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The Relationship Between Achievement Motivation and Academic Achievement Levels in Mathematics Among Middle School Students

A Field Study Conducted on Fourth-Year Middle School Students: A Case Study of Sidi Chaker Middle School – Tlemcen

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Abstract

This study aims to investigate the correlational relationship between achievement motivation and academic achievement levels in mathematics among middle school students. The descriptive method (case study) was employed, involving a sample of 109 students (with 89 students in the primary study) from the fourth year of middle school at "Sidi Shaker" school in Tlemcen. To achieve the research objectives, a specialized tool was developed to measure achievement motivation across five dimensions: sense of responsibility, pursuit of excellence, perseverance, awareness of the importance of time, and future planning.

The results revealed a statistically significant positive correlation (at the 0.05 level) between the level of achievement motivation and academic achievement scores in mathematics. These findings are attributed to the nature of mathematics, which demands high problem-solving capabilities and persistence—core traits of individuals with high achievement motivation. The study concludes that low academic performance may stem from a fear of failure, lack of stimulation, or rigid teaching methodologies.

Keywords: Achievement Motivation, Academic Achievement, Mathematics, Middle School Students, Guidance Programs.

1. Introduction

Achievement motivation represents a pivotal dimension within the human motivational system. In recent years, it has emerged as a distinctive landmark for research and inquiry in the fields of social psychology and personality psychology. It has also gained significant traction in the study of academic achievement and laboratory performance within educational psychology, owing to its profound importance in understanding various pedagogical and educational challenges.

In general, achievement motivation has received greater scholarly attention compared to other social motives. This interest stems from its critical role across numerous applied and practical domains, particularly in educational and academic settings. Achievement motivation

is considered a vital factor in directing and energizing an individual's behavior, shaping their perception of situations, and providing a framework for interpreting their own actions and those of others.

Furthermore, it is a fundamental component of the individual's pursuit of self-actualization and self-assertion. Individuals experience self-fulfillment through their accomplishments, the goals they attain, and their strive for a better lifestyle and higher levels of human existence. Thus, achievement motivation stimulates behavior toward self-actualization by striving for high levels of excellence. This implies that as achievement motivation increases, the rate of academic attainment rises accordingly. Moreover, positive self-beliefs enhance students' self-confidence, further propelling them toward academic distinction and success.

1.1. Research Problem

Is there a statistically significant correlational relationship between the level of achievement motivation and the degree of academic achievement in mathematics among middle school students?

1.2. Hypothesis

There is a statistically significant correlational relationship between the level of achievement motivation and the degree of academic achievement in mathematics among middle school students.

1.3. Objectives of the Study

To explore the role of achievement motivation and its relationship with academic achievement in mathematics among middle school students.

1.4. Conceptual Framework

1.4.1. Definition of Achievement Motivation

The study of achievement motivation has garnered significant attention from psychologists, exceeding that given to other human motives. Although the term is attributed to Murray (1939) and its conceptual clarification traces back to Sears (1942), research in this field is predominantly associated with the pioneering work of McClelland and his colleagues. Below is a review of the definitions provided for the concept of achievement motivation:

1.4.2. Definition of Achievement:

Abu Shaqqa (2007) defines achievement as the success and progress an individual attains by relying on their personal abilities and talents, which significantly shapes their future and life orientations. Furthermore, Abu Shaqqa (2007) defines achievement motivation as: "The ability to formulate a goal that challenges the individual's potential and to establish an achievement plan to reach this goal based on quality standards within a specific timeframe, while maintaining a systemic indicator toward goal attainment."

- **Henry Murray's Definition:** Murray defines the "Need for Achievement" as the individual's desire or tendency to overcome obstacles, exercise power, and strive to perform difficult tasks well and as rapidly as possible... it manifests through the individual's endeavor to engage in challenging activities (Maamria, 2012).
- **R.M. Goldenson's Definition:** Goldenson defines achievement motivation as: "The individual's need to overcome obstacles and struggle to master difficult challenges.

Achievement motivation is the tendency to set high standards of performance and strive to achieve them through intense diligence and continuous perseverance" (Maamria, 2012, p. 52).

- **Farouk Abdelfattah Moussa's Definition:** He defines achievement motivation as: "The desire for high performance and the attainment of success; it is a self-oriented goal that energizes and directs behavior. It is considered a vital component of success, positively correlated with independence and self-confidence, and can be developed experimentally" (Al-Arfawi, 2008, p. 13).
- **Attia's Definition (2008, p. 07):** Achievement motivation is "the individual's desire to succeed and complete daily tasks on time in a satisfactory manner. It reflects the student's general sense of accomplishment and their attempt to seek out what is new."
- **Abdellatif Khalifa's Definition (2006, p. 26):** It is "the individual's readiness to take responsibility, the pursuit of excellence to achieve specific goals, perseverance in overcoming obstacles and problems that may arise, an awareness of the importance of time, and future planning."

From the aforementioned set of definitions, the broad concept represented by achievement motivation clearly emerges. It is a driving force that compels the individual to perform tasks, solve problems, and seek superiority based on certain standards of excellence and preference. It involves persistence in performance and taking responsibility until obstacles are overcome and success is achieved. As a crucial element of personality, achievement motivation encompasses a set of mental functions and emotional changes to ensure task performance in a way that satisfies the individual or those around them. It is the result of the interaction between external environmental factors and internal factors that direct the individual's behavior toward distinguished and high-quality performance.

1.5. Operational Definition of Research Variables:

- **Achievement Motivation:** Operationally defined as the total score obtained by the student on the Achievement Motivation Scale employed in this study. Scores range from 25 to 100, categorized as follows:
  - **25.00 – 43.75:** Indicates a low level of achievement motivation.
  - **43.76 – 62.50:** Indicates a moderate level of achievement motivation.
  - **62.51 – 81.25:** Indicates an acceptable level of achievement motivation.
  - **81.26 – 100.00:** Indicates a high level of achievement motivation.
- **Academic Achievement:** Operationally defined as the average grades obtained by the student in assignments and exams. In this study, it is measured by the cumulative GPA (Grade Point Average) of the first and second terms for the academic year 2014-2015.

1.6. Research Methodology:

The researcher utilized the Descriptive Method, which is defined as any investigation focused on educational or psychological phenomena as they exist in the present, aiming to diagnose them, reveal their various aspects, and determine the relationships between their internal elements or between them and other educational, psychological, or social phenomena. Specifically, a Case Study design was adopted, aiming to identify the characteristics and content of a single phenomenon or case in a detailed and precise manner. This approach was used to explore the case history in terms of its onset, stabilization, causes, and progression.

1.7. Study Sample:

The target population consisted of fourth-year middle school classes. The research sample comprised 109 male and female students distributed across four classes at "Sidi Shaker" middle school in Tlemcen, located in an urban area within the city's fabric. A Simple Random Sampling technique was employed to ensure an acceptable representation of the research population and to cover the cases required by the study's scope. For the Pilot Study, 20 students were selected from the fourth-year class (Group 04). The remaining classes (Groups 01, 02, and 03) constituted the Main Study. This division was intentional, as the classes in the main study were taught by the same mathematics teacher. The distribution is detailed in the following table:

Table No. (01): Distribution of the Research Sample by Pilot and Primary Study

Study Type	Pilot Study	Basic Study	Basic Study	Basic Study
Section/Class	4M4	4M1	4M2	4M3
Number of Students	20	30	31	28
Number of Females	11	17	15	12
Number of Males	09	13	16	16

The total sample for the primary study consisted of 89 male and female students distributed across three classes. Of these, 45 were male and 44 were female. The percentage distributions are presented in the following table:

Table No. (02): Percentage Distribution of the Primary Sample by Gender and Class Sections

Class Sections	4M 01	4M 02	4M 03	Total
Males	%56.67	%48.39	%42.86	%49.44
Females	%43.33	%51.61	%57.14	%50.56
Total	%33.71	%34.83	%31.46	%100.00

1.8. Study Instruments

In order to apply the instrument we initially designed, based on previous studies, research literature, and the theoretical frameworks of this study, it was imperative to determine the degree of validity and reliability of this tool. This was necessary to assess its suitability for the target group and the extent to which it measures what it was intended to measure, as well as its consistency across different settings. Guilford (1954) defines validity as "determining the correlation coefficient between the test and certain measures or criteria of performance in various life situations" (Maamria, 2011, p. 180).

The test was refined by referees after being presented to them. Furthermore, the instrument demonstrated high internal consistency, achieving a Cronbach's Alpha coefficient of 0.851 prior to adjustment and 0.933 after refinement. The items also exhibited strong internal correlation. Additionally, the researcher utilized the students' term grades in mathematics to detect the effectiveness of the program regarding this subject.

2. Characteristics of Individuals with High Achievement Motivation

Based on research findings regarding achievement motivation (Chouchane, 2008), researchers have found that individuals characterized by high achievement motivation tend to exhibit the following behaviors:

- **Task Selection:** They prefer tasks that provide them with feedback on their performance results over those that do not. They also favor tasks of moderate difficulty—where the probability of success is approximately 50%—rather than very easy tasks (e.g., 90% success rate) or very difficult tasks where the probability of success diminishes (e.g., 10%). Moreover, they prefer tasks that offer a high degree of independence and personal responsibility, allowing them to control the outcomes of their efforts.
- **Performance of Tasks that Stimulate Achievement Motivation:** They exert significant effort in attempting to accomplish and achieve performance goals. Consequently, they attain higher achievement than individuals lacking strong achievement motivation. They persevere in their attempts to reach successful performance outcomes, ultimately achieving greater results despite any initial failures they might encounter.
- **The Impact of Success and Failure:** They experience happiness and satisfaction from the mere act of achieving successful accomplishments, regardless of external rewards (such as receiving a prize for their success).

3. Methods for Enhancing Achievement Motivation

In recent years, numerous studies have focused on educational training programs aimed at increasing or developing achievement motivation across various sectors, including occupational and academic fields. For instance, the work of McClelland, Alschuler, and their colleagues identified fundamental principles for such programs and outlined a critical series of steps to achieve designated objectives (Al-Arfawi, 2008, p. 74).

Training programs aim to encourage individuals to commit to core social values, such as self-reliance in diverse situations and accepting personal responsibility for the outcomes of one's actions. This is achieved by clarifying concepts related to achievement motivation. These goals can be realized through a comprehensive and integrated program designed to elevate achievement motivation levels. According to Markoun (2004, p. 112), the procedures for this program can be summarized into six primary steps followed during training to increase achievement motivation:

- **Focusing attention** on occurring events within the individual's environment across time and space.
- **Introducing new ideas, actions, and feelings** characterized by abundance and experiential integration.
- **Assisting the individual** in benefiting from their experience by attempting to perceive and internalize its content.
- **Establishing a link** between the individual's experience and the value of their goals, behavior, and relationships with others.
- **Supporting the stability of new ideas** by practicing feelings, sensations, and actions associated with these concepts.

- **Internalizing and assimilating** these psychological and behavioral changes.

4. Obstacles to Achievement

When individuals anticipate failure or fear success, they often cease their attempts to achieve success; consequently, achievement becomes highly improbable. Below, we outline the two primary obstacles that hinder the realization of achievement:

- **Expectations of Failure:** The accumulation of frustration and recurrent experiences of failure lead individuals to stop attempting to accomplish tasks, likely due to a sense of despair that makes them unable to envision any outcome other than failure. This is supported by the research of psychologist Richard De Charms, who concluded that "expectations of failure and feelings of despair underlie the low-level achievements of many impoverished youth" (Shoushan, 2008, p. 105).
- **Fear of Success:** The motive to avoid success is defined as a learned social motive stimulated by competitive situations when individuals fear that success may bring negative consequences. To this end, Horner studied this motive among a group of students and classified her research findings according to the students' perceptions of the fear of success into three groups (as cited in Shoushan, 2008, p. 105):
  - Success causes an intense fear of social rejection.
  - Success leads to feelings of guilt, sadness, and skepticism regarding whether the individual is "normal."
  - Success is denied by altering or distorting the statements provided in the inquiry, such that the individual is not held directly responsible for their success.

5. Dimensions of Achievement Motivation

In 1970, Hermans identified ten distinct manifestations of achievement motivation, which serve as the primary indicators for its measurement and conceptualization (Khalifa, 2000, p. 54). These dimensions are categorized as follows:

- **Level of Aspiration:** The individual's expectations regarding their future performance based on past experiences.
- **Risk-Taking Behavior:** The tendency to choose tasks with moderate difficulty and a calculated probability of success.
- **Social Mobility:** The drive toward improving one's social status through personal accomplishment.
- **Perseverance:** The ability to sustain effort and remain committed to a task despite obstacles.
- **Task Tension:** The psychological state of persistent concern or "unfinished business" regarding incomplete goals.
- **Time Perception:** The individual's subjective experience and appreciation of the value of time.
- **Future Orientation:** A cognitive focus on long-term goals and strategic planning for the future.
- **Partner Choice (Peer Selection):** Selecting associates based on their competence and contribution to goal achievement rather than mere emotional affiliation.

- **Recognition-Seeking Behavior:** The desire for feedback and validation of one's competence from others.
- **Achievement Behavior:** The manifest actions directed toward surpassing a standard of excellence.

As indicated by Abdel-Khalek and Al-Nayal (1991, p. 15), through their review of numerous definitions of achievement motivation, the manifestations of this motive—or the desire and inclination to perform tasks with speed and in the best possible manner—involve diverse behavioral patterns characterized by the element of challenge. It is the drive to accomplish something of significance, as well as the incentive to solve difficult problems that challenge the individual and obstruct their path.

Furthermore, Hassan (1986, pp. 42-43) addressed achievement variables by categorizing them into three distinct dimensions:

- **Achievement as a Motive (The Propensity to Achieve):** This refers to an individual's readiness to strive for success according to a specific standard of quality or excellence, accompanied by a sense of pride and self-worth upon its attainment.
- **Achievement as Performance (Academic Attainment):** In this context, academic achievement results are considered a direct expression of the intensity of the individual's achievement motivation.
- **Achievement as a Personality Trait (The Achieving Personality):** It is hypothesized that achievement represents a stable personality trait that encompasses or is associated with specific cognitive or temperamental characteristics.

Atkinson and Feather (1966, p. 327) clarified that actual achievement is positively correlated with the strength of the achievement motive when the expectations of satisfying this motive are influenced. However, when the satisfaction of other motives is aroused during the same performance, this simple relationship between motive strength and actual achievement tends to weaken.

Veroff and Smith distinguished between two fundamental types of achievement motivation (Khalifa, 2000, p. 54):

- **Autonomous Achievement Motivation:** This refers to the application of internal or personal standards within achievement-related situations.
- **Social Achievement Motivation:** This involves the application of excellence standards based on social comparison—that is, comparing an individual's performance against that of others.

Both types [of motivation] can function simultaneously; however, their relative strength varies depending on which one exerts greater dominance and control over the situation. If intrinsic achievement motivation holds more weight and situational dominance, it is often followed by social achievement motivation, and vice versa.

Furthermore, Mathis et al., as cited in Khalifa (2000, p. 58), distinguished between achievement motivation and competence motivation. This distinction is based on the premise that competence motivation centers on the immediate pleasure and gratification experienced by the individual. In contrast, achievement motivation focuses on future accomplishments and long-term success. Mathis and his colleagues emphasized the significance of both types, noting

that learning occurs more rapidly among children with high levels of achievement motivation (Khalifa, 2000, p. 59).

Accordingly, Khalifa (2000, p. 26) identified five primary dimensions of achievement motivation as follows:

- **Sense of Responsibility:** Represented by commitment and seriousness in performing assigned tasks to the fullest extent, exerting additional effort and attention to achieve precision and dedication, and engaging in tasks that enhance individual skills.
- **Striving for Excellence to Achieve High Ambition:** Exerting effort to obtain the highest grades, the desire to explore new knowledge, innovating solutions to problems, striving to improve performance levels, and preferring challenging tasks that require intensive thinking and research.
- **Perseverance:** The continuous effort to overcome obstacles encountered during task performance, striving to solve difficult problems regardless of the time and effort required, the readiness to face failure with patience until the work is completed, and sacrificing various lifestyle aspects such as leisure time and recreational activities.
- **Awareness of the Importance of Time:** Ensuring the timely completion of duties and adhering to a strict schedule for all activities, whether related to task performance or social interactions and feeling distressed by others' lack of punctuality.
- **Future Planning:** Manifested in designing a clear plan for intended actions, recognizing that such planning organizes one's life, prevents potential problems, and serves as the most effective means to save both time and effort.

These dimensions are adopted in the current research and serve as the foundational framework for the construction of the research instrument, as they represent the dimensions most commonly agreed upon by the aforementioned researchers (Khalifa, 2000, p. 27).

6. Explanatory Theories of Achievement Motivation

Table No. (03): Summary of the Key Theories of Achievement Motivation

Theory	Core Principles
Henry Murray's Theory	Murray defines achievement motivation as the desire to accomplish things as rapidly and as well as possible. He conceptualized it through specific constructs (desires, effects, actions, integrations, and ramifications). The need for achievement (nAch) is considered one of the most dominant psychological needs, falling under the broader "Need for Excellence." Murray developed the Thematic Apperception Test (TAT) as a primary tool to measure this motivation (Khalifa, 2000, p. 45).
Cognitive Dimension Theories (McClelland & Atkinson)	McClelland introduced his theory to explain achievement motivation and was the first to use the term "Achievement Motivation" formally. He shifted the theoretical focus from a strictly need-based conception to an Expectancy-Value framework. His research combined experimental methods with field observation, leading to the standardization of "Content Analysis" (Shoushan, 2008, p. 88).

Theory	Core Principles
	Conversely, Atkinson emphasized the experimental manipulation of variables, unlike McClelland who focused on complex social variables in life situations. Atkinson framed his theory within the Expectancy/Value approach, assuming a conflict between the "Need for Achievement" and the "Fear of Failure." He provided precise equations summarizing the relationship between the determining factors of achievement motivation (Maamria, 2012, p. 112).
Attribution Theories	Fritz Heider's Theory: Heider was the first to write about attribution as a subjective cognitive process, highlighting the importance of an individual's perception of their ability, effort, and task difficulty. He posited that individuals perform attributions as an attempt to link behavior to causes, as they reflect deeply on the reasons behind their actions (Abou Shaqqa, 2007, p. 34). Bernard Weiner's Theory: Weiner assumed that people attribute their success and failure to either internal or external causes. He identified four causal elements for behavioral action and formulated them into an equation. Weiner developed three dimensions of attribution: Locus of Causality, Stability, and Controllability. These are crucial for understanding the causal patterns learners use to explain their achievement behavior and clarify reasons for success or failure (Attia, 2008, p. 156). Andy Kukla's Theory: Kukla's theory differs from Atkinson's; he equates the product of achievement motivation with the concept of "Perceived Ability." Through his experiments, he sought to identify differences between high-achievers and low-achievers (Markun, 2004, p. 77).
Achievement Goal Orientation Theory	This theory focuses on the specific goal an individual seeks when performing a task (the "why" of motivation). It is a qualitative theory of motivation as it encompasses the type of motivational orientation. It distinguishes between Performance Goals and Mastery Goals, creating a framework for individuals to evaluate achievement behavior, set personal learning goals, and exert effort to reach desired outcomes (Al-Arfaoui, 2008, p. 92).

7. Presentation, Interpretation, and Discussion of Findings

The study's hypothesis was formulated as follows: "There is a statistically significant correlation between the level of achievement motivation and the degree of academic achievement in mathematics among middle school students."

To verify this hypothesis, the Pearson Correlation Coefficient was calculated between the achievement motivation scores obtained by the sample members—consisting of 89 students distributed across three classes at "Sidi Shaker" Middle School in Tlemcen—and their grade point averages (GPA) in mathematics. These averages were derived from the results of the first

and second semesters of the 2014/2015 academic year. This approach aligns with the assertion that achievement motivation acts as a primary catalyst for academic success, particularly in demanding subjects like mathematics (Khalifa, 2006, p. 26). The results related to this hypothesis are summarized in the following table:

Table No. (04): Pearson Correlation Coefficient Between Achievement Motivation and Academic Achievement in Mathematics

Variables	Indicators	Achievement Motivation Level
Average Math Grades (1st & 2nd Semesters)	Pearson Correlation (R)	0.283**
	Sig. (2-tailed)	0.007
	Sample Size (N)	89
Statistical Significance	**The correlation is statistically significant at the 0.01 level.	

8. Analysis and Interpretation of Results

Based on Table (26), the calculated Pearson correlation coefficient (r) between the average grades of the two semesters in mathematics and achievement motivation scores is greater than the critical (tabular) value. Since the p-value (Sig.) is less than 0.05, we reject the null hypothesis and accept the alternative hypothesis, confirming a statistically significant positive correlation at the 0.05 significance level.

The findings for this hypothesis indicate a positive correlation between the level of achievement motivation and the level of academic achievement in mathematics. This underscores the critical link between achievement motivation and performance in a vital subject like mathematics. This relationship is attributed to the nature of the subject, which requires responsibility, perseverance, planning, time management, and a high drive for excellence, in addition to problem-solving skills. These dimensions align with the core components of achievement motivation as defined by numerous researchers, and they form the basis of the achievement motivation scale utilized in this study. Furthermore, these results highlight the importance of developing guidance programs aimed at stimulating achievement motivation to improve mathematics performance. This significant finding supports the current research objective of designing and implementing a guidance program on an experimental sample to observe its impact on mathematical achievement.

This result is consistent with previous literature addressing the relationship between achievement motivation and academic achievement in general, and mathematics in particular. For instance, Shawashra (2004, p. 82) conducted a study to explore the correlations between problem-solving ability and achievement motivation variables. The results showed that Pearson correlation coefficients among the five problem-solving variables in the causal model ranged between (0.65) and (0.78), all of which were statistically significant.

Consequently, the first hypothesis—which states that there is a statistically significant correlation between the level of achievement motivation and the degree of academic achievement in mathematics among middle school students—is confirmed.

These findings are also supported by a similar study conducted by Al-Shinawi (1989, p. 45) titled *"The Relationship Between Achievement Motivation and Attitude Toward Mathematics."* The results of that study revealed a positive correlation between achievement motivation scores and attitudes toward mathematics among both male and female students.

Therefore, we conclude that implementing programs that stimulate and develop achievement motivation is highly feasible for enhancing academic achievement in mathematics, especially if these guidance programs incorporate mathematical topics to foster a positive attitude toward the subject and improve students' desire to learn.

We interpret this relationship by noting that the fear of failure in solving mathematical exercises and problems inhibits the desire for success and achievement, leading to lower levels of motivation. This is often due to prevailing educational patterns characterized by rigidity, a lack of consideration for individual differences, and pedagogical methods based on rote learning and premature judgments about students' mental capacities to grasp challenging subjects like mathematics. Additionally, the absence of stimulation and genuine competition among students directly correlates with low grades in mathematics, particularly at the middle school level.

9. Conclusion

In light of the preceding presentation and discussion, it can be concluded that achievement motivation is far more than a transient internal drive; rather, it serves as a fundamental pillar upon which academic excellence is built, particularly in rigorous scientific disciplines such as the subject of this study (Mathematics). Statistical evidence has demonstrated that students who possess a future-oriented vision, a profound sense of responsibility, and persistence in the face of obstacles are the most capable of attaining distinguished academic outcomes.

These findings open broad pedagogical horizons, emphasizing the urgent need to transition from traditional rote-learning methods toward the adoption of counseling and training programs designed to stimulate learners' achievement motivation. Overcoming the "fear of failure" and fostering "positive self-beliefs" are essential factors for enhancing a student's efficacy in tackling complex mathematical problems. Consequently, this study concludes by recommending the integration of motivational strategies within educational curricula and the training of teachers to account for individual psychological differences. Such measures will ensure a competitive learning environment that elevates the aspirations of the Algerian student, propelling them toward self-actualization and human fulfillment through cognitive excellence.

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