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# Comparison of creativity and critical thinking among female students of selective and public high schools

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## ABSTRACT

**Aims:** This study is conducted to provide comparison between female students of selective and public high schools (PHS) in Urmia city in Iran, using creativity and critical thinking measures.
**Methods:** Statistical randomized-sampling technique is used in selection of 90 students from one selective high school (SHS) and 260 students from three PHS. The Torrance creativity and California critical thinking inventories were used for data collection.
**Results:** A causal-comparative strategy is used in the analysis, while one-way ANOVA test and T test between independent groups were used to test the hypothesis regarding the difference between students in SHS and PHS. Results showed that there is a significant difference between SHS and PHS groups (fluidity, expansion, initiative, and flexibility).
**Conclusion:** It is concluded that while considering the critical thinking, no significant difference exists between the components of deductive and inductive analysis. But, differences between selected groups was observed when considering the analysis and inference components. According to the results obtained for creativity, a meaningful relationship between all of the elements in both of the selected groups with $p<0.001$ is observed.
**Keywords:** Critical thinking, creativity, female students, public high school, selective high school

## INTRODUCTION

Creativity and critical thinking are among the most essential capabilities for collaborative and social relationships. Creative thinking can be considered as the ability to produce idea,[1] generating alternative solutions,[2] and helping individuals confront different problems with ease. Juliantine[3] believed that creativity in individuals can be improved through education, resulting in humans with superior creative abilities. Amabile concluded that, based on the componential theory of creativity, individual-specific skills, cognitive processes that leads to creativity, and intrinsic motivation of the individual can be considered as the pivotal components of creativity for each person.[4] The structure of an educational system exerts a profound influence on the cultivation of students' creative and critical thinking abilities. In the Iranian context, traditional educational practices are predominantly shaped by exam-centric, memorization-based methodologies that prioritize standardized assessment over cognitive exploration. Such approaches tend to constrain the development of creativity and higher-order thinking by valuing rote reproduction rather than original thought. In contrast, contemporary pedagogical paradigms-such as student-centered, collaborative, and project-based learning-have been shown to significantly enhance students' creative capacities by fostering active engagement and problem-solving. As Girgin and Akcanca[5] argued, the integration of the collaborative creativity model within educational settings equips learners with the ability to generate, assess, and implement innovative solutions to complex, real-world challenges, thereby nurturing a more dynamic and adaptable cognitive skillset.

Recently, Matraeva et al.[6] suggested that creativity can be evaluated based on the degree of accuracy, authenticity, flexibility, and Guilford fluency in a person. It is believed that creativity in students is more related to the personal characteristics, attitude, supervisory technique, and administrative behavior of the teacher in charge. Hence, it is not surprising that the educational system of any country plays a key role, in the students' skills and competencies within creativity context. Creativity is also associated with the originality of ideas, openness to new experiences, willingness for new things, willingness to take risks (i.e. thoughts and actions), and sensitivity to the beauty of the ideas. Likewise, Gülel[7] and Kanli[8] addressed creativity in Turkish students with consideration to different educational backgrounds and their demographic properties. Agnoli et al.[9] showed that the level of creativity for any student is related to several factors most of which are related to the environmental variables that take place inside or outside the school. Also, Gralewski and Karwowski[10] stated that the socio-economic status of

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the family and/or the any extrinsic support positively affects students' creativity during childhood, but loses its impact in adulthood.

On the other hand, the critical thinking obviously has a great effect on the students' performance. Lipman[11] defined critical thinking, as a type of thinking that has a fundamental characteristic based on several criteria and self-corrective tendency towards its context or theme. Santrock[12] showed that we are able to create critical idea by patterning and motivating the behaviors and our skills. In today's world, acquisition of skills for critical thinking is more about the undeniable necessity in labor market, facing material and spiritual questions, evaluation of viewpoints, individuals' policy, institutions, and facing with social problems. According to Brodin and Frick[13] any person needs to be mentored to turn this process into an academic skill, while Adriansen[14] believed that rationality, analytical thinking, evaluative perspective, and selectivity are the concepts of which are needed to improve critical thinking. More recently, Saputro et al.[15] conceptualized the critical thinking as a bi-dimensional act that includes dispositions and skills, and therefore its dispositional aspects are broad-mindedness, truth-bearing, and self-confidence.

Paul and Elder[16] have examined the connection between critical and creative thinking. They argued that creativity influences both the production and critique processes, which in turn affect how we evaluate and make judgments. They also believed that the best way to develop critical thinking is through Socratic questioning-the method of asking and answering questions to stimulate deeper thoughts. Unlike Marzano,[17] Paul and Elder[16] did not see critical and creative thinking as separate. They believed these two types of thinking are closely related and often function as one. Creative thinking involves generating or producing ideas, while critical thinking involves evaluating or judging them.

Even the definition of "creative" includes a critical aspect, such as imagination and intellectual originality. When someone is engaged in deep, meaningful thinking, the mind both creates and evaluates ideas at the same time. So, creativity and critical thinking work together to generate and assess outcomes. Good thinking requires both imagination and strong intellectual standards. In theory, creativity and critical thinking can be separated, but in practice, they are part of the same mental process. Thought becomes systematic when it follows a clear path to the end, but it can also rely on intuition when no clear plan or strategy is present.

A creative mind sets standards for what it creates. No effective mind lacks judgment, precision, or clarity. A weak mind would rely on vagueness, irrelevance, or inconsistency. Therefore, a capable mind produces valuable ideas because it holds itself to high standards and cares about both how and what it creates.[18] Numerous studies have been conducted on creativity and critical thinking skills. But, many of them have focused on either one of the constructs in isolation, or within limited socio-cultural contexts. Furthermore, a considerable portion of the existing literature predominantly examines creativity and critical thinking at the university level, overlooking the developmental period of adolescence, particularly within high school settings. In addition, prior studies have rarely addressed the influence of school type-especially the distinction between selective and public high schools-on students' creativity and critical thinking abilities. The impact of familial background, and specifically maternal education level, on these cognitive skills has also not been extensively explored in relation to school environments. These gaps highlight the need for a comprehensive investigation that considers both individual and environmental factors simultaneously.

As outlined, critical thinking and creativity play a pivotal role in educational planning and the formulation of long-term policies aimed at fostering a more progressive and resilient society. However, in developing countries such as Iran, there remains a noticeable scarcity of systematically conducted and well-documented studies that address these dimensions within the educational context. To the best knowledge of the authors, there is no comprehensive study regarding the role of educational differences and creativity among students in Urmia city, Iran. Hence, this study investigates the cognitive differences between students in elite and public schools in Urmia through a multidimensional lens. Given that elite schools in Iran admit students via competitive exams and maintain rigorous academic standards, the research critically evaluates whether these conditions translate into enhanced cognitive abilities. It further examines how differing educational environments-such as resource availability, class size, and academic focus-affect student development. By comparing students from similar socio-economic backgrounds, the study also addresses issues of educational equity. Moreover, the findings offer practical implications for policymakers and educators while contributing original insights to the underexplored educational context of Urmia city. This study also investigates the role of mothers' education level (called as the parents' education level here after) on creativity and critical thinking of the students.

## METHODS

### Ethics

The study was conducted in accordance with the Declaration of Helsinki, and approved by the I.R.I. Ministry of Education Ethics Committee (Date: 23.04.2013, Decision No: 551/41/27700, documented in Farsi).

### Participants

As detailed previously, this study provides a comparative look between creativity and critical thinking skills among female students that are studying either in public or selective high schools in Urmia city, Iran. Since there exist only two selective high school (SHS) and seven public high schools (PHS) with similar socio-economic background in the city of Urmia, we have decided to get our samples from one SHS and three of PHSs. Then, a random sampling technique is used and sample sets with 90 students from the SHS and 260 students from three PHSs are used in the conducted analysis. It is noteworthy that the number of students at SHS (i.e. 90 students) were considered to be fewer than those who study in PHS (i.e. 260 students) due to lower number of attendees and highly selective nature of the SHSs in Iran. Additionally,

in distribution of the inventories, students with similar economic and social background were preferred to reduce the effect of external factors and bias in the study.

## Measures Used

**Multiple-choice paper-and-pen test of Torrance creativity:** The multiple-choice paper-and-pen inventory test also called as the Torrance creativity test, is developed based on the definition of Torrance for creativity in human being.[18-20] In Iran, the test is also known as the Torrance creativity (TC), which is briefed and standardized by Abedi[21] and continuously applied in studies conducted by Iranian researchers. In this respect, the TC test evaluates four elements of critical thinking namely fluidity, innovation, flexibility and development. Abedi concluded that the perpetuity coefficient of fluidity section is about 85%, while the remaining criteria including innovation, flexibility and development sections respectively have 82%, 85%, and 80% effect.

**California Critical Thinking Skills Test:** California critical thinking skills test of form B (CCTST-FB) contains 34 multiple choice questions[22] with one correct answer in the field of cognitive skills of critical thinking (analysis, evaluation, inference, deductive and inductive reasoning) for specific measurement of the level of critical thinking skills in the post high school stages. For this, one score is given to every correct answer and the total sum of the correct answers is considered as the total score (maximum 34 scores). In this respect, the correct answer is the one which is correctly selected in concordance with the test key. The participant(s) during the test has 45 minutes to answer 34 questions out of 200 questions, while the test results, finally reveals the validity and reliability along with a choice for distinguishing the degree of difficulty in the test. For this reason, it was assumed that the CCST-FB provides more comprehensive results than the remaining tools for assessment of critical thinking.

In this regard, the range of the questions include cases which measures the conceptual analysis from one sentence to a more complex integration of critical thinking. Hence, some answer to the CCST-FB test needs explicating a correct inference from a case's needs by evaluation and rational justification of a conclusion. It is noteworthy that the validity of the CCST-FB test has been reported to be between 68%-70% with utilizing the Kuder-Richardson method. Eslami also has reported a validity of 78% for this test when utilizing the retesting method.[23] Similarly, Bigdeli reported that the validity of perpetuity for CCST-FB test is about 73% when using 15-day retesting method.[24]

In conclusion, and based on the posterior studies it was concluded that both of the TC and CCTST-FB tests are eligible, credible, and would eventually provide reasonable results in evolution of the hypothesis of the study, which are detailed in the following section.

## Hypothesis

The credibility of the hypotheses from a deductive aspect is tested using one-way ANOVA test and T test of independent groups. In this respect, the following hypothesis are used to make a comparison based on creativity and critical thinking among the selected groups.

- **Hypothesis 1:** There is difference between creativity of female students of SHS and PHS.
- **Hypothesis 2:** There is difference between critical thinking of female students of SHS and PHS.
- **Hypothesis 3:** There is a relation between critical thinking and/or creativity with the education level of mothers for female students attending for SHS and PHS.

Yet, as the calculated Cronbach's-alpha coefficients for estimation of perpetuity of creativity and critical thinking scales are considered to be 82% and 51% respectively (to be de-tailed in the results), all the perpetuity coefficients in case of removing the question are less than these values. Therefore, the questions of the tests are suitable for evaluating the considered variables and could be utilized in the analysis and reasoning with acceptable perpetuity.

# RESULTS

Initially, the data acquired from the TC and CCTST-FB tests are evaluated using Statistical Package for the Social Sciences (SPSS) software. To ensure the comparability of two unequal groups, homogeneity of variance and normality of the samples are tested. Table 1 details the obtained results for TC and CCTST-FB tests, while the Table 2 details the

**Table 1. Statistics related to the obtained results of TC and CCTST-FB tests**

| Test | Variable | n | Max | Min | μ | σ | γ | k |
|---|---|---|---|---|---|---|---|---|
| TC | Fluidity | 22 | 44 | 11 | 27.72 | 5.75 | -0.03 | -0.05 |
| | Development | 11 | 21 | 3 | 12.94 | 3.41 | -0.14 | -0.28 |
| | Innovation | 16 | 32 | 6 | 19.71 | 4.46 | -0.08 | -0.24 |
| | Flexibility | 11 | 21 | 5 | 14.48 | 3.20 | -0.30 | -0.43 |
| | Creativity (overall) | 60 | 113 | 37 | 74.85 | 12.98 | 0.11 | -0.29 |
| CCTST-FB | Analysis | 9 | 38 | 9 | 24.14 | 4.38 | -0.20 | 0.94 |
| | Evaluation | 14 | 52 | 14 | 35.70 | 5.21 | -0.32 | 1.40 |
| | Deduction | 11 | 40 | 11 | 29.14 | 4.66 | -0.61 | 1.19 |
| | Deductive reasoning | 17 | 56 | 17 | 41.34 | 5.73 | -0.29 | 0.59 |
| | Inductive reasoning | 14 | 52 | 14 | 37.01 | 5.32 | -0.72 | 2.00 |
| | Critical thinking (overall) | 34 | 115 | 35 | 88.97 | 10.37 | -0.61 | 2.00 |

TC: Torrance reativity, CCTST-FB: California critical thinking skills test of form B, n: The number of questions related to each variable in the test, Max: The maximum grade obtained from the collected questionnaires, Min: The minimum grade obtained from the collected questionnaires, μ: The average grade obtained from the collected questionnaires, σ: Standard deviation, γ: Skewness, k: Kurtosis of the collected samples

Kolmogorov-Smirnov test of normality of the conducted tests. Since the p-value (i.e. k-s) is bigger than the significance level, it can be concluded that the measured variables for creativity and critical thinking is normally distributed and can be used for further analysis. This is also illustrated in Figure, which depicts the probability distribution function (PDF) of samples for creativity and critical thinking separately. It can roughly be concluded that the samples are normally distributed which confirms the results of Kolmogorov-Smirnov in Table 2.

**Table 2. Kolmogorov-Smirnov test of normality for the TC and CCTST-FB tests**

| Test | Variable | k-s | Sig. | n |
|---|---|---|---|---|
| TC | Fluidity | 0.88 | 0.42 | 350 |
| | Development | 1.28 | 0.07 | 350 |
| | Innovation | 0.99 | 0.27 | 350 |
| | Flexibility | 1.73 | 0.005 | 350 |
| | Creativity (overall) | 0.83 | 0.50 | 350 |
| CCTST-FB | Analysis | 1.09 | 0.18 | 350 |
| | Evaluation | 1.14 | 0.15 | 350 |
| | Deduction | 1.43 | 0.03 | 350 |
| | Deductive reasoning | 0.88 | 0.41 | 350 |
| | Inductive reasoning | 1.49 | 0.02 | 350 |
| | Critical thinking (overall) | 1.02 | 0.25 | 350 |

TC: Torrance creativity, CCTST-FB: California critical thinking skills test of form B, k-s: Score of the test, Sig: Significance

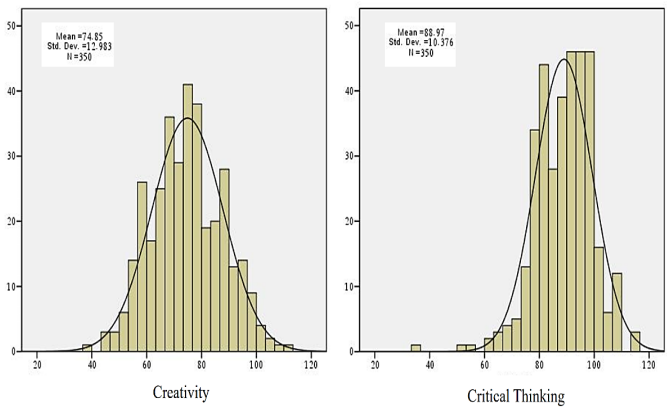


**Figure.** The PDF and the histogram of samples taken for creativity and critical thinking

PDF: Probability distribution function

It is also noteworthy that the deviations in flexibility, deduction, and deductive reasoning (Table 1) can be neglected due to the small skewness and kurtosis together with the large sample size of the experiment. Additionally, by applying the Cronbach-alpha it can be assured about the concordance between components of the tests. In this respect, Table 3 details the results of Cronbach-alpha for the conducted tests. Since the Cronbach-alpha for creativity and critical thinking respectively are 0.82 and 0.51, perpetuity coefficients in case of removing the question are less than these values. Therefore, the questions are suitable for measuring the desired variables and the tests used in the study have acceptable reliability.

**Table 3. The Cronbach's alpha value for the conducted tests**

| Parameter | Index | Value |
|---|---|---|
| Creativity | A | 0.82 |
| | Number of questions | 60 |
| | Sample size | 350 |
| Critical thinking | A | 0.51 |
| | Number of questions | 34 |
| | Sample size | 350 |

After the initial data analysis were conducted, to test the first hypothesis of the study regarding the difference between creativity of female students of PHS and SHS, T test is used among two independent groups of students. As given in Table 4, it can be concluded that with 99% confidence ($p<0.01$), there is a meaningful difference between the variable of creativity (overall) of female students of PHS and SHS, while the reasons may lie within the capacity and/or the facilities provided by the school to the students which attend SHSs. It can also conclude that creativity levels significantly differ between female students in PHS and SHS.

**Table 4. Results of T test for the first hypothesis, regarding the difference between creativity and its elements in PHS and SHS**

| Variable | School | M | t | Df | Sig. |
|---|---|---|---|---|---|
| Fluidity | Public | 26.27 | -8.76 | 348 | 0.001 |
| | Selective | 31.85 | | | |
| Development | Public | 12.54 | -3.79 | 348 | 0.001 |
| | Selective | 14.09 | | | |
| Innovation | Public | 19.04 | -4.88 | 348 | 0.001 |
| | Selective | 21.62 | | | |
| Flexibility | Public | 13.81 | -7.07 | 348 | 0.001 |
| | Selective | 16.40 | | | |
| Creativity (overall) | Public | 71.66 | -8.52 | 348 | 0.001 |
| | Selective | 83.95 | | | |

PHS: Public high schools, SHS: Selective high school, Df: Degrees of freedom, Sig: Significance

Then, to test the second hypothesis of the study regarding the difference between the critical thinking of female students of SHS and PHS, once again the T test was used among two independent groups. Results are given in Table 5, indicating that there is no meaningful difference between the elements of evaluation, deductive, and inductive reasoning. However, there is difference between the elements of analysis and deduction between both groups. So, it can be concluded that the element of critical thinking is different between two groups which is the source of creativity and therefore requires higher level of cognitive complexity.

Likewise, Table 6 depicts the mothers' level of education that is later used in evaluation of the effect of mother education on creativity and critical thinking of students. Additionally, to test the third hypothesis of the study regarding the relation between the critical thinking or creativity with the education level of students' mothers, one-way ANOVA test is used (Table 7). According to the result of the one-way ANOVA test, it can

**Table 5. Results of T test for the second hypothesis, regarding the difference between critical thinking and its elements in SHS and PHS**

| Variable | Type | M | t | Df | Sig. |
|---|---|---|---|---|---|
| Analysis | PHS | 23.84 | -1.95 | 135 | 0.05 |
| | SHS | 24.98 | | | |
| Evaluation | PHS | 35.82 | 0.75 | 348 | 0.45 |
| | SHS | 35.34 | | | |
| Deduction | PHS | 29.42 | 1.95 | 348 | 0.05 |
| | SHS | 28.32 | | | |
| Deductive reasoning | PHS | 41.66 | 1.75 | 348 | 0.08 |
| | SHS | 40.44 | | | |
| Inductive reasoning | PHS | 37.08 | 0.45 | 348 | 0.65 |
| | SHS | 36.79 | | | |
| Critical thinking (overall) | PHS | 89.09 | 0.33 | 139 | 0.74 |
| | SHS | 88.64 | | | |

SHS: Selective high school, PHS: Public high schools, Df: Degrees of freedom, Sig: Significance

be concluded that there is meaningful relation between the average variable of critical thinking and the level of mothers' education.

**Table 7. Results of the one-way ANOVA test for third hypothesis, regarding the relationship between creativity and critical thinking related to the mothers' education**

| Variable | | SD | Df | MS | F | Sig. |
|---|---|---|---|---|---|---|
| Creativity | Intergroup | 1049.76 | 6 | 174.96 | 1.05 | 0.39 |
| | Intragroup | 55652.96 | 336 | 165.43 | | |
| | Overall | 56702.72 | 342 | | | |
| Critical thinking | Intergroup | 2597.49 | 6 | 432.91 | 4.35 | 0.001 |
| | Intragroup | 33422.85 | 336 | 99.47 | | |
| | Overall | 36020.34 | 342 | | | |

ANOVA: Analysis of variance SD: Standard deviation, Df: Degrees of freedom, Sig: Significance

## DISCUSSION

This study makes an original contribution by exploring factors influencing creative and critical thinking development among Iranian high school students, addressing the scarcity of comparative research between selective and public schools. Findings reveal that students in selective schools exhibit stronger cognitive skills, underscoring the influence of educational settings.

Results obtained for the first hypothesis indicate that there is a significant difference between the average creativity between female students of PHS and SHS, while findings are in line with the result obtained by Chan.[25] Selective high schools, by virtue of their superior resources and instructional strategies, cultivate an educational environment that is highly conducive to the development of students' creative and critical thinking abilities. Through individualized guidance, problem-based learning, and cognitively stimulating pedagogies, such institutions foster originality, cognitive flexibility, and advanced problem-solving skills-key components of creative potential. Hence, it is assumed that the SHS are well equipped with educational and upbringing equipment in comparison with other schools. As a results, there is a probability that can be expressed in which school type would not present the creativity level of the students, given that they have been provided with conditions facilitating creativity, school type may not fully determine students' creativity levels. Yet, according to some studies the students who study at schools in which encourage innovation, creativity, and value the creativity of their students would encounter more creative students in comparison to the students who study at schools that focus only on the educational performances.

Result achieved for the second hypothesis is also in concordance with the conducted result of previous studies such as those conducted by Alborzi and Ostovari.[28] In this respect, it can be concluded that critical thinking components, such as deduction and analysis, differ significantly between the two groups, which is the outcome for creativity and therefore requires higher level of cognitive complexity and for this, processing complex information is needed. Therefore, the fact which is also confirmed by most of the experts is that the critical thinking skills develops in discussions, exchanging opinions and solving problems.

Since the Cronbach's alpha values for the creativity and critical thinking components are 0.82 and 0.51 respectively, it is evident that internal consistency for creativity falls within the acceptable and desirable range. In contrast, while the alpha coefficient for critical thinking appears lower than the generally accepted threshold of 0.68-0.78,[26] its acceptance can be justified under certain empirical and methodological considerations. Specifically, the perpetuity coefficients observed upon item deletion remained below the reported alpha value, suggesting that none of the individual items disproportionately weakened the overall scale reliability. Moreover, in exploratory or pilot-phase studies-particularly those involving abstract constructs such as critical thinking-lower alpha values may still be considered tolerable, especially when the construct comprises heterogeneous dimensions or when the number of items is limited (limited number of SHS and PHS in this study). As noted in the psychometric

**Table 6. Demographic information regarding the mothers' level of education**

| School | | PHD | BSc | MSc | Post-high school | High school | Guidance school | None |
|---|---|---|---|---|---|---|---|---|
| PHS | Number | 4 | 18 | 67 | 34 | 90 | 28 | 14 |
| | Percent | 1.2 | 5.2 | 19.5 | 9.9 | 26.2 | 8.2 | 1.4 |
| SHS | Number | 1 | 8 | 43 | 15 | 18 | 3 | 0 |
| | Percent | 0.3 | 2.3 | 12.5 | 4.4 | 5.2 | 0.9 | 0 |

PHD: Philosophiae Doctor, BSc: Bachelor of Science, MSc: Master of science, PHS: Public high schools, SHS: Selective high school

literature (e.g., Cortina;[26] Schmitt[27]), a Cronbach's alpha around 0.50 can be considered adequate for preliminary investigations or newly adapted scales in educational and behavioral research, provided the instrument demonstrates conceptual validity and the items capture different facets of a multifaceted cognitive domain. Therefore, although the alpha value for critical thinking is below ideal expectations, its interpretability and utility remain valid within the contextual and methodological scope of this experimental study.

Results obtained for the third hypothesis indicate that there is relation between the variable of critical thinking and mother's education level, while our results are in line with the conducted analysis of Ghasemi and Oghlidos.[29] Generally speaking, the role of parents' education in upbringing kids and growth of creativity and critical thinking or adaptation of creative thinking in life is undeniable, constructive, and crucial. Based on the results obtained, there is no significant relationship between the mean of the creativity variable and the mother's level of education. However, there is a significant relationship between the mean of the critical thinking variable and the mother's level of education. Therefore, parents are an effective role-model for their children, whereas in this course of age, the level of dependency and relation of female teenagers with parents especially mothers are more and therefore are influenced by their thoughts and opinions.

To brief the discussion, it can be said that we deal with a process rather than a consequence or an output, both for creativity and critical thinking. In total agreement with the results of Mohseni et al.,[30] there is a significant difference between the students who attend PHS and SHS in terms of motivation for progress, creativity and its components, and can conclude that the gifted students have higher creativity and critical thinking abilities. Yet, creativity involves generating original ideas and redefining existing values through systematic and reflective thinking, a process that inherently requires critical evaluation. Due to the conceptual overlap between creativity and critical thinking, growth in one often reinforces the other, which is in line with the preliminary studies of Paul and Elder[16] and in oppose with Marzano[17] that the critical and creative thinking should be considered as one. Additionally, by studying the classification of bloom from educational purposes in cognitive environment, for reaching up to combination level, mostly used as equivalent to creativity, we must have successfully passed the analysis level which is considered to be one of the elements of critical thinking. According to Bloom's taxonomy, achieving creativity (synthesis) requires successfully passing the analysis level, a key element of critical thinking. This emphasizes that creativity relies on the prior development of critical thinking, particularly analytical reasoning. Within this framework, the educational system and maternal education serve as key factors in shaping cognitive growth. Mothers with higher educational backgrounds often cultivate intellectually enriched home environments, reinforcing analytical skills essential for creative thinking. Thus, the combined influence of supportive schooling and maternal intellectual engagement significantly enhances female students' capacity for both critical and creative thought.

### Limitations

This study is limited by its focus on female students from Urmia, restricting the generalizability of the results. Additionally, the reliance on TC and CCTST-FB scales captures only momentary cognitive performance, potentially overlooking long-term development. The absence of controls for socio-economic status, un-even sample size, instructional practices, and individual variability further constrains the findings. Future research should incorporate broader, more diverse samples and longitudinal approaches to address these limitations comprehensively.

## CONCLUSION

This study addresses creativity and critical thinking abilities between female students who were randomly selected from selective and public high schools of Urmia city in Iran. For this, the TC and CCTST-FB inventories are used among 90 students selected from one SHC and 260 students from three PHS randomly selected for this aim. Then, three hypotheses are used to test the difference between creativity and critical thinking among the selected students. The hypotheses were tested by means of T test and one-way ANOVA test. Results showed that;

- Creativity between the female students of PHS and SHS are not the same.
- There is statistically significant difference between the elements of evaluation, deductive, and inductive reasoning in students of PHS and SHS.
- A significant relationship exists between critical thinking skills and mothers' education levels.

## ETHICAL DECLARATIONS

### Ethics Committee Approval

The study was carried out with the permission of the I.R.I. Ministry of Education Ethics Committee (Date: 23.04.2013, Decision No: 551/41/27700, documented in Farsi).

### Informed Consent

Informed consent was obtained from all subjects involved in the study.

### Referee Evaluation Process

Externally peer-reviewed.

### Conflict of Interest Statement

The authors have no conflicts of interest to declare.

### Financial Disclosure

The authors declared that this study has received no financial support.

### Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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