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Cognitive Styles and Demographic Variables: A Meta-Analysis Study

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Abstract

Cognitive style, stress, and academic success should be carefully examined in order to improve educational processes and difficulties of students at higher stages. On stress levels, academic performance, and other various demographic variables, cognitive styles, however, have varying consequences. This article examines the statistics on the correlation between learners' cognitive styles and other demographic factors. The researchers focused primarily on the effects of cognitive styles on stress levels, gender, location, stream, family status, and coping and learning techniques. Most often, post-facto and experimental research designs are used. Most researchers collect samples that are greater than 100 or 300, and they use standardised tools like the Cognitive Style Inventory, the Kirton Adaptation Inventory, and the Learning Styles Inventory to gather data. The data is analyzed through mean, standard deviation, t-test, ANOVA, correlation methods and chi-square. The results indicated that the cognitive styles play an important role in the learning effect of students. Also it indicated that the students who achieved more academic achievement; they tend to be field independent in comparison to those who are less successful in their studies. Some researchers also found that the males who have systematic cognitive styles of high stress levels – they can manage stress level as compared to female. In nutshell those who have high cognitive styles are always good in achievement, stress levels, streams etc. etc. and they fall under independent field learners styles.

Key words: Cognitive styles, Stress, Academic Achievement, learners.

Introduction

The greatest wealth of a nation is its young population unless and until they are not cared and reared properly we can't expect a developed and prosperous nation. Youth are the building blocks of any nation envisioning progress and development. Their personal growth and development undoubtedly is the need of the hour. Their mental health has indicated a growing concern and has been the subject of heightened attention at the present moment. Research Studies have indicated that stress has alarming negative effects on psychological, physical and behavioural responses of an individual [9]. Stress is a subject which is very difficult to avoid. It is a necessary and unavoidable concomitant of daily living. It

is necessary because without some kind of stress we would be lethargic and lazy creatures, and unavoidable because it relates to any external event, be it pleasurable or anxiety producing. Extreme stress levels and frequent stress conditions can have a serious impact on one's health, productivity and academic accomplishments. Empirical evidence also stating that stress is associated with poorer mental health [27] and the students, who report stress problems also suffer from mental health problems (Associate Press, 2008). Therefore stress needs to be controlled or managed effectively.

Cognitive Styles

The phrase 'Cognitive Style' consists of two words cognitive and style. The word cognitive owes its origin to the Latin word 'cognocere' which means 'to apprehend". Cognition is a generic term used to designate all processes involved in knowing [6]**.** It is the process, by which the sensory input is transformed, reduced, elaborated, stored, recovered and used [16] Main stages in the process of cognition are sensing, attending, perceiving, comprehending, understanding and remembering[18]**.** Cognitive style or "thinking style" is a term used in cognitive psychology to describe the way individuals think, imagine, perceive, recognize, distinguish and remember information.

Dimensions of Cognitive Style

- **Systematic style:-**An individual identified as having a systematic style is one who rates high on the systematic scale and low on the intuitive scale.
- **Intuitive style:-**An individual who rates low on the systematic scale and high on the intuitive scale is described as having an intuitive style.
- **Integrated style:-**A person with an integrated style rates high on both scales and is able to change styles quickly and easily.
- **Undifferentiated style:** An individual rating low on both the systematic and the intuitive scale is described as having undifferentiated cognitive behaviour.
- **Split Style:-**An individual rating in the middle range on both the systematic and the intuitive scale is considered to have a split style involving fairly equal (average) degrees of systematic and intuitive specialization

Stress

The concept of stress has its origin in 1936 where it was defined as "the non-specific response of the body to any demand for change" [21]. It has been used in different ways by different theorists. According to **McGrath (1970)** "stress is perceived as an imbalance between demand and response capability under the condition where failure to meet demands has important consequences". **Wayne (2001)** defines stress as any circumstance that threatens or is perceived to threaten one's well-being and that thereby taxes one's coping abilities.

Stress mainly comes from academic tests, interpersonal relations, relationship problems, life changes, and career exploration. Such stress may usually cause psychological, physical, and behavioural problems. Learning and memory can be affected by stress. Too much stress can cause physical and mental health problems, reduce self-esteem [12]**;** [25]; [17]. Although an optimal level of stress can enhance learning ability [8]; [11]**,** and may affect the academic achievement of students [5]**;** [28]**.**

Types of Stress

Walt (1996) identified three types of stress namely; **neustress, distress** and **eustress. Neustress** is neutral stress, arousal with neither harmful nor helpful effects on the mind or body. When arousal is too high or too low, distress ensues, resulting in harm to mind and body. Common distress symptoms include trembling hands, tight shoulders, anxiety, poor concentration, depression, fuzzy thinking, accelerated speech, irritability and short temperedness. These symptoms serve as a warning that something is wrong and needs to be changed. **Distress** is something to avoid whenever possible because its cost does not stop with the individual since its negative energy ripples outward affecting others. Eustress, on the other hand, is a positive stress or helpful arousal that promotes health, energy, satisfaction and peak performance. **Eustress** is helpful in that it enables us to respond quickly and forcefully in physical emergencies and to prepare for deadlines.

Mental Health

Mental health refers to our cognitive, and/or emotional wellbeing, it is all about how we think, feel and behave. The World Health Organization **(WHO)** defines mental health as a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community. Mental health must be defined as a state of physical, social and psychological well-being rather than simply as an absence of illness or infirmity.

Objectives of the Study

This study is intended to get acquaintance on the following:

I. To present findings from the collected related literature on Cognitive Styles and Demographic Variables likewise gender, locale, stress, mental health, stream, etc.

II. To summarize the methodology and Results of the studies conducted on Cognitive Styles and Demographic Variables likewise gender, locale, stress, mental health, stream, etc. which will give a direction for future research.

Review of Related Literature

The research studies conducted on Cognitive Styles and demographic variables are:

Shi Changju (2011) conducted a study of the relationship between cognitive styles and learning strategies. This main focus of the study is to find out the relationship between cognitive styles and learning strategies. For this purpose, a quantitative study was carried out to obtain an overall idea about the subjects' learning styles and learning strategies. A sample of 178 second-year English undergraduates was selected from the Foreign Language School of a university in Wuhan. The data was collected through the two self-reported inventories to examine the subjects' learning styles and learning strategies respectively. Learning Style Survey (constructed by Cohen, with Rebecca Oxford and Julie Chi) was used to examine the learning styles of the participants and another tool, Oxford's Strategy Inventory for Language Learning, which was translated into Chinese, was conducted to survey the subjects' learning strategies. The results revealed that the cognitive styles have significant influence on learners' choices of learning strategies. Synthesizing style, sharpener style, field-independent style and impulsive style of cognitive styles correlate positively almost with every strategy presented, so they turn to be the most influential cognitive styles that have an impact on learners' learning strategy choices. [24]

Kumar (2014) studied Cognitive Styles of J.B.T. trainees in Hamirpur district of Himachal Pradesh state with respect to gender, locale, stream, and family status. The investigator used causal comparative method of research. Researcher has taken 5 B.Ed. Colleges of district Hamirpur in H.P and drawn 140 samples. The tool used in this study is Kirton adaptation/innovation inventory and data as well as hypotheses was analyzed through mean, standard deviation and t-test. Result shows that highly significant differences were found among Arts male & Arts female J.B.T. trainees and significant differences were found among Science male & Arts male J.B.T. trainees in district Hamirpur of Himachal Pradesh with respect to their cognitive styles (Innovation/Adaptation). A number of studies have been done on cognitive styles and creativity which are mentioned as follows. Cognitive style is different from the ability and is not dependent on intelligence, gender and personality. Overall one can know which variable is cause of Cognitive styles. [10]

Chandra and Reddy (2014) investigated the effect of Mental Health on Study Habits, Teaching Attitude and Academic stress. A study was conducted on 600 prospective teachers to find out the effect of mental health on study habits, teaching attitude and academic stress among prospective teachers. The tools Mental Health Status inventory, Study Habits inventory and Teaching Attitude inventory and Scale for Assessing Academic stress were used to assess the mental health, study habits, teaching attitude and academic stress of the prospective teachers. The data was analyzed and synthesized by mean, standard deviation and ANOVA. The results indicated that there is a significant impact of mental health on study habits, teaching attitude and academic stress of prospective teachers. [3]

Jain et. al. (2015) conducted a study on Cognitive Styles of Adolescents in Relation to their Stress level. The main focus of the researcher was to study the impact of stress on cognitive styles of adolescents. The investigator has selected 200 graduate students of Bhilai Nagar Chhattisgarh in which 100 male and 100 female were drawn by using a random sampling method. The data was collected through Cognitive style inventory and student stress scale. The results indicate that there is a significant difference between the systematic cognitive styles of high and low stresses level female students. Among male undergraduates stress level has no impact on systematic and intuitive cognitive style. Therefore we can say that males can manage stress level compared to females. [7]

Cortina (2016) conducted a study on cognitive styles and psychological functioning in rural South African school students: Understanding influences for risk and resilience in the face of chronic adversity. This study examines the cognitive interpretations and psychological functioning of 1025 school children aged 10-12 years old children of the 28 primary schools in a rural, socioeconomically disadvantaged area of South Africa with high HIV prevalence by using the cognitive triad inventory for children (CTI-C). The data presented here comes from a large cross-sectional study conducted in 2007 from a stratified random sampling technique. The gathered data analyzed through t-test, Pearson correlations, Spearman's correlations and ANOVA. The results indicated that children were examined in relation to psychological functioning on scales of depression, anxiety, somatization and sequelae of potentially traumatic events. Children with more negative cognitions viewed the school-environment more negatively. Children living in poverty in rural South Africa experience considerable adversity and those with negative cognitions are at risk for psychological problems. Targeting children's cognitive interpretations may be a possible area for intervention. [4]

Mukherjee and Chatterjee (2016) conducted a study on Cognitive Style of Humanities, Commerce and Science Students - A Study on Higher Secondary Students from West Bengal. The main objective of the study was to find out the significant effect of stream, gender and interaction between

the stream and gender of study on cognitive style of Higher Secondary students in terms of – Introversion, Extraversion, Sensing, Intuitive, Feeling, Thinking, Judging, and Perceiving. The study sample consists of 90 higher secondary school students (30 each from science, humanities and commerce background). The male female ratio was 50:50. The age range was from 16-18 years. They were all from middle socio-economic status. The tool administered was an adapted version of cognitive style questionnaire by Ancona, Kochan, Scully, Van maanen and Westne and the data was analyzed and synthesized by mean, standard deviation and ANOVA. The results indicated that the dimensions of Sensing, intuition and perceiving have significant effect of stream of study and gender. Sensing was highest for the science stream and lowest for the Humanities. Again Intuition was highest for the Humanities stream and lowest for the Science stream. The males have always scored highest in the dimension of Perceiving than their female counterparts both in Humanities and Science stream. And the female irrespective of the stream of study has scored higher in the Intuitive dimension. Therefore this study is supportive in the field of designing educational guidance and curriculum for the Higher Secondary Students. [15]

Vandana Singh (2017) conducted a study on Exploring the Relationship between Cognitive Style and Learning Style with Academic Achievement of Elementary School Learners. The researcher focused on to identify the learning styles, cognitive styles and relationship between these two. The investigator has drawn 160 8th class students from public schools of Delhi. For collection of date the researcher has used the tools; Learning styles inventory and Group embedded figure test. This study revealed that the data from the research indicates that there is a link between cognitive style and learning style which also determines the achievement of learners. The results from the data indicate that the learners having field dependents and field independents (cognitive style) have different learning styles. Since, the learners differs in their cognitive style, therefore if an attempt is made to identify them will improve the learning. It is also argued that by supplementing the curriculum transaction with the awareness of cognitive and learning styles, the teachers can help their learners to reach the desired learning levels. [26]

Sharma Prerna (2017) conducted a study on a study of cognitive styles of senior secondary students with relation to their gender. The main objective of the investigation is to study the types of cognitive styles that exist among boys and girls of senior secondary students. A sample of 100 students (50 boys and 50 girls) was selected from class 12^{th} students by using a simple random sampling technique. The data was collected through cognitive style inventory (CSI) constructed by Dr. Praveen Kumar Jha (2001) and the data was analyzed and synthesized by a statistical technique chi-square. The results revealed that the there is a significant difference between cognitive styles of senior secondary students due to variation in their gender. Hence, investigator feels that there is need for the development of new instructional programs that could accommodate the unique styles of individual students. [23]

Sharma et al. (2018) conducted a study on Relationship of Cognitive Styles with Academic Achievement among Secondary School Students. The main focus of the researcher is to find out the relationship between field independent/dependent cognitive styles and academic achievement of 9th grade students in multimedia and traditional instructional environment. Investigator has used experimental method with factorial design and has taken 64 students of om public school Gohana (Sonepat). The data has been collected through Group Embedded Figure test and achievement test in English and analyzed by using statistical technique Pearson correlation coefficient. The findings of the study revealed that there is a significant positive relationship between cognitive styles (Field

Independent & Field Dependent) and academic achievement. Accordingly few more researchers found the same result viz. Yaghubi (2006), Hosseini-nasab et.al. (2002) and Mokhtarian (2003). So in nutshell the researcher found that those individuals who have gained more academic achievement tend to be field independent in comparison to those who are less successful in their studies. [22]

Masalimova et. al. (2018) conducted a study on the Interrelation between cognitive styles and coping strategies among student youth. The article deals with the problem of studying the issues of creative thinking, cognitive styles and coping strategies among students. The sample of the study was composed of 52 people aged 21 from Ulyanovsk and Kazan Federal Universities. Three techniques were used for each respondent underwent the diagnostic assessment: J. Bruner's technique of determining the types of thinking and the level of creativity, K. Gottschald's test "included figures" and the questionnaire "the ways of coping behaviour" by Lazarus (Brunner,1971,1977, Lazarus and folkman, 1984). The results indicated that the students of humanities programs with developed creative thinking are focused on external factors, do not strive to avoid problem resolution, but when they encounter a problem situation, the primary negative reaction prevents them from resolving it quickly, thereby enabling them to correctly plan and find optimal ways out of this stressful situation, creative students-mathematicians are less susceptible to external factors, have a high control of emotions, they are capable of generating new solutions, which allows them to take conscious steps to solve the problem. [13]

Reddy et al. (2018) in their study concludes that stream wise difference in stress does exist in students. It is important to deal with stress at personal, social and institutional level. Remedies such as feedback, yoga, life skills training, mindfulness, meditation and psychotherapy have been found useful to deal with stress. To identify the main reason of stress is the key to deal with it. Professionals can develop tailor made strategies to deal with stress. The integrated well-being of the students is important not only for the individual but for the institute as well. [20]

Zhang & Tian (2019) did a research on The Influence of Field Independent-Dependent Cognitive Styles on Students' Learning Performance under Different Teaching Modes viz. traditional classroom, online learning and flipped classroom. The investigator has recruited 90 subjects 48 men and 42 women. The investigator has collected the data through measurement tools; Basic information questionnaire, Previous Knowledge test, Cognitive Style Questionnaire and Learning Effective test. The researcher has applied Experimental Design and analyzed the data through a statistical technique ANOVA. The results of the study showed that (1) there were significant differences in the influence of the three teaching modes on learning achievement, reaction time and learning satisfaction. (2) Students with a field-independent cognitive style showed a faster reaction time during test-taking than those with a field-dependent style. (3) The interaction between cognitive style and teaching modes was significantly related to reaction time. So, in future education, we should attach importance to the matching of teaching modes and individual differences. [30]

Agarwal et. al. (2019) conducted a study on the impact of cognitive style diversity on implicit learning in teams. This study is mainly concerned the implications of cognitive diversity for longer-term outcomes such as team learning, with its broader effects on organizational learning and productivity. The sample consisted of 337 participants, randomly assigned to 98 teams of two to five participants each. The participants were recruited from the general public in the northeastern U. S and paid for their participation. Cognitive styles were measured by Object-Spatial Imagery and Verbal Questionnaire (OSVIQ) (Blazhenkova & Kozhevnikov, 2009). The results indicated cognitive style diversity has a curvilinear-inverted U-shaped- relationship with collective intelligence. Collective intelligence is further

positively related to the rate at which teams learn and is a mechanism guiding the indirect relationship between cognitive style diversity and team learning. [1]

Alalouch Chaham (2021) conducted a study on cognitive styles, gender and students' academic performance in Engineering Education. This study attempted to critically assess the effect of cognitive styles and gender on students' academic performance in eight engineering majors to understand whether cognitive style preference is associated with certain majors. The samples of 584 engineering students were selected and used the data. The gathered data was analyzed by multiple standard statistical tests, regression tree analysis, and cluster analysis. The results showed that none of the three cognitive styles was exclusively associated with better performance. It indicates students who had a stronger performance for a cognitive style were more likely to perform better. Also it showed Gender, the major and students clarity about their cognitive style were shown to be the best predictors of academic performance. Female students performed better and were clearer about their preferred cognitive style, while as male students were more capable of adapting to different learning tasks. [2]

Possel and Roane (2021) conducted a study on relations of cognitive styles, depressive symptoms and blood pressure in community college students. This study proposed cognitive styles described in the Hopelessness. Theory would be associated with depressive symptoms and systolic blood pressure (SBP) and those depressive symptoms mediate these associations. The research method used here is cross-sectional and 324 community college student participants were taken as sample. The data was gathered through self-reports of cognitive styles and depressive symptoms, resting blood pressure was measured three times at 1 minute intervals and the data was analyzed by using mean. The results indicated that path analysis demonstrated differing associations between each cognitive styles and depressive symptoms are independently associated with SBP. The conclusion shows that when conceptualizing and measuring the associations of cognitive styles with depressive symptoms and SBP, the styles should be evaluated individually. Interventions targeting cognitive styles might be especially beneficial as changing them might improve mental and physical health. [19]

Discussions and Implications

In the light of the above investigations, investigator found that the above studies are conducted on Cognitive Styles in relation to Learning Styles, Depressive Symptoms, Students' Academic Achievement, Stress levels, Cognitive style diversity among teams, Influence of Field Independent-Dependent Cognitive Styles on Students' Learning Performance, coping strategies, psychological functioning and mental health among the elementary students, secondary school students, Engineering students, and adolescents. The above studies show the relationship between Cognitive styles and gender, stream and locale, Cognitive styles and stress levels, cognitive styles and learning styles with academic achievement, Field independent and dependent cognitive styles on students, Cognitive styles and psychological functioning, cognitive styles and coping strategies. It is obvious to find out the cognitive styles among learners in relation to their mental health, stress levels, academic achievement, gender, stream, locale, etc. for the betterment of community life.

Methodology

As the researchers mostly taken the two groups in their investigations likewise independent field learners and dependent field learners. The investigators compare mostly the two groups in case of gender, academic achievement, stream, family status, stress levels, learning strategies and mental health.

The investigators used the experimental method in their successful researches and for the appropriate results. The tools used by the investigators here are mainly related to cognition which are cognitive inventory constructed by Parveen Kumar Jha [7], Kirton adaptation inventory [10], learning styles inventory [26], Group Embedded Test [22], Cognitive Style Questionnaire [30]. The better results were found through cognitive style inventory. The statistical techniques used by the investigators are ANOVA, Pearson correlation coefficient, mean, standard deviation, t-test, chi-square test. In most of the cases the parametric tests are used to evaluate the better results.

Conclusions

The results indicate that the cognitive styles play a pivotal role in the learning of students with respect to their stress levels and mental health. The children with more negative cognitions viewed the school environment negatively and they are at risk for psychological problems [4]. The students of humanities programs with developed creative thinking are focused on external factors do not strive to avoid problem resolution but when they encounter a problematic situation the primary negative reaction prevents them from resolving it quickly [13]. The students who had a stronger response for a cognitive style where more likely to perform better [2]. The students who achieved more academic achievement they tend to be field independent in comparison to those who are less successful in their studies [22]. The males who have systematic cognitive styles of high stress levels they can manage stress level as compared to females [7]. In most of the researches the researchers has taken the cognitive styles along with field independent and field dependent. Therefore the maximum results indicate that field independent learners are always good in their stress level, academic achievements, and streams than field dependent learners.

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