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The Development of Fast and Slow Thinking of Adolescents and Adults

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Abstract

The objective of the current research is to identify fast-slow thinking of adolescents and adults, and to identify the significance of the differences in fast-slow thinking of adolescents and adults according to the age variable (14-15, 16-17, 18-19, 20-22, 21-25, 24-23, and 24-25) years, and according to the gender variable. The research sample consisted of 180 adolescents and adults. Moreover, a scale specified for measuring slow and fast thinking, which included thirty items, was prepared to achieve the research objectives. The face validity and stability of the research tool were verified, as the Pearson correlation coefficient reached 0.81. The reliability coefficient reached 0.76 which was calculated by making use of the internal consistency method according to the Cronbach Alpha equation. The study found that the age groups 14-15 years, 16-17 years, and 18-19 years were characterized by a fast-thinking style. Furthermore, adults in the age groups 20-21 years, 22-23 years, and 24-25 years have a slow thinking. Slow thinking takes a developmental path across the ages 14-15 years, 16-17 years, 18-19 years, 20-21 years, 22-23 years, and 24-25 years and a continuous form, which is consistent with cognitive evolutionary theories. There was no effect of gender (male-female) or interaction between age and gender on fast-slow thinking.

Keywords: Fast-Slow Thinking, Adolescents, Adults, Gender.

Introduction

Despite the improvements made by our educational institutions, both quantitatively and qualitatively, their programs and activities still lack promoting sound critical thinking methods (Hmad & Mohammed, 2017). Thinking is one of the most significant and intricate human characteristics (Olimovna, 2024; Rosenbaum et al., 2024), which is an attribute, whereby Allah has made humans distinct from other creatures. It is the most crucial way for a person to get the answers to all his inquiries and find solutions to his issues (Al-Tamimi, Ghanim, & Farhan, 2023).

Humans use thinking for psychological and social purposes at many points in their lives, but it is particularly crucial during adolescence and adulthood, which are regarded as significant developmental phases because they present several difficulties because of psychological and social changes. As the study of thinking has become one of the matters of interest, thinking supports a person in overcoming the social and psychological issues they encounter. It also included processing the information required for remembering, perceiving, solving problems, and mechanisms for conducting operations.

Studies have indicated that adolescents tend to think quickly and are more likely to engage in risky behavior compared to older people, as they are characterized by haste in making decisions regarding their lives, and do not evaluate them correctly. Most of the decisions made by adolescents could be non-formative, risky, or uncertain (Al-Hajjah & Al-Zarqa, 2015). Adolescents often have absolute thinking, while adults are more receptive to the reality of many, contradictory, and competing cognitive systems. It is possible that this leads to the adult's social circle growth, knowledge growth, taking on various social positions, familiarization with other viewpoints, and even becoming more articulate about them. In addition, cognitive mental abilities in adulthood mostly reach their peak performance during this stage. Studies and research in this area have shown that many innovative skills, such as originality and flexibility, are at their peak at this point in life. These skills include performance on tasks requiring quick response times, short-term memory, and the capacity to perceive relationships (Al-Tahir, 2010).

Al-Zintati (2010) stated that the adults holds all their legal and social accountability, which is obvious evidence of integrated mental development, and

bears responsibility for behavior as a result of the conscious awareness of the relationships that link behavioral phenomena and the abstract and indirect facts of matters, as well as the ability to concentrate, think logically, follow topics, and pay attention to every detail, problem, issue, or topic. Al-Sahib (2019) indicated that adults tend to think slowly "carefully" more than to think quickly, because students in adulthood have reached a level of logical thinking that makes the individual think before making decisions because of the cognitive experiences that the university provides them during the study curriculum. This leads them to not be inclined to think quickly, and because of the experiences that adults go through, this slows their thinking (Al-Sahib, 2019). He also pointed out that adults are characterized by slow thinking, where they tend to more use this type of thinking, because the life they live, especially at this time, and because of what the adult is experiencing, they need to be careful in their thinking. Also, they analyze logic and rationality in making decisions (Al-Ani, 2020).

There has been great interest among researchers to study and determine the age stage at which fast-slow thinking begins to appear in adolescence and adulthood, especially our knowledge is still limited on this subject. Therefore, the current study provides an insight into the age stage at which fast-slow thinking begins to emerge in the developmental stage of adolescence and adulthood by answering the following questions:

1. At what age does fast-slow thinking begin to appear in both adolescents and adults?
2. Does it take a developmental path when getting older?

By considering the above research questions, the current study developed the following research objectives.

1. To examine fast-slow thinking for teenagers and adults ages 14-15, 16-17, 18-19, 20-22, 21-25, 24-23, 24-25 years.
2. To examine the significance of the differences in fast-slow thinking for adolescents and adults according to the age variable: 14-15, 16-17, 18-19, 20-22, 21-25, 24-23, 24-25 years, the gender variable: males and females, and the interaction among them.

The significance of the current study is clearly apparent in terms of bridging the research gap about fast-slow thinking, as there is a scarcity of studies that have dealt with this variable in the Arab environment in general and the Iraqi environment

in particular. Furthermore, the significance of the current research is highlighted by the fact that it deals with the variable "fast-slow thinking". The consideration of fast-slow thinking in previous studies is very rare, therefore, this study has made a valuable contribution.

Literature Review

Adolescents are a basic segment in the construction and progress of the country (Gallego & López-Gil, 2024). They are the prosperity of the complex and its creative energy for a better future (Muhammad & Mahmoud, 2016). Adolescence is of great importance in an individual's life, as it is a transitional stage between childhood and adulthood. It is believed that development is a set of stages that an individual goes through during his life cycle. These stages are not separate, but rather a continuous, overlapping, and continuous series in a way that makes each stage an extension of the one before it and a prelude to the one after it (Al-Mamouri, 2011).

After that, the stage of adulthood starts, which brings about many changes in a person's life mentally, physically, and socially, because of the beginning of the secretion of hormones from the pituitary gland in males and females. At this stage, the individual's responsibility begins in many social, economic, and religious aspects (Abdel Rahman, 2016). The ability to think critically is a crucial skill that allows people to be creative both individually and as a group and gives them the chance to express their opinions later. It also invites them to practice evaluative thinking by examining the opinions and facts presented to them and by proposing multiple solutions to address the problems they face. Thus, this is what educational institutions aim to achieve. Nonetheless, education is a fundamental pillar of human development (Hussein & Farhan, 2023).

Al-Maamari (2010) stated that the significance of thinking lies in the following: the path to academic and life success, as the decisions that an individual makes in life situations are mere product of thinking through which they determine the extent of success and failure. It is considered one of the necessities of life and a renewable force for the survival of humans and society together, as thinking skills provide individuals with the tools they need to deal effectively with any type of data in the future (Al-Maamari, 2010).

The psychologist Daniel Kahneman pointed out in his famous book "Thinking Fast Slow" that there are two systems in the human mind: the fast-thinking system and the slow thinking system. Kahneman stated that a fast system is a system that operates automatically, quickly, and with less effort in the absence of voluntary control over it. As for the slow system, it is practical, involving regular efforts, and shifts of attention to the higher mental activities it requires. This is found in complex mental processes, automatic mechanical processes for fast thinking, and processes that can be controlled through slow thinking (Kahneman & Egan, 2011).

Development

Development is the organic, functional, and behavioral changes associated with the chronological age. Chronological age is a person's age in terms of years, months, and days. The changes such as organic, functional, and behavioral changes associated with chronological age may take the form of fortification or progression, as is the transition from childhood to adolescence". These changes are very important for the Children because they belong to the transition from childhood to adolescence.

Fast-slow Thinking

Kahneman and Egan (2011) defined it as "two systems representing two poles of thinking: the first characterized by speed and automaticity, intuition, voluntary attention, emotion, repetition, weak awareness, stereotype, and the ability to understand the feelings of others. The second is characterized by careful interpretation and analysis in making judgments, awareness, doubt, and stress." Thinking is procedurally defined as: the total score that adolescents and adults obtain because of their answers to the fast-thinking scale prepared in this study.

Adolescence

It is a developmental stage that occurs between childhood and adulthood and represents a critical period in an individual's life. This means that it requires adaptation to a new type that completely differs from what the individual was accustomed to before. This stage usually begins at the end of childhood and ends at the beginning of adulthood (Al-Tayyar, 2021).

Adulthood

It is the stage that follows adolescence, in which the person has a kind of balance, understanding, and mental and social maturity (Hmad & Mohammed, 2017). The conventional age at which legal adulthood is reached is 18, however, the distinctive definition may contrast depending on legal entitlements, jurisdiction, and psychological maturation.

Theoretical Background of the Study

Thinking is the real tool by which a person confronts the variables of the current era, whereby the beliefs, inclinations, and outlook on what is around them are formed. The interests of societies have become focused on developing the thinking skills of individuals in order to benefit from them (Al-Ansary, 2012). Developing thinking skills makes the classroom full of activities and vitality, and this is reflected in the improvement of the students' achievement level, which also develops students' self-confidence. Al-Atoum, Al-Jarrah and Bishara (2009) stated that the importance of developing thinking is determined by the following points:

1. It increases a person's self-confidence and improves the level of self-knowledge.
2. It develops their information and data instead of memorizing information produced by others.
3. It teachers how to process their information and not receive it as it is.
4. It contributes to teaching individuals new skills and helps them to adapt to their different environments and life circumstances.

Both fast and slow thinking systems are considered a development of the concept of "jumping to conclusions," which assumes that individuals tend to use little, limited, or unrealistic data and information to reach certain decisions. Therefore, this anomalous or ambiguous information is quickly evaluated, and fictitious conclusions are drawn on its basis because it was built according to limited information and evidence without a comprehensive study of that information or review of the evidence (Garety & Freeman, 2013). Daniel Kahneman developed this concept and referred to both fast and slow thinking as a model of thinking process according to the

psychological and cognitive theory. Daniel Kahneman, a professor of psychology, won the Nobel Prize in 2002 for his influence in the field of behavioral economics with his famous book, "Thinking, Fast and Slow". It has been stated that rational cognition that is left unchallenged is vulnerable to adopting systematic errors and fallacies, and the two opposing thinking systems (fast and slow) of the human mind meet and lead to numerous errors in decision making (Kahneman & Egan, 2011). With the popularity of Daniel Kahneman's best-selling book in 2011, slowing down thinking has become increasingly popular (Chussil, 2016). Daniel Kahneman pointed out two systems of thinking:

1. Fast thinking system: It is a fast type of thinking that is characterized by high ability, and it is independent of working memory. Fast thinking is subject to emotional leadership, and it is, in general, like primitive thinking, which enables us to sense danger or discover the source of a sound. Fast thinking skills are acquired through training and enable quick and complex decisions (Charlin et al., 2007).
2. Slow thinking system: It is thinking that is characterized by low capacity, depends on working memory, and is linked to individual differences in cognitive ability. Slow thinking also leads the individual to apply faulty inferential logic more seriously and carefully, as slow thinking lacks access to the base necessary to improve accuracy. It can be said that slow thinking controls the mind, and it is often in a state of readiness (Zavala et al., 2017).

Theories Explaining Fast-Slow Thinking

Insight Theory

The theory of insight appeared in 1994 by the scientist "Bocchio" who investigated and linked the individual's behavior and his creative preferences for solving problems, i.e., the types of creative solutions to problems. After 10 years with a group of researchers, he was able to develop his theory through an effective study and rigorous testing. He studied GPS models for a period of 10 years. The model and theory were developed and named Insight Theory. It is a theory developed for the theory of creative problem solving. As a result of the study and research conducted

by "Boccio," and the insight is considered an innovative way to know and measure the individuals' preferences and ideas (Billout & Soutoer, 2007).

Fast-Slow Thinking Theory by Daniel Kahneman

During the 1980s, Kahneman and Thaler collaborated to jointly develop the theory of behavioral economics, which states that the mind has two ways of thinking. These two methods are: the first system, which means an automatic system that is fast, uncontrolled, unconscious, and irrationally intuitive; and the second system, is the traditional way in which we think we make decisions. This type is characterized by being slow, conscious, and logically inferential (Heath, 2016).

Daniel Kahneman's theory indicates that there are two systems of thinking that work to understand what is going on inside the human mind, which are fast and slow thinking. These two systems of thinking represent a large part of what a person does in the waking life. Daniel Kahneman called it the first system of fast thinking, and the second system of slow thinking, to facilitate and simplify the tasks of the human mind. According to Kahneman's theory, the brain is divided into two distinct systems, where each system determines how the individual thinks, which is relied upon in making decisions (De Neys & Pennycook, 2019).

The first system, "fast thinking," means a system of the automatic and rapid brain that relies mainly on intuition and includes the two innate mental activities that the individual was born with, such as the readiness to perceive stimuli and the environment that surrounds the individual, discovering things, directing the individual's attention to different sensory stimuli, and discovering things. The fast-thinking system works quickly and effortlessly in the absence of voluntary control over its operation. This system is characterized by speed, intuition, and emotional reactivity. The second system, "slow thinking," refers to the slow analytical mode of the mind. According to the second system, its performance is activated when the individual does something that does not come automatically and requires high mental effort. It is also characterized by the fact that it transfers attention to the mental activities that require it, including complex mathematical operations, and the second system is slow, careful, and logical (Newman, Gibb, & Thompson, 2017).

It is worth noting that the mind performs a precise and complex balance and integration between the two systems (the first system and the second system). This integration is determined by the fact that the rapid system, although it includes the mental skills that humans share with animals in terms of the willingness to perceive the world around them and everything in it. However, the slow system has more ability to change the work of the fast system, through programming the automatic functions of memory and attention. The complementarity between them also appears in that the rapid system includes feelings and impressions that do not involve effort, as this is considered a basic source of choices and beliefs in the second system. When the first system produces exciting and complex ideas, the second system builds those ideas into linked, organized steps and selects options. The two systems are two actors in the brain with no specific place in the brain assigned to each of them (Kahneman & Egan, 2011).

Methodology

A descriptive approach was adopted, which sought to determine and describe the current situation of the phenomenon under research. It depended on studying reality or describing it accurately as it exists. In addition, the approach also sought to determine their quantity and quality. The descriptive approach did not stop at the limits of describing the phenomenon, but rather went beyond it to analysis, interpretation, and comparison, leading to more information about it using mathematical symbols (Jaafar & Mahdi, 2015). The present study used cross-sectional developmental investigations, which examined a physical or behavioral appearance over a cross-section of time at the developmental level, as one of the descriptive method studies.

Research Population and Sample

The research community consisted of adolescents and adults in Iraq, where a random sample of (180) adolescents and adults were selected. The table below shows the distribution of the research sample members:

Table (1): Distribution of The Research Sample.

Females	Males	Age group
15	15	year 15-14
15	15	year 16-17
15	15	year 18-19
15	15	year 20-21
15	15	year 22-23
15	15	year 24-25

The Research Tool

After investigating Daniel Kahneman's theory in his book "fast-slow thinking," the researchers prepared a scale for the fast-slow thinking, which consisted of (30) items. The paragraphs were verbally formulated, where there were two alternatives under each situation, in which the first alternative (a) represented fast thinking, and alternative (b) represented slow thinking.

Face Validity of Research Instrument

The face validity of the questionnaire and its suitability for the current study were verified by presenting it in its initial form to 12 arbitrators from faculty members in Iraqi universities. The purpose behind presenting them is to express their opinions about the precision and validity of the content of the scale, in terms of the suitability of the paragraphs to the scale, the soundness of the linguistic formulation, and adding, modifying, or appropriately deleting the paragraphs. Based on the consensus of the arbitrators' opinions and comments, two paragraphs were deleted, and some were also amended. It should be noted that the rate of agreement of the arbitrators on the validity of the scale, its clarity, and the suitability of its items reached (80%), which was a high rate of agreement. Thus, the scale in its final form included (30) items.

Reliability of Research Instrument

The scale was used in conjunction with the test-retest method to verify the stability of the research tool. Two weeks later, the scale was administered once more to thirty adults and adolescents who were not part of the research community. Calculated using the estimations from both periods, the Pearson correlation value was 0.81. The Cronbach Alpha equation was used to compute the dependability

coefficient, which came out to be (0.76) using the internal consistency approach. To this study, these values were thought to be adequate.

Results

Findings of the First Objective

The first objective is to identify fast-slow thinking among adolescents and adults for ages (14-15, 16-17, 18-19, 20-22, 21-25, 24-23, 24-25) years. The researchers extracted the means and standard deviations for both fast and slow thinking. A one-sample t-test was also used to compare the means to determine the significance of the differences among the achieved means and the theoretical average (15), as shown in the table (2).

First: Fast Thinking

Table (2): The Average Scores of The Study Sample on Fast Thinking and T-Value According to The Age Variable.

Calculated T-value	Standard deviation	Avg. scores	No. of sample	Age
8.564	3.582	20.60	30	15-14year
7.214	3.133	19.13	30	17-16year
5.884	3.510	18.77	30	19-18year
-4.929	3.889	11.50	30	21-20year
-6.396	4.476	9.77	30	23-22year
-10.947	3.037	8.93	30	25-24year

The results revealed that the differences were significant in all age groups, as all T-values were statistically significant at a significant level (0.001) and a degree of freedom (29). The arithmetic means were higher than the theoretical average in the age groups (14-15 years, 16-17 years, and 18-19 years), whereas they were below the theoretical average in the age groups (20-21 years, 22-23 years, and 24 years). -25 years). Figure (1) illustrates the average scores of the research sample on fast thinking based on the age variable.

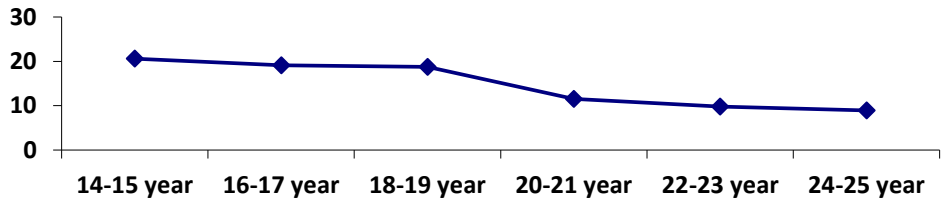

Figure 1: Average Scores of The Research Sample on Fast Thinking Based on The Age Variable.

Second: Slow Thinking

Table (3): The Average Scores of The Research Sample on Slow Thinking and T-Value According to The Age Variable.

Calculated T-value	Standard deviation	Avg. scores	No. of sample	Age
-8.564	3.582	9.40	30	15-14year
-7.214	3.133	10.87	30	17-16year
-5.884	3.510	11.23	30	19-18year
4.929	3.889	18.50	30	21-20year
6.396	4.476	20.23	30	23-22year
10.947	3.037	21.07	30	25-24year

The findings revealed that the differences were significant in all age groups, as all the T-values were statistically significant at a significance level (0.001) with a degree of freedom (29). The arithmetic averages were lower than the theoretical average in the age groups (14-15 years, 16-17 years, and 18-19 years), whereas they were higher than the theoretical average in the age groups (20-21 years, 22-23 years, and 24-25 years). Figure (2) is the averages scores of the research sample on slow thinking based on the age variable. The average scores of the research sample on slow thinking and T-value are given in Table (3).

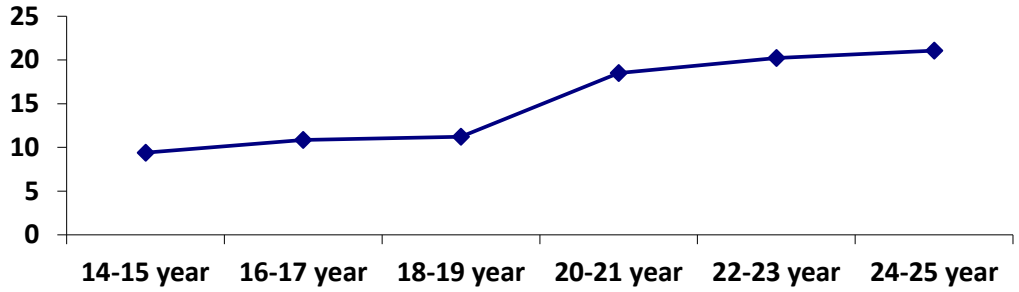

Figure 2: Average Scores of The Research Sample on Slow Thinking Based on The Age Variable.

The Findings of the Second Question

The significance of the differences in fast-slow thinking among adolescents and adults is determined according to the variable of age (14-15, 16-17, 18-19, 20-22, 21-25, 24-23, 24-25) years, of gender (males, females), and the interaction between them. Both the arithmetic means and the standard deviations were extracted for the fast and slow thinking in adolescents and adults according to the age variable, as illustrated in the table below.

First: Fast thinking

Table (4): The Arithmetic Means and Standard Deviations of Fast Thinking Among Adolescents and Adults According to The Age Variable.

No.	Standard Deviation	Arithmetic Mean	Age	Gender
15	3.058	20.67	15-14years	Male
15	2.987	18.73	17-16years	
15	3.327	18.10	19-18years	
15	3.863	11.53	21-20years	
15	4.658	9.87	23-22years	
15	3.352	8.76	25-24years	
90	5.863	14.61	Total	
15	4.148	20.53	15-14years	Female
15	3.327	19.53	17-16years	
15	3.674	19.44	19-18years	
15	4.051	11.47	21-20years	
15	4.448	9.67	23-22years	
15	2.795	9.10	25-24years	
90	6.179	14.96	Total	
30	3.582	20.60	15-14years	Total
30	3.133	19.13	17-16years	
30	3.510	18.77	19-18years	
30	3.889	11.50	21-20years	
30	4.476	9.77	23-22years	
30	3.037	8.93	25-24years	
180	6.009	14.78	Total	

Table (4) illustrates an apparent difference in the arithmetic means and standard deviations of fast thinking among adolescents and adults owing to the various categories of variable age and gender. To demonstrate the significance of the statistical differences among the arithmetic means, a two-way analysis of variance was adopted as illustrated in Table (5).

Table (5): Two-Way Analysis of The Effect of Age, Gender, and Their Interaction on Fast Thinking Among Adolescents and Adults.

Statistical significance	F-value	Sum squares	Degree of freedom	Sum squares	Source of variation
.000	61.292	832.401	5	4162.007	Age
.532	.393	5.339	1	5.339	Gender
.959	.208	2.819	5	14.094	age × gender
		13.581	168	2281.600	Error
			179	6463.040	Total

It is obvious from Table (5) that:

3. There were statistically significant differences at the level of significance (p = 0.05) owing to the effect of age, where the P value reached 61.292 and had a statistical significance of 0.000. To better illustrate statistically significant pair differences among the arithmetic means, post comparisons were adopted using the Scheffe method, as illustrated in Table (5).
4. There were no statistically significant differences (p = 0.05) owing to the effect of gender, as the P value reached 0.393 and the statistical significance reached 0.532.

5. There were no statistically significant differences (p = 0.05) owing to the effect of the interaction between age and gender, as the P value reached 0.208 and the statistical significance was 0.959.

Table (6): Post Comparisons Using the Scheffe Method for The Effect of Age on Fast Thinking Among Adolescents and Adults.

25-24 year	**23-22 year**	**21-20 year**	**19-18 year**	**17-16 year**	**year 15-14**	**Arithmetic mean**	
						20.60	year 15-14
					1.473	19.13	year 17-16
				.357	1.830	18.77	year 19-18
			*7.270	*7.627	*9.100	11.50	year 21-20
		1.727	*8.997	*9.353	*10.827	9.77	year 23-22
	.843	2.570	*9.840	*10.197	*11.670	8.93	year 25-24

*Significant at the level (p = 0.05).

It is obvious from Table (6) that there are statistically significant differences (p = 0.05) between 14-15 years old on the one hand and 20-21 years old, 22-23 years old, and 24-25 years old on the other hand. The differences were in favor of 14-15 years old. Moreover, there were statistically significant differences (p = 0.05) between 16-17 years old, 20-21 years old, 22-23 years old, and 24-25 years old. The differences were in favor of 16-17 years old, and there were statistically significant differences (p = 0.05) between 18-19 years and 20-21 years old, 22-23 years old, and 24-25 years. The differences were in favor **of 18-19 years old.**

Second: Slow Thinking

Table (7): The Arithmetic Means and Standard Deviations of Slow Thinking Among Adolescents and Adults According to The Variables of Age and Gender.

No.	Standard deviation	Arithmetic mean	Age	Gender
15	3.058	9.33	15-14year	Male
15	2.987	11.27	17-16year	
15	3.327	11.90	19-18year	
15	3.863	18.47	21-20year	
15	4.658	20.13	23-22year	
15	3.352	21.24	25-24year	
90	5.863	15.39	Total	
15	4.148	9.47	15-14year	Female
15	3.327	10.47	17-16year	
15	3.674	10.56	19-18year	
15	4.051	18.53	21-20year	
15	4.448	20.33	23-22year	
15	2.795	20.90	25-24year	
90	6.179	15.04	Total	
30	3.582	9.40	15-14year	Total
30	3.133	10.87	17-16year	
30	3.510	11.23	19-18year	
30	3.889	18.50	21-20year	
30	4.476	20.23	23-22year	
30	3.037	21.07	25-24year	
180	6.009	15.22	Total	

Table (7) illustrates an obvious difference in the arithmetic means and standard deviations of fast thinking among adolescents and adults owing to the different categories of age and gender variables. To demonstrate the significance of the statistical differences among the arithmetic averages, a Two-Way analysis of variance was adopted according to Table (8).

Table (8): Two-Way Analysis of Variance for The Impact of Age, Gender, and Their Interaction on Slow Thinking Among Adolescents and Adults.

Statistical significance	F-value	Sum squares	Degree of freedom	Sum of squares	Source of variation
	61.292	832.401	5	4162.007	Age
.000	.393	5.339	1	5.339	Gender
.532	.208	2.819	5	14.094	gender × Age
.959		13.581	168	2281.600	Error
			179	6463.040	Total

It is evident from Table (8) that:

6. There were statistically significant differences at the level of significance (p = 0.05) owing to the effect of age, where the P value reached 61.292 and had a statistical

significance of 0.000. To better illustrate the statistically significant two-way differences among the arithmetic means, post comparisons were used using the Scheffe method, as shown in Table (8).

7. No statistically significant differences (p = 0.05) were found because of gender, as the P value reached 0.393 and the statistical significance was 0.532.
8. We found zero statistically significant differences (p = 0.05) because of the interaction between age and gender, as the P value reached 0.208 and the statistical significance was 0.959.

Table (9): Post-Comparisons Using the Scheffe Method for The Effect of Age on Slow Thinking.

25-24years	23-22 years	21-20 years	19-18 years	17-16years	15-14years	Arithmetic mean	
						9.40	15-14years
					1.473	10.87	17-16years
				.357	1.830	11.23	19-18years
			7.270*	7.627*	9.100*	18.50	21-20years
		1.727	8.997*	9.353*	10.827*	20.23	23-22years
	.843	2.570	9.840*	10.197*	11.670*	21.07	25-24years

* Significant at the level (p = 0.05).

Table (9) illustrates that there are statistically significant differences (p = 0.05) between 14-15 years old on the one hand and 20-21 years old, 22-23 years old, and 24-25 years old on the other hand in favor of those aged 20-21 years, 22-23 years old, and 24-25 years old. At(p = 0.05), the 16-17 years old, 20-21 years old, 22-23 years old, and 24-25 years were statistically different in favor of 20-21 years old and 22-23 years old and 24-25 years. The same is true with p = 0.05 of those between 18–19-year-olds and 20–21-year-olds, 22–23-year-olds, and 24–25-year-olds favoring those aged 20-21 years, 22-23 years old, and 24-25 years old.

Conclusions

This study concludes that the age groups (14-15 years, 16-17 years, and 18-19 years) are characterized by a fast-thinking style. This result is reasonable, as the person in adolescence tends to be hasty and not think enough when making decisions, so that their thinking is absolute. This is due to the nature of cognitive development in adolescence. Furthermore, adults in the age groups (20-21 years, 22-23 years, and 24-25

years) have a slow thinking, which is a logical result, as the individual in adulthood tends to think carefully rather than quickly. In adulthood, the individual reaches a level of logical thinking, which makes them think carefully before making decisions. This is attributed to the experiences and cognitive experiences that the adult has undergone. Cognitive abilities in adulthood reach their highest levels, which leads the adult to think carefully and pay attention to all details of the subject before making decisions. Moreover, slow thinking takes an evolutionary path across the ages (14-15 years, 16-17 years, 18-19 years, 20-21 years, 22-23 years, and 24-25 years) and a continuous form in line with evolutionary cognitive theories. As the person moves to an older stage of life, their cognitive development and cognitive mental abilities increase because of the experiences and experiments they go through until they reach the point of thinking carefully and slowly in making decisions and staying away from haste, risk, and uncertainty. Additionally, there are no statistically significant differences ascribed to the effect of gender on both fast and slow thinking among adolescents and adults. This result is attributed to the fact that male and female adolescents are exposed to the same experiences and live in the same environment. The cognitive development of both adults and adolescents is similar, so their answers are similar and so is the development of their thinking, whether they are male or female.

Implications of the Study

The significance of the current research is highlighted by the fact that it deals with the variable "fast-slow thinking," as it is one of the modern topics in the field of psychology. Studying the nature of adolescents and adults is useful in revealing their thinking patterns, which contributes to drawing a picture of the cognitive processes of adolescents and adults. Benefiting from the scale that is prepared in the current study and using it by subsequent people in some educational and psychological studies can improve the student learning. Detecting the development of fast-slow thinking in adolescents and adults helps those concerned with the development of thinking among students, and has a key importance. Using certain strategies and teaching methods that motivate students to use thinking skills is important. Results are guiding parents of adolescents on developing adolescents' contemplative methods. It is important to

motivate adolescents to engage in reflective thinking. It is also important to develop educational plans and programs to develop slow thinking among adolescents. Furthermore, teachers are recommended to develop their teaching practices so that they are based on using caution and not rushing to perform school assignments.

Limitations and Future Directions

The current research was limited to a sample of adolescents and adults aged between 14-15, 16-17, 18-19, 20-22, 21-25, 24-23 and 24-25 years. Future studies may consider students of other ages. Moreover, the research was conducted in the schools and universities of Baghdad. Better results can be generated by including other countries. Additionally, the current research was applied in the second semester of the academic year 2023-2024. Hence, future studies should consider students of other semesters as well.

References

Abdel Rahman, B. (2016). The Development of Imaginative Thinking and Its Relationship to Problem Solving Among Adults. *Journal of the College of Education for Girls, University of Bafdad, 27*(3), 821-841. https://search.mandumah.com/Record/1162325

Al-Ani, D. M. (2020). Linguistic Intelligence and Its Relationship to Fast-slow Thinking. *Journal of Educational and Psychological Sciences,* (148), 138-171.

Al-Ansary, S. (2012). Positive Thinking Symposium: Its Strategies and Applications. *The Egyptian Journal of Psychological Studies, 22*(74), 5-22. https://doi.org/10.21608/ejcj.2012.98797

Al-Atoum, A., Al-Jarrah, A., & Bishara, M. (2009). *Development of Thinking Skills-Models of Theories and Practical Applications*. A2, Dar Al Masirah, Amman, Jordan.

Al-Hajjah, S., & Al-Zarqa, A. (2015). The Effectiveness of Skilled Thinking Training in Developing Decision-Making Skills for Early Adolescents Students. *The Jordanian Journal of Educational Sciences, 11*(3), 357-372. https://search.mandumah.com/Record/721720

Al-Maamari, B. (2010). Teaching Thinking Skills. *Educational Development Journal of Sultanate of Oman,* (60).

Al-Mamouri, N. (2011). *Psychosocial Development and Its Relationship to Psychological Adjustment* [Unpublished Master's Thesis, University of Babylon, Iraq].

Al-Sahib, M. M. (2019). Fast-Slow Thinking Among University Students. *Journal of Educational Studies, 12*(46), 349-370. http://search.shamaa.org/FullRecord?ID=253408

Al-Tahir, M. N. (2010). *Studies in Developmental Psychology*. Lebanon: Dar Al-Fikr Al-Arabi.

Al-Tamimi, R. S., Ghanim, K. S., & Farhan, N. D. (2023). The Effect Of Productive Thinking Strategy Upon The Student's Achievement For The Subject Of Research Methodology In The College Of Islamic Sciences. *Journal of Namibian Studies: History Politics Culture, 34*(S1), 1263-1289. https://namibian-studies.com/index.php/JNS/article/view/2455

Al-Tayyar, N. (2021). The Development of Emotional Regulation in Adolescents. *Wasta Journal for the Human Sciences, 17*(47), 156-191. https://www.iasj.net/iasj/article/194354

Al-Zintati, M. (2010). *Introduction to Developmental Psychology*. Tripoli: Dar Wasel.

Billout, G., & Soutoer, N. (2007). *Breakthrough Thinking: Brainstorming For Inspiration and Idea*. Sterling, Publisher Command, Incorporation.

Charlin, B., Boshuizen, H. P. A., Custers, E. J., & Feltovich, P. J. (2007). Scripts and Clinical Reasoning. *Medical Education, 41*(12), 1178-1184. https://doi.org/10.1111/j.1365-2923.2007.02924.x

Chussil, M. (2016). Slow Deciders Make Better Strategists. *Harvard Business Review, 94*(7/8). https://hbr.org/2016/07/slow-deciders-make-better-strategists

De Neys, W., & Pennycook, G. (2019). Logic, Fast and Slow: Advances in Dual-process Theorizing. *Current Directions in Psychological Science, 28*(5), 503-509. https://doi.org/10.1177/0963721419855658

Gallego, A., & López-Gil, J. F. (2024). The role of individual and contextual economic factors in obesity among adolescents: A cross-sectional study including 143 160 participants from 41 countries. *Journal of Global Health, 14*, 04035. https://doi.org/10.7189/jogh.14.04035

Garety, P. A., & Freeman, D. (2013). The Past and Future of Delusions Research: From the Inexplicable to the Treatable. *The British Journal of Psychiatry, 203*(5), 327-333. https://doi.org/10.1192/bjp.bp.113.126953

Heath, R. (2016). *Seduction of the Subconscious Mind, the Psychology of Emotional Influence in Advertising*. Translated by Muhammad Othman, Al-hindawi Foundation for Education and Culture.

Hmad, S. A., & Mohammed, Q. (2017). The Development of Critical Thinking Skills Among Adults. *Alustath Journal for Human and Social Sciences, 223*(2), 253-276. https://doi.org/10.36473/ujhss.v223i2.345

Hussein, A. A., & Farhan, N. D. (2023). The Effectiveness of E-Training in Developing the Skills of Designing E-Courses for Teachers of Arabic in the Colleges of Education in Iraq. *Migration Letters, 20*(S3), 406-425. https://doi.org/10.59670/ml.v20iS3.3791

Jaafar, Z. M., & Mahdi, I. H. (2015). The Development of Internal Discourse at the Age of (6-11) Years. *Al-Ustath Magazine, College of Education for the Humanities/Ibn Rushd, University of Baghdad, 2*(212).

Kahneman, D., & Egan, P. (2011). *Thinking, Fast and Slow*. New York, NY: Farrar, Straus and Giroux.

Muhammad, R. Z. F., & Mahmoud, H. K. (2016). The Development of Emotional Suppression in Adolescents and Its Relationship to the Need to Transcend. *Al-Ustad Journal for Humanities and Social Sciences, 2*(216), 109-138.

Newman, I. R., Gibb, M., & Thompson, V. A. (2017). Rule-based reasoning is fast and belief-based reasoning can be slow: Challenging current explanations of belief-bias and base-rate neglect. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 43*(7), 1154-1170. https://doi.org/10.1037/xlm0000372

Olimovna, K. N. (2024). Characteristics of developing students' critical thinking. *International Global Conference, 1*(4), 54-63. http://interconference.org/index.php/ims/article/view/113

Rosenbaum, S., Moberg, J., Chesire, F., Mugisha, M., Ssenyonga, R., Ochieng, M. A., Simbi, C. M. C., Nakyejwe, E., Ngatia, B., & Rada, G. (2024). Teaching critical thinking about health information and choices in secondary schools: human-centred design of digital resources. *F1000Research, 12*, 481. https://doi.org/10.12688/f1000research.132580.2

Zavala, A. M., Day, G. E., Plummer, D., & Bamford-Wade, A. (2017). Decision-making under pressure: medical errors in uncertain and dynamic environments. *Australian Health Review, 42*(4), 395-402. https://doi.org/10.1071/AH16088