

## **Reasoning Ability of Senior Secondary School Students in Relation to Gender, Social Category and Stream of Study**

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### **Abstract**

The study examined the reasoning ability of senior secondary school students in relation to gender, and social category and stream of study. A sample of 300 students of class 10+1(150 males, 150 females) from different government (10) senior secondary school of Shimla district (Himachal Pradesh, India) affiliated to H.P.S.E.B. Dharamshala were taken. For collecting data reasoning ability test (RAT) developed by L.N. Dubey was used. Results of analysis of variance revealed that there were no significant difference and interaction between gender and social category but stream of study differed significantly in relation to reasoning ability. Students studying in science stream had significantly higher mean of reasoning ability scores than commerce and arts stream students.

**KEYWORDS:** Reasoning ability, senior secondary school students

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### **Introduction**

Thinking, reasoning and problem-solving is related concepts of psychology and education. Reasoning and problem-solving are the highest form of thinking. It operates on realizing the highest cognitive objectives of teaching and learning .It is different from ordinary imagination in that the results of reasoning are supposed to be checked with some outside criteria, that is they are supposed to be correct while such checks are not necessarily required in imagination. Reasoning plays a significant role in one's adjustment to one's environment. It controls not only one's cognitive activities but may also influence the total behaviour and personality by the proper or improper development of one's reasoning ability. Reasoning must be defined as something manifested in behaviour rather than as a kind of conscious process having an association between a certain classes of responses. Reasoning is a process of controlled thinking, an association which starts with some problem of interest to the reasoner and is directed towards its solution.

Reasoning is the highest form of thinking that needs a well organized brain. Reasoning is that form of thinking which occurs when the individual is confronted with a problem that demands a solution or requires some adjustment. By a problem, we understand a situation for which the individual has no readymade solution, when an individual is confronted with a problem he may reason out a solution. When there is a well defined problem before the mind which seeks solution the reasoning is known as reflective thinking. Reasoning is a valuable mental activity, which helps to solve problems pertaining to any field of education.

The process of reasoning requires two conditions -first, that the person's mind should have completely formed concepts, and second, that he should be endowed with the power of reaching decision. In reasoning , one make a study of new circumstances and then after determining correctness or propriety on the basis of reasoning one can discover the correct path. In the process of reasoning, the individual reasons from the past experience. In this manner, reasoning helps to reach certain conclusions concerning the future without anything having been achieved in actual practice. Evidently, such an application needs some imagination as an essential part.

Reasoning is much like trial and error behavior but instead of motor exploration it is mental exploration. It is essentially a cognitive ability and is like thinking in many ways. "Reasoning is, therefore, a highly purposeful, controlled and selective thinking process, the material of which is predominantly factual reproduction of past experience". Reasoning and learning are closely related, both being methods of solving problems, learning usually resulting from the process of reasoning.

More and more exercises in problem solving will develop a child's reasoning ability. If a child starts taking interest in problem solving he will develop self-confidence and thus he may improve his reasoning ability. Accuracy is the next step after thinking when the human mind becomes mature. Reasoning has mental research, imagination and mental

**In the words of Bhatia (1967),** "Reasoning is the mental activity used in argument, demonstration or proof". It consists in making a new judgment on the basis of judgment or judgment already formed. In other words, it can be defined as a process of seeing agreement or disagreement along judgments already made.

**According to Garrett (1968),** "Reasoning is step-wise thinking with a purpose or goal in mind".

Thus we can say that reasoning depicts a higher type of thinking which a very careful, systematic and organized function. Reasoning is a process of controlled thinking, an association which starts with some problem of interest to the reasoner and is directed towards its solution. It differs from ordinary imagination in that the results of reasoning are supposed to check with some outside criteria, that is they are supposed to be correct while such checks are not necessarily required in imagination. More and more exercises in problem solving will develop a child's reasoning ability. Reasoning is a valuable mental activity, which helps to solve problems pertaining to any field of education.

#### **OBJECTIVES OF THE STUDY**

To study the differences in reasoning ability of Sr. Sec. School students in relation to gender, social category, stream of study, and interactional effects between them.

#### **HYPOTHESES OF THE STUDY**

Gender, social category and stream of study will not interact significantly with regard to reasoning ability of students.

### **SAMPLING**

For the conduct of present study a representative sample of 300 students of both genders (150 SC & 150 Non SC) studying in +1 class of Shimla Districts of Himachal Pradesh was selected. The investigator has selected only govt. senior secondary school of Shimla district. Ten schools were selected randomly by draw of lots method from list of schools. Since the students belonging to non scheduled caste were available in large number, sample from this category was drawn by making use of random number table. However, very few students belonging to scheduled caste were Present in 10 +1 class in each school, so total numbers of Students belonging to these categories were included in the sample.

### **DATA COLLECTION**

For collecting data reasoning ability test (RAT) developed by L.N. Dubey was used.

### **RESEARCH DESIGN**

In the present study 2x2x3 factorial design consisting of two levels of gender i.e. male and female, two levels of social category i.e. Scheduled Caste and Non Scheduled Caste and three levels of Stream of study i.e. Arts, Science and commerce were used.

### **RESULT AND DISCUSSION**

#### **REASONING ABILITY OF SENIOR SECONDARY SCHOOL STUDENTS IN RELATION TO GENDER, SOCIAL CATEGORY AND STREAM OF STUDY**

**Table 1**

**Means of Reasoning Ability Scores of Students in Relation to their Gender, Social Category and Stream of Study**

<b>Social Category</b>	<b>Gender</b>	<b>Arts</b>	<b>Science</b>	<b>Commerce</b>	<b>Mean</b>
	Male	47.6	54.12	56.32	52.68
SC	Female	45.72	53.60	53.64	50.98
	Male	48.80	52.00	48.00	49.60
NON SC	Female	47.68	55.72	52.44	51.94
	Mean	47.45	53.86	52.60	51.30

From the means of reasoning ability scores 'F' values were calculated. The result analyses are given in table 3.5 below:

**Table 2**  
**The Complete Summary of Analysis of Variance for**  
**Reasoning Ability**

Sr. No	Source of Variation	Sum of Squares	df	Mean Squares Variance	F-Ratio
1.	Gender	8.003	1	8.003	0.048
2.	Social category	84.270	1	84.270	0.507
3.	Stream of study	2306.607	2	1153.303	6.94 **
4.	Gender X Stream of study	131.607	2	65.803	0.396
5.	Stream of study X Social category	544.580	2	272.290	1.639
6.	Gender x Social category	306.030	1	306.030	1.842
7.	Gender X stream of study X social category	126.780	2	63.390	0.382
8.	Error variance	47835.520	288		
9.	Total	51343.397	299		

\*\* significant at 0.01 level

### MAIN EFFECTS

#### (A) Gender

The obtained value of 'F' for the main effect of gender on the reasoning ability of students irrespective of their social category and stream of study for df 1 and 288, came out to be .048, which is much below than the table value even at .05 level of significance. However, from the means score table 3.4, it is evident that girls have higher means of reasoning ability scores (102.92) than boys (102.28) but the difference is not significant statistically.

#### (B) Social Category

The calculated value of 'F' for the main effect of social category on the reasoning ability of students irrespective of their gender and stream of study for df 1 and 288, came out to be 0.507, which is less than the table value even at 0.05 level of significance. However, from the means score table 3.3 it is evident that Scheduled caste students have higher means of reasoning ability scores (103.66) than non Scheduled caste (101.54) but this difference is not significant statistically.

#### (C) Stream of Study

The calculated value of 'F' for the main effect of stream of study on the reasoning ability of students for df 2 and 288, came out to be 6.944, which is higher than the table value 0.05 level of significance. It may be said that students studying in different streams differ significantly in their reasoning ability. The comparisons in the reasoning ability scores of students studying in different stream were made by making use of 't' test . The results are given in table 3 below:

**Table 3**  
**Means, SDs and 't' Values for Comparing Reasoning Ability of Students Studying in Different Stream of Study**

Sr. No	Streams	Number	Mean	SD	M.D	S.E.D	df	't' value
1.	Arts (A)	100	47.45	13.83	6.41 (A-B)	1.88	198	3.40**
2.	Science(B)	100	53.86	12.85	1.26 (B-C)	1.72	198	0.73
3.	Commerce (C)	100	52.60	11.55	5.15 (A-C)	1.8	198	2.86**

From table 3 the calculated value of 't' for comparing the reasoning ability of sr.sec. Students studying in arts and science streams came out to be 3.40 which are significant at 0.01 level of significance for 1/198 df. From this it may be interpreted that mean of reasoning ability scores of sr. sec school students studying in science stream(53.86) was significantly higher than the students studying in arts stream(47.45).

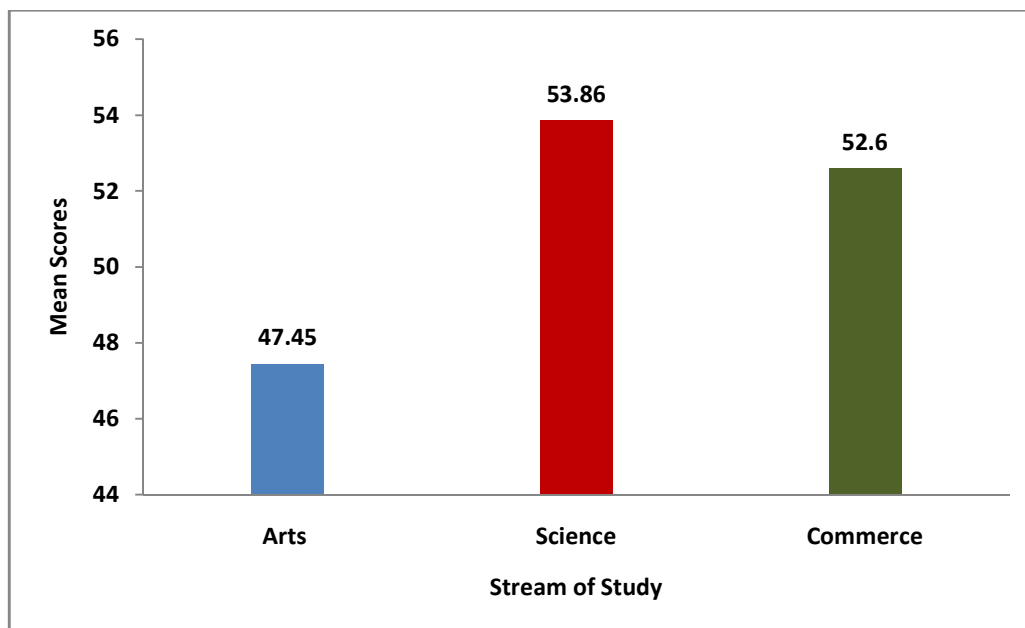
The obtained value of, 't' for comparing the reasoning ability of sr.sec. Students studying in science and commerce streams came out to be 0.73, which is not significant even at 0.05 level of significance for 1/198 df. However , from the means table 3.6 it is evident that students studying in science stream had higher mean of reasoning ability scores(53.86) than the students studying in commerce stream(52.60) but this difference is not significant statistically.

The computed value of 't' for comparing the reasoning ability of sr.sec. Students studying in arts and commerce streams came out to be 2.86, which is significant at 0.01 level of significance for 1/198 df. From this it is interpreted that means of reasoning ability scores of sr. sec

school students studying in commerce stream(52.60) was significantly higher than their counterparts studying in arts stream(47.45).

**Fig No 1**

**Means of Reasoning Ability Scores of Students Studying in Different Stream of Study**



**INTERACTIONAL EFFECTS**

**(A) STREAM OF STUDY X GENDER**

There is no interactional effect. It may be interpreted that the difference in the reasoning ability of boys and girls is of the same form for different streams of study i.e. arts, science and commerce

**(B) STREAM OF STUDY X SOCIAL CATEGORY**

There is no interactional effect .It may be interpreted that the difference in the reasoning ability of Scheduled caste and non Scheduled caste is of the same form for different streams of study i.e. arts, science and commerce.

**(C) GENDER X SOCIAL CATEGORY**

There is no interactional effect. It may be interpreted that the difference in the academic achievement of boys and girls is of the same form for different social categories i.e. scheduled caste and non scheduled caste.

**(D) TRIPLE INTERACTIONAL EFFECT**

There is no interactional effect. The fact that interaction among gender, social category and stream of study is not significant means that gender X social category interaction for separate stream of study is of

same form; that gender X stream of study interaction for separate level of social category is of same form; that social category X stream of study interaction for separate level of gender is of same form.

## **CONCLUSIONS**

1. Male and female students do not differ significantly in their reasoning ability..
2. Students belonging to different social categories do not differ significantly in their reasoning ability. However, non scheduled caste students had higher mean of reasoning ability scores than scheduled caste students but the difference is not significant statistically.
3. Students studying in different streams of study differ significantly in their reasoning ability. Students studying in science stream had significantly higher mean of reasoning ability scores than the students studying in arts streams. The students studying in commerce streams had not differed significantly with respect to science streams.
4. Gender and stream of study do not interact significantly with regard to reasoning ability of students.
5. Social category and stream of study do not interact significantly with regard to reasoning ability of students.
6. Gender and Social category of study do not interact significantly with regard to reasoning ability of students.
7. There is no significant triple interactional effect of gender, social category and stream of study on reasoning ability of students.

## **EDUCATIONAL IMPLICATIONS**

1. Senior Secondary School male and female students do not differ significantly in reasoning ability scores. This is a healthy trend and reveals the fact that both male and female students are getting sufficient and equal educational facilities. It shows that parents and teachers have started providing equal opportunities and facilities for both the boys and girls.
2. Senior Secondary students belonging to different social categories do not differ significantly in their reasoning ability scores. This is a healthy and positive trend that the programme of the govt. for the upliftments of socially deprived categories has started bearing fruits in terms of raising achievement level as well as reasoning ability of the students of these categories.
3. Students belonging to science stream of study had significantly higher mean of reasoning ability scores than their counterpart's studying in arts and commerce stream. To enhance the reasoning ability and academic achievement of students following measures can be undertaken:

- The parents and teachers should provide conducive and free environment to the students in order to develop good reasoning ability.
- Reasoning ability test should be taken into consideration at the time of admissions to various streams, specially opting science stream at sr. sec. level.
- Teachers should administer tests like problem solving ability test, creative thinking test to increase and develop reasoning ability among students.
- Teachers should try to improve and develop reasoning ability among students by giving some additional exposure like seminars, experts' lectures, field trips, and additional training programmes so on.
- Teacher should also helpful in enhancing creativity and originality of the students by giving them proper guidance.
- The elements of convergent and divergent thinking should be continuously stressed and applied to the solution of problems throughout the entire curriculum.

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