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SCIENTIFIC TEMPERAMENT AND HAPPINESS AMONG HIGHER SECONDARY SCHOOL STUDENTS

Mohanasundaram.V[1], Saraswathy.R[2], Sathishkumar.S[3], Satheeshkumar.S[4]
[1]Associate Professor, Excel College of Education, Komarapalayam
[2]Assistant Professor, Sri Sarada College of Education,Salem
[3]Principal, Sasurie College of Education, Tirupur,
[4]Professor of Nano Science, KSR College of Tech, Thiruchengode,
vu2ici@gmail.com, kanisaraswathy@gmail.com, sathish84kumars@gmail.com, satheeskumars@ksrct.ac.in

Abstract
This article was focused on the broad objective of examining the scientific temperament and happiness levels among higher secondary students. The population of the study includes higher secondary students in Namakkal district. For the present study stratified random sampling method was used. The sample for the study consisted of 300 second-year higher secondary students drawn from six selected schools using stratified random sampling technique. To investigate the levels of scientific temperament and happiness, the Scientific Temperament Inventory and the Happiness Scale were administered to the selected sample. The research indicates that there is a **significant difference in scientific temperament between higher secondary students based on gender**. The mean scientific temperament score of higher secondary girls (93.52) is higher than that of boys (86.19), indicating that girls exhibit a greater scientific temperament. Additionally, the study shows a positive correlation between scientific temperament and happiness among higher secondary students, suggesting that students with higher scientific temperament tend to report greater happiness.
Keywords: Scientific temperament, happiness, higher secondary school and twelfth standard students.

1. Introduction

All other forms of knowledge are inferior to scientific knowledge. In general, knowledge lacks qualities of validity and reliability, but scientific knowledge is required to have these attributes. Furthermore, scientific knowledge is subject to experimentation and practical application. Therefore, scientific knowledge is a logically connected and well-organized set of facts about which anyone can conduct experiments and use validity and reliability tests. To put it briefly, science is the methodical study of a certain subject. It is important to note that the principles of science are characterized by clarity, definiteness, broad applicability, validity, purity, reality, and reliability in all aspects.

Jawaharlal Nehru (Nehru 1946) advocated about scientific temperament that the ultimate purposes of human life may be considered to include gaining knowledge, realizing truth, and appreciating goodness and beauty. However, the scientific method of objective inquiry is not applicable to all these aspects, as many vital elements of life lie beyond its scope—such as sensitivity to art and poetry, the emotions evoked by beauty, and the inner recognition of goodness. For example, a botanist or zoologist may possess extensive scientific knowledge yet lack a love for humanity. Nevertheless, even when we explore realms beyond the reach of the scientific method—ascending to the heights where philosophy resides and where profound emotions arise, or contemplating the vastness of existence—the scientific approach and temperament remain essential.Temperament refers to consistent, biologically based individual differences in behavior, emotions, and reactivity that appear early in life and remain relatively stable. It acts as a person's inherent "style" of approaching the world, covering traits like activity level, sociability, and emotionality.

Key Aspects of Temperament

- **Biological Basis:** Temperament is rooted in genetics and heredity, rather than just learning or environment.
- **Stability:** While most noticeable in children, these behavioral traits are generally stable across the lifespan.
- **Components:** Key dimensions include activity level, mood quality, adaptability, approach/withdrawal, and intensity.

1.1 Need For The Study : Scientific temperament plays a vital role in everyone life, especially for young students which brings the happiness, both motivates to achieve the goals in the education and betterment of life. Temperament means how a person's mind reacts to life events. It shows how they understand cause and effect. It also includes how much they value science in daily life. Temperament shows if a person is adventurous or cautious. It tells if they like to try new things. It also means being honest and fair in thinking. A person with good temperament is open-minded. They are ready to question beliefs without proof. They are also willing to accept change. Scientific temperament signifies "the attitudes of mind which lie behind the method of acquiring reliable and practical knowledge". Happiness is described as the degree to which a person views their life in a positive way. Simply put, it shows how satisfied someone is with the life they are living. In the words of Hurlook, E.B. (1985), "The essentials to happiness, or the state of well-being, contentment, and satisfaction, are Acceptance, Affection, and Achievement—often referred to as the three A's of happiness. It is expected that influence of both the variables namely scientific temperament and happiness among the students is of paramount importance, a systematic study in the assessment of scientific temperament and happiness assumes vitality. It is significant to study the level of scientific temperament and happiness among higher secondary students and to expose the association between these two factors. The findings of this study may help teachers, educators, policymakers and parents, and provide the insight about the influence of scientific temperament in contribution to students' emotional well-being and overall development of the student.

2 Review Of Related Literature: Kalla Ashok ,et al (2024) studied the level of scientific temperament among doctoral research scholars in agricultural sciences in India and discovered a notable difference between male and female scholars. Akash, et al., (2023) investigated scientific temperament among 108 undergraduate students. The standardized Scientific Temperament Inventory was administered to collect the primary data from samples. The results revealed that most undergraduate students possessed above-average scientific temperaments. Additionally, students from urban areas and those from joint families demonstrated significantly higher scientific temperaments. However, no significant differences were found in scientific temperament based on gender, academic stream, religion, or caste.

Akcay, et al ., (2026) examined digital game addiction and happiness levels among 224 fourth-grade students. Results showed a negative moderate correlation, meaning that higher digital game addiction was linked to lower happiness at school. Emad Shdaifat, et al (2024) studied how personality traits relate to happiness in nursing students from Saudi Arabia and Jordan. They found that agreeableness played a big role in happiness by changing both reappraisal and suppression. Extraversion made happiness and reappraisal better but lowered suppression. Neuroticism lowered happiness and reappraisal and also hurt suppression. Openness helped increase suppression. Conscientiousness had a positive effect on happiness.

2.1 Problem Identification: In the recent technological scenario, the growth of a scientific temperament or personal interest and behavior towards the technology and subjects among school and college students become a needed for problem-solving, coherent thinking and decision-making. UNESCO and National Education Policy 2020, adopting scientific temperament and thinking is a one of the vital objective of learning or education. Scientific temperament motivates the learners and students to raise the query, investigate suggestion, avoid fallacy, and cultivate rational intellectual skills. Simultaneously, the well-being and happiness of leaners and students are one of a key objective of the education. The happiness and emotional well-being of school students are affected by competition, academic activities, family anticipations, and social challenges. WHO emphasized that well-being and happiness are important aspects for positive psychological growth and academic attainment.

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The important stage for every student's life is higher secondary education, in which the student has critical academic responsibilities and to decide career of his life. At this stage, raising a scientific attitude may supports students attitude towards facing the challenges logically and sustains emotional stability. But, several students experienced the confusion, stress and disappointment in the face of academic attainments. While scientific temperament is stimulated in learning structures, partial investigation has been conducted on in what way scientific temperament narrates to pupils' happiness, mostly amongst students. It is not very clearly implicit whether school students with high altitudes of scientific intelligence towards capability of better happiness and emotional well-being. Hence, finding the significant difference between scientific temperament and happiness among higher secondary school students turn out to be significant. Considering this relationship could support the educationalists develop policies to encourage both scientific rational thinking and emotional happiness in schools.

2.2 Statement of The Problem

"Scientific Temperament and Happiness among Higher Secondary School Students".

2.3 Operational Definitions Of The Key Terms

Scientific Temperament. Scientific temperament refers to the state of an individual's mind or personality traits, particularly in how they respond to life situations by recognizing cause-and-effect relationships.

Happiness: Happiness is how much a person feels good about their life. It shows how much they enjoy the life they are living.

Higher secondary students

Higher secondary students are those who are studying in the twelfth grade at higher secondary schools.

2.4 Objectives Of The Study

1. To investigate the scientific temperament of higher secondary students across various subgroups such as gender, residential area, type of school management, academic stream, and medium of instruction.
2. To investigate the happiness levels of higher secondary students across different subgroups, including gender, residential area, type of management, academic stream, and medium of instruction.
3. To study the relationship between scientific temperament and happiness among higher secondary students.

2.5 Hypotheses Of Study

1. There is no significant difference in the scientific temperament of higher secondary students based on the selected subgroups of gender, residential locality, type of management, academic stream, and medium of instruction.
2. There is no significant difference in the happiness of higher secondary students based on the selected subgroups of gender, residential locality, type of management, academic stream, and medium of instruction.
3. There is no significant association between scientific temperament and happiness of higher secondary students.

2.6 DELIMITATIONS OF THE STUDY

The study was delimited to:

1. The study deals with only the higher secondary students' scientific temperament and happiness.
2. The study has been confined to the twelfth standard higher secondary of Namakkal District, Tamil Nadu, India.
3. Only Three hundred higher secondary students from six higher secondary schools were selected for the study.
4. Only six biographical variables have been considered for the study of scientific temperament and happiness among the higher secondary students.

4. Population And Sample Of The Study

The population of the research includes higher secondary students in Namakkal district. For the present study stratified random sampling method was used. In the study 300 second year higher secondary students from 6 six schools selected (Govt. Schools -2, aided Schools -2 and private schools -2) formed the sample and selected 50 students each school.

3 Tools Used For The Study: Scientific Temperament Inventory (STI) was standardized by S.Misra (2020) and Happiness Scale (HS) was standardized by Meenakshisundaram, A and Krishnan, K (1991)**.**

3.1 Statistical Techniiques Used: The inferential statistical tools "t" test, "F" test and correlation analysis are employed for investigation of the collected the data.

4. Data Analysis: The differential analysis of the data regarding scientific temperament and happiness was determined by 't' test to access the significant difference between each study variables and each biographical variable (Gender, locality of residence, stream of study and medium of study and 'F' test to check significant difference between each study variable scientific temperament and happiness and each biographical variable (type of management).

4.1 Scientific Temperament

Hypothesis 1: There is no significant difference in the scientific temperament of higher secondary students based on the selected subgroups of gender, residential locality, type of management, academic stream, and medium of instruction.

A) Gender

There is no significant difference in the scientific temperament of higher secondary students when comparing male and female students.

Table 1: Difference in Scientific Temperament Scores of Higher Secondary Students by Gender

Groups	Mean	SD	't' Value	Significance (0.05 level)
Boys (N=150)	86.19	8.34	7.67	Significant
Girls (N=150)	93.52	8.21		

The calculated 't' value of 7.67 is greater than the table value of 1.96 at the 0.05 level. This shows a difference in scientific temperament between male and female students. Therefore, the hypothesis is rejected. The average scientific temperament score of higher secondary girls (93.52) is higher than that of boys (86.19).

B) Locality of Residence

There is no significant difference in the scientific temperament of higher secondary students based on their locality of residence.

Table 2: Difference in Scientific Temperament Scores of Higher Secondary Students by Locality of Residence

Groups	Mean	SD	't' Value	Significance (0.05 level)
Rural (N=114)	88.73	9.03	1.70	Not Significant
Urban (N=186)	90.55	9.01		

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The calculated 't' value of 1.70 is lower than the critical value of 1.96 at the 0.05 significance level. This means there is no significant difference in scientific temperament between rural and urban higher secondary students. Therefore, the hypothesis is accepted. However, the average score of urban higher secondary students (90.55) is slightly higher than that of rural students (88.73) in scientific temperament.

B) TYPE OF MANAGEMENT

No significant difference exists in the scientific temperament of higher secondary students when comparing different types of management.

Table 3: Difference in Scientific Temperament Scores of Higher Secondary Students by Type of Management

Sources of variation	SS	Df	MS	F	Significance (0.05 level)
Between groups	6237.05	2	3118.52	50.89	Significant
Within groups	18201.79	297	61.29		

The table 3 shows that F-Value of scientific temperament as perceived by Higher secondary students of three groups in terms of type of management is 50.89 with df 2 and 297. This is significant difference at 0.05 level. This finding demonstrates a statistically significant difference in the scores of higher secondary students of different type of management.

C) STREAM OF STUDY

There is no significant difference in the scientific temperament of higher secondary students according to their stream of study

Table 4: Difference in Scientific Temperament Scores of Higher Secondary Students by Stream of Study

Groups	Mean	SD	't' Value	Significance (0.05 level)
Mathematics (N=200)	88.73	8.71	3.11	Significant
Arts (N=100)	92.12	9.30		

The calculated 't' value of 3.11 is greater than the critical value of 1.96 at the 0.05 significance level. This shows a significant difference in scientific temperament between higher secondary students in the Mathematics and Arts streams. Therefore, the hypothesis is rejected. The mean scientific temperament score of Arts students (92.12) is higher than that of Mathematics students (88.73).

E) MEDIUM OF INSTRUCTION

There is no significant difference in the scientific temperament of higher secondary students regarding medium of instruction

TABLE 5: Difference in Scientific Temperament Scores of Higher Secondary Students by Medium of Instruction

Groups	Mean	SD	't' Value	Significance (0.05 level)
Tamil (N=150)	95.93	5.77	15.69	Significant
English (N=150)	83.79	7.52		

The obtained 't' value of 15.69 is greater than the critical value of 1.96 at the 0.05 level, indicating a significant difference in scientific temperament between Tamil and English medium students. Therefore, the hypothesis is rejected. Tamil medium students have a higher mean score (95.93) compared to English medium students (83.79).

4.2 HAPPINESS

HYPOTHESIS – 2

A) GENDER

There is no significant difference in the happiness levels of higher secondary students of male and female students.

Table 6: Difference in Happiness Scores of Higher Secondary Students by male and female students

Groups	Mean	SD	't' Value	Significance (0.05 level)
Boys (N=150)	32.97	4.92	3.38	Significant
Girls (N=150)	34.77	4.30		

The calculated' value of 3.38 more than the critical value of 1.96 at 0.05 significance level, this shows that significant difference in happiness among male and female students. Therefore, the hypothesis is rejected. Additionally, the mean happiness score of higher secondary female students (34.77) is more than that of male students (32.97).

B) LOCALITY OF RESIDENCE

No significant difference in the happiness of higher secondary students based on locality of residence.

Table 7: Difference in the Scores of Happiness of Higher Secondary Students among Rural and Urban Area

Groups	Mean	SD	't' Value	Significance (0.05 level)
Rural (N=114)	33.76	4.92	3.00	Significant
Urban (N=186)	33.93	4.57		

The calculated 't' value of 3.00 is higher than the critical value of 1.96 at the 0.05 significance level. This shows a significant difference in happiness between rural and urban higher secondary students. Therefore, the hypothesis is rejected. The average happiness score of urban students (33.93) is slightly higher than that of rural students (33.76).

C)TYPE OF MANAGEMENT

No significant difference in the happiness of higher secondary students different type of school management.

Table 8: Difference in the Happiness Scores of Higher Secondary Students among Different Type of School Management

Sources of variation	SS	Df	MS	F	Significance (0.05 level)
Between groups	531.49	2	265.74	13.02	Significant
Within groups	6063.18	297	20.41		

The above table shows that F-Value of happiness as perceived by higher secondary students of three groups in terms of type of management is 13.02 with df 2 and 297. This is significant difference at 0.05 significance level. This shows a significant difference in the scores of higher secondary students of type of school management.

C) STREAM OF STUDY

There is no significant difference in the happiness levels of higher secondary students according to their stream of study.

Table 9: Difference in Happiness Scores of Higher Secondary Students by Stream of Study

Groups	Mean	SD	't' Value	Significance (0.05 level)

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Mathematics (N=200)	34.03	4.78	0.83	Not Significant
Arts (N=100)	33.55	4.53		

The obtained 't' value of 0.83 is less than the critical value of 1.96 at the 0.05 significance level, indicating no significant difference in happiness among higher secondary students of the Mathematics and Arts streams. However, the mean happiness score of Mathematics students (34.03) is slightly more than that of Arts students (33.55)

D) MEDIUM OF INSTRUCTION

There is no significant difference in the happiness levels of higher secondary students based on their medium of instruction.

Table 10: Difference in Happiness Scores of Higher Secondary Students by Medium of Instruction

Groups	Mean	SD	't' Value	Significance (0.05 level)
Tamil (N=150)	35.27	3.77	5.40	Significant
English (N=150)	32.47	5.11		

The obtained't' value 5.4 is in excess of the critical value 1.96 at 0.05 significance level, it is evident that there is difference in happiness among English and Tamil medium students. Hence the hypothesis is rejected. Higher secondary Tamil medium students mean score (35.27) have higher than the English medium students mean score (32.47) of happiness.

4.3 CORRELATION ANALYSIS

HYPOTHESIS – 3

There is no correlation or relationship between the scientific temperament and happiness of higher secondary students.

TABLE 11: Relationship between Scientific Temperament and Happiness of Higher Secondary Students

Variables	N	$\sum x$	$\sum y$	$\sum x^2$	$\sum y^2$	$\sum xy$	'r' Value
Scientific temperament and happiness	300	89.86	33.87	24438.75	6594.65	3973.56	0.313

The obtained correlation co-efficient is 0.313. This indicates that there is low, definite but small relationship between scientific temperament and happiness among higher secondary students. This 'r' value 0.313 to further tested and found that it is significant at 0.05 level. Meanwhile the value 'r' = 0.313 is greater than the critical value 0.112 at 0.05 significance level.

5. Major Findings Of The Study

- There is significant difference between the scientific temperament of higher secondary students based on gender, type of school management, stream of study and medium of instruction.
- There is no significant difference between the scientific temperament of higher secondary students based on locality of residence.
- There is significant difference between the happiness of higher secondary students based on gender, locality of residence, type of school management and medium of instruction.
- There is no significant difference between the happiness of higher secondary students based on stream of study.
- There is correlation between the scientific temperament and happiness of higher secondary students.

5.2 Recommendations Of The Study

- Cultivate Scientific Temperament within Students
- An extra support and guidance to encourage the girl students for Scientific Temperament
- Arrange the equal chances and opportunities to all type of school students in terms of facilities, laboratories
- Modern Teaching Aids and Methods **to be adopted to enhance the temperament of students**
- Provide the counseling, yoga and recreations to enhance the learner's Happiness and Well-being
- Support the Rural Students at par to urban students in terms with best educational **resources, digital instruments, and modern setup to all rural schools to expand students' whole development happiness and emotional well-being.**
- Necessary activities to improve the Positive School Environment in order to improve the scientific temperament and emotional well-being.

6.Conclusion

In this article, it is investigated the **scientific temperament and happiness among higher secondary school students.** The outcomes of the research exposed that gender, locality of residence, management type, type of academic stream and medium of instruction play significant part in prompting the scientific temperament and happiness of the students. However scientific temperament and happiness by the girls mean score (93.52) have higher than the boys mean score (86.19), also there is no significant difference among rural and urban students in scientific temperament. But, significant differences were observed in happiness among rural and urban area students.

The present study also emphasized that the students from govt., aided and private schools and Tamil and English mediums indicated differences in both scientific temperament and happiness. Additionally, there is small but positive correlation between the scientific temperament and happiness of higher secondary students.

Generally, the present research emphasizes the significance of increasing scientific temperament and encouraging emotional well-being amongst higher secondary students. Educational organizations can incorporate the suitable strategies and supportive school environments to improve the **scientific temperament and happiness**, which are necessary for to improve the academic achievements and individual growth of the school students.

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