

A Comparative Study of Cognitive Styles of Science and Arts High Achiever Students

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Abstract

Cognition has to define so narrowly as to refer only to Awareness (Guilford, 1970) and so broadly by others. As to include all higher mental processes (Perception, thinking, attention, language, reasoning, problem solving, creativity, memory etc.). Consequently, cognition is being studied and researched in various forms and facts such as cognitive model of development, theories of cognitive development, cognitive modifiability, Cognitive models of Development, Theories of cognitive development, Cognitive modifiability, Cognitive styles, Cognitive preference texts and Cognitive cohorts .

(i) "Cognition is the act of knowing and the analysis of the act and its components has become the core of psychologists and educationalists, attempts to understand the mind".

International Encyclopedia of Education (1985)

(ii) "Cognitive styles are different modes of functioning that characterize the individuals perceptual and faculties".

Witkin (1967)

Several dimensions of individual differences in the performance of cognitive tasks have been identified. These dimensions, cognitive styles are appearing to reflect consistencies in the manner or form of cognition as distinct from the cognition on the level of skill displayed.

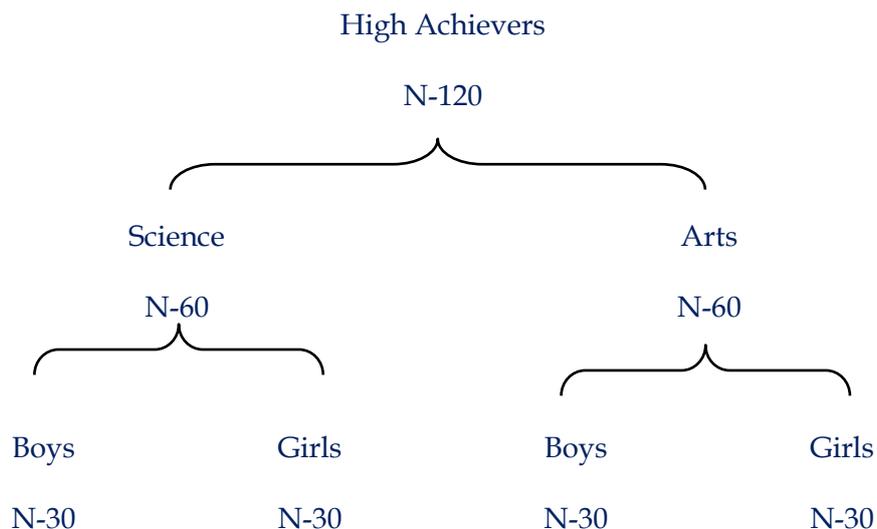
The term cognitive development scarcely appeared in the educational or psychological literature until the early 60s. By 70s it had become the principle core of the cognitive psychology. Infact the classroom output of students are outcomes of these cognitive styles/processes. The nature and extent of cognition varying person to person, individual to

individual. One has to ascertain the nature and extent/scope of cognitive processing in the class room with a view to achieve the desired objectives of the higher cognitive order. "Presently, research on human cognitive processing outside classroom settings greatly exceeds that on students cognitive processing in the classroom. Only recently have researcher begun to explore students cognitive processing during teaching and describe the way this relate to what they learn in the classroom".

The objectives of the study are identification of cognitive styles of science high achievers and arts high achievers. To compare the cognitive styles of science high achievers & arts high achievers, science high achievers boys & girls, science high achievers boys & arts high achievers boys, science high achievers boys & arts high achievers girls, science high achievers girls & arts high achievers boys, science high achievers girls & arts high achievers girls, arts high achievers boys & girls.

A researcher has to limitize her study due to so many constraints like time, resources, approaches, vast samplings, data gathering tools, inadequate knowledge of various related aspects. Out of ten, only four cognitive style have been selected/chosen for the research. Cognitive styles involve processing of cognition. Here Researcher confined his study inside the classroom. Outside the classroom is treated as unexplored territory. Cognitive processes involved in the investigation have not been dealt with separately. They used 'On Need' basis. Normative approach followed for the identification of cognitive styles with a view to ascertain the styles on the manifestation made by the subjects. The selected stratified sample is restricted to the Senior Secondary student of Udaipur area. The basis of selection of a sample is purely the first division marks in Secondary Board Examination. The research method is deliberately delimited to the scaling other flawed designs of measurement have not been used (Crownbech & Show, 1977). The information furnished by the students and the Board observations made by their perspective teachers have made the foundation for stratifications. The study is confined to high achievers only because researcher believes that Consistency cum-Stability dimension of cognition is readily present or present in the high achievers rather than low achieving students.

The nature and structure of the research approach affects the adoption of the research tool. So the self made **Verbal Rating Scale (5 point)** was designed, developed and employed for the needed data collection. Researcher used here **Self Made** Tool for data gathering.



To test the hypotheses and to analyze the collected data, the statistics used in the study are Mean, Percentage, Standard deviation, t - test.

After final drafting of research plan with relevant aspects data analysis and collection through proper implementation. Hence the researcher followed the path to reach at the target, implementing above three stages. A. For measuring cognitive styles - Designing and Development of Self Made Tool. B. Selection of stratified constant samples. C. Administration of the tool in proper way. D. Collection and classification of desired data. E. Identification of cognitive styles of Science and Arts group. F. Classification and analysis of intra-group units boys and girls, on the basis of Mean, SD and t value. G. Correlative findings among different groups. H. Statistical comparison of cognitive styles in elaborate way. I. Inferred the identification, comparison and correlations. J. Final reporting of the research in form of Dissertation and Summary for readers and coming research scholars.

The basic purpose of this study is to identify the nature of selected cognitive styles of the students having science & arts at their Senior Secondary level.

Therefore, it is possible to highlight the characteristics of selected cognitive styles and then proceed to the process of identification. So this chapter is divided into 4 sections, namely:-

1. Preliminary explanation of the selected cognitive styles.
2. Identification of the cognitive styles of the science & arts high achievers.
3. Inter and Intra group comparative analysis and interpretation of cognitive styles of the science & arts high achievers.

the data was collected with the help of the tool. The researcher herself has collected the primary data regarding the study. For this purpose the researcher used a self-made tools named 'Cognitive Style Measurement Scale' This tool was constructed to find out the cognitive style of students

"The process of interpretation is essentially on stating what the findings show. That all the limitations of data must enter into and become a part of interpretation of the result"

Good, Bar, Scates [1941,p41]

"The important portion of the research work of the researcher is the systematic analysis and interpretation of the result but for all this the systematic data collection is essential."

Hildue [1997, p37]

Analysis of the data:

There is an important place of data collection and statistical analysis in the field of research. Obviously analysis, interpretation and inference drawn are the peak points of any scientific study. The data collected are to be systematically arranged so that, they are able to describe the result as designated by the objectives.

"Analysis means categorizing, ordering, manipulation and summarizing of data to obtain answer to each question."

Major findings:

1. The high achievers of senior secondary standard have tendency to articulate, logical reasoning and analytical approach to the situations. They implies more evaluative, analytical confidence in acquisition of higher order knowledge with depth in understanding and insight into cognition of content by High Achievers of Science stream. Research scholar summarize the domination order of Senior Secondary Science High Achievers as follows:

| Cognitive style pair | Dominating pole |
|-------------------------------|--------------------|
| Cog. Simplicity/Complexity | Complexity |
| Convergence/ Divergence | Convergence |
| Field Independence/Dependence | Field Independence |
| Verbalization/Visualization | Verbalization |

2. On the basis of calculated mean science high achievers Cognitive Simplicity/Complexity pair of cognitive styles is the most dominating here than selected styles in present study. At the same time Verbalization/Visualization is the least dominating pair and FI/FD, Convergence/Divergence is in ascending order of domination. The higher calculated mean value indicates that science high achieving student of Senior Secondary standards are more intended towards Cognitive Simplicity rather than Cognitive Complexity during cognition of a information. At the same time the difference between means interpreted as consistency cum stability of the cognitive style in act of cognition.

In this way the high achieving science students preferences may summarize as follows:

| Cognitive style pair | Dominating pole |
|-------------------------------|----------------------|
| Cog. Simplicity/Complexity | Cognitive Simplicity |
| Convergence/ Divergence | Convergence |
| Field Independence/Dependence | Field Independence |
| Verbalization/Visualization | Verbalization |

3. Simplicity/Complexity style is most dominating. The other styles are Convergence/Divergence, FI/FD and Verbalization/Visualization in descending order respectively in domination. These High Achievers have depth in understanding and insight into cognitive subject matter, tendency of articulation, logical reasoning analytic approach to the situations. The preferable pair and their dominating pole in High Achieving arts students as follows:

| Cognitive style pair | Dominating pole |
|-------------------------------|--------------------|
| Cog. Simplicity/Complexity | Cog. Simplicity |
| Convergence/ Divergence | Convergence |
| Field Independence/Dependence | Field Independence |
| Verbalization/Visualization | Verbalization |

4. Cognitive Simplicity/Complexity style is most preferred style in high achieving science students, irrespective to stream/ discipline and sex. There is no significance difference found in any group for any pair of cognitive style in Science and arts high achieving students. Verbalization/Visualization mode of information processing is least preferred

mode of information processing in high achieving science students, irrespective to sex and discipline found in present study.

In High Achieving Science students, cognitive styles are identified and comparison accounted on the basis of sex and discipline. The Cognitive Simplicity/Complexity pair of information processing found as most dominative pair while Verbalization/Visualization as least dominative one. The nearly identical results are concluded irrespective to Sex and Disciplined.

- Data figures interpreted that boys have slight more tendency to articulate, logical reasoning and analytical approach to the situations. The science boys are more verbaliser than science girls but small internal difference represents variability in adoption according to situations. On the basis of mean numerical figures calculated means are very high then tabular values. These results concluded as predomination of Simplicity during information processing. At the same time small intra group mean difference analyzed as variability in adoption of style during act of cognition at the same time In this way Researcher summarize the preferential order of cognitive styles of senior secondary science high achievers as follows:

| Pref. order | Cognitive style pair |
|-------------|-------------------------------|
| (i) | Cog. Simplicity/Complexity |
| (ii) | Convergence/ Divergence |
| (iii) | Field Independence/Dependence |
| (iv) | Verbalization/Visualization |

- On the basis of mean numerical figures calculated means are very high then tabular values. These results concluded as predomination of Simplicity during information processing. At the same time small intra group mean difference analyzed as variability in adoption of style during act of cognition at the same time In this way Researcher summarize the preferential order of cognitive styles of science high achievers boys as follows:

| Pref. order | Cognitive style pair |
|-------------|-------------------------------|
| (i) | Cog. Simplicity/Complexity |
| (ii) | Field Independence/Dependence |

| | |
|-------|-----------------------------|
| (iii) | Convergence/ Divergence |
| (iv) | Verbalization/Visualization |

7. In comparison between science high achiever boys and arts high achievers girls On the basis of mean numerical figures calculated means are very high then tabular values. These results concluded as predomination of Simplicity during information processing. At the same time small intra group mean difference analyzed as variability in adoption of style during act of cognition at the same time In this way Research scholar summarize the preferential order of cognitive styles of senior secondary science high achievers as follows:

| Pref. order | Cognitive style pair |
|-------------|-------------------------------|
| (i) | Cog. Simplicity/Complexity |
| (ii) | Field Independence/Dependence |
| (iii) | Convergence/ Divergence |
| (iv) | Verbalization/Visualization |

8. When researcher analyzed integrated samples, there is No significant difference found in acquisition of cognition in science girls & arts boys On the basis of displayed table Cognitive Simplicity/Complexity pair is found most dominating in science high achievers girls & arts high achievers boys Convergence/Divergence, FI/FD followed by it. Verbalization/Visualization style is concluded as least dominating in science high achievers girls & arts high achievers boys out four styles. The results concluded as predomination of Simplicity during information processing. At the same time small intra group mean difference analyzed as variability in adoption of style during act of cognition at the same time In this way Research scholar summarize the preferential order of cognitive styles of senior secondary science high achievers as follows:

| Pref. order | Cognitive style pair |
|-------------|-------------------------------|
| (i) | Cog. Simplicity/Complexity |
| (ii) | Convergence/ Divergence |
| (iii) | Field Independence/Dependence |
| (iv) | Verbalization/Visualization |

9. Cognitive Simplicity/Complexity pair is found most dominating in science & arts high achievers girls. Convergence/Divergence, FI/FD followed by it. Verbalization/Visualization style is concluded as least dominating in science high achievers girls & arts high achievers boys out four styles. When researcher analyzed integrated samples, there is No significant difference found in acquisition of cognition in science & arts high achievers girls. In this way Research scholar summarize the preferential order of cognitive styles of senior secondary science & arts high achievers girls achievers as follows:

| Pref. order | Cognitive style pair |
|--------------------|-------------------------------|
| (i) | Cog. Simplicity/Complexity |
| (ii) | Convergence/ Divergence |
| (iii) | Field Independence/Dependence |
| (iv) | Verbalization/Visualization |

10. When researcher analyzed integrated samples, there is no significant difference found in acquisition of cognition in arts high achiever boys and girls. On the basis of mean numerical figures calculated means are very high then tabular values. These results concluded as predomination of Simplicity during information processing. At the same time small intra group mean difference analyzed as variability in adoption of style during act of cognition at the same time In this way Research scholar summarize the preferential order of cognitive styles of arts high achiever boys and high achiever girls are as follows:

| Pref. order | Cognitive style pair |
|--------------------|-------------------------------|
| (i) | Cog. Simplicity/Complexity |
| (ii) | Convergence/ Divergence |
| (iii) | Field Independence/Dependence |
| (iv) | Verbalization/Visualization |

As far as cognitive styles are concerned people contrasting personalities differ not only in terms of behaviour but also in their modes of perceiving, thinking, retention, reasoning and utilization of particular information.

Marino (1978) suggested that these cognitive styles can be developed at an early stage of the education system. Hence, efforts are made by teachers then they can develop Field Independent cognitive styles among young children. But once a particular type of style is developed, it affects the various aspects of an individual.

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