and indirectly through cognitive complexity by (0.44), and thus the total direct and indirect effect of psychological hardiness reached (0.86). The value of the interpretation coefficient (R2) reached (0.72), which means that psychological hardiness through cognitive complexity explains (72%) of the changes that occur in the OODA decision loop, while the remaining percentage is attributed to other variables not included in the research model. These results affirm the presence of an indirect effect of psychological hardiness in the OODA decision loop through cognitive complexity at the level of the Thi-Qar Health Department (research sample).

Sobel Test: To know the significance of the mediating effect of cognitive complexity, the Sobel, Aroian and Goodman test was conducted based on standard errors, the effect and the t value of the path of the effect relationships between the variables. All values were greater than (1.96) at a significance level of (0.000), i.e. less than (0.05), as the symbols (a) and (b) represent the effect values (Estimate) and the symbols (Sa) and (Sb) represent the accompanying standard error, and the significance of the test is determined or not through the (P-Value) value, as in Table (11).

Table 11. Sobel test for the effect of psychological hardiness in the decision loop (OODA) by mediating cognitive complexity

	Input		Test Statistic	Std. Error	P-Value	T- test
a	0.461		Sobel test 11.227	0.0233	0.000	6.420
b	0.572		Aroian test 11.288	0.0233	0.000	6.148
S_a	0.035					
S_b	0.0263		Goodman test 11.166	0.0233	0.000	6.085
t_a	8.128					
t_b	10.124					

It appears from Table (11) that the mediating role of cognitive complexity is a real role as far as the significant relationship (P-Value=0.000) of the main variable (psychological hardiness) in the OODA Decision Loop is concerned, and the calculated (t) value (6.240) was greater than its tabulated value (1.97) at the significance level (0.01), which proves that the modeling of the significant relationship of the mediating role and across its path is significant.

4. **Conclusions and Recommendations**

4.1. Conclusions:

1. The results showed the availability of psychological hardiness components in its dimensions (control, commitment, and challenge) among the research sample of decision makers.

2. The availability of the components of implementing the OODA decision loop in its stages (observation, orientation, decision, and action) among the research sample of decision makers.

3. The availability of dimensions of cognitive complexity (cognitive differentiation and integration) for the Thi-Qar Health Department's leaders, which contributes to processing, analyzing, classifying, integrating, and linking information within the cognitive structures of the human mind to achieve appropriate responses to environmental events.

4. The research results showed that psychological hardiness enhances the stages of implementing the OODA decision loop, which means that managers working in the Thi-Qar Health Department rely on the strength of their psychological hardiness in building the foundations of decision-making and implementation.

5. It became clear that psychological hardiness is linked to cognitive complexity, the more the levels of hardiness of the Thi-Qar Health Department's leaders, the more cognitive ability increases.

6. It became clear that cognitive complexity plays an important role in increasing the impact of psychological hardiness in the OODA decision loop as an intervening variable.

4.2. Recommendations:

1. The necessity of employing the capabilities possessed by managers working in the department in analyzing and understanding complex environmental conditions of a surprising nature by exploiting strong organizational opportunities and communicating and cooperating with the relevant local and international departments.

2. The necessity of benefiting from employing the dimensions of psychological hardiness in a way that achieves a balance between its dimensions when making decisions in various situations, and at various stages of the OODA decision loop and investing that in achieving better performance through environmental sensing and sensitivity and responding to pressures and threats.

3. Developing the levels of cognitive complexity of leaders through training and development programs to achieve speed and accuracy in understanding and better awareness of environmental variables through which accurate decisions can be made that contribute to facing challenges.

4. Holding educational workshops related to the concepts of psychological hardiness and the decision-making circle in order to create a strategy aimed at achieving a level of tolerance to work pressures among administrative leaders, within the limits of the available material and human means and capabilities, and enhancing their capabilities in making more effective decisions.

5. Creating a department to establish an information system in which data related to emergencies and disasters that occur are recorded, which helps decision-makers in obtaining the correct information and then analyzing, summarizing and disseminating it on a regular basis, to improve the effectiveness of decision-makers.

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