

**INTELLECTUAL GIFTEDNESS: AN EXPLORATORY STUDY
ON COGNITIVE AND PSYCHOSOCIAL DOMAINS**

Thesis submitted in partial fulfilment of the
award of the degree of

**DOCTOR OF PHILOSOPHY
IN
PSYCHOLOGY**

VIMY V VIJAYAN

Under the guidance of
DR NICE MARY FRANCIS P



**POST-GRADUATE AND RESEARCH
DEPARTMENT OF PSYCHOLOGY
PRAJYOTI NIKETAN COLLEGE, PUDUKAD
(Affiliated to the University of Calicut)
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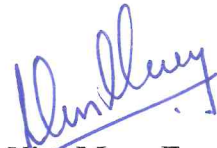
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ACKNOWLEDGMENTS

First and foremost, I bow my head before the Almighty, who has blessed me with the strength, perseverance, and patience to complete this journey.

I consider myself very fortunate to have had the honour of the guidance of Prof. (Dr.) Nice Mary Francis P. I express my gratitude for her expertise, valuable suggestions, constructive criticisms and patience throughout, which kept me going till the last moment in this endeavour

I take this opportunity to thank my great teachers in the Department of Psychology, Prajyoti Niketan College- Dr Milu Maria Anto, Dr Sukanya B Menon, Dr Saumya Starlet and Dr Jaya A T, who instilled the love of learning and have been a constant source of motivation. I want to extend my sincere thanks to Dr Vargheese Paul, Former HOD of psychology and Dr Monsy Edward, for the inspiration and caring that they have provided me with.

I am deeply grateful to Dr Harshajan Pazhayattil, founder and Director of Prajyoti Niketan College, for providing us with a research environment at Prajyoti and Dr Simi Vargheese, the Principal, who always coupled with a vibrant tone and energetic attitude. Your presence always gives us confidence in the smooth functioning of our research endeavours. I extend my heartfelt thanks to Dr Shaijan Paul, former principal, for his support throughout my academic journey.

I would also like to thank the Principals of various schools in Thrissur district for permitting me to conduct this study and allowing a comfortable space for research work. I am indebted to the unending support of teachers from state and CBSE schools, as well as the adolescents who were a major part of my research pursuit, for allowing me to conduct the study in their schools. I am deeply remembering Francis Sir, Vima Mam, Smitha Mam, Smitha teacher and Kavya for their warm nature and kind-heartedness during the data collection period. Also, express my gratitude to the parents of adolescents, who have shown cooperation and trust in my research process.

I am incredibly grateful to the Kaveri Gifted Education and Research Centre, Pune, for helping me to know better about the gifted population. I express my deepest gratitude to Dr Sameena Manaswala for her valuable suggestions and discussions in my scholarly pursuit. Moreover, thank you for opening the door to the experiential literature of 'giftedness' to me rather than what I read in articles.

I take this opportunity to thank Dr Baby Shari for her research discussions and constructive criticisms in doctoral committee meetings that sparked a fire in me to think much deeper. I am also thankful to Dr Shamla, Dr Saliha and Dr Anjo for providing insights for the statistical analysis of my research work.

I would like to express my sincere thanks for the wholehearted support of my colleagues, Sr Julie, Liby, Shiny, Pulari, Sreerekha, Vandana, Bishmi, Jisha, Fathima, Saumya, Karthika, Ratheesh, Bayana, Sara and Ajitha, whose insightful scholarly discussions and constant encouragement have enriched and strengthened my research voyage. I thank all my junior scholars, Divya, who engaged in meaningful discussions with me, Mubeena, Abidha, Vinu, Radhika and others for their continuous pursuit of excellence and for being a constant source of motivation.

I extend my gratitude to Ms Shinta G Nellai, Dr Sreelakshmi, and Ms Midhu, Assistant professors at Prajyoti Niketan College, for exchanging research discussions on different subjects that created another pathway of inspiration. Also thankful to Ms Annie, Librarian, for the timely help and welcoming approach.

I express my thanks to the nonteaching staff of Prajyoti Niketan College for the administrative support. I also thank Ms Seena, Lab assistant, for her loving support.

I am grateful to thank members of Thrissur Clinical Psychology Forum who always warm up with immense energy and experience. I am indebted to Ms Sangeetha and team, Compass Psychological Services, for accessing the data collection support and thoughtful discussions on gifted children.

I extend my heartfelt gratitude to the Indian Council of Social Science Research (ICSSR) for granting me a doctoral fellowship, which helped me pursue my research endeavour securely. Thanks to Dr Binu P Chacko, Former Principal, who helped me complete the procedure of the fellowship and avail the grant on time.

The words are not enough when I acknowledge my family. Love to my parents, especially my 'amma', who has been a constant power throughout my academic pursuits. My husband, the partner of all my cognitive and psychosocial overloadings in this voyage. I am grateful to my in-laws, especially my mother-in-law, who stood and ran with me whenever I needed to breathe. I deeply remember my lovable sister and family; whenever I needed extra support, you were there. Also, my heartfelt thanks to Ms Saritha and family and Ms Sajith and family. My Kids, Sidhu and Kichu, for their unconditional love, cooperation and understanding. Your fun and play in tough times were a stress buster. I am proud of how you both handle the situations that taught you to be adaptive. My love to Keerthu, the adolescent girl. I am very fortunate to have you, Radhechi. My kids are in safe hands, so I can close my eyes peacefully. Yes, I rose, fell, woke up and moved on...I was in this cycle for the last 6 years. All the hurdles I crossed were with the collective effort of all of you.

I am deeply remembering all who have been there with me through thick and thin. Thanks, and love to everyone.

VIMY V VIJAYAN

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H	Strength & Difficulty Questionnaire (SDQ)
I	Research Ethical Committee certificate
J	WISC-IV, India training certificate
K	Gifted education training certificate
L	Copy of paper publications

ABBREVIATIONS

IG	: Intellectual giftedness
IGA	: Intellectually gifted adolescents
IAA	: Intellectually average adolescents
IQ	: Intellectual Quotient
HG	: Highly gifted
LG	: Low gifted
WISC IV	: Wechsler Intelligence Scale for Children IV
VC	: Verbal comprehension
PR	: Perceptual reasoning
WM	: Working memory
PS	: Processing speed
SPM	: Standard progressive matrices
PAQ	: Parenting Authority Questionnaire
AN	: Authoritarian parenting style
AT	: Authoritative parenting style
PRMS	: Permissive parenting style
SDQ	: Strengths and Difficulties Questionnaire
EBP	: Emotional and behavioural problems
ES	: Emotional symptoms
IH	: Inattention & hyperactivity
CP	: Conduct problems
PP	: Peer problems
Total EBP	: Total emotional and behavioural problems

INTELLECTUAL GIFTEDNESS: AN EXPLORATORY STUDY ON COGNITIVE AND PSYCHOSOCIAL DOMAINS

Abstract

The identification of intellectually gifted adolescents and exploring their needs and vulnerabilities lacks systematic and empirical grounding in our culture. Hence, understanding their cognitive strength and weaknesses, making them aware of the skills will benefit them in terms of academic, career and behavioural aspects. Even though a highly intelligent individual has a remarkable capacity for seeing and internalising the vast uncertainties, possibilities, and problems, this gift can also have psychological vulnerabilities. The present study aimed to identify intellectually gifted adolescents, to obtain cognitive and psychosocial profile of intellectually gifted adolescents (IGA) and to compare it with intellectually average adolescents (IAA) and finally to explore the link between intellectual giftedness and emotional and behavioural problems (EBP). The present study follows the descriptive correlational research. The sample of 106 IGA and 106 IAA was drawn from both State and CBSE schools with multi-stage purposive sampling.

The study is carried out in two phases: The Phase 1 (exploration of tools and variables) includes scoping review, pilot study and expert suggestions. The selected cognitive domains are verbal comprehension (VC), perceptual reasoning (PR), working memory (WM) and processing speed (PS) and psychosocial domains are parenting style (PS) and emotional and behavioural problems (EBP). The Phase 2 includes screening and selection of IGA and IAA, understanding the sociodemographic and academic-non-academic characteristics, understanding the differences in cognitive and psychosocial domains compared to IAA, between low gifted and highly gifted adolescents and with respect to gender, exploring the relationship between intellectual giftedness and EBP, examine the predictive role of cognitive domains and parenting style on EBP among IGA and finally clustering the IGA. The tools used in the main study were Personal data sheet, Teacher nomination criteria, Standard Progressive Matrices, Weschler Intelligence Scale for Children (WISC -IV, India), Parenting authority questionnaire and Strength and difficulty questionnaire. Statistical analysis include descriptive statistics, Kolmogorov-Smirnov test, Mann-Whitney U test, Spearman's rank correlation rho, Multiple Regression and Cluster analysis.

The findings of the study reveal that, about 3.60% intellectually gifted adolescents were identified from the school setting using WISC-IV. Though all the cognitive domains (VC, PR, WM and PS) might act as cognitive markers of intellectual giftedness, VC and PS relatively act as a higher cognitive strength among IGA. A subset of IGA has EBP at a 'clinically significant level'. The perceptual reasoning has a significant positive association with conduct problems, peer problems and total EBP. The authoritarian parenting is positively correlated with emotional symptoms, conduct problems, peer problems and total difficulty in the study. Perceptual reasoning and authoritarian parenting positively predicted total EBP and authoritative parenting negatively predicted total EBP. The findings highlight the need for greater awareness and appropriate support from teachers, parents, and clinicians to promote the positive mental health of gifted children.

Keywords: Intellectual giftedness, Cognitive domains, Parenting style, Emotional and behavioural problems.

CHAPTER 1

INTRODUCTION AND REVIEW OF LITERATURE

- Background of Giftedness
- Review of literature
- Research gap
- Need and relevance of the study
- Definitions of key terms
- Statement of the problem
- Research questions
- Objectives of the study
- Hypotheses of the study

This chapter presents an overview of key concepts and ideas underpinning the current research. The first section highlights the background of giftedness, its characteristics, types of giftedness, prevalence in the community, aetiology, theories, identification methods, vulnerabilities associated with intellectually gifted adolescents (IGA), and how giftedness is depicted in both global and Indian contexts. The second section explores key variables, including verbal comprehension (VC), perceptual reasoning (PR), working memory (WM), and processing speed (PS) (cognitive domains), as well as parenting style and emotional and behavioural problems (EBP) (psychosocial domains). The literature review section encompasses the existing studies on how the intellectual giftedness among adolescents is demonstrated in research papers and the variables studied under the purview of giftedness (scoping review), identification methods, sociodemographic and academic aspects, cognitive domains (VC, PR, WM, PS) of intellectually gifted adolescents (IGA), parenting style of IGA and emotional and behavioural problems (EBP) among IGA. The review section further searches for existing studies on the association between intellectual giftedness and EBP, cognitive domains and EBP, parenting style and EBP and then looks for the reviews that predict the role of cognitive domains and parenting style on emotional and behavioural problems among IGA.

Giftedness

Giftedness is understood as a brain-based difference that contributes to the dynamic and neurodiverse nature of human development. This neurological variation leads exceptional individuals to follow distinct pathways of intellectual, academic and social-emotional growth compared to their neurotypical peers. Since the mid-century, the phenomenon of giftedness has drawn sustained attention from psychologists,

educators and educationists and neuroscientists. Research in this area has informed the development of specialised assessments and enrichment programs worldwide, all aimed at identifying gifted children, fostering their talent development, supporting the realization of their potential, and addressing the social and emotional challenges associated with their unique developmental trajectories (Kurup & Nayar, 2013). In the Indian context, however, gifted education remains largely overlooked by educators, researchers, and policymakers, resulting in limited opportunities for children whose needs arise from accelerated cognitive development. At present, there is no well-defined, clearly articulated and universally applicable definition of giftedness in India that can guide the systematic identification and nurturing of gifted children and adolescents (Maithreyi et al., 2013). The term ‘gifted’ has many connotations, and confusion around it remains. Various terms, such as gifted, talented, intelligent, bright, prodigy, brilliant, etc., are often associated with such groups. Giftedness is classified within educational, psychological, and neurological frameworks, leading to distinct paradigms and implications. The educational domain helps adolescents perform effectively in classrooms, addressing perceived needs and providing support to help them fit into the school environment. In psychology, giftedness is identified mainly through checklists and assessment tools, which are regularly updated to reflect current knowledge. Identification, therefore, combines observation, performance indicators and formal testing. Neurologically, gifted individuals show differences such as larger regional brain volumes and stronger connectivity across brain networks.

The study of giftedness can be traced back to ancient Greece, where Plato (4th century BCE) advocated specialized education for intellectually and physically exceptional youth at his academy. In China, during the Tang Dynasty (6th century),

child prodigies were educated at the imperial court. Across cultures, sociocultural values shaped the recognition of giftedness: Spartans emphasized military skill, Athenians valued academic and physical excellence, Romans cultivated engineering abilities, and India fostered religious and philosophical inquiry.

In these early societies, giftedness was recognized through exceptional early achievements rather than through structured assessments. Interest in individual differences grew in the late 19th century. In the United States, however, education from the 17th to 19th centuries offered a uniform curriculum to all children, regardless of ability. A major shift occurred with Francis Galton, who established a psychometric laboratory in London in the late 19th century. Through his work on measuring mental abilities, Galton concluded that cognitive abilities are largely heritable. Later, Binet and Simon in 1905 developed the first practical intelligence scale for children and Terman, in 1916, revised it at Stanford in the United States (US) and known as be Stanford-Binet test, with the Intellectual Quotient (IQ) being computed and IQ greater than 140 and above, the highest intellectual range were classified as intellectually gifted. The intelligence testing was first introduced in the U S Army placements. Over time, it came to be widely used by educational psychologists within school settings, followed by the emergence of gifted programmes in the US during the Great depression, and it became a priority for people as survival. (Colangelo & Da ,2003). The pioneering studies in the early 20th century in, US were conducted by Lewis Terman and Leta Hollingworth. Terman is known as the ‘Father of gifted education’. He also published a five-volume magnum opus, ‘Genetic Studies of Genius’, a longitudinal study with 1500 gifted children. It was Hollingworth in 1942 who drew attention to the emotional and counselling needs of highly gifted students (Hollingworth,1942). Soon, in 1955, the

American psychologist David Wechsler published the Wechsler Adult Intelligence Scale (WAIS) IQ test with verbal and nonverbal scales and gradually expanded it to children and preschool and primary children- WISC, WPPSI. Apart from assessing intelligence, these tests are also used to test and diagnose giftedness, to identify developmental delays and learning disability. In 1954, the United States established the National Association for Gifted Children (NAGC) to address the growing need to prepare high-ability students for global competitiveness during the Soviet era. Following this, the National Defence Education Act of 1957 marked a major federal initiative in gifted education. Over the years, NAGC has contributed substantially to the field, including the publication of the Pre-K–Grade 12 Gifted Program Standards, which guide seven key areas of service for gifted and talented learners. In 2004, the University of Iowa released an influential report on acceleration strategies, identifying acceleration as one of the most cost-effective interventions for gifted students. This work laid the foundation for the establishment of the Institute for Research and Policy on Acceleration. Currently, countries worldwide offer various programs and national policies addressing giftedness, including government and privately funded organisations for students and parents (Kurup & Nayar, 2013).

Most of the researchers use the giftedness based on IQ testing, though eminent researchers Guilford (1967) and Thurstone (1947) focused on multiple components of intelligence. Sternberg's conception of giftedness widens the giftedness to performance other than potential, such as art, writing, leadership, etc Similarly, Joseph Renzulli shifted the focus to gifted behaviour from gifted individual. So, over the years, the researchers have moved to a more liberal view from a conservative definition of

intelligence, ie, from measurable to difficult-to-define. Also viewing the intelligence as the result of a genetic predisposition interacting with the environment.

Different views and definitions of giftedness

According to **Francis Galton (1869)**, a gifted is described as a person who has demonstrated 'exceptional talent' in some area. He coined the term 'gifted'.

Lewis Terman (1925) first used the term giftedness an IQ of 140 or more. He defined it as 'a degree of brightness that would rate them well within the top one percent of the population'.

Marland (1972) described one of the most comprehensive definitions of giftedness. He was the one who first proposed specific characteristics of gifted children-

- Children having higher performance or potential in one or more of the areas, such as a) general intellectual ability, b) specific academic aptitude, c) creative or productive thinking, d) leadership capacity, e) visual and performing arts, f) psychomotor ability, than their developmentally normal peers are identified as gifted.
- Utilisation of these criteria for identification of the gifted and talented will encompass a minimum of 3 to 5 percent of the school population.

Renzulli (1978) & and Renzulli (2000) reconceptualised the three-ring conception of giftedness. This three-ring model identified three factors that are essential and work together for the development of gifted behaviour: above-average general ability, high levels of creativity and high levels of motivation (task commitment). He also stated that 'creative-productive giftedness' is more likely to be found in

approximately 20% of the population, rather than Marland's estimate of 3-5% of the population (Renzulli, 2000)

Columbus group (a group of researchers,1991) named as asynchronous development, in which advanced cognitive abilities and heightened intensity combine to create inner experiences and awareness that are qualitatively different from the norm.

Munich model of giftedness is the one of the contemporary models of giftedness. It is characterized as a multi-factorized ability construct within a network of noncognitive (motivation, interests, self-concept, control expectations) and social moderators which are related to the giftedness factors(predictors) and exceptional performance areas (criterion variables)

National Association for Gifted Children (2003) in the United States, gifted individuals are those who demonstrate outstanding levels of aptitude (defined as an exceptional ability to reason and learn) or competence (documented performance or achievement in top 10% or rarer) in one or more domains. The domains include any structured area of activity with its own symbol system (e.g., mathematics, music, language) and/or set of sensorimotor skills (e.g., painting, dance, sports).

Gagné (2003) defined giftedness as spontaneous untrained abilities that place the individual in the top 10% of same-age peers in a given domain. Gagne's' differentiated model of giftedness and talent distinguishes between potential and achievement. It suggests the presence of high abilities (intellectual, creative, socio-affective potential) that may or may not develop in to talent (achievement) depending on catalysts such as motivation, environment and individual's temperament.

According to **Jacob K Javits Gifted and Talented Students Education Act** of 2001, in US –gifted children were defined as ‘students, children, or youth who give evidence of high achievement capability in areas such as intellectual, creative, artistic, or leadership capacity, or in specific academic fields, and who need services and activities not ordinarily provided by the school to fully develop those capabilities’

Summarizing, it is to be noted that the specificities in definitions- as high in general intellectual capacity (Marland), Three Ring Model- High IQ, Task commitment and creativity (Renzulli), presence of high abilities (Gagne), IQ=140 and above on any intelligence tests (Terman), at or above 95th Percentile, intellectual superiority (SPM), IQ above 130 as very superior intelligence (WISC-IV) or Intellectual giftedness (Guenole et al.,2013; Riaz et al.,2013, Guignard et al.,2012, Nail & Evans,1997, Shaywitz et al.,2001), all considered high intelligence as one of the major factor for giftedness. Various literatures are available regarding definitions and these intersect some common characteristics. (Rinard, 2008, as cited in Case Profiles of Gifted Children, 2019) -giftedness as ability superior to age peers, the term revolves around the issues of whether giftedness is innate or developed through application and the programmes define anywhere between 1-20 percent of the population as gifted.

Characteristics of giftedness

No two gifted individuals are identical. Each displays a distinct combination of abilities and characteristics. Many gifted learners share certain common traits and no single individual demonstrates them all. According to the Davidson Institute for Talent Development, there are several common characteristics often observed among gifted children:

- Ability to comprehend material several grade levels above their age peers

- Surprising emotional depth and sensitivity at a young age
- Strong sense of curiosity
- Enthusiastic about unique interests and topics
- Quirky or mature sense of humour
- Creative problem solving and imaginative expression
- Absorbs information quickly with few repetitions needed
- Self-aware, socially aware, and aware of global issues

The National Association for Gifted Children (NAGC) characterises cognitively gifted or intellectually gifted as keen power of abstraction, interest in problem-solving and applying concepts, large vocabulary, voracious and early leader, intellectual curiosity, scepticism, power of critical thinking, self-criticism, goal-directed behaviour, persistence, independence in work and study and diversity of interests and abilities.

According to Gross et al. (2005), there are differences both of degree and of kind in how a gifted learner assimilates new information or solves a problem (Kurup & Nayar, as cited in An introductory reading to giftedness, NIAS report, 2013). Both qualitative differences and quantitative differences are reported. Qualitative, or differences of kind, are reflected in how gifted learners use time when solving problems or completing tasks, the depth with which they explore possible solutions, the types of relationships they spontaneously perceive among problem elements, and the way they absorb and store information - often by chunking elements and grasping concepts holistically. In contrast, differences of degree, or quantitative differences, relate to tendencies such as a stronger preference for working independently and a greater inclination toward learning something entirely new rather than building incrementally on existing knowledge.

Different concepts and types of giftedness

The various connotations under the term giftedness were described below:

Giftedness

The Differentiated Model of Giftedness and Talent defines giftedness as the possession and spontaneous, untrained expression of superior natural abilities in one or more domains, at a level that places an individual among the top 10% of age peers. (Gagne,1999).

Talent

Talent refers to an ability or skill that has been systematically cultivated to an exceptional level, placing an individual among the top 10% of age peers who are active in that field. An individual who begins with a natural gift can develop it into a talent through various catalysts, including intrapersonal factors such as maturity, motivation, and interests, as well as environmental influences such as family, school, and even chance opportunities. (Kurup & Nayar, as cited in An introductory reading to giftedness, NIAS report, 2013) .

Skill

A skill is defined as a primarily motor-based ability, evident in areas such as sports, musical performance, and other physical or physically oriented activities. (Kurup & Nayar, as cited in An introductory reading to giftedness, NIAS report, 2013).

Bright

A child who appears bright is often a high achiever in the classroom. However, not all high achievers are truly gifted, and not all gifted children necessarily perform as

high achievers. (Kurup & Nayar, as cited in An introductory reading to giftedness, NIAS report, 2013).

Savants

The American Association on Mental Deficiency defined a savant as ‘a person with low general intelligence who possesses an unusually high skill in some special tasks like mental arithmetic, remembering dates or numbers, or in performing other rote tasks at a remarkably high level’ (Grossman, 1983). About 10% of autists are savants, as opposed to 1% of the general population who are savants.

Prodigy

The term child prodigy refers to a distinctly developmental phenomenon in which very young children demonstrate expertise at levels typically seen only in adults. According to Shavinina (2007), a prodigy is a child who, before the age of 10, exhibits exceptional intellectual or creative performance and/or achievements in any natural domain, such as intellectual, musical, or artistic fields.

Twice exceptional

Twice Exceptional (or 2e) describes children who possess outstanding ability in one or more areas while simultaneously having special needs in others. These children may achieve high scores on intelligence tests but still struggle with academic performance. Their giftedness may coexist with conditions such as autism, emotional or behavioural disorders, learning disabilities (e.g., dyslexia, dyscalculia, dysgraphia), ADHD or ADD, visual or auditory processing difficulties, or sensory integration and modulation disorders (Chamberlin, Buchanan, & Vercimak, 2007). It is estimated that approximately 2% to 5% of children with disabilities are also gifted (Nielsen, 2002).

Specific giftedness

The individuals who are brighter than others in one area, like an individual who is exceptional at intelligence, academics, mathematics, languages, creativity, leadership, arts, chess, sports, etc. For example, an academically gifted student who is superior among his peer groups in terms of academic excellence is academically gifted. Cognitive giftedness is more specific in terms of highly excellent in different cognitive skills such as attention, comprehension, reasoning, working memory, processing speed etc... Intellectual giftedness is used interchangeably with cognitive giftedness.

Intelligence and giftedness

Earlier, exceptional general intelligence was considered the primary hallmark of giftedness, but it is now viewed by most authorities as only one of many possible manifestations (Gardner, 1983; Pfeiffer & Jarosewich, 2003; Sternberg, 1997). The multidimensionality of outstanding abilities is the core feature of giftedness in new theories. (Gagne, 1999; Gardner, 1983; Sternberg, 1997). In the Munich Model of Giftedness and Talent, the following aspects of talent are considered: intelligence, creativity, social competence/leadership, and musical-artistic abilities (Zigler & Heller, 2000). The current research focused on one type of giftedness, intellectual. Robert Sternberg (1997) succinctly states that “intelligence comprises the mental abilities necessary for adaptation to, as well as shaping and selection of, environmental context. Intellectual giftedness includes cognitive abilities such as verbal and/or nonverbal abstract reasoning, effective and efficient problem solving, insight, mental speed, and memory (Pfeiffer & Jarosewich, 2003). Gifted children may exhibit a wide range of talents, including aesthetic, artistic, athletic, creative, dramatic, interpersonal, and musical abilities, among others. The number and types of gifts are constrained only by

what a particular society recognises and values as culturally significant (Pfeiffer, 2002). Research indicates that many types of talents are moderately intercorrelated among gifted children; however, this pattern does not hold for all individuals (Pfeiffer & Jarosewich, 2003). Most, if not all, multidimensional definitions of giftedness incorporate some reference to intelligence, which is understood as goal-directed mental activity characterised by efficient problem solving, critical thinking, and effective abstract reasoning (Pfeiffer, 2002).

Intellectual giftedness

According to WISC-IV, in India and the UK, an Intellectual quotient (IQ) greater than or equal to 130 is categorised as ‘very intellectual superiority’. Many researchers considered this IQ score of 130 as intellectually gifted (Pfeiffer et al.,2012; Sparrow et al.,2005; Erden et al.,2018)

According to SPM, a score at or above the 95th percentile is categorised as intellectually superior or grade 1. Many researchers used this top percentile as intellectually gifted (Tyerman,1986).

Levels of giftedness

The level of giftedness is computed via standardised IQ tests administered individually to the adolescents. The Stanford-Binet test and the Wechsler Intelligence Scale for Children are the commonly used psychometric measures to assess intellectually gifted adolescents. The Stanford-Binet has a standard deviation of 16 and the Wechsler scale has a standard deviation of 15. Both use a scoring procedure for the highest ranges of IQ known as Extended IQ with extended norms (Zhu et al.,2008). The WISC IV extended IQ and categorised the IQ ranges as mildly gifted (115-129),

moderately gifted (130-144), highly gifted (145-159), exceptionally gifted (160-179) and profoundly gifted (180 and above). The Stanford-Binet scores SB5 revised the levels of giftedness with extended IQ as moderately gifted (125-144), highly gifted (145-159), exceptionally gifted (160-179) and profoundly gifted (180+) (Kurup & Nayar, 2013). These were for the extended norms, UK only. Indian norms for the extended IQ is not available to both SBT and WISC IV India. Hence, the IQ score of above 130 as per WISC IV, Indian norms were considered as intellectually gifted and used in the research. Different researchers have also classified the levels of giftedness. An international group estimated the ranges of IQ corresponding to the levels of giftedness as gifted (IQ range= 130-144 with approximate frequency 1:40 to 1:1,000), highly gifted (145 to 159 with approximate frequency of 1:1000 to 1:10,000), exceptionally gifted (160 to 174 with approximate frequency of 1:10,000 to 1:1 million) and profoundly gifted (175 and above with approximate frequency of rarer than 1:1 million). Shawyitz and colleagues (2001) grouped the gifted as a low intellectually gifted group (IQ=124-139) and a highly gifted group (IQ=140 and above).

Researchers usually use the above classification as per their purpose, objectives and requirements of their work.

Prevalence of giftedness

The variations in prevalence exist depending on different cultures and the use of psychometric measures. The IQ tests and achievement tests are traditionally regarded as the gold standard for the identification of gifted in a quantified way. Commonly accepted IQ-based measures of giftedness have estimated the top 3-5 percent of the population to be gifted (NIAS,2013), 1- 2% (Terman,1925), top 10% among peer groups

(Gagne,2003). Other measures reveal 5 to 10% (Renzulli,2000) and 20 % (Marland,1972).

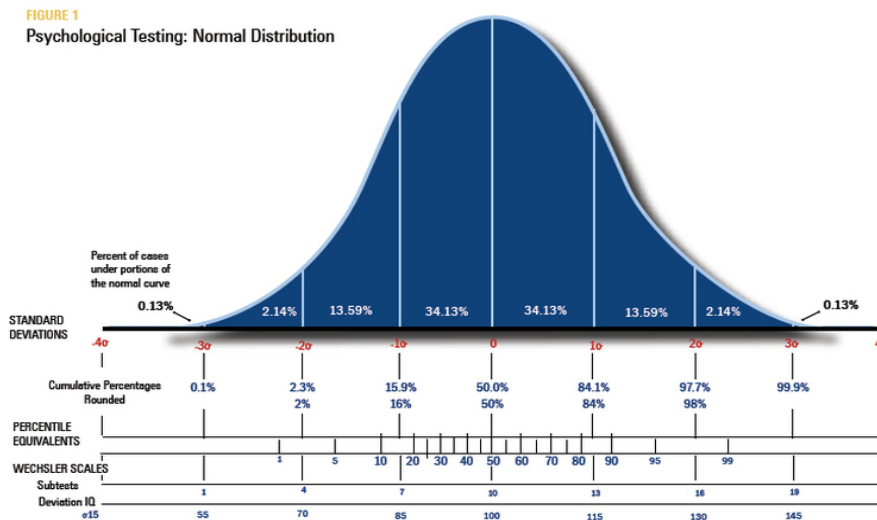
According to Gagne (2008), the terms ‘gifted or talented’ can be qualified in the following manner:

Table 1.1

Descriptive statistics of the level of giftedness

Level of Giftedness	Fraction of Population	Frequency of Occurrence
Mildly	Top 10%	1: 10
Moderately	Top 1%	1: 100
Highly	Top 0.1%	1: 1,000
Exceptionally	Top 0.01%	1:10,000
Extremely	Top 0.001%	1: 100,000

The Wechsler series and other prominent intelligence tests consider the Gaussian curve of normal distribution with a mean IQ of 100 and a standard deviation of $15(\pm 1)$. It covers 68% of the population. The very superior of the intellectually gifted group had a standard deviation of +2 ($IQ \geq 130$) covering 2.2 % population (WISC IV India,2012). Research suggests that the ‘tails’ of the actual distribution of intelligence (along with that of many other traits hypothesised to lie along a normal distribution) are in fact thicker than a Gaussian curve. In other words, there may be more individuals at both the lower and the upper extremes of intelligence than hereto believed (Kurup & Nayar,2013). Many recent studies and definitions supported these facts (Gagne,2003; Renzulli,2000).

Figure 1.1*Normal distribution***Aetiological basis for giftedness**

The origins of giftedness are multifactorial, involving complex interactions between genetic, neurobiological, psychological and environmental influences. No single factor can fully explain giftedness. It emerges from the dynamic interplay of biological endowment and experiential opportunities.

Genetic and Hereditary factors:

Twin and family studies consistently show that intelligence has a substantial genetic component with heritability estimates ranging between 50-80%. Heritability accounts for 40 % IQ at age 10, 20% variance at age 1yr and 80% to adulthood. As individuals age, hereditary influences on their intelligence increase, while the influence of environmental factors correspondingly decreases. The IQs of adults correlate highly with those of their biological parents (Neisser et al.,1996). Specific genes that are linked to synaptic plasticity, neurotransmitter regulation and brain development have been associated with higher cognitive potential. Moreover, giftedness is not determined by a

single ‘gifted gene’ but by the cumulative effect of many genetic variants interacting with the environment. Apart from this, family clustering highlights giftedness as observed across generations, supporting a hereditary contribution. Genetic propensities can be more fully cultivated, expressed, and acted upon in more enriched and supportive environments (Bronfenbrenner et al., 1994). Some aspects of gifted cognitive ability have a hereditary component, according to research (Thompson et al., 2002). It would appear that effortful and deliberate practice is also important in the development of gifted abilities. (Ericsson, 1993) Hence, giftedness is the product of a reciprocal dynamic relationship between hereditary endowment and environment (Labuda et al., 1987; Scarr, 1983).

Neurobiological basis

The neurological perspective suggests that the gifted brain is different from a neurotypical brain. The larger regional brain volume, greater connectivity across brain regions, increased brain activation, greater sensory sensitivity and increased brain areas associated with emotional processing are the differences compared to the neurotypical brain.

- *Larger regional brain volume*

Gifted persons often show increased grey matter volume in specific brain regions linked to higher intelligence and sensory processing. Larger frontal lobes enhance executive functions, memory, decision making and social reasoning; temporal lobes support auditory processing, memory and emotion; parietal lobes aid attention, sensory integration and visuospatial skills and the occipital lobe connects visual input with stored images. These brain differences align with Dabrowski’s theory of overexcitabilities, though their link to giftedness remains debated. Brain development

is asynchronous, meaning different areas mature at different rates, leading to uneven strengths and weaknesses. This can cause minor quirks or, in extreme cases, twice exceptionality where exceptional abilities coexist with challenges such as dyslexia, ADHD or autism. While many gifted children can adapt, those with significant asynchrony may require targeted support to develop their potential fully (Haier et al., 2004; Montgomery, 2018).

- *Greater connectivity across brain regions*

Gifted brains show increased connectivity, more white matter tracts linking brain regions, which can enhance rapid information processing and unique connections. FMRI studies reveal these connections, similar to high-speed highways, though “traffic jams” can still occur, slowing thought. The slow processing speed in gifted persons may stem from measurement issues, white matter traffic jam or asynchronous brain development, causing coordination difficulties. Their rich connectivity can lead to rapid but tangential thought chains, sometimes producing brilliance, other times resembling attention issues (Penke et al., 2012).

- *Increased brain activation*

Gifted children often thrive with an accelerated pace of learning due to increased bilateral brain activation, larger brain volumes and more white matter tracts (Lee et al., 2006; Haier et al., 2004). They need continual challenge to stay engaged; without it, boredom can lead to fidgeting, inattention and self-doubt. Many grasp big concepts quickly but struggle with foundational steps (“whole-to-part learning”), benefiting from working backwards from the big picture and using interests for context. Teaching should align with their strengths and asynchronies, allowing them to work at their natural pace. High brain activation can appear as restlessness but often reflects

intense mental engagement. This need for brain activation can manifest as fidgeting or inattention. The comprehension of new material and understanding expectations to implement it at a higher level are challenging for them. A child may follow a concept, but not necessarily have the skills or ability to demonstrate that knowledge in every circumstance. Another scenario, mathematically gifted children show greater overall and bilateral cortical activation, especially during mental rotation tasks (O'Boyle,2005). When highly engaged, their brain operates in a coordinated, high-capacity "flow" state, which can spill over into physical movement like pacing or fidgeting (Eide & Eide ,2004). Brain scans often depict this intense activity as if the brain is on 'fire'. Without meaningful outlets, this intensity can contribute to stress, depression or existential concerns.

- *Greater sensory sensitivity*

Gifted children are highly sensitive to their environment, often displaying heightened emotional and behavioural responses. Dabrowski's concept of "superstimulabilities" describes their amplified neurological activity, not just intensity. Research shows they process auditory input faster, louder, and longer due to more efficient neural networks. This heightened sensory response can resemble Sensory Processing Disorder (SPD), where sensory signals become scrambled, leading to hyper- or hypo-sensitivity. While SPD and super-stimulabilities overlap, the key concern is their impact; without support, these sensory asynchronies can affect daily functioning, relationships, and mental health (Davidson Institute for Talent Development, 2008).

- *Increased brain areas associated with emotional processing*

The individuals with higher intelligence have a larger volume in two regions of the limbic system, which is associated with emotional processing (Ohtani et al.,2014).

The greater connectivity in these regions explains the reasons of gifted individuals process all information through an emotional filter. The qualitative hallmarks of giftedness, including the intense demand for truth and justice, existential depression, a more emotional lens, and, for some gifted children and adults, a more emotional or empathic link_(Tolan,2018) than other people could be explained by this emotional integration. The deep capacity for empathy felt by gifted individuals, even at an early age, was examined with the help of two studies- a study by Penny et al. 2018 explored the possible connections between anxiety, worry, and intelligence. The study found that verbal intelligence was a unique positive predictor of worry and rumination severity; it was found that individuals with high IQs showed increased volume in their right uncinate fasciculus (Song et al.,2018). This study concluded that the uncinate fasciculus is an important white matter tract underlying intelligence. Years later, a study conducted by Oishi determined that the right uncinate fasciculus plays an important role in the emotional empathy network. The asynchronous development had an effect on peer relations (Gross,2018). The gifted eleven-year-old boy may wish for a friend in whom to confide more adult concerns, while his age peers are far more interested in video games and pre-pubescent humour.

Cognitive basis

One emerging trend in giftedness research is the move toward deconstructing the unitary notion of intelligence into its underlying cognitive abilities (Chekaf et al., 2018; Rowe et al., 2014; Wai et al., 2022). This perspective allows for a more refined understanding of how such abilities are profiled in gifted children. In this framework, intelligence may be viewed as the visible tip of an iceberg, beneath which lies a broad and diverse set of cognitive processes that contribute to intellectual functioning (Gow,

2016; Schneider & Newman, 2015). Domain-general cognitive abilities can be conceptualised as a set of brain processes that enable individuals to engage in a wide range of activities, from basic tasks such as perceiving stimuli in the environment to more complex undertakings, such as planning and organising a demanding week of work. Similar to the construct of intelligence, cognitive abilities have been extensively examined for decades (Atkinson & Shiffrin, 1968; Baddeley & Hitch, 1974; Diamond, 2013). Within this body of research, individual cognitive processes are generally categorised into specific domains, including attention (Sohlberg & Mateer, 1989), memory (Baddeley & Hitch, 1974), and executive functions (Lezak, 1982), among others. Notably, executive functions represent one of the domains most closely associated with intelligence (Chen et al., 2019; Deary et al., 2009; Debraise et al., 2020; Gray et al., 2022; Takeuchi et al., 2021). This strong association is supported by neuroimaging evidence indicating that both executive functions and intelligence are primarily mediated by the prefrontal cortex of the human brain (Friedman & Robbins, 2021; Jones & Graff-Radford, 2021; Sternberg, 2012).

Generally, the cognitive basis of intellectual giftedness is characterised by enhanced abilities in several core areas, including exceptional working memory, processing speed, reasoning, attention, and strong verbal skills. Research states that gifted adolescents show a significantly higher capacity for working memory, allowing them to simultaneously hold and manipulate more information (Aubry, 2021). In terms of processing speed, they can process elementary information and execute tasks more quickly, demonstrating advantages in tasks related to speed and efficiency. They can easily grasp complex ideas, make connections between different facts, and apply concepts across various domains, and hence their reasoning skills are stronger (Asensio

et al., 2023). They exhibit a tight focus and can be very persistent in their goal-directed learning and problem-solving. Apart from these features, they often have a large vocabulary, enjoy wordplay, and may even create new concepts with their wide knowledge and comprehension.

Psychological and Social/Environmental Basis

A person starting with a gifted has the opportunity to develop it into a talent by the agency of a variety of catalysts. These catalysts include interpersonal factors such as maturity, motivation, interests, chance and environmental factors such as family and school. The metacognition, motivation and self-regulation contribute to the realisation or suppression of potential. The less the temperamental issues, the more would be the cultivation of cognitive components. Similarly, psychosocial factors have a predominant effect on the development of children's talent, temperament and personal growth. The role of healthy parenting, family environment, peer group, motivation and social support has a major impact on the achievements in one's life. Psychosocial vulnerabilities may also affect children with high intelligence or very superior children to have emotional and behavioural issues throughout their entire life span, which may hinder their potential. A common myth on the fact that such gifted children would be born enough to cope with such vulnerabilities (Kurup & Nayar, 2013). Research on epigenetics found that the environment (nutrition, stress, stimulation) can alter gene expression, impacting cognitive and emotional development.

The theory of Olson's circumplex model (Family system's model) explains how family functioning affects individual development including emotional and behavioural problems. The two core dimensions, family cohesion and family flexibility and facilitating dimension communication play a major role in this (Olson, 2000). The

balanced families fall in central area of intersecting axes (low to high) while extremes (too high or too low) are considered unbalanced and linked to psychosocial difficulties. A gifted adolescent with high cognitive abilities may seek autonomy in problem solving. A rigid parent or family may experience more conflict while a flexible family supports healthy independence and helps to thrive.

Hence, we could say intelligence is not something an individual is born with but is developed over time, through interactions with and feedback from the environment and depending on the initial individual tendencies and abilities.

Existing theoretical frameworks associated with giftedness

Though high intelligence is often viewed as a protective factor, its relationship with emotional and behavioural problems (EBPs) is nuanced. Renzulli's three ring model, the theory of asynchronous development, overexcitability theory and twice exceptional (2e) were theoretical frameworks work supported

- ***Renzulli's Three-Ring Conception of Giftedness***

Joseph Renzulli's Three-Ring Conception of Giftedness (1978, 1986) represents one of the most influential paradigms shifts in the conceptualisation of giftedness. Departing from the traditional psychometric view that equates giftedness primarily with high intelligence or IQ, Renzulli proposed that giftedness is not a fixed personal attribute but a dynamic pattern of behaviour emerging through the interaction of three essential traits: above-average ability, creativity, and task commitment. According to this model, gifted behaviour is demonstrated when these three characteristics converge and interact within an individual, rather than existing independently (Reis & Renzulli, 2023).

Within the model, above-average ability encompasses both general intellectual abilities and domain-specific aptitudes. Renzulli argued that exceptionally high intelligence is not a prerequisite for outstanding achievement; instead, individuals with abilities in approximately the upper 15–20% of the population may demonstrate gifted behaviour when supported by creativity and sustained motivation. Creativity refers to originality, flexibility of thought, curiosity, and the capacity to generate novel ideas, while task commitment extends beyond ordinary motivation to include perseverance, intrinsic interest, determination, and sustained effort toward meaningful goals. Renzulli considered task commitment a critical factor that transforms potential into productive achievement (Reis & Renzulli, 2023).

Another significant contribution of Renzulli's theory is the distinction between schoolhouse giftedness and creative-productive giftedness. Schoolhouse giftedness refers to the abilities typically recognized through standardized tests, academic achievement, and classroom performance. In contrast, creative-productive giftedness involves the application of knowledge, creativity, and motivation to generate original ideas, innovative products, or meaningful solutions to real-world problems. Renzulli argued that while schools traditionally emphasize academic excellence, society benefits more profoundly from individuals who demonstrate creative-productive giftedness through innovation and knowledge creation. (Reis & Renzulli, 2023).

- ***Theory of Asynchronous Development***

Asynchronous development refers to the uneven development often observed in gifted children, where their intellectual, emotional, and physical development do not progress at the same rate. It is primarily associated with the work of Linda Kreger Silverman, an American psychologist and a leading expert in gifted education. She

introduced and developed this theory through her work at the Gifted Development Centre. Gifted children may show advanced cognitive abilities but have emotional or social development more typical of their chronological age or even younger. This developmental asynchrony can contribute to psychosocial challenges, such as emotional distress, heightened sensitivity, perfectionism, social difficulties or difficulties in peer relationships, when emotional maturity lags behind intellectual capacity (Silverman, 2009).

- ***Theory of Overexcitability***

Gifted youth may show heightened emotional, intellectual, or psychomotor sensitivity, termed "overexcitabilities" - which can predispose them to internalising problems like anxiety, perfectionism, or depression. In Dabrowski's (1964) theory of positive disintegration, he posited that there were five areas of heightened emotional response. Over-excitabilities (OEs) include: a. psychomotor (pressure for action)-impulsiveness, restlessness, pursuit of intense physical activity, workaholism, the capacity for being active and energetic b) Sensual overexcitability c) imaginal overexcitability d) emotional overexcitability((intense connectedness with others)-in strong attachments, living things or places, intense desire to offer love, compassion, responsibility, feeling of inadequacy and inferiority, self-examination and e) intellectual (intellectual and moral pursuits) - asking probing questions, curiosity, avidity for knowledge and analysis, independent thinking, search for knowledge and truth, love of ideas and theoretical analysis "Emotional Cognition" showed positive correlation with "intellectual OE" (Silverman & Falk, 1994; Silverman, 1993). These characteristics can be observed in gifted/talented individuals. If the gifted/talented lacked some degree of

intensity in the five primary components of psychic life, then talent was merely technical facility lacking heart and fire (Piechowski, 2002).

- ***Twice-Exceptional (2e) Framework***

This model examines individuals who are both intellectually gifted and have a co-occurring psychological/ learning disorder/emotional and behavioural problems (e.g., ADHD, ASD). The mismatch between cognitive strengths and behavioural/emotional challenges can lead to frustration and maladaptive behaviours.

Depending on the needs of gifted education programmes, 1) education that will enable the children equal opportunity to develop his abilities by The United Nations Declaration of the Rights of the Child (Office of the High Commission for Human Rights (1959)) and 2) the gifted children constitute an important resource, which must be developed in the interests of our countries future (Colangelo N, 2004) 3) to help develop a healthy self-concept (Gross, 1993), prevent underachievement (Whitmore, 1986), and enhance motivation to learn (Wolfle, 1989), Following are the basic theories underlying intervention programmes for the gifted -Zone of Proximal Development/Dynamic Assessment and Structural Cognitive Modifiability / Learning Propensity Assessment Device.

- ***Zone of Proximal Development/Dynamic Assessment***

The developmental psychologist Lev Vygotsky (1896-1934) described the zone of proximal development (ZPD) for children as ‘the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers’ (Vygotsky, 1978). The ZPD, in other words,

is the difference between what the child can achieve on his/her own, and what he/ she can achieve when guided by an adult or a more experienced peer. DA emphasises the child's fluid intelligence, placing less importance on what the child already knows; it may thus be an inherently more culture-fair means of gifted identification (Kurup & Nayar, 2013).

- ***Structural Cognitive Modifiability / Learning Propensity Assessment Device.***

The theory of structural cognitive modifiability (SCM) was developed by Feuerstein (1990). It views the human organism as open, adaptive, and capable of change. The aim of SCM is to modify the individual, emphasising autonomous and self-regulated change. Intelligence is viewed as the tendency of the organism to modify itself when confronted with the need to do so. It involves the capacity to be modified by learning and the ability to use whatever modification has occurred for future adjustments. Intelligence is thus regarded as intrinsically modifiable rather than as a fixed quantity. Cognition is viewed as central role in such modifiability; behavioural and emotional conditions are viewed as modifiable through cognitive intervention; and behaviours (physical and psychological) are viewed as creating new cognitive structures via brain plasticity. Two types of interactions may trigger the development of higher cognitive functions: direct experiences and mediated learning experiences (MLE). Mediated learning experiences are essential to a child as they facilitate direct learning experiences by providing the prerequisites.

Identification methods of intellectual giftedness

The identification methods are generally used for research purposes and educational practices of gifted children and adolescents. Based on the purposes, single measures and multidimensional mode of identification tools are used. Recently though

single measure, a comprehensive approaches like WISC-IV and Standford Binet test was commonly used for research works of gifted children and adolescents. Similarly, teacher nominations and checklists for domain-wise selections and observational assessments along with IQ were used for gifted education programmes. Broadly, identification methods fall into four approaches – psychometric, performance-based, observational and ecological approaches.

1. Psychometric methods

Psychometric methods are the traditional and cognitive assessments used to identify intelligence, including intellectual giftedness. The Intelligence/Cognitive tests and achievement tests come under this method. The standardized IQ tests include WISC-IV, WISC-V, Stanford Binet versions, Raven Progressive Matrices, Kaufman Assessment Battery, etc..The IQ scores above 125-130 typically indicate giftedness, and above 145 indicates highly gifted. The strength of such assessments is objective, norm-referenced and reliable. A few achievement tests like Woodcock-Johnson Tests of Achievement, Talent Search tests etc.. It helps to identify children performing significantly above grade level. These tests are widely used in schools, clinical settings and research programmes.

2. Performance-Based Methods

This method includes curriculum-based assessments, portfolios, work samples and competitions and talent programs. The curriculum-based assessments evaluate mastery of the school-level curriculum beyond age expectations. The portfolios and work samples consist of a collection of creative writing, artwork, problem-solving projects or science models. It is particularly useful for identifying talent in non-academic areas (art, creativity, leadership). The competitive and talent programs

include participation and performance in Olympiads, math contests, music/dance exams or innovation challenges. These are mostly used in school settings, both normal and gifted education schools.

3. Observation and Rating Scales

This method of identification of gifted children and adolescents is through teacher nomination, parent nomination and peer nomination. Teachers use checklists, rating scales like Renzulli scales for rating behavioural characteristics of superior students, Gifted rating scales (GRS) etc.. and nomination criteria. The strength of teacher nomination is that teachers see students' classroom behaviours daily. The limitation is its subjectivity and may be biased toward complaint or high-achieving children. Parents are often the first to notice advanced language, curiosity and problem solving and useful in early childhood when formal testing may not be possible. Peers can recognise classmates who are leaders or unusually skilled. Least used nomination, but can highlight social/ creative giftedness. These are mostly used in school and home settings.

4. Multidimensional approaches

This method considers other dimensions along with high intelligence. Renzulli's three-ring model (1978), Gardner's Multiple Intelligences Framework (1983) and Dynamic Assessment (Feuerstein,1970) come under this. Renzulli's model identifies the interaction of above-average ability, creativity and task commitment. Gardner recognises linguistic, logical, mathematical, spatial, musical, bodily kinesthetic, interpersonal, intrapersonal and naturalistic intelligence. The dynamic assessment follows the 'Test-teach-retest' model, focusing on learning potential rather than static IQ. The biopsychosocial model considers cognitive, psychosocial, emotional, cultural

and environmental aspects in the identification process, especially during gifted educational practices.

Measures of creativity and divergent thinking have also been part of this measure helps to identify the students who may not score exceptionally high on IQ tests but demonstrate creative giftedness. Torrance tests of creative thinking, which measure fluency, flexibility, originality and elaboration and Guilford's divergent thinking tasks, which measure problem solving from multiple perspectives.

Our research was more towards psychometric methods, though teacher nomination was used in the referral stage.

Intellectual giftedness and psychopathology

The relationship between intellectual giftedness and psychopathology has long been debated in psychology and education. Though giftedness is commonly associated with advanced reasoning, creativity and academic achievement, researchers have also noted that gifted individuals may be at heightened risk of emotional and behavioural problems. The perspective of 'well-adjusted myth' emphasises that gifted adolescents and children are generally well adjusted as their peers or even better. Also argue that the high intellectual ability is often a protective factor with problem-solving skills, adaptability and resilience that reduce the risk of psychopathology (Hollingworth,1942). Contrary to this, the 'vulnerability hypothesis' proposes that giftedness may predispose individuals to psychological difficulties. This stems from factors such as asynchronous development, heightened sensitivity, perfectionism and social isolation due to being different from peer mates (Peterson,2009). Research under this view highlights increased risk for emotional problems, inattention, anxiety, depression and peer relationship problems among gifted adolescents (Wellisch &

Brown, 2012). The adults with intellectual superiority also reported having emotional problems, anxiety, depression, psychosis and so on. The continuum model suggests that giftedness is not inherently protective or pathological but interacts dynamically with environmental and contextual factors. They thrive in supportive familial and educational environments but struggle when their needs are neglected (Neihart, 2018). Hence, the outcome depends on the interplay between cognitive potential, socioemotional development and contextual supports. Adolescence, being a transitional stage of identity formation, peer integration, and emotional development, is a particularly sensitive period in which the risk-resilience balance of giftedness becomes evident.

Intellectual giftedness and the adolescent period

Adolescence is a critical developmental stage marked by significant cognitive, emotional, and social changes, which are often more pronounced in intellectually gifted individuals. Gifted adolescents typically demonstrate advanced abstract reasoning, creativity, and problem-solving abilities; however, they may also encounter psychosocial difficulties, such as heightened sensitivity, perfectionism, and challenges in peer relationships (Neihart et al., 2018; Cross & Coleman, 2014). In recent decades, the relationship between intellectual giftedness and psychopathology in children and adolescents has been the subject of investigation. Despite considerable progress in research, findings remain inconsistent. Some studies indicate that gifted children may be particularly vulnerable to socio-emotional difficulties, including emotional problems, anxiety, depression, poor peer relationships, and even self-harm (Delisle, 1980; Manaster & Powell, 1983; Plucker & Levy, 2001; Silverman, 1993; Wellisch & Brown, 2012). In contrast, other research reports that gifted children demonstrate higher

levels of social maturity and adjustment than their typically developing peers (Eklund et al., 2015; Kelly & Colangelo, 1984; Neihart, 1999; Neihart et al., 2002; Pontes de França-Freitas, Del Prette, & Del Prette, 2014). High levels of intelligence have also been identified as protective factors against internalizing problems such as generalized anxiety disorder and posttraumatic stress disorder (Fergusson & Lynskey, 1996; Kandel et al., 1988; Koenen et al., 2007; Martin et al., 2007). At the same time, there is evidence to suggest that many gifted children display no greater behavioural or emotional adjustment difficulties than their peers, with only a minority requiring specialized intervention (Morawska & Sanders, 2008). Collectively, this body of research highlights the heterogeneity of psychosocial outcomes in gifted populations and underscores the need for further empirical work to clarify the conditions under which intellectual giftedness functions as either a risk or protective factor, in conjunction with other psychosocial factors.

Cognitive and psychosocial changes in intellectually gifted adolescents

There are cognitive and psychological differences in gifted adolescents compared to average group. The cognitive differences are in terms of rate of cognitive development, advanced abstract and logical thinking, enhanced metacognition, intense intellectual curiosity and uneven cognitive profile. The cognitive development in gifted adolescents occurs earlier and faster. They reached abstract reasoning and metacognition at a younger age. They begin to think about possibilities (what-if scenarios) and future consequences much earlier (abstract, hypothetical and logical reasoning). They started to think about their own thinking processes and became more self-aware and can evaluate their strengths, weaknesses and strategies much faster. For eg, a gifted 12-year-old may understand concepts like probability, ethics or physics, that

an ‘average’ peer group only at 15-16 years. On the other hand, average adolescents gradually reach higher-order thinking later. The abstract thinking may be inconsistent. The gifted adolescents show deeper and more complex reasoning. They can see multiple solutions or perspectives in a situation. For eg, while discussing climate change, a gifted adolescent may connect science, economics, politics and ethics in one explanation. The average adolescent may understand the issue but explain it in simpler cause-effects. They could reflect back on their thoughts, strategies and mistakes and self-monitor their learning and often prefer independent learning. (meta cognition) A gifted student may say: This method didn’t work, and will try a different strategy for maths problem or do certain works in own way than what teacher followed. The average student may prefer to follow teacher’s guidance and may not analyze their own thinking. Another difference is in intense intellectual curiosity. The gifted adolescent may ask deeper ‘why/how’ questions and read extensively and explore topics much beyond the textbook. The average adolescent may learn the syllabus content but may not pursue topics at deeper levels unless encouraged. The uneven cognitive profile (asynchronous development) may be seen in gifted adolescents. Those who are very high in verbal or perceptual reasoning but sometimes average or low in processing speed. For eg., a gifted boy may solve complex puzzles quickly (high perceptual reasoning), but write slowly (low processing speed). The average group may have more balanced abilities across cognitive domains.

In terms of psychosocial differences, the differences occur in identity formation, emotional intensity, peer relationships, autonomy and independence, moral and ethical development and psychosocial vulnerabilities. The gifted adolescent may form identity around abilities (“I am different,” “I am a thinker”). Sometimes struggles with being

“different” from peers. For eg, a gifted teen may hide their abilities to fit in. For average adolescents, the identity is formed around peer group, hobbies, appearance and social roles. The gifted experience emotions more intensely (excitability, sensitivity) and are more prone to emotional symptoms like anxiety, overthinking and perfectionism. For eg, a small mistake in an assignment may cause high stress or a feeling of failure. The average adolescent's emotional reactions are present but not usually as intense. The gifted adolescents may prefer friends who match their intellectual level and may feel socially isolated if peers don't share interests. For eg, a gifted teen interested in astronomy or physics may struggle to bond with peers who discuss only social media or fashion. The peer relationships of average adolescents are based more on similarity in lifestyle, fun and social interests. The gifted adolescents seek independence earlier. They want to make decisions on their own learning, hobbies and projects. They may initiate independent projects like coding apps, writing books and building models. But autonomy develops gradually more they rely on parents and teachers. Similarly, in gifted adolescents presence of more advanced moral reasoning, like fairness, justice and global issues, is formed. They question rules and authority if they find them illogical. They may debate school policies or social issues more passionately. The average tends to follow rules more routinely and moral thinking is less complex. There is a high risk for psychosocial vulnerabilities such as emotional problems like anxiety, depression, peer rejections and existential concerns. He may think, ‘Why am I different from others?’. The average adolescent may have more typical adolescent concerns: appearance, peer acceptance, academics and social media.

Theoretical frameworks on the role of cognitive-psychosocial aspects in the psychological vulnerabilities of intellectually gifted adolescents

The Neurodevelopmental model of giftedness and psychopathology (Neihart,1999; Kim,2016) was proposed to explain why intellectually gifted adolescents sometimes show more serious emotional and behavioural problems, despite their advanced cognitive abilities. It suggests that giftedness and psychopathology share overlapping neurodevelopmental mechanisms, meaning that the same brain systems that underlie exceptional cognitive functioning may also predispose individuals to emotional dysregulation, social difficulties or maladaptive behaviours, particularly during adolescence. The core assumptions of the model include shared neural pathways, asynchronous development, environmental interaction and neuroplasticity and adaptation.

The talent development mega-model (Subotnik et al.,2011) highlights the interaction between cognitive ability, psychosocial skills and environmental support. It emphasises that gifted adolescents need psychosocial training. This framework explains how giftedness develops from childhood into adulthood. This contradicts the traditional views that giftedness is a fixed, inborn ability. This model explains giftedness as a dynamic developmental process influenced by cognitive, environmental and cultural factors. The model proposes three stages: Potential stage (childhood), in which giftedness is expressed as high ability, often measured through IQ and cognitive strengths play a major role. At this stage, giftedness is fragile, it requires support to grow. Next is the competency stage (adolescence), where children begin turning potential into actual performance. Here, psychosocial skills like emotional stability, supporting parenting, coping strategies, motivation, etc.. become essential. These psychosocial variables determine whether cognitive talent is successfully expressed. The third stage is the expert eminence stage of adulthood, where they transform

competence into highly developed expertise. This stage requires intense practice, mentoring, psychological maturity and persistence. The unmanaged emotional and behavioural problems can derail talent development.

Giftedness in the global context

The countries such as the UK, Canada, Italy, Spain, Turkey, and Arab nations widely implement identification of giftedness within school systems. The WISC-IV adaptations were widely used for the identification process of gifted adolescents. The term is much familiar in Western countries, like other special education groups such as Intellectual disability, ASD, LD etc.. The top 10% were identified as gifted across various domains as per the National Association for Gifted Children (NAGC). The use of intelligence tests as a central assessment tool is universally emphasised in gifted education. They also consider screening tools and nominations from teachers, parents, or peers, which play an important role in the identification process. Comprehensive intelligence tests are frequently employed, such as WISC-IV, WISC-V or Stanford-Binet Intelligence Scale (Fifth Edition). There exist specialized programs such as gifted education programs and special schools for gifted children are designed to meet the unique needs of gifted learners. Also, inclusive school settings were available and gifted students are often integrated into regular schools with specialized provisions. The access to accelerated learning opportunities programs to challenge and develop the advanced capabilities of gifted students. Counselling services at the school level and gifted education centres are widely implemented. Mentoring from International institutes is a part of the curriculum. Parental and teacher training programmes and workshops are also incorporated into the academic curriculum. Gifted education programme courses are available and accessible to stakeholders and communities.

Some researches indicate that some gifted students in educational centres exhibit psychological vulnerabilities requiring further attention and support. The researchers recruited participants directly from gifted education centres, with limited studies conducted in broader school settings over the last 10 years, in such countries as gifted resource centres are an integral part of the school system.

Indian context

There is no explicit, justifiable and inclusive definition for giftedness available in the Indian context to provide a basis for the systematic identification and nurturance of this group of children and adolescents (Kurup & Nayar, 2013). Major contributions to gifted education in India is provided by India's oldest talent search organisation - Jagadis Bose National Talent Search (JBNSTS), National Institute of Advanced Studies (NIAS), Bangalore and Jnanabodhini. There is a collaborative project undertaken by three organisations- Delhi University, Agastya International Foundation and NIAS for a project supported by the Principal Scientific Advisors' office (PSA) to the Government of India for the identification of gifted children. Kaveri Gifted Education and Research Centre, Pune, is the other centre that promotes counselling to gifted children and adolescents. A few educational programmes like Navodaya, Jnanabodhini, Olympiads, and NTSE were incorporated in school education for identifying highly talented students. Even though Kerala seems to have a high literacy rate and is producing a high number of students to pursue higher education in national and abroad universities, the actual concept of giftedness is still lacking. Moreover, some students are unidentified and thereby losing opportunities to flourish. Apart from this, there is a dearth of reviews on vulnerabilities of gifted adolescents in the Indian context. The following table denotes the major contributions of India to gifted education.

Table 1.2*Major contributions to gifted education in India*

Organization	Features
India's oldest talent search organisation -Jagadis Bose National Talent Search (JBNSTS)	<ul style="list-style-type: none"> ✓ Leader in the science-talent search ✓ Nationally recognised body working with gifted students from Science, Technology, Engineering and Mathematics. ✓ State government-funded program.(West Bengal) ✓ Age 13 -21 years
Jnana Prabodhini Institute of Psychology (JPIP)	<ul style="list-style-type: none"> ✓ Emphasis on enrichment to nurture multiple facets of intelligence and personality. ✓ Promoting general awareness about giftedness ✓ One-year full-time gifted education course for teachers in 2015, UGC, Government of India
National Council for Educational Research and Training (NCERT)	<ul style="list-style-type: none"> ✓ National Talent Search Examination,1963 ✓ Identifying academically high-ability students.
INSPIRE (Innovation of science pursuit for inspire research) Homi Bhabha centre for science and education	<ul style="list-style-type: none"> ✓ To pursue careers in science ✓ Top one per cent in achievement ✓ National body set up,1974 ✓ Purpose of promoting equity and excellence in science and mathematics education. ✓ Olympiad programs in mathematics, physics, biology and astronomy.
Tribal Mensa Nurturing Program (TMNP)	<ul style="list-style-type: none"> ✓ State of Maharashtra in Western India,2002 ✓ For underprivileged, disadvantaged socio-economic and ethnic backgrounds ✓ Holistic nurturing ✓ 160 parameters assessed through psychological testing

Organization	Features
	✓ India's first associated European talent centre.
Kaveri Gifted Education Centre, Pune	<ul style="list-style-type: none"> ✓ Pune, 2014 ✓ Working on creating modules and a manual ✓ Identification, assessment, nurture and mentoring of gifted students and teacher development. Counselling services. ✓ Workshops for teachers and students.
Education Department, Delhi University	<ul style="list-style-type: none"> ✓ Only department to have had a regular interest in gifted education research ✓ Identification, needs and nurturance. ✓ Organised 5th Asia Pacific Conference on Giftedness, 1998
Indo-US Round Table (2010)	<ul style="list-style-type: none"> ✓ Indian government and Delhi University ✓ Significant efforts are being made to create models for gifted children in science and math. (Roy et al., 2017)
National Institute of Advanced studies (NAIS)	<ul style="list-style-type: none"> ✓ Bangalore, Southern India ✓ Gifted education project, 2010 ✓ Aim to study giftedness in Indian contexts ✓ Drawing up policy recommendations in favour of gifted education ✓ Workshops for gifted children
National Association of Gifted Education, India	<ul style="list-style-type: none"> ✓ Originated from NIAS, 2012 ✓ PRODIGY, a national website for promoting India's gifted young ✓ For teachers, parents, mentors, experts and community members. ✓ Provide nomination scales for public access. ✓ Initiation and direction towards the National policy for employing gifted education programmes (Roy et al., 2017)

Definitely, we could say research on giftedness is on developing stage in India. There has been an rising move from last few years where more institutes been part of this education. Few research papers mainly from Bangalore, Maharashtra, Delhi and Pune. Most of them were review analyses of foreign countries, case profiles and qualitative studies. National Institute of Advanced Studies, which provided gifted education services, is in the implementation phase of gifted identification check lists for teachers as per Indian norms. Also, they are conducting counselling services for gifted children and adolescents. Another initiative is admission to Menza, India, a part of Menza International for gifted education. The individual has to complete the protocol of giftedness through standardised IQ tests they prefer and admission gives a pathway to interact with other gifted people, where he/she can interact with wide opportunities and discussions with their mental age ones. In 2020, the National Education Policy has also highlighted the need for identifying and nurturing gifted children and adolescents through curriculum modification, inclusiveness and training teachers and parents.

Considering the Kerala context, the term "gifted" is not commonly used to describe highly intelligent individuals in the cultural or educational framework. However, various school programs aim to identify and nurture exceptional academic abilities. These include:

- Subject-Specific Programs

This is a national-level platform designed to identify and reward subject-level excellence. This includes olympiads (Science, Social Studies, Mathematics, English, etc), USS (Upper Secondary Scholarship) other scholarships that assess academic competence at the national level etc..

- Gifted-Specific Initiative: Promotion of Excellence Among Gifted Students

This initiative targets students in grades VIII and IX across Kerala. It emphasises hands-on learning in mathematics, science (Physics, Chemistry, Biology), English, and Information Technology. The program also integrates counselling and aligns with international standards for science curriculum and evaluation. Learning activities are experiential, focusing on real-world applications, data management, and higher-order thinking skills such as hypothesising, inferring, and generalising.

Both programmes are purely based on academic excellence and the achievement score of exams. Apart from this, very few researchers who produced doctoral dissertations in Kerala, available on platforms like Shodhganga, have primarily focused on mathematical and subject-specific giftedness, Intelligence, life skills training, academic achievement, and competency. These studies often rely on academic performance as the primary criterion for identifying giftedness, with no explicit frameworks for broader giftedness selection. It reveals the identification and exploration part is even missing compared to global perspectives.

Summing up, giftedness, an area that has not been properly explored in Kerala culture, deserves attention from researchers, educators, and policymakers. Beginning with a general ability, intellectual giftedness in current research in a community setting would pave the way for the identification of unexplored variables, the least-studied areas, and the needy domains to look into. It also leads to comprehensive research on the gifted group. It again reminds the fact that gifted children need advanced material in the same way the special children receiving remedial training and other services. Since the area is less explored, moving to specific areas of giftedness from the community would be less beneficial, cumbersome and non-directional. Hence, analysing and reviewing the variables covered under the term intellectual giftedness

will open the hidden areas to be further explored. Table 1.3 and Table 1.4, revealing a scoping review of different variables with respect to gifted children and adolescents, were narrated in the review section.

Review of Literature

A literature review is a systematic, critical, and analytical synthesis of existing research, theories, and scholarly work relevant to a particular topic or field of study. It provides an overview of what has already been studied, identifies key concepts, methods and findings and highlights the gaps or inconsistencies in existing knowledge (Creswell,2014 & Hart,2018). The purpose of a literature review is not only to demonstrate familiarity with the subject but also to establish the context and rationale for the present study (Ridley,2012). In current research, a scoping review has been conducted to analyse the variables or areas studied under intellectual giftedness among adolescents (Table 1.3 and Table 1.4) and thereby to assess the research gap in the literature where the researcher could focus on the uncovered areas to be studied. The sections include:

- Scoping Review in global context
- Literature review in the Indian context

Further, related studies on the selected variables have been included and thus the review of literature of current research is organised under the following sections:

- Identification and sociodemographic aspects of intellectually gifted adolescents
- Cognitive domains of intellectually gifted adolescents
- Parenting style of intellectually gifted adolescents
- Emotional and behavioural problems of intellectually gifted adolescents

- Association of intellectual giftedness, cognitive domains, parenting style and emotional and behavioural problems.
- Role of cognitive domains and parenting style on emotional and behavioural problems among IGA.
- Literature review in the Indian context

The reviews under the above headings encompass studies on intellectually gifted adolescents, comparing them with their peers of average intelligence, as well as examining variations within the gifted adolescents themselves, including gender differences and distinctions between levels of intellectual giftedness (low gifted and highly gifted).

Scoping Review

Table 1.3

Characteristics and findings of reviews (2010-2022) on gifted children and adolescents

No :	Author/ Study	N	Sample description	Design	Intellectual giftedness/Cogni tive ability assessment measure	Ability groups	Variables/ Outcome measures	Findings	Research gap
1.	King et al. (2022)	Varied	Mixed samples	Survey quantitative	WISC/Identificati on records	Gifted/2e groups	WISC indices	Working memory/ processing speed is often implicated in 2e educational difficulties	Need cognitive profile-focused education studies
2.	Akgul et al (2022)	Varied	Gifted students- pandemic	Cross- sectional survey	Local identification criteria, including an IQ test	Gifted identified children	Anxiety levels, resilience, activity, and gaming	Showed variable anxiety that related to resilience & coping behaviours, the pandemic may exacerbate vulnerabilities for some	Contextual stressors (pandemic) interact with giftedness-need, baseline comparisons pre/post stressors
3.	Tasca et al. (2022)	19 studies	Children and adolescents across countries	Systematic review	IQ-defined giftedness across studies	Gifted vs non-gifted	Internalizing and externalizing disorders (Various instruments)	Mixed results, heterogeneous evidence- age, informant and IQ discrepancy matter	Recommend multi-informant assessments and consider verbal- performance discrepancies
4.	Renati et al (2022)	44-210	Parents of gifted children, Italy	Cross- sectional survey	IQ identification used by parents/records	Gifted children per records	Adjustment, parental perception questionnaire	Parents report generally good adjustment but note sensitivity,	Heavy reliance on parent report; need child self-report

No :	Author/ Study	N	Sample description	Design	Intellectual giftedness/Cogni tive ability assessment measure	Ability groups	Variables/ Outcome measures	Findings	Research gap
								perfectionism and educational challenges.	and objective measures.
5.	Pezzuti et al (2022)	86 gifted children + 86 parents	Italian school/clinic sample	Cross-sectional	WISC-IV/V	Gifted ≥ 120 cutoff	Cognitive index profiles, parent-child comparison	Gifted children had high VCI & PRI; Working memory and processing speed lower relative to those.	small sample- replication needed
6.	Ogurlu (2021)	Meta analyses	International samples	Meta analysis	EI measures., gifted defined by IQ/selection	Gifed vs nongifted	Emotional intelligence scales	Gifted individuals show a higher mean EI than peers (moderate effect)	Few longitudinal studies, cultural moderators understudied.
7.	Papadopoulos et al,(2021)	Mixed	Parents of gifted children	Narrative review & empirical data	Various criteria	IQ Gifted typical	Family functioning, parental perceptions, and coping	Parents report cohesive families, but also unique social-emotional needs for gifted children	More multi-method research is needed linking family functioning, cognitive profiles and child outcomes.
8.	Aubry et al. (2021)	55 gifted	French Children, enrolled in special gifted programs Age 8-14 yrs	Cross-sectional study	SPM, WISC-IV IQ>95 th percentile	Gifted average	vs Attention-Alerting, orienting, executive control. WM tasks, EF tests, ANT child version	Gifted children are faster on ANT, higher executive control, working memory	Need replication across tasks and age ranges.

No :	Author/ Study	N	Sample description	Design	Intellectual giftedness/Cogni tive ability assessment measure	Ability groups	Variables/ Outcome measures	Findings	Research gap
			55 gifted & 55 average children						
9.	Kermarrec et al,2020	Review	Mixed clinical and school samples	Systematic review	IQ/HIP definitions	High intellectual potential vs peers	Anxiety disorders, Diagnostic instruments	Mixed results, several studies show higher anxiety in HIP but methodological heterogeneity noted.	Need standardized diagnostic assessments
10.	Peperkorn &Wegner (2020)	40 studies	Mixed samples from different places	Systematic review	Various definitions	IQ Gifted vs nongifted	Personality (Big Five), Self concept	Gifted students often show higher openness and lower neuroticism and a higher academic self concept	Many small studies, need uniform gifted criteria and checks for sampling bias
11.	Garcia- Perales & Almeida, (2019)	120	Adolescents	Cross sectional	WISC-IV, LASSI		Learning styles, cognitive indices	Gifted used deeper cognitive, learning strategies, PSI not predictive	Reliance on self reports,no longitudinal validation
12.	Ogurlu &Kizildag, (2018)	240	Gifted adolescents Turkey	Cross sectional	WISC IV	Gifted adolescents	WISC IV- cognitive indices, academic motivation scale,	Higher PRI and VCI associated with intrinsic motivation	No behavioural outcome measures, narrow age range
13.	Karpinski et al (2018)	Multipl e data sets	Meta analytic Adult /child studies synthesized	Meta analytic/revi ew	IQ measures	High IQ measures depending on various studies	Mood disorders, ADHD, ASD, immune correlates	Proposed a curvilinear/nonlinear relationship: very high IQ sometimes associated with elevated risk for some disorders	Need child/adolescent- specific longitudinal evidence; test nonlinearity in

No :	Author/ Study	N	Sample description	Design	Intellectual giftedness/Cogni tive ability assessment measure	Ability groups	Variables/ Outcome measures	Findings	Research gap
									developmental samples
14.	Eren(2018)	49 gifted	49 gifted and 56 of normal intelligence 9-18yrs, turkey/mixed samples	Empirical + narrative synthesis	Various IQ tests, local norms	Gifted vs non-gifted	Emotional/behavioural/ self-report & parent report	Gifted children self- report more inattentiveness, some depressive symptoms, parents reports differ	Heavy reliance on a single informant, need combined parent/teacher/self assessments.
15.	Lee & Olszewski- Kubilius,2 016	276	Gifted high schoolers USA	Longitudinal	IQ		Ability tests, Achievement records, motivation questionnaires	Motivation mediated the link between cognitive ability and long term STEM outcomes	Focus on STEM only, psychosocial moderators are underexplored
16.	Burgemeist er et al (2017)	180	Adolescents	Cross sectional	WISC-IV		Self perception/Self concept	Gifted showed higher academic self- concept, mixed social self concept	Single timepoint
17.	Makel et al. (2016)	90	Review	Metaanalyses	IQ		IQ,achievement	Average correlation between IQ and achievement, similar pattern in gifted subgroups	Domain-level cognitive indices and achievement link lacking.
18.	Mofield & Peters P (2016)	153	46%M,4%F US adolescent gifted/advanced	Cross sectional	School identification/pro gram list IQ >118 with multiple criteria	Gifted/advanced vs typical	Perfectionism scales, mindset, achievement, attitudes	Gifted students show higher maladaptive perfectionism dimensions linked to anxiety/underachievement subgroups	Need cross cultural replication & link to cognitive index profiles

No :	Author/ Study	N	Sample description	Design	Intellectual giftedness/Cogni tive ability assessment measure	Ability groups	Variables/ Outcome measures	Findings	Research gap
19.	Francis et al.(2016)	18 studies	Mixed child/adolescent samples	Systematic review	IQ defined in included studies	Gifted vs non-gifted	Psychopathology Various instruments	Most studies reported equal or better socio-emotional adjustment in gifted groups; mixed results across outcomes.	Heterogeneity of definitions, measures & informants, need standardized multi informant studies
20.	Peyre et al(2016)	1459	Population based EDEN mother-child cohort, France, preschool period	Cohort analysis	Multiple IQ proxies/assessments in the cohort, including WPPSI-III	High IQ vs typical	Emotional/behavioural/social difficulties-SDQ	In preschool, high IQ children did not show more difficulties, some subgroups with cognitive verbal strengths showed worry tendencies.	Need follow up into later childhood/adolescence, Examine informant differences
21.	Guenole et al. (2015)	107	Age 8 to 11 Gender: 27M/80F Clinically referred gifted sample, French	Cross sectional	WISC III IQ>=130	SVPD>=15, With and without discrepancy	Behavioural impairment, index of discrepancies	Developmental asynchrony correlates with behaviour problems, supports subgrouping within gifted children	Needs standardized clustering across larger samples
22.	Molinero et al.(2015)	87	Age :6-13yrs Spanish sample	Crosssectional	WISC IV	Gifted sample defined by local criteria	Factor structure of WISC-IV indices,CFA	Processing speed components may penalize gifted identification	Speeded subtests may be problematic, may psychometric caution
23.	Guenole et al. (2013)	144	Mean age/range:8-11	Cross-sectional	WISC III, French	FSIQ:132-145.2	Psychopathology CBCL	Clinically referred highly gifted	Clinical referral bias, need

No :	Author/ Study	N	Sample description	Design	Intellectual giftedness/Cogni tive ability assessment measure	Ability groups	Variables/ Outcome measures	Findings	Research gap
			Gender:102M, 42F Ethnic composition: French- unspecified		Individually administered IQ levels: gifted and matched control	VIQ:130- 144.6 PIQ:118.6- 136.6 Control: random selection		individuals showed not uniformly more problems, developmental asynchrony (VCI- PIQ discrepancies) associated with behavioural problems	school/community samples and multi informant longitudinal data
24.	Riaz et al. (2013)	197	Mean age/range:12- 16 Gender:121M, 76 F IQ levels: 93 gifted (43M,50F)and 104 average (78M,26F) Ethnic composition: Pakistani students – unspecified	Cross- sectional	RIAS Individually administered	High IQ :>130 Average IQ:90-110	Adjustment RAASI - Academic, social, emotional	Gifted showed better academic adjustment, mixed social/emotional	Very few South- Asian studies, cultural moderators need testing
25.	Guignard et al.(2012)	132	Meanage/rang e: gifted 11.6, average 11	Cross- sectional	WISC-IV individually administered or CFT group administered	Gifted= IQ>=130	Anxiety Perfectionism RCMAS, CAPS	Gifted children showed higher self- oriented perfectionism, anxiety-	Need longitudinal work to see whether perfectionism predicts later

No :	Author/ Study	N	Sample description	Design	Intellectual giftedness/Cogni tive ability assessment measure	Ability groups	Variables/ Outcome measures	Findings	Research gap
			Gender: M/F, numbers unknown IQ levels: 61 gifted and 71 average Ethnic composition: Parisian students – unspecified					perfectionism relationship complex (‘paradox’)	internalizing problems
26.	Snyder et al. (2011)	210	Gifted adolescents	Cross sectional	WISC IV	IQ	Self report-Academic achievement, GPA	Higher VCI and WMI predicted GPA more than PSI	No socioemotional measures, limited to GPA
27.	Shaywitz et al(2001)	varied	Boys,4-7 yrs, Highly gifted - 18 Low gifted-17 Learning disabled-26 Typical controls-26	Cross- sectional	WISC scores Teacher/behaviou r rating scale	IQ	Teacher rating scale	High gifted boys showed levels of behavioural problems similar to boys with learning disabilities. Low gifted boys showed significantly fewer behaviorual problems than the other group	Small sample sizes, Lack generalization Gender biased
28.	Ziegler & Stoeger. (2010)	512	Secondary students Germany	Crosssectio nal	IQ /achievement; School motivation scales		Motivation engagment	school Gifted students showed strong mastery goals but	Lacked domain- specific cognitive profiling

No :	Author/ Study	N	Sample description	Design	Intellectual giftedness/Cogni tive ability assessment measure	Ability groups	Variables/ Outcome measures	Findings	Research gap
								achievement anxiety present	
29.	Preckel al (2010)	et 1028	High school students	Cross sectional	IQ, Achievement tests, Achievement Motivation inventory	Based on IQ	Achievement, motivation	Gifted had higher motivation + achievement, but uniformly superior	Mostly European sample, cultural generalizability unclear
30.	Batey al.,2010	et 140	Adolescents UK	Cross sectional	Creativity test, IQ	School adolescents based on high IQ	Divergent thinking tests, creativity, school grades	Creativity moderately correlated with GPA in gifted	IQ not always linked to creativity, need EF inclusion

Note: WISC-Wechsler Intelligence Scale for Children, 2e-Twice exceptionals, IQ-Intelligence quotient, WM-Working memory, ANT- Attention Network test, EF-Executive function, HIP-High intellectual potential, PSI-Processing speed index, PRI-Perceptual reasoning index, ADHD- Attention deficit hyperactive disorder, ASD- Autism Spectrum Disorder, STEM- Science, Technology, Engineering and Mathematics, EDEN cohort -Study of the Pre- and Early Postnatal Determinants of Child Development and Health in France, RCMAS-, Revised children's anxiety scale, CAPS- Children & Adolescent Perfectionism Scale, WPPSI-Wechsler Preschool and Primary Scale for Intelligence, SVPD-Significant verbal performance discrepancy, VCI-Verbal comprehension index, CFA- Confirmatory factor analysis, RAASI-Reynolds Adolescent Adjustment Screening Inventory, LSSI- Learning and study strategies inventory, SDQ-Strengths and difficulties questionnaire, GPA-Grade Point Average.

The table presents the characteristics, findings, and research gaps of studies on giftedness among children and adolescents conducted between 2010 and 2022 across various countries. The reviewed studies were sourced from databases such as Google Scholar, PubMed, Academia, Elsevier, Springer, and other open-access journals. The scoping review comprises 21 quantitative studies, 8 meta-analytic/systematic reviews, and one empirical study synthesised through a narrative review. Analysis of study characteristics indicates that the sample sizes ranged from a minimum of 40 to a maximum of 1,028 participants, with the majority recruiting between 100 and 200. Most studies drew participants from gifted education programs, special education settings, or clinician referrals, while direct identification from schools or community settings was relatively uncommon. Considerable variation was observed in identification methods, including differences in IQ cut-off scores (e.g., IQ 118 and above), achievement tests, and creativity/divergent thinking measures. The majority of studies relied on a single test or criterion, with relatively few employing multiple assessments. A notable trend in recent studies is the preference for Wechsler scales, whereas earlier research more frequently employed achievement tests, single cognitive measures, or local norms. Approximately 10 studies included comparative groups, either contrasting gifted children/adolescents with their average-intelligence peers or differentiating within the gifted group (e.g., highly gifted vs. moderately gifted). Only a few studies adhered to the conventional $\text{IQ} \geq 130$ (top 2%) criterion, while most identified gifted participants as advanced or highly intelligent. Frequency analysis further revealed that around 10 studies focused on achievement, learning, motivation, or divergent thinking; 4 examined cognitive domains; 7 explored psychosocial aspects such as family and parenting, self-concept, adjustment, self-perception, and personality; and 8 investigated emotional and behavioural problems or psychopathology. Although

considerable research has addressed the association between cognitive abilities and academic or learning outcomes, a significant gap remains in examining the relationship between cognitive domains and psychopathology through quantitative approaches. The examined studies mostly concluded the relationship with either comparative phenomena or descriptive measures. Very few studies have depended on correlational studies.

The review studies conducted over the last twelve years highlight consistent evidence that intellectually gifted adolescents perform significantly higher than their average-ability peers on global cognitive measures. The trend was using the Weschler scales for comprehensive evaluation. Several studies (e.g., Guignard et al., 2012; Guenole et al., 2013; Yoon et al., 2017) report superior performance in verbal comprehension, perceptual reasoning, and working memory. However, findings related to processing speed remain mixed, with some studies indicating it as a relative weakness (Wang & Neihart, 2015; Karadag & Mutlu, 2020), while others find no meaningful differences. Moreover, intra-individual variability has been observed, where gifted adolescents show uneven profiles across domains, suggesting that giftedness is not uniformly distributed across all cognitive processes (Guez et al., 2018). Despite these insights, most studies are limited to cross-sectional comparisons, often with small sample sizes, and rarely capture developmental trajectories across adolescence.

Psychosocial outcomes present a more heterogeneous picture. Certain studies suggest that gifted adolescents may be more vulnerable to emotional problems, ADHD, anxiety, perfectionism, or social difficulties (Guignard et al., 2012; Guenole et al., 2013; Zeidner & Shani-Zinovich, 2011), while others report no significant increase in risk

compared to non-gifted peers (Riaz et al., 2013; Yoon et al., 2017). Evidence also indicates that protective factors such as parenting style, family support, and school environment can moderate psychosocial adjustment (Neihart, 2015; Karadag & Mutlu, 2020). Nevertheless, emotional and behavioural difficulties, when present, often intersect with academic pressures or social isolation, making this group complex and context-dependent.

Taken together, these findings reveal several research gaps. First, few studies systematically examine all cognitive domains within a single framework, particularly in relation to intra-individual discrepancies. Second, the interaction between cognitive strengths and psychosocial functioning has not been sufficiently addressed, despite theoretical claims that uneven cognitive profiles may contribute to psychosocial vulnerabilities. Third, the majority of existing research is cross-sectional, relies on convenience samples, and applies inconsistent criteria for defining giftedness (e.g., varying IQ cut-offs, teacher nominations, or achievement-based criteria), limiting comparability across studies. Finally, longitudinal, large-scale, and culturally diverse studies are notably absent, with most evidence emerging from Western and East Asian contexts. Addressing these gaps is crucial for developing a nuanced understanding of both the cognitive profiles and psychosocial adaptation of gifted adolescents.

Apart from this, the researcher further explored the Indian studies from the last twelve years. The findings will help to select the variables to be studied after corroborating with pilot work and expert suggestions.

Literature review in the Indian context

Table 1.4

Characteristics and findings of studies conducted in India

No	Study/Author	N	Sample/setting	Design	Measures (gifted/cognitive)	Main outcomes/variables	Key findings	Research gap
1.	Case Profiles of Gifted Children / Maithreyi et al., NIAS report (2013)	12(case profiles)	Identified children (3-15 yrs) from NIAS pilot sites across India (urban & rural)	Descriptive / program evaluation with quantitative screening data	Multi-stage screening tools used by the project	Identification rates, talent domains, and socio-demographics	Documented diversity of gifted expression and strong urban/SES selection bias in pilot participants.	Limited to case studies not representative of a large sample, standardised quantitative sampling & inferential analyses.
2.	Giftedness among School Children: Kiran Babu N.C. & V. Murthy (2016) - review with embedded empirical data	N ≈ 770	JNV and KV school students (class VIII sample reported)	Quantitative descriptive analyses embedded within a review	Local intelligence/ability tests and school records	Group IQ comparisons (JNV vs KV), gender comparison	Reported higher mean intelligence scores for JNV vs KV students discuss Indian identification models.	Few WISC-indexed gifted, only analyses - need focused top-end (IQ ≥ 130) quantitative studies.
3.	Identification of Gifted & Talented Children in India: Jambunathan &	24 (pilot)	Single-school pilot (grades 3-5;	Pilot quantitative /	Locally developed screening instruments:	Identification accuracy,	Pilot screening distinguished teacher-	Needs norming, standardization

No	Study/Author	N	Sample/setting	Design	Measures (gifted/cognitive)	Main outcomes/ variables	Key findings	Research gap
	Jayaraman (pilot, ~2014–15)		teacher-nominated & tested)	instrument development	teacher nomination	group differences	nominated potential vs high-performers but sample very small.	n, and large multi-site validation across Indian states.
4.	WISC-IV & RAVLT indicators of SLD & discrepant achievement, I. Thomas et al. (2022) - Kerala study	308	School students in Kerala (ages 12–16): Underachievers / Normal / Overachievers / SLD groups	Cross-sectional quantitative	WISC-IV India; Rey Auditory Verbal Learning Test (RAVLT)	WISC indices (WMI, PSI, Digit span, LNS), RAVLT retention; discriminant metrics	WMI, PSI, Digit span and LNS discriminated SLD from other groups; cognitive-profile differences explained discrepant achievement despite similar overall IQ.	Not a gifted-only sample, but provides important Kerala normative/clinical cognitive-profile data; lack of longitudinal tracking of high-ability students.
5.	Traits of Gifted Children in India- NIAS programme analysis (2016–2022) - program synthesis	Program datasets (varied counts across sites)	NIAS pilot locations (urban & rural)	Program analysis / descriptive quantitative	Screening batteries used by NIAS projects, teacher nominations, task performance	Identification, distribution, and socio-demographic correlates	Confirms selection biases (urban, higher SES) and highlights domain-specific concentrations (math/science).	Requires peer-reviewed inferential studies and representative prevalence estimates.
6.	Meta-analysis of gifted education effects (incl. aggregate	k ≈ 130 studies	Aggregated studies on gifted education outcomes	Meta-analysis	Varied IQ achievement	Effects on achievement	Overall positive effects of gifted education on	Few Indian quantitative studies

No	Study/Author	N	Sample/setting	Design	Measures (gifted/cognitive)	Main outcomes/ variables	Key findings	Research gap
	some India studies) - M. (2020) thesis/paper	d (global; includes few Indian works)			measures across studies	motivation, teaching strategies	achievement & motivation noted; Indian- specific studies sparsely represented.	included; need India-specific controlled evaluations of gifted programs.
7.	Project Abhishikt (Delhi Govt) -selection & program data (2024) - public report/news	Screened ~6000 students; 82 shortlisted	Delhi government schools (classes VI/IX selection pilots)	Programmatic selection with screening data	CFIT + IQ tests (culture-fair + IQ)	Selection counts; short-term program metrics	Demonstrates recent large- scale operational identification using numeric testing at state level.	Public reports lack peer- reviewed outcome evaluation; longitudinal follow-up & cognitive- profile analyses missing.

Note: NIAS-National Institute of Advanced Studies, JNV-Jawahar Navodaya Vidyalaya, KV-Kendriya Vidhyala, RAVLT- Rays Auditory Verbal Learning Test, WISC- Wechsler Intelligence Scale for Children, SLD-Specific learning disability, WMI-Working Memory Index, PSI-Processing Speed Index, LNS- Letter Number Sequencing, CFIT- Culture Fair Intelligence Test, IQ-Intelligence Quotient.

Research on gifted adolescents in India reveals several persistent gaps. In terms of identification and cognitive profiling, most studies have relied on teacher nominations, basic IQ tests, or general ability measures, with limited use of comprehensive instruments such as the WISC-IV India. Consequently, a detailed cognitive profiling across domains such as verbal comprehension, perceptual reasoning, working memory, and processing speed and how it differs from adolescents with average intelligence, remains underexplored. Indian studies also rarely analyse within-group (highly gifted vs low gifted), and the conventional IQ cut-off continues to dominate, unlike international work that extends into sub-factor analysis.

Psychosocial and emotional-behavioural outcomes represent another unexplored area. While program reports have highlighted motivation and talent, standardised tools such as Child Behaviour Checklist (CBCL), Strengths and Difficulties Questionnaire (SDQ) or others are seldom applied, and comparative studies between gifted and non-gifted adolescents are scarce. The previous studies were more coined on constructs such as motivation, academic achievement, overachiever, creativity, and learning styles and are mentioned in the thesis and programs.

Sociodemographic and cultural dimensions of giftedness remain biased toward urban and high economic populations, with rural, tribal, and low economic groups largely absent from published research. Gender-based findings are inconsistent, and systematic comparisons are rare. Program evaluation is also limited, with existing initiatives such as the National Institute of Advanced Studies (NIAS) and Project Abhishikt focusing primarily on identification while neglecting empirical assessments of program effectiveness. Methodologically, most studies are small-scale, case studies, cross-sectional, and descriptive, with a lack of longitudinal designs or advanced statistical techniques (e.g., regression, cluster analysis) to explore interactions between

cognitive and psychosocial domains. Furthermore, standardised instruments such as WISC-IV India, CBCL, and SDQ remain underutilised in the Indian giftedness literature.

Summarising the above findings, identifying the IGA from school settings through a comprehensive tool like WISC IV India and exploring their cognitive and psychosocial domains and psychopathological outcomes is the need of the hour. Apart from this, researchers also conducted a pilot study in a school setting and a clinical setting to get a better understanding of the current scenario of intellectually gifted adolescents and to select variables and tools for the study (Section: Methodology/ Pilot study). The review analysis and pilot study corroborate the unexplored areas of IGA in our culture. Finally, the current research delves into the aspects of identifying intellectually gifted adolescents using WISC-IV, India, a comprehensive evaluation of cognitive domains such as verbal comprehension, perceptual reasoning, working memory and processing speed using WISC-IV, India, psychosocial domains such as parenting style using PAQ and emotional and behavioural problems using SDQ associated with intellectually gifted adolescents and compares with adolescents with average intelligence. Apart from this, a subset of the gifted group (highly gifted vs low gifted) was also similarly assessed. The research also looks into the link between intellectual giftedness and emotional and behavioural problems and further classifies the cognitive-psychosocial profiles of IGA.

Reviews related to selected variables

The selected variable to assess the giftedness is measuring intelligence with WISC-IV, India and sociodemographic variables are age, gender, family type, ordinal position, socioeconomic status, occupational and educational status of parents.

Identification and sociodemographic aspects of intellectually gifted adolescents

Pezzuti et al. (2021) conducted a descriptive study in Italy to examine the cognitive profiles of gifted children in comparison with their parents using the Wechsler scales. Participants were recruited through an association for gifted children and their families. They classified the four levels of performance on the Wechsler scales as gifted with an IQ above 130 and moderately gifted with an IQ between 120 and 129. 59 gifted children and adolescents were identified. There are 19 girls and 40 boys, age range between 6 and 14 years. Children and adolescents were assessed with the WISC-IV while their parents were evaluated using the WAIS-IV. Correlation results indicated that children's IQ was positively associated with that of their mothers' IQ, suggesting an intergenerational link in intellectual functioning. Interestingly, the majority of mothers and nearly half of fathers also attained IQ scores above 120.

Assouline et al. (2010) investigated cognitive and psychosocial characteristics of gifted students with written language disorder and specific learning disability and used a score of 120 on the verbal scale of a cognitive ability test. The students were recruited over an 18-month period. The gifted students with learning problems or severe social impairments participate in the study in Iowa. The placement in a gifted program, greater than the 85th percentile or grade level standardised test, was also considered as a referral for such study. Out of 29 referrals, however, only 14 met both criteria for specific learning disability of written expression and giftedness (one IQ index score of 120 or above).

The study of Erden et al. (2022) investigated the Turkish version of the Wechsler Intelligence Scale for Children- Fourth Edition (WISC-IV) to distinguish gifted children from non-gifted children. 201 gifted children and 201 non-gifted children were

included in the study. The gifted group was selected from special educational institutions for gifted education affiliated to the Ministry of Education, and the non-gifted group was selected from primary or high schools in different cities in Turkey. About 43.8% were boys and 56.2% were girls in gifted children. The mean age was 11.09 years (range 6–16 years). About 43.8% were boys and 56.2% were girls, in non-gifted group and the mean age was 11.11 years (6–16). The findings of this study highlight the diagnostic utility of WISC-IV in identifying gifted children.

Rocha et al. (2020) compared the cognitive performance of gifted or high-capacity children and adolescents with that of typically developing peers using psychological tests designed to assess executive functions. The two groups were matched on school level and age (10–15 years). The students are from 5th to 9th grades who attended regular schooling, where different curricular units were taught by different teachers. The IQ score was determined based on the previously calculated WISC-III. 42 students represented by gifted students, with 81% of males and 51 regular students, with the majority being females (59.6%). Most of the gifted students were in the high school category and came from middle to upper socioeconomic backgrounds (59.5%), with 46.2% belonging specifically to medium to high family socioeconomic levels. The gifted group demonstrated stronger cognitive skills, suggesting that these abilities may serve as valuable components in giftedness screening procedures, complementing traditional IQ measures.

Sparrow et al. (2005) examined the assessment of gifted children using the WISC-IV. The Wechsler scales are the most commonly administered intelligence tests in school, US. Additionally, many school systems tend to identify gifted children or

adolescents on the basis of intellectual and/or academic giftedness, making the Wechsler scales a central tool in gifted assessment.

Klausmeier, Mishra, and Maker (1987) conducted a national survey of assessment practices among school psychologists and found that the Wechsler scales had also become the overwhelming first choice for the assessment of gifted children. In addition to the WISC-IV, Sparrow et al. 2005 initiated the Gifted Rating Scales (GRS) (Pfeiffer & Jarosewich, 2003), which is designed to be completed by teachers who are going to assist in the identification of gifted children and adolescents. They also recommended using both to identify gifted children and adolescents.

Kaufman and Harrison (1986) cautioned psychologists and educators to use intelligence tests responsibly. They emphasized the importance of considering multiple criteria, rather than relying on a single test score, when determining eligibility for gifted programs, and highlighted that standard errors of measurement should always be taken into account. They also noted that while a child identified as gifted may be placed in a gifted program, such placement should occur within the framework of long-term educational planning. Despite these warnings against the misuse or overreliance on intelligence tests, Kaufman and Harrison (1986) acknowledged that, to date, no alternative method is superior to intelligence tests for identifying gifted children.

Kaufman (1992) evaluated the psychometric strength of the WISC-III for gifted children without comparing it with other tests. He stated that the WISC-III is quite useful for identifying gifted children in that it is a “carefully constructed, technically superior instrument with attractive materials, sensitive items (by gender and ethnicity), exceptional standardisation (s), strong construct validity, reliable and stable IQ scores, and intelligently written manuals that facilitate test interpretation. Furthermore, he

pointed out that the majority of subtests have ceilings ranging from adequate to exceptional.

Watkins and his colleagues (2002) conducted a factor analytic study of the WISC-III performance of 505 gifted students. Results indicated a two-factor solution that approximated the Verbal Comprehension and Perceptual Reasoning indexes best demonstrated the strengths of the gifted students.

Few researchers and authorities have recommended the use of multiple measures in the identification of giftedness (Kaufman & Harrison, 1986; Pfeiffer, 2001). They concluded that a single test score should never be used alone. Overall predictive accuracy (i.e., the overall probability that the result of an assessment procedure accurately identifies individuals as having a certain condition, here, giftedness) is increased with the judicious use of technically meritorious, multiple measures, and clinical procedures (Pfeiffer, 2002).

Sparrow et al. 2005 also investigated the gifted samples with the Gifted rating scale, apart from WISC, which was developed with the support of Psychological Corporation, 2003. The GRS includes a School Form (GRS-S) and a Preschool/Kindergarten Form (GRS-P) to account for developmental differences in giftedness across the age range 4:0 years to 13:11 years. The six scales on the GRS represent five types of giftedness (intellectual ability, academic ability, creativity, artistic talent, and leadership ability) as well as motivation. The GRS-S yields five scale scores indicating the likelihood that a student is gifted in one or more of five areas of giftedness. For each of the 72 items on the GRS-S, the teacher is asked to rate the student compared to other children of the same age. The great majority of correlations between the GRS-S scale scores and WISC-IV full-scale and subscale scores were

significant. The GRS-S Intellectual and Academic Ability Scales correlated most strongly with the WISC-IV subtest and composite scores. The GRS-S Intellectual Ability scale correlated .53 with WISC-IV Full Scale IQ, .45 with Verbal Comprehension Index (VCI), .42 with Perceptual Reasoning Index (PRI), .39 with Working Memory Index (WMI), and .32 with Processing Speed Index (PSI). The GRS-S can be easily used as a first-stage screening instrument to screen an entire class, school, or school district. The GRS-S can also be used as a second-stage screening device with a target subgroup of the school population who have already been identified using another method (e.g., students nominated by their last year teacher or scoring above a certain level on an end-of-year achievement test). Finally, the GRS-S can be used as part of a test battery in assessing giftedness. The GRS-S is designed to complement the WISC-IV in identifying intellectually and academically gifted students.

Opengin and Sezeral (2023) examined the Anadolu-Sak Intelligence Scale [ASIS], an intelligence evaluation tool originating from Turkey, which is extensively used for identifying gifted students. This study aimed to investigate the cognitive profiles of gifted children using the ASIS and also to compare with average intelligent group. Participants were selected from students who underwent intelligence testing at the Gifted Education Research and Practice Centre (GERPC). The study focused on data from 360 students with a GIQ score of 130 or higher. They were determined to assess the cognitive profiles of gifted students, a statistical technique called latent profile analysis. The results revealed two distinct gifted profiles: verbal gifted (38%) and nonverbal gifted (62%).

Cognitive domains of intellectually gifted adolescents

The selected cognitive domains for the current research were verbal comprehension, perceptual reasoning, working memory and processing speed.

Pezzuti et al. (2021) conducted a descriptive study in Italy to explore the cognitive profiles of gifted children in comparison to their parents using Wechsler scales. The participants were recruited from Association of Gifted Children and parents. They classified the four levels of performance on the Weschler scales as gifted with IQ above 130 and moderately gifted as IQ in between 120 and 129. They identified 59 gifted children and adolescents (19 girls and 40 boys) aged between 6 and 14 years. Children and adolescents were assessed with the WISC-IV while their parents were evaluated using the WAIS-IV. The findings revealed that gifted children displayed particularly high scores in verbal comprehension (VCI) and perceptual reasoning (PRI). Comparative analyses showed that gifted children significantly outperformed both parents in VCI and PRI, whereas mothers scored higher than their children in processing speed. The study also noted that the cognitive profile of gifted children varied across domains, with the General ability index (involving verbal comprehension and perceptual reasoning) being the most representative measure of their intellectual potential.

The study of Erden et al. (2022) aimed to investigate the utility of the Turkish version of the Wechsler Intelligence Scale for Children- Fourth Edition (WISC-IV) to distinguish gifted children from non-gifted children. For this purpose, 201 gifted children and 201 non-gifted children were included in the study. The study determined the predictive power of the WISC-IV index and subtest scores; logistic regression analyses were performed. Results indicated that the Perceptual Reasoning Index,

Working Memory Index, and Processing Speed Index scores (except Verbal Comprehension Index score), and all subtest scores significantly predicted giftedness. Furthermore, correct classification rates among gifted children were 93% for index scores and 97% for subtest scores. The findings of this study suggest that intelligence scores obtained from the WISC-IV have a diagnostic utility and provide valid and reliable results in identifying gifted children.

Rocha et al. (2020) compared the cognitive performance of gifted or high-capacity children and adolescents with typical development in the performance of psychological tests aimed at the evaluation of executive functions. The two groups were matched in terms of school level and ages, 10-15 years. The students are from 5th to 9th grades who attended regular schooling, where different curricular units were taught by different teachers. The IQ score was determined based on previously calculated WISC-III. 42 students represented by gifted students, with 81% of males and 51 regular students, with the majority being females (59.6%). Most of the gifted students are from high school category and belong to middle to upper socioeconomic level (59.5%) and 46.2% from a medium to high family socioeconomic level. In addition to a socio-demographic questionnaire, several psychological tests were applied. Therefore, for the analysis of Working Memory, the Rey Complex Figure test (memory reproduction) and the WISC-III - Memory of the Digit test - were used; for Inhibitory Control, the D2 test was applied, as well as the Five Digit test, which also supported the analysis of Cognitive Flexibility. For the analysis of higher cognitive skills, the Numerical Reasoning and Verbal Reasoning tests from the Battery of Reasoning Tests were applied, as well as the Expressions test of the Cognitive Assessment Battery for evaluating Reasoning, the copy phase of the Rey Complex Figure for the Planning

factor, and mathematical problem-solving tests to assess the Problem-Solving factor. The results indicate marginally significant differences in the cognitive flexibility function and statistically significant differences in working memory, as well as in the higher cognitive functions of problem solving and reasoning, with no statistically significant differences in the tests that evaluate inhibitory control and planning.

Sparrow et al. (2005) conducted an assessment of children who are gifted with the WISC-IV. For the WISC-IV standardization sample, giftedness was defined based on an existing score of 2 standard deviations above the mean on the WISC-III (60% of the gifted sample) or another standardized measure of cognitive abilities either individual (SB-IV, WJ-R/III, or KABC) (Thorndike, Hagen, & Sattler, 1986; Woodcock, McGrew, & Mather, 2001) or group administered (Otis, 19% of the sample; or CogAT, 10% of the gifted sample). In all, 63 children between 6 and 16 years old from the standardization sample were categorised as gifted (Wechsler, 2003). Results revealed that students in the gifted sample significantly outperformed students in the matched control sample on the WISC-IV subtests. However, on two subtests Cancellation subtest and the required Coding subtest, the differences between the two groups were nonsignificant, indicating that these subtests did not distinguish students identified as gifted from the control sample. Another study reported that processing speed is not a distinguishing characteristic of gifted individuals (Kaufman, 1993).

Sparrow et al. (2005) also evaluated the 34 students from the gifted sample who performed 2 standard deviations above the mean on a WISC-IV factor, the results in comparison to their matched controls indicate that, although the four factors still discriminate between the two groups, the subtests Cancellation (Randomized, Structured, and Total), Coding, Digit Span Backward, and Word Reasoning

demonstrate no significant differences between gifted and matched controls. Again, processing speed is not in differentiable terms.

Sparrow et al. (2005) additionally assessed 34 students who scored greater than 130 on a factor of the WISC-IV, 27 achieved this score on the verbal comprehension factor, 4 additional (9 total) students achieved greater than 130 on the perceptual reasoning factor, and 1 additional student attained a score greater than 130 in each of the Working Memory, Processing Speed, and Full-Scale Factors. They found that Verbal Comprehension was the important defining factor in determining giftedness, though they did not underestimate the other areas of giftedness. The inability of the Processing Speed subtests, Coding and Cancellation to discriminate between the groups was expected based on previous findings and assertions that speed is not a defining characteristic of intelligence. Also, the new Working Memory factor, often conceptualised as a higher-level skill than Processing Speed, was not more influential in defining this gifted group.

Compared to their peers, these children have higher levels of cognitive flexibility, inhibitory control, working memory and planning (Vaivre-Douret, 2011), which may be related to a stronger, flexible, and dynamic reconfiguration of brain networks in the frontoparietal regions of the executive system, promoting a superior development of fluid intelligence (Barbey, 2025) and superior effectiveness in tasks that require working memory, flexibility, and automation of cognitive control (Fiske & Holmboe, 2019).

Gifted children and young people may have a complex neuronal network capable of analysing information more efficiently, thereby favouring neuronal plasticity (Goriounova & Mansvelder, 2019) and neuronal communication (Solé-Casals et al.,

2019). Several superior connections and activities within the medial cyst-striatal-thalamic-cortical circuit promote greater anticipation and sensitivity to reward during the learning process. Another evidence of a greater inter-hemispheric and inter-functional area connection, especially in the frontoparietal regions and the cerebellum (Sastre-Riba & Viana-Sáenz, 2016), with an increase in myelin in the latter area, as well as in the corpus callosum and in the right and left occipital lobes, which triggers a higher speed of perceptual processing of visuospatial information (Chevalier et al., 2015) and a higher development in cognitive skills in general (Dai et al., 2018).

Goriounova and Mansvelder (2019) report the existence of gifted children or those with high capacities of cerebral volume of the temporal lobe and in the upper hippocampus, with pyramidal neurons of a larger size and complexity, which allows for a superior general cognitive capacity, with working memory, reasoning, perception and language standing out.

Opengin E and Sezeral B (2023) examined the Anadolu-Sak Intelligence Scale (ASIS), an intelligence evaluation tool originating from Turkey, which is extensively used for identifying gifted students. This study aimed to investigate the cognitive profiles of gifted children using the ASIS and also to compare them with the average intelligent group. Participants were selected from students who underwent intelligence testing at the Gifted Education Research and Practice Centre (GERPC). The study focused on data from 360 students with a GIQ score of 130 or higher. They were determined to assess the cognitive profiles of gifted students, a statistical technique called latent profile analysis (LPA). The results revealed two distinct gifted profiles: verbal gifted (38%) and nonverbal gifted (62%). Children with a verbal gifted profile excelled in tasks involving verbal reasoning, analogies, and linguistic abilities.

Conversely, children with a non-verbal gifted profile demonstrated exceptional abilities in tasks requiring visual flexibility and sequential processing. Both groups exhibited superior cognitive abilities across various domains compared to the average group mean.

The greater the information processing efficiency more chances to be having high intelligence. Gifted adolescents often show superior working memory, attention control, and metacognitive awareness. Research on working memory reveals that intervening the working memory may result in improving fluid intelligence in individuals, especially during developmental period (Fry & Hale, 1996). Training working memory has been shown to improve the measured fluid intelligence of young adults (e.g. Jaeggi et al., (2008), mediating the ability to understand relationships between various concepts independent of any previous knowledge or skills, and to use these relationships to solve problems. Fluid intelligence is a component of IQ. It remains to be seen how long the benefits of working memory training last, however. Jaeggi et al. (2008) observed increase in fluid intelligence could be related to plasticity of the brain stimulated by the training, revealing the working memory as the basis of intelligence.

Researches also supports that the language development with verbal abilities and comprehension may impact the cognitive development of gifted adolescents. The cognitive development programme to enrich the learning environment of young children of mothers with low IQ which resulted a marked increase in IQ of the children, supported such evidences. The Milwaukee project in U.S (1973) aimed 17 children born to mothers of low IQ were educated in an infant stimulation centre received education, vocational, child care and home making training and showed improvement in IQ points

(Gabber,1988). Another similar study was the Abecedarian Early Intervention Project, North Carolina starts during the infancy period and extended till preschool. Each child had an individualised curriculum of activities through games, addressing social, emotional and cognitive development, with a focus on language. The effect sizes were the greatest for reading, and mathematics too showed large to moderate improvement. Findings concluded that the programme benefited the children in cognitive, health, and parenting domains, as well as the younger children in the social-emotional domain (as cited in Kurup & Nayar, 2013).

Parenting style of intellectually gifted adolescents

Dwairy (2004) examined the parental styles and psychosocial adjustment of adolescents and the relationship between them in gifted as compared to nongifted Arab adolescents. The scales administered were the Parental Authority Questionnaire, Child Attitude Toward Parents. Lipsitt's Self-Concept Scale for Children, Rosenberg Self-Esteem Scale and The Psychological State Scale. All the scales were administered to 118 gifted (38 males and 77 females) and 115 nongifted (36 males and 82 females) Arab adolescents who studied in 9th grade and belong to middle-class Arab citizens in Israel. The gifted subjects were drawn from three gifted children's centres to which they had been admitted after scoring above 140 in IQ according to screening psychometric tests. Results indicate that parents of gifted adolescents tend to be more authoritative and less authoritarian than parents of nongifted adolescents. The attitudes of the gifted adolescents toward their parents were more positive than those of the nongifted adolescents. The gifted displayed higher self-esteem and fewer identity disorders, phobias, and conduct disorders than the nongifted adolescents. The authoritative parental style correlates positively with the mental health of both gifted and nongifted

adolescents, while the authoritarian parenting style impacts negatively on the mental health of the gifted, but not of the nongifted adolescents. The study results indicate that the authoritarian parenting style is a crucial factor that influences the well-being of gifted children and may affect their psychological adjustment.

Yazdani & Daryei (2016) examined the parental styles and psychosocial adjustment of adolescents and the relationship between them in gifted adolescents compared to normal adolescents. Four scales, The Parental Authority Questionnaire, Child Attitude Toward Parents, Rosenberg Self-Esteem Scale, and The Depression, Anxiety, and Stress Scale, were administered to 118 gifted and 115 normal adolescents, age 11-14yrs old, in Amol city. The study was conducted in three academic grades (sixth, seventh and eighth and ninth) of students' junior high school in Amol city. In the gifted children's school to which they had been admitted, the gifted subjects were administered an IQ test by the Ministry of Education, while the normal subjects were administered the text from the normal children's school. The results show that parents of gifted adolescents tend to be more authoritative and less authoritarian than parents of normal adolescents. The attitudes of the gifted adolescents towards their parents were more positive than those of the normal adolescents. The gifted adolescents displayed a higher self-concept and fewer psychological reactions (depression, anxiety and stress) than the normal adolescents. The authoritative parenting style correlates positively with the psychological adjustment of both gifted and normal adolescents, while authoritarian style impacts negatively on the psychosocial adjustment of the gifted adolescents but not that of the normal adolescents.

Rudasill et al. (2013) investigated the relationship between children's cognitive abilities and their perceptions of maternal and paternal parenting styles, and examined

how these relationships were moderated by race, sex, and age in a sample of gifted students. The study included 332 participants aged 9-17 years who attended a summer residential program for gifted students and completed the Parental Authority Questionnaire along with the verbal battery of the Cognitive Abilities Test. Three main findings emerged. First, factor analyses supported the use of the Parental Authority Questionnaire with gifted populations. Second, regression analyses and comparisons of mean differences by cognitive ability level were consistent with earlier research, indicating that more cognitively able students tended to perceive their parents as employing a flexible, authoritative parenting style. Finally, consistent with prior studies in nonidentified populations, age, sex, and race were associated with parenting styles as reported by this group of gifted students. Overall, the findings reinforce the view that authoritative parenting fosters positive outcomes for children, particularly those identified as gifted.

Papadopoulos (2021) reviewed current literature to highlight the parenting of Gifted/Talented (G/T) children, with particular focus on their unique social-emotional needs. The studies reviewed indicate that authoritative parenting-which fosters autonomy and self-motivation with parents' supportive behaviours and attitudes toward the exceptional needs of G/T children, are significant determinant of their personal growth. In contrast, authoritarian parenting negatively affects children's well-being and mental health, hindering the full development of their potential. Strengthening the caregiving capacity of family members by alleviating stress associated with parenting and caregiving can have a substantial positive impact on the developmental trajectory of gifted children.

Yildiz (2021) conducted a literature review to examine parenting attitudes and their effects on gifted children. Based on the inclusion criteria, 11 studies were analyzed. Gifted children generally perceived parental attitudes as tolerant and democratic, whereas peers often viewed them as authoritarian or permissive. The review found that authoritarian parenting negatively affected children's mental development, anxiety levels, self-concept, family relationships, and overall well-being. Conversely, democratic and tolerant parenting was associated with higher academic performance, self-esteem, well-being, and improved family relationships among gifted children. The study also highlighted the importance of both maternal and paternal parenting attitudes and emphasized the significance of mother-child interactions.

Emotional and behavioural problems of intellectually gifted adolescents

Tasca et al. (2022) systematically reviewed the literature to examine the relationship between intellectual giftedness and socio-emotional and/or behavioural disorders. Nineteen studies met the inclusion criteria, with 17 involving children and/or adolescents and 12 including a non-gifted control group. Findings indicated that socio-emotional problems, such as withdrawal, were reported in 3 of 8 studies; internalizing disorders, such as anxiety, in 5 of 9 studies; and externalizing disorders, such as hyperactivity, in 3 of 5 studies. Attention-deficit/hyperactivity disorder (ADHD) was the most frequently investigated comorbidity. Due to the heterogeneity of participants' ages, informants, and assessment instruments, a definitive conclusion regarding the association between intellectual giftedness and socio-emotional or behavioural problems could not be drawn. It suggests that factors such as age and discrepancies between verbal and nonverbal intellectual abilities should be carefully considered.

Eren et al. (2018) compared the areas of social, emotional, behavioural, and mental problems, the quality of life, and family functioning of gifted children and children of normal intelligence. The sample included 49 children in the gifted category and 56 peers matched with age and gender. The measurements used were the schedule for affective disorder and schizophrenia for present and lifetime version (K-SADS-PL), Children's depression rating scale, Trait-State Anxiety Inventory, Strengths and Difficulties Questionnaire, Quality of Life Scale for children and parent-reported family and behavioural measures, were administered to both groups and their parents. Findings indicated that gifted children perceived themselves as more inattentive and energetic, reported lower social functioning and had a poorer perception of their physical health than their non-gifted peers. Within the gifted group, boys exhibited higher depressive symptoms than girls. Parents of boys of average intelligence reported lower academic performance compared to parents of gifted boys, whereas no such difference was found between gifted girls and their peer group. The results address both their strengths and vulnerabilities.

Magai et al. (2018) examined emotional and behavioural problems (EBP) in childhood and adolescence in Kenya. The study obtained behavioural ratings of the Child Behaviour Checklist (CBCL) from 1022 parents of children aged 6-18 years. Parent reports indicated that EBP were highly prevalent compared to multicultural norms, with 27% of children scoring in the borderline range and 17% in the clinical range. Younger children were reported to have higher overall EBP and greater internalizing problems than older children. Self-reports revealed that girls scored higher than boys, particularly on internalizing problems. The findings highlight elevated parent-reported EBP among Kenyan youths.

Bain and Bell (2004) examined socially related self-concept, attributions for social success and failure, and peer relationships among fourth- through sixth-grade students identified as intellectually gifted, compared with a group of high-achieving students not identified as gifted. The gifted group scored significantly higher than the comparison group on three of four socially related self-concept subscales ($p < .01$) and on the general self-concept scale ($p < .05$) of the Self-Description Questionnaire-I. On the Student Social Attribution Scale (Bell & McCallum, 1995), an interaction effect indicated that gifted students attributed social success more to ability and effort and attributed social failure less to ability, effort, and task difficulty compared with the comparison group. There are no significant differences between the groups in terms of teacher ratings; however, boys were rated significantly higher than girls across both groups.

Francis et al. (2016) conducted a systematic search strategy in which intellectual giftedness was operationalised in terms of IQ score. The authors reviewed evidence from studies examining the association between giftedness and psychopathology by comparing the gifted children who scored an IQ equal to or greater than 125 with non-gifted peers who had above IQ score above 90 using standardised assessments and empirically validated measures of psychopathology. Finally, 18 studies met the inclusion criteria. Overall findings suggested that gifted children show better socioemotional adjustment and fewer behavioural difficulties than their typically developing peers. The authors noted several factors that may bias results in this direction, including the common practice of selecting participants from gifted education programs and recommended that future research employ larger sample sizes,

longitudinal designs, individually administered cognitive assessments, age-appropriate psychopathology measures and analyses testing interactions among variables.

Lavrijsen et al. (2023) conducted a meta-discussion on high cognitive ability and mental health, emphasising internalising vulnerabilities in gifted youth. The study examined the association between intellectual giftedness, operationalised as high cognitive ability and mental health outcomes in a non-selective sample of early adolescents (N=3409) using the standardised Covat-CHC intelligence test. The sample consists of 49.6% boys, and the mean age was 12.5 years. The adolescents with high cognitive ability were identified using a cutoff of an IQ score equal to or above 120, with a sample of 403. The researchers compared this group with their peers of average ability on multiple psychosocial outcomes, including self- and parent-reported emotional problems, conduct problems, hyperactivity/inattention, and self-reported worry and global self-esteem. Overall, all the findings indicated that adolescents with high cognitive ability were not at greater risk for psychological maladjustment. Also, they tend to favour the high ability group, suggesting comparatively better socio-emotional functioning. Notably, however, adolescents who had been formally identified as gifted showed poorer adjustment across several outcomes.

Çitil and Özkubat (2020) compared the social skills, problem behaviours and academic competence of gifted students at the elementary level with their non-gifted peers, and assessed these based on the variables age, gender, and school year. The sample consists of 50 gifted students and 50 non-gifted students from lower primary school, Ankara. The results revealed that the level of social skills and academic competence of gifted students were more compared to peer group. Also, it was reported

that there is no differences in problem behaviours interms of gifted and non-gifted students.

Eklund et al. (2015) investigated gifted and non-gifted students from elementary classes with a sample of 1,206 to identify emotional and behavioural risk. The tools used were the Parent and Teacher Behavioural Assessment System for Children, Second Edition (BASC-2) and the Behavioural and Emotional Screening System. It was rated by teachers and parents. The purpose was to assess the behavioural functioning. The findings suggest that there are significant differences between the two groups. The teachers and parents reported emotional and behavioural risk among gifted boys and the non-gifted group. The elevation of internalizing behaviours in gifted children was rated by parents. gifted children. The high cognitive abilities may serve as a protective factor for gifted students despite being at risk level, as they have shown higher academic performance.

Guénolé et al. (2013) evaluated the intellectually gifted children, that is, children with an $IQ \geq 130$ who referred to paediatric or child neuropsychiatry clinics for socio-emotional problems and/or school underachievement or maladjustment. They mainly show internalizing problems and that behavioural difficulties are worse in those who are highly gifted, ie, IQ equal to or greater than 145 or who show developmental asynchrony (a large verbal-performance IQ discrepancy). The sample included 143 gifted children aged 8-12 and they were assessed using the Wechsler Intelligence Scales and Children's Behaviour Checklist. Compared to the general group, these clinically referred gifted children showed higher levels of behavioural problems across all symptom areas. Internalizing problems were not more common than externalizing problems. The study also found that highly gifted children did not have more

behavioural issues than those with lower levels of giftedness. However, children who showed a significant verbal-performance discrepancy had more externalizing problems and mixed behavioural difficulties than those whose abilities were more balanced. These findings indicate that developmental synchrony plays an important role in understanding emotional and behavioural problems in gifted children.

Association of intellectual giftedness, cognitive domains, parenting style and emotional and behavioural problems.

Morawska and Sanders (2008) studied to describe children's behavioural and emotional adjustment, and the factors that contribute to children's difficulties, as well as to examine the styles of discipline used by parents of gifted and talented children and their level of confidence in managing specific parenting tasks. The 211 parents met the criteria of the study. The results revealed that gifted children exhibit no more behavioural difficulties than other children in the community sample. But the gifted children show higher levels of emotional symptoms and peer problems. And these difficulties were predicted by parenting factors such as parental confidence. They also tend to use a more authoritarian style of parenting than the permissive type.

Zennatti (2024) assessed the role of family functioning in internalizing and externalizing problems in gifted children. Though such children carry high cognitive abilities, they tend to show socioemotional difficulties. The participants include mothers (n=362) and their gifted children (n=362). The tools were administered to mothers. The WISC-IV was completed by children. The results suggest the model predicting internalizing and externalizing problems was significant and explained 5.6% and 10% of variance, respectively. The rigidity subscale had only an independent and positive effect on internalizing problems and externalizing problems over and above

sociodemographic variables and QI, whereas disengagement, enmeshment, and chaos were not associated with internalizing and externalizing problems. The rigid family environment of gifted children, characterized by limited flexibility and a reduced capacity to adapt during periods of stress or change, appears to heighten the risk of both internalizing and externalizing problems among gifted children.

Tong et al. (2010) examine gender differences in the correlations between intelligence and developmental problems as well as social competence in first graders. The sample size was 90. Both parent and child participated. The age of the children was 7 years old. Ninety parent-child dyads participated in this study. The WISC-III, Parent Child Interaction Scale and SDQ Parent Version were applied. The findings revealed that the processing speed of boys was significantly related to peer problems. Similarly, the emotional symptoms in girls are associated with their intellectual skills. There are differences in the correlations between parenting and intellectual abilities between boys and girls.

Overview of Literature and Research Gap

Studies from India indicate that gifted students are frequently under-identified due to a lack of systematic screening procedures, limited teacher awareness, and prevailing sociocultural misconceptions about giftedness (Kumar & Raj, 2012; Nair, 2019). As a result, many adolescents remain unrecognized in regular classrooms, leading to underutilization of their potential, disengagement, and even underachievement. Research in the Indian context has also shown that academic achievement is often used as the sole indicator of giftedness in school settings, while cognitive aspects and psychosocial factors remain underexplored (Rao, 2007; Bhatt, 2013). This creates a strong rationale for adopting comprehensive approaches that

examine multiple dimensions of cognitive abilities of giftedness beyond academics and IQ.

In Kerala, where educational systems place strong emphasis on examination performance and rote learning, the concept of giftedness as a distinct developmental category is rarely addressed. This contrasts with research from countries such as China, Korea, and Singapore, where gifted education initiatives have gained policy-level recognition and integrated enrichment and acceleration programs for talented adolescents. International findings consistently highlight that without proper identification and differentiated instruction, gifted adolescents are at risk of boredom, disengagement, and psychosocial difficulties such as anxiety, stress, or depression (Peterson, 2009; Reis & Renzulli, 2010). In the Indian cultural context, these risks may be amplified by academic pressures, limited career guidance, and a lack of specialized services for gifted learners (Sengupta & Pal, 2019).

Research on intellectual giftedness has consistently highlighted the advanced cognitive abilities of gifted adolescents, particularly in verbal comprehension, perceptual reasoning, and working memory, although findings for processing speed remain mixed (Pezzuti et al., 2023; Calero et al., 2007). At the same time, psychosocial research suggests that gifted adolescents may experience greater sensitivity, emotional intensity, inattention and peer adjustment difficulties compared to their peers (Neihart, 1999). Though many studies have documented mean-level group differences in either cognitive domains or psychosocial outcomes, relatively few have examined the direct associations between cognitive profiles and emotional or behavioural problems among gifted adolescents. This is a critical gap because such associations could illuminate

specific vulnerabilities (e.g., whether lower processing speed predicts peer difficulties) and guide interventions tailored to gifted populations.

Another limitation in the existing literature is the fragmented mode of contextual variables, particularly parenting styles and family dynamics. Studies indicate that authoritative parenting is associated with fewer psychosocial difficulties in gifted adolescents, while authoritarian or inconsistent parenting correlates with higher internalizing problems and maladaptive behaviours (Moon, 2001; Dwairy, 2004). However, these studies typically examine parenting and behavioural problems from cognitive factors, leaving unanswered whether family context moderates or exacerbates the link between cognitive strengths/weaknesses and emotional-behavioural problems.

While considerable research has been conducted in Western contexts, there remains a paucity of studies within the Indian cultural framework (Rao, 2007; Raina, 2012). Moreover, there is a scarcity in researches focusing the asynchronous development of gifted adolescents through cognitive and psychosocial associations and finding out the predictive elements (cognitive and psychosocial) of emotional and behavioural problems. This gap underscores the importance of examining both the cognitive and psychosocial domains of gifted adolescents in the local context, to better understand their developmental needs, inform educational practices and psychosocial interventions.

Therefore, the present study seeks to address these gaps by exploring the interrelations between intellectual giftedness, cognitive domains, parenting styles, and EBP in adolescents. By employing correlational and multivariate approaches, the study will move beyond descriptive comparisons to test whether specific cognitive abilities

and parenting factors are associated with emotional and behavioural problems. Importantly, this work will contribute culturally grounded evidence from India, providing insight into an underrepresented population in the global giftedness literature. Given these gaps, researching intellectual giftedness among adolescents is both timely and essential. The findings are expected to inform both educational practice and family-based interventions, offering a more integrated understanding of gifted adolescents' cognitive and psychosocial development.

Need and Relevance of the Study

Research on giftedness in India extends over five decades, yet it remains limited in terms of systematic work and empirical grounding. Although the country possesses a vast talent pool, a substantial proportion of gifted children continue to go unidentified and unrecognized. The slow and uneven development of science and technology sectors over the years has further contributed to a persistent “talent drain,” with many high-ability students seeking advanced opportunities abroad. There is a need to explore, identify, assess their needs and vulnerabilities and develop systems and processes by which they can find their niche within our place. Nurturing of such children will eventually lead to contributions to India's knowledge bank. Hence, understanding their cognitive strength and weaknesses, making them aware of the skills will benefit them in terms of academic, career, social and behavioural aspects. In the Indian context, giftedness, high ability and creativity are often viewed as special endowments, leading to the perception that such children are already ‘the lucky ones’. As a result, society tends to assume that these students will excel independently with minimal need for additional support or guidance. Researchers have generated substantial evidence identifying several factors associated with intellectual giftedness, including high

intellectual ability, advanced academic achievement, heightened sensitivity, creativity, and overall quality of life. However, there is a lacuna in studies of the vulnerabilities of gifted children, as there is a common bias on gifted children are mentally fit due to their intellectual skills. Through the study, the researcher attempts to provide insight into intellectual giftedness and its exploration in cognitive and psychosocial aspects by comparing them with adolescents with average intelligence and within themselves. Even though highly intelligent individuals has a remarkable capacity for seeing and internalizing these vast uncertainties, possibilities, and problems, this gift can either be a catalyst for empowerment or it can be a predictor of dysregulation and debilitation. Therefore, the present study has been designed to identify intellectually gifted adolescents, explore the cognitive and few psychosocial aspects and explore the link between intellectual giftedness and emotional and behavioural problems, where the findings of the present study will shed more light on teachers, parents and clinicians who promote awareness and positive mental health of gifted children. It will be a base for further cognitive, educational and emotional-behavioural interventions for the needy gifted adolescents. Moreover, in a state like Kerala with multicultural and multi-traditional backgrounds, gifted education is yet to be part of a formal educational policy. Importantly, this aligns with the objectives of the National Education Policy (NEP) 2020, which calls for recognising and nurturing diverse talents, including giftedness. They are likely to be demographically spread across the school setting and hence valuing and recognising them is important for national growth.

In short, the present study can be of significance with respect to the following reasons:

- Early identification enables children to receive optimal opportunities for developing their abilities.

- Adolescence, a period of stress and strain- a confusing period where an he/she is at the brink of choosing their career, edge of making independent decisions and living with their skills. Exploring the cognitive and psychosocial aspects would provide them a better understanding of themselves.
- Developing the children's and adolescents' capacities to participate in programmes at the national level.
- To be aware that unidentified or unobservable gifted children than hereto considered as upper extremes of intelligence.
- To support them in developing their talents and realizing their potential, while also helping them navigate the social and emotional challenges that may arise from their differences.
- Exceptional skills could be applied to appropriate settings.
- Reducing the risk of maladaptive behaviours in the later period.
- To ensure more parental awareness regarding accelerated development in children and seek help for cognitive-psychosocial differences.
- To reinforce the understanding that schools and teachers hold an ethical responsibility to provide guidance and mentorship that supports students in achieving success and reaching their fullest potential.
- To raise awareness the teachers and parents beyond the perspectives of a high achiever, just a bright student and thereby understand their needs, issues and challenges, which would help them to cope in a much better way.

- To initiate enrichment programmes, raise awareness on gifted research centres, parent groups, and mentoring groups for gifted students existing in India, which could be a turning point in their future.

Statement of the Problem

The current research aims to identify intellectually gifted adolescents from the school setting, explore the cognitive domains, parenting style and emotional and behavioural problems (EBP) among intellectually gifted adolescents (IGA) and compare them with intellectually average adolescents (IAA). The study would also focus on identifying emotional and behavioural problems (EBP) among IGA and to assess if there is any association between intellectual giftedness and emotional and behavioural problems. Also association between cognitive domains and EBP among IGA. Apart from intellectual and cognitive domains, the study would also attempt to establish the link between parenting styles and emotional and behavioural problems among IGA. It further examines the predictive role of intelligence, cognitive domains and parenting style on emotional and behavioural problems among IGA. Finally, the research delves into forming heterogeneous clusters of intellectually gifted adolescents based on similar/homogenous cognitive-psychosocial characteristics that could be utilised for intervention. Hence, the study is entitled: “INTELLECTUAL GIFTEDNESS: AN EXPLORATORY STUDY ON COGNITIVE AND PSYCHOSOCIAL DOMAINS”.

Definitions of the Key Terms used in the Study

○ Intellectual giftedness

Intellectual giftedness is usually described with an Intellectual quotient (IQ), equal to or above 130 on an intellectual test, which implies the intelligence is very

superior to their peer group (WISC IV India, 2004 & Subotnik et al., 2011). Based on Cattell-Horn-Carroll theory of intelligence, Gridley and colleagues (2003) described intellectually gifted individuals as, who “demonstrate (a) a high performance in general intellectual abilities and/or (b) an exceptional potential in specific intellectual abilities and /or (c) exceptional general or specific school attitudes” (Schneider & McGrew, 2012).

Here, in our study, intellectual giftedness is operationalized as the cutoff score of Full-Scale Intelligence quotient (FSIQ) equal to or above 125 on Wechsler Intelligence Scale for Children (WISC-IV India, 2004). We selected a cutoff IQ score of 125 or above to account for the standard error of measurement. An IQ of 130, commonly used to indicate high intellectual ability, typically falls within the range of 124 to 134 about 95% of the time ((WISC-IV India, 2004 & Sattler, 2008 & Francis et.al, 2015). The IQ score of 130 usually classifies individuals who scores two standard deviations above the mean ($IQ \geq 130$) as gifted, representing 2% of the population (Wechsler, 2003)

- **Average intelligence**

Average intelligence refers to a level of intellectual functioning that falls within the normal range of cognitive ability (90-109), typically measured using standardized intelligence tests (Wechsler, 2003; Sattler, 2009). It represents approximately 68% of the population according to a normal distribution. They demonstrate age-appropriate reasoning, comprehension, and problem-solving abilities, performing within the expected range in academic and daily life tasks (Wechsler, 2003; Sattler & Ryan, 2009).

In the context of this study, average intelligence is operationally defined as Full-scale IQ scores ranging from 90-109 on the Wechsler Intelligence Scale for Children

(WISC-IV, India). This range represents individuals whose cognitive abilities fall within one standard deviation of the population mean ($M=100$, $SD=15$) based on standardized norms for the Indian population.

- **Adolescents**

According to World Health Organization (WHO),2022, “Adolescents are individuals in the 10-19 years age group, experiencing rapid physical, emotional and social changes as they transition from childhood to adulthood”. WHO categorizes adolescence into three: Early adolescence (10-13 years), Middle adolescence (14-17 years) and late adolescence (18-19 years).

For the research perspective, Adolescence is operationally defined as the developmental period between 13 and 15 years of age, approximately aligning with the middle phase of adolescence as categorized by the World Health Organization (WHO, 2022). This period is marked by continued brain maturation, deeper identity exploration, and stronger independence. The school-going individuals (high school students) who belong to the 13-15-year developmental period is represented as adolescents in the research.

Intellectually gifted adolescents: Adolescents (13-15 years) who score above 125 on the Full scale IQ (FSIQ) of WISC-IV, India, are defined to be intellectually gifted.

Intellectually average adolescents: The adolescents (13-15 years) whose scores come between 90-109 on the FSIQ of WISC-IV, India, are defined to be intellectually average.

- **Cognitive domains**

Cognitive domains are defined as the mental capacity used to organise cognitive processes such as attention, memory, reasoning and problem-solving (Lezak et

al.,2012). They help in understanding how individuals process information and apply it to various contexts. The six key domains of cognitive function include complex attention, executive function, learning and memory, language, perceptual-motor control, and social cognition. DSM-5 explains that these domains collectively represent the core components of cognitive functioning required for adaptive and independent behaviour (American Psychiatric Association, 2013).

In the context of research, cognitive domains are selected, assessed and measured by the sub tests of WISC-IV India. The main variables to assess cognitive skills were Verbal comprehension, Perceptual reasoning, Working memory and Processing speed.

- **Verbal comprehension**

It comprises of verbal reasoning, social judgment and learning ability. It is measured through subtests of WISC-IV India such as similarity, comprehension and vocabulary, respectively. The composite score of the three subtests constitutes verbal comprehension. In line of research, verbal comprehension is indicated by the scores derived from intellectually gifted adolescents responses to above subtests.

- **Perceptual reasoning**

It comprises of visual perception and organisation, abstract reasoning and fluid reasoning. It is measured through subtests of WISC-IV India, such as block design, picture concepts and matrix reasoning, respectively. The composite score of the three subtests constitutes perceptual reasoning. Considering this study, perceptual reasoning is represented by the scores derived from intellectually gifted adolescents' responses to the above subtests.

- **Working memory**

It comprises attention and concentration and short-term auditory memory. It is measured through subtests of WISC-IV India, such as digit span and letter-number sequencing, respectively. The composite score of the two subtests constitutes working memory. In relation to our research, working memory is indicated by the scores derived from intellectually gifted adolescents' responses to the above subtests.

- **Processing speed**

It comprises visuo-motor coordination and short-term visual memory. It is measured through subtests of WISC-IV India, such as coding and symbol search, respectively. The composite score of the two subtests constitutes processing speed. In line of research, processing speed is achieved by the scores derived from intellectually gifted adolescents' responses to the above subtests.

- **Psychosocial domains**

Psychosocial domains refer to the interconnected areas of an individual's psychological and social well-being. These domains involve the interplay between mental (psychological) processes and social factors, such as relationships, culture, and environment. Essentially, they reflect how a person's mental health, emotions, and behaviours are influenced by their social environment. The psychosocial domains highlight how an individual's mental health is shaped by both internal psychological processes and external social experiences.

Pertinent to our research, selected psychosocial domains such as parenting style and emotional and behavioural problems were measured and scored based on the tools used in the study.

- **Parenting style**

The construct of parenting style is used to describe parents' practices in socializing their children (Baumrind, 1991) and thereby shaping them to reach their potential. It is based on Baumrind's (1971) three major parenting styles, reflecting distinct patterns of responsiveness and demandingness: authoritative, authoritarian, and permissive.

As a part of this study, the three types of parenting style, namely authoritative, authoritarian and permissive, were indicated from the scores of the parenting authority questionnaire (PAQ).

- **Emotional and behaviour problems**

Emotional and behavioural problems (EBP) are the broad term for internalizing and externalizing problems (Nikstat A & Reimann R, 2020). Internalizing behaviours refer to inward-directed emotional problems, where individuals turn their distress inward, often experiencing internal struggles like emotional problems such as anxiety, depression etc.. It may lead to social withdrawal and difficulties in forming relationships. Externalizing behaviours involve outward-directed actions, where individuals act out or display disruptive, hyperactive, aggressive, or antisocial behaviours that affect others around them. It can result in social conflict, problems with authority, and issues in peer interactions.

Here in our study, the EBP is operationalised as a total score measured by using the Strengths and Difficulties Questionnaire (SDQ). It comprises emotional symptoms, conduct problems, inattention and hyperactivity and peer problems. Emotional symptoms were defined as internalizing emotional difficulties, including anxiety,

worries, fears, low mood and somatic complaints. Hyperactivity/Inattention was operationalised as difficulties in attention regulation, impulse control, and activity level, reflected in restlessness, distractibility, and reduced task persistence. Conduct Problems were defined as externalising behavioural difficulties such as temper tantrums, aggression, defiance, rule-breaking, lying, and stealing. Peer Problems were operationalised as difficulties in peer relationships, including social withdrawal, limited friendships, peer rejection, and experiences of being bullied. The total emotional and behavioural problems are the summation of all four areas. And these all are operationalised as scores attained by each subdomain through SDQ.

The following are the research questions, objectives and hypotheses formulated for the main study (Phase II) based on Phase I. The exploration of variables and tools in phase I is detailed under Chapter 2, Methodology section.

Research Questions

1. What proportion (or percentage) of adolescents in the school setting meet the standardized criteria for intellectual giftedness based on their WISC-IV scores?
2. What are the sociodemographic characteristics (e.g., age, gender, socioeconomic status, educational background of parents, etc.) and academic characteristics of intellectually gifted adolescents (IGA) compared to those of intellectually average adolescents (IAA)?
3. Is there any significant relationship between intellectual giftedness and sociodemographic variables and academic variables among adolescents?
4. What are the key cognitive characteristics of intellectually gifted adolescents as measured by WISC-IV and how do different cognitive abilities vary among intellectually gifted adolescents?

5. How do cognitive domains of intellectually gifted adolescents differ from those of intellectually average adolescents?
6. What are the common parenting styles adopted by IGA and IAA?
7. To what extent do IGA and IAA in the school setting experience emotional and behavioural problems at risk level and at clinically significant level?
8. How do psychosocial (parenting style and EBP) domains of intellectually gifted adolescents differ from those of intellectually average adolescents?
9. Are there any significant differences in cognitive outcomes among IGA with varying levels of giftedness (low gifted vs highly gifted)?
10. Are there any significant differences in psychosocial outcomes among IGA with varying levels of giftedness (low gifted vs highly gifted)?
11. Are there significant differences in cognitive and psychosocial outcomes among IGA with respect to gender?
12. Is there any relationship between intellectual giftedness and emotional and behavioural problems among IGA?
13. Is there any relationship between cognitive domains and EBP among IGA?
14. Is there any relationship between parenting style and EBP among IGA?
15. To what extent do cognitive domains (Verbal Comprehension (VC), Perceptual Reasoning (PR), Working Memory (WM), Processing Speed (PS)) and parenting style predict EBP among IGA?
16. What distinct cognitive-psychosocial subtypes exist among adolescents identified as intellectually gifted based on cognitive domains (VC, PR, WM, PS) and psychosocial domains (Parenting style, EBP)?

Objectives

- ✓ To determine the percentage of intellectually gifted adolescents in the school setting using WISC-IV, India.
- ✓ To understand the sociodemographic characteristics (e.g., age, gender, socioeconomic status, educational background of parents etc..) of intellectually gifted adolescents.
- ✓ To understand the academic and nonacademic characteristics of intellectually gifted adolescents.
- ✓ To identify the key cognitive characteristics of intellectually gifted adolescents as measured by the WISC-IV.
- ✓ To compare the cognitive domains of IGA with those of IAA.
- ✓ To explore the parenting styles of intellectually gifted adolescents.
- ✓ To understand the varying levels of emotional and behavioural problems among IGA and IAA.
- ✓ To compare the psychosocial domains of IGA with those of IAA.
- ✓ To investigate the differences in cognitive and psychosocial outcomes among intellectually gifted adolescents with varying levels of giftedness.
- ✓ To compare the cognitive and psychosocial domains of IGA with respect to gender.
- ✓ To examine the relationship between intellectual giftedness and emotional and behavioural problems among intellectually gifted adolescents.

- ✓ To examine the relationship between cognitive domains and emotional and behavioural problems among intellectually gifted adolescents.
- ✓ To examine the relationship between parenting style and emotional and behavioural problems among intellectually gifted adolescents.
- ✓ To find out the predictive role of cognitive domains (VC, PR, WM, PS) and parenting style (Authoritative, Authoritarian, Permissive) on emotional and behavioural problems among IGA.
- ✓ To identify the various clusters among IGA based on cognitive and psychosocial characteristics.

Hypotheses

The following hypotheses were formulated for the main study (Phase II) based on the objectives of the research.

Phase II

- 1. There is no significant association between intellectual giftedness and sociodemographic variables.**
 - 1.1 There is no significant association between intellectual giftedness and gender.
 - 1.2 There is no significant association between intellectual giftedness and school curriculum.
 - 1.3 There is no significant association between intellectual giftedness and residence.
 - 1.4 There is no significant association between intellectual giftedness and the type of family.

- 1.5 There is no significant association between intellectual giftedness and the education level of parents.
- 1.6 There is no significant association between intellectual giftedness and the occupation level of parents.
- 1.7 There is no significant association between intellectual giftedness and socioeconomic status.
- 1.8 There is no significant association between intellectual giftedness and ordinal position.
2. **There is no significant association between intellectual giftedness and academic variables.**
 - 2.1 There is no significant association between intellectual giftedness and academic achievement
 - 2.2 There is no significant association between intellectual giftedness and level of scholarship.
 - 2.3 There is no significant association between intellectual giftedness and subject excellence.
3. **There are no significant differences in the cognitive variables between intellectually gifted adolescents (IGA) and intellectually average adolescents (IAA).**
 - 3.1 There is no significant difference in the verbal comprehension (VC) and its sub-variables (verbal reasoning, social judgement and learning ability) between IGA and IAA.
 - 3.2 There is no significant difference in the perceptual reasoning (PR) and its sub-variables (visual perception and organization, abstract reasoning and fluid reasoning) IGA and IAA.

3.3 There is no significant difference in the working memory and its sub-variables (attention and concentration & short-term auditory memory) between IGA and IAA.

3.4 There is no significant difference in the processing speed and its sub-variables (visuomotor coordination and short-term visual memory) between IGA and IAA.

4. There are no significant differences in cognitive variables with respect to levels of giftedness (low vs high) among intellectually gifted adolescents (IGA).

4.1 There is no significant difference in verbal comprehension and its sub-variables (Verbal reasoning, social judgment and learning ability with respect to levels of giftedness (low vs high) among IGA.

4.2 There is no significant difference in perceptual reasoning and its sub-variables (Visual perception and organization, abstract reasoning and fluid reasoning) with respect to levels of giftedness (low vs high) among IGA.

4.3 There is no significant difference in working memory and its sub-variables (Attention and concentration & short-term auditory memory) with respect to levels of giftedness (low vs high) between intellectually gifted adolescents.

4.4 There is no significant difference in processing speed and its sub-variables (Visuo-motor co-ordination and short-term visual memory) with respect to levels of giftedness (low vs high) among IGA.

5. There are no significant differences in cognitive variables with respect to gender among intellectually gifted adolescents (IGA).

5.1 There is no significant difference in verbal comprehension and its sub-variables (Verbal reasoning, social judgment and learning ability with respect to gender among intellectually gifted adolescents.

- 5.2 There is no significant difference in perceptual reasoning and its sub-variables (Visual perception and organization, abstract reasoning and fluid reasoning) with respect to gender among intellectually gifted adolescents.
- 5.3 There is no significant difference in working memory and its sub-variables (Attention and concentration & short-term auditory memory) with respect to gender among intellectually gifted adolescents.
- 5.4 There is no significant difference in processing speed and its sub-variables (Visuo-motor co-ordination and short-term visual memory) with respect to gender among intellectually gifted adolescents.
6. **There are no significant differences in the parenting style (authoritarian, authoritative and permissive) among intellectually gifted adolescents (IGA) and intellectually average adolescents (IAA).**
7. **There are no significant differences in parenting style (authoritarian, authoritative and permissive) with respect to levels of giftedness (low vs high) among intellectually gifted adolescents.**
8. **There are no significant differences in parenting style (authoritarian, authoritative and permissive) with respect to gender among intellectually gifted adolescents.**
9. **There are no significant differences in emotional and behavioural problems between IGA and IAA.**
- 9.1 There are no significant differences in emotional problems between IGA and IAA.

9.2 There are no significant differences in inattention/hyperactivity problems between IGA and IAA.

9.3 There are no significant differences in conduct problems between IGA and IAA.

9.4 There are no significant differences in peer problems between IGA and IAA.

9.5 There are no significant differences in total emotional and behavioural problems between IGA and IAA.

10. There are no significant differences in emotional and behavioural problems with respect to levels of giftedness (low vs high) among intellectually gifted adolescents.

10.1 There is no significant difference in emotional symptoms between low-gifted and highly gifted adolescents.

10.2 There is no significant difference in inattention/hyperactivity problems between low-gifted and highly gifted adolescents.

10.3 There is no significant difference in conduct problems between low-gifted and highly gifted adolescents.

10.4 There is no significant difference in peer problems between low-gifted and highly gifted adolescents.

10.5 There is no significant difference in total emotional and behavioural problems between low-gifted and highly gifted adolescents.

11. There is no significant difference in emotional and behavioural problems with respect to gender among intellectually gifted adolescents.

11.1 There is no significant difference in emotional symptoms with respect to gender among intellectually gifted adolescents.

- 11.2 There is no significant difference in inattention/hyperactivity problems with respect to gender among intellectually gifted adolescents.
- 11.3 There is no significant difference in conduct problems with respect to gender among intellectually gifted adolescents.
- 11.4 There is no significant difference in peer problems with respect to gender among intellectually gifted adolescents.
- 11.5 There is no significant difference in total emotional and behavioural problems with respect to gender among intellectually gifted adolescents.
- 12 **There is no significant relationship between intellectual giftedness and EBP among IGA.**
- 13 **There is no significant relationship between cognitive domains and EBP among IGA.**
 - 13.1 There is no significant relationship between verbal comprehension and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.
 - 13.2 There is no significant relationship between perceptual reasoning and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.
 - 13.3 There is no significant relationship between working memory and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

13.4 There is no significant relationship between processing speed and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

14 There is no significant relationship between parenting style and EBP among IGA.

14.1 There is no significant relationship between authoritative parenting style and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

14.2 There is no significant relationship between authoritarian parenting style and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

14.3 There is no significant relationship between permissive parenting style and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

15 Cognitive domains (Verbal comprehension, perceptual reasoning, working memory, processing speed) and parenting style do not significantly predict emotional and behavioural problems among intellectually gifted adolescents.

15.1 The cognitive domains (VC, PR, WM, PS) and parenting style do not have a predictive role in total EBP among IGA.

15.2 The cognitive domains (VC, PR, WM, PS) and parenting style do not have a predictive role in emotional problems among IGA.

15.3 The cognitive domains (VC, PR, WM, PS) and parenting style do not have a predictive role in conduct problems among IGA.

- 15.4 The cognitive domains (VC, PR, WM, PS) and parenting style do not have a predictive role in inattention/hyperactivity symptoms among IGA.
- 15.5 The cognitive domains (VC, PR, WM, PS) and parenting style do not have a predictive role in peer problems among IGA.

CHAPTER 2

METHOD

Phase 1

- Scoping Review
- Pilot work
- Expert suggestions
- Selection of variables and tools

Phase II

- Research design
- Participants
- Measures
- Procedure
- Ethical considerations
- Statistical analyses

Research is fundamental to advances in human society. It is a systematic process of examining a topic to generate new knowledge, validate existing theories, or address specific problems. In psychology, research helps to understand human behaviour, cognition, emotions, and social interactions through various methodologies such as experiments, surveys, and observational studies. Various theorists and researchers have defined psychological research as scientific, apart from its philosophical connections. Scientific research is a systematic and objective attempt to provide answers to certain questions. The purpose of the research is to discover and develop an organized body of knowledge (Singh, 2005, as cited in Dr B. R. Ambedkar Open University, 2020). Kerlinger (1993) defined research as “a systematic, controlled, empirical, and critical investigation of hypothetical propositions about the presumed relationships among natural phenomena. It pertains to collecting, analysing, and interpreting data using scientific methods to reach conclusions. In short, research methodology acts as the foundation of a study, providing a systematic model for investigation. This chapter concise a framework for the study, which includes research design, participants, tools used, procedure, ethical considerations and methods of statistical analyses.

The current research aims to identify intellectually gifted adolescents (IGA) from school settings and to explore the selected cognitive and psychosocial domains associated with such adolescents and to compare them with intellectually average adolescents (IAA). The research also aims to look into the association between intellectual giftedness and emotional and behavioural problems (EBP) among intellectually gifted adolescents. It further designs the predictive role of cognitive domains and parenting style on emotional and behavioural problems in intellectually gifted adolescents. Finally, the research looks into identifying different clusters of intellectually gifted adolescents based on cognitive-psychosocial domains, which

would be helpful for tailored cognitive and psychosocial interventions. The research also explores the cognitive and psychosocial domains in levels of giftedness and gender differences among IGA. The study employs a quantitative approach, with exploratory in nature. An exploratory study is often used in areas where limited prior research exists and when a researcher seeks to identify patterns, relationships, or structures in numerical data without initially discovering patterns. The research initially emphasizes the identification and exploration of intelligence, cognitive domains and psychosocial domains by quantifying the data through descriptive and inferential statistics, finding an association between intellectual giftedness and emotional and behavioural problems and then moving on to identify natural groupings or clusters among gifted adolescents, which is again quantitative in analysis. Hence, this research facilitates a predefined hypothesis attributing a deductive approach. Deductive approaches start with a theory or hypothesis and test it with the data to conclude. Though clustering is merely towards inductive research (the research develops new insights or theories based on data patterns), here we put forward cluster analysis, a quantitative measure over the other inductive approaches (focused groups, interviews etc..). Therefore, considering the hypothesis testing in the main study (Phase II), the research justified the quantitative paradigm. The research adopts a quantitative methodological stance and unfolds in two phases: Firstly, an exploration of variables and tools (Phase I) precedes the main study, serving as groundwork for the main study (Phase II).

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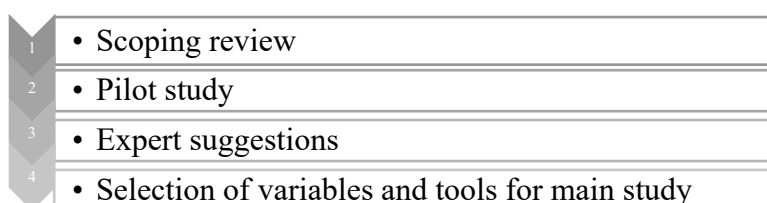
PHASE I

Exploration of variables and measures used in the study

It in-cooperates scoping review, pilot study focusing exploration of varying levels of intelligence among adolescents in a school setting and there by identifying the proportion of intellectually gifted adolescents, exploring the psychosocial factors and assessing the psychopathology associated with IGA from a clinical setting, expert suggestions and finally, selection of research variables and tools to identify intellectually gifted adolescents (IGA) in our context. The flow chart of the exploration phase is depicted below in Figure 2.1.

Figure 2.1

Flow chart of the exploration phase



1. Scoping review

The purpose of the scoping review is to outline the key concepts, gather available evidence, and identify gaps in the research. It is also useful in exploring a new or complex research area. Rather than concluding, it helps to review what is out there in the specified research area. Hence, adding a scoping review that precedes the selection of variables and tools would serve a background work for the study. In the context of our research, we review it under the purview of:

- Reviewing of various identification measures, and cutoff scores of IQ used for identifying such adolescents

- Reviewing the characteristics of existing studies related to IGA
- Reviewing cognitive and psychosocial domains associated with intellectually gifted adolescents.
- Reviewing the association between intellectual giftedness and psychopathology
- Reviews in the Indian context

Table 1.3 and Table 1.4 (Chapter 1, Review of literature) highlight the above review sections and explore the research gap that has already been discussed. Along with this, a pilot study is also conducted to finalize the variables and tools.

2. Pilot study

A pilot study is a small-scale version of the main research. Its purpose is to test the feasibility of the methodology, tools, and procedures. It checks whether data collection works smoothly, identifies practical issues, and helps refine the final research design. In the present study, the researcher has conducted the work in two settings: one is community-based, ie, in a school and the other is clinic-based.

1) Setting: School

School provides direct access to a large and diverse group of adolescents and are efficient in screening potential participants. It offers a structured environment that facilitates organized data collection in classrooms or resource rooms. There is an availability of academic records and we could easily coordinate with the school authorities. Moreover, it is a natural setting of community where adolescents express their cognitive abilities, academic performance, peer interactions, and behavioural patterns are regularly expressed and observed, compared to any other community setting. And the educational exposure is provided in a similar way to a certain extent and they are living with age-matched peer groups. The pilot study in a school setting is conducted based on the following objectives:

- To find out differences in levels of intelligence among adolescents at class level.
- To get a baseline on how much intellectually gifted adolescents are present at class level.
- To confine the tool for identifying IGA by practically administering the SPM and WISC IV, India.
- To ensure the practicality of selection in terms of the time, resources and support.
- To explore the psychosocial attributes of selected intellectually gifted adolescents.
- To understand the psychopathology associated with intellectually gifted adolescents.

Research design

The present pilot study follows a descriptive research design. It is a method of gathering information to describe a population, situation or phenomenon through frequencies, trends, categories and characteristics. It is used when there is not much known about a topic or problem. This research design helps the researcher to set the stage for more advanced or next-level research endeavours.

a. Sample:

The study was conducted in three schools of Thrissur district (Aided school, Govt school and CBSE school) selected on convenience. The purposive sampling method was used to identify intellectually gifted adolescents. Purposive sampling is a non-probability sampling technique in which researchers intentionally select participants who possess specific characteristics, experiences or knowledge that are directly relevant to the purpose of the study. Here, the criteria of IQ at or above the 95th Percentile, Grade 1, Intellectually superior in Standard progressive matrices

(SPM), was the initial criterion for screening intellectually gifted adolescents and $IQ \geq 125$ was considered as the selection cut-off in WISC IV India. The adolescents aged between 13 and 15 years were selected.

Inclusion criteria

Participants were selected based on the following criteria:

- Adolescents aged between 13 and 15 years
- Enrolled in high school
- Both male and female adolescents
- Adolescents who enrolled on English as the medium of instruction.

Exclusion criteria

Participants were excluded based on the following conditions:

- Adolescents aged below 12yrs and above 16yrs
- Adolescents enrolled in upper primary (below grade 8) and higher secondary (grades 11-12)
- Adolescents who enrolled on Malayalam as the medium of instruction.
- Adolescents with any illnesses, physical conditions, or impairments that would impact the performance of the test.
- Adolescents with a history of seizure disorder/epilepsy/ brain injury, with severe visual, auditory, and speech impairments, were also excluded.

b. Measures:

The following tools were used in school setting:

1. Standard Progressive Matrices (SPM)

The Raven's Standard Progressive Matrices (RPM), developed in the U.K., is one of the most widely used non-verbal tests of intelligence. It can be administered individually or in groups and is suitable for individuals from about five years of age to

older adults. The test may be given with or without a time limit, and extensive research supports its use as a measure of general intelligence (g). The Indian norms for Ravens' standard progressive matrices -A normative study in Delhi and Maharashtra were used to find out the percentile age norms in our study. (More details regarding SPM are described in the method section of the main study, Phase II).

2. Wechsler Intelligence Scale for Children (WISC-IV) India

The Wechsler Intelligence Scale for Children–Fourth Edition (WISC-IV) is a comprehensive tool used to assess the intellectual functioning of children. The age range is from 6 years 0 months to 16 years 11 months and it is administered individually. It provides both subtest scores and composite indices that reflect specific cognitive domains, along with a Full Scale IQ score representing overall intellectual ability. Although a score of 130 and above is classified as “Very Superior” on the WISC-IV, a Full Scale IQ of 125 or higher was used to identify intellectually gifted children in this study, taking into account the standard error of measurement. More details were described in the method section of the main study (Phase II)

c. Procedure:

The researcher approached a few schools to assess the differences in the level of intelligence among adolescents in different classes of high school and thereby identified IGA. Permission was obtained from the school authorities before test administration, and the procedures and implications of the study were explained to them in detail. The three convenient classes from different schools were selected accordingly. The data collection spanned around 2 months. The identification process includes two stages:

- ✓ Screening
- ✓ Selection.

Stage 1: Screening

The screening phase of participant selection involved the administration of the Standard Progressive Matrices (SPM) in small groups consisting of 8 to 10 adolescents. Similarly, the whole adolescents of selected classrooms were assessed. The assessment was conducted in convenient classroom settings and took approximately 30 to 40 minutes to complete. Adolescents who scored above the 95th percentile on the SPM, indicating intellectually superior performance (Grade I), were referred for the next stage of selection. Other categories of levels of intelligence on SPM are described in Table 2.1

Stage 2: Selection

The WISC-IV India was administered to the screened adolescents by the research scholar. Consent was taken from the parents of the respective adolescents before testing over the phone. The research scholar was a Clinical Psychologist who had undergone intensive training in administering WISC-IV India. The tests were administered individually to each participant at the counselling unit of the school or the private spaces like free classrooms, board rooms or mini-conference rooms. The selection process of an adolescent was done over a period of two weeks in two or three leisure or Art club hours, with 45 minutes/for each period. Prior appointment was fixed with the adolescent and teachers. Those who scored greater than or equal to 125 on the intellectual quotient were considered to be intellectually gifted.

d. Data analysis:

The data was analysed with descriptive statistics. It is used to summarize and describe the basic features of a dataset in a study. Here in our study, we used frequency distributions with counts and percentages of participants in different categories of

intelligence and tables and graphs to visualise distributions. It offers a simple overview of the sample and measures.

e. Results and Major Findings:

Results are summarized as tables and graphs.

Table 2.1

Differences in levels of intelligence among adolescents in school settings

School	Class	Total No: of adolescents	Differences in the intelligence level of adolescents using SPM				
			<25 th Percentile	25-75 th Percentile	75-90 th Percentile	90-95 th Percentile	>95 th Percentile
Aided	8 th	38	5	23	7	2	1
Government	9 th	22	6	13	2	1	0
CBSE	9 th	42	3	26	8	4	1
Total		102	14 (13.73%)	62 (60.78%)	17 (16.66%)	7 (6.86%)	2 (1.96%)

Note: SPM -Standard Progressive Matrices, CBSE-Central board of secondary education.

Table 2.1 reveals the differences in levels of intelligence among adolescents using SPM. Out of 102, only 2 (1.96%) adolescents came under the category of intellectually superior (>95th Percentile), Grade 1. About 60.78% of adolescents came under the category of average intelligence (25-75th Percentile), Grade IV. About 16.66% and 6.86% come under the category of above average (>75th percentile, Grade II and 90-95th percentile, Grade II Plus, respectively). About 13.73% comes under the category of below average intelligence, Grade V (<25th Percentile).

Table 2.2

Identification of intellectually gifted adolescents using SPM (screening) and WISC IV (selection).

School	Class	Total No: of adolescents	Differences in the intelligence level of adolescents using SPM (Percentile)					WISC IV India IQ $\geq$ 125
			<25 th	25-75 th	75-90 th	90-95 th	>95 th	
Aided	8 th	38	5	23	7	2 (SPM)	1(SPM)	2
						WISC, IQ $\geq$ 125 =1	WISC, IQ $\geq$ 125 =1	
Government	9 th	22	6	13	2	1(SPM)	0(SPM)	0
						WISC IQ $\geq$ 125 =0		
CBSE	9 th	42	3	26	8	4(SPM)	1(SPM)	3
						WISC IQ $\geq$ 125 =2	WISC IQ $\geq$ 125 =1	
Total		102	14 (13.73%)	62 (60.78%)	17 (16.66%)	7(SPM) (6.86%)	2(SPM) (1.96%)	5 (4.90%)
						WISC IQ $\geq$ 125 =3	WISC IQ $\geq$ 125 =2	

Note: SPM -Standard Progressive Matrices, WISC IV,India-Wechsler Intelligence Scale for Children, Indian edition

Table 2.2 presents the identification process of intellectually gifted adolescents (IGA) using the Standard Progressive Matrices (SPM) and WISC-IV India. Initially, only two adolescents met the predetermined criteria - scoring above the 95th percentile on the SPM (intellectually superior) and having an IQ $\geq$ 125 on the WISC-IV India- thus qualifying as intellectually gifted. Given that only 2 out of 102 adolescents were identified in the screening phase, the criteria were broadened to include those scoring in the 90th–95th percentile range on the SPM (Grade II – intellectually above average).

Among these seven adolescents (those who are intellectually above average), three were found to have an $IQ \geq 125$ on the WISC-IV. Thus, a total of five adolescents out of 102 were classified as intellectually gifted based on the WISC-IV ($IQ \geq 125$). It highlights that approximately 4.90% of the adolescents were identified as intellectually gifted. Therefore, the initial SPM screening threshold was revised from the 95th percentile to the 90th percentile, while the final selection criterion based on the WISC-IV ($IQ \geq 125$) remained unchanged.

Challenges faced during the exploration phase in the school setting:

- Obtaining permission to conduct major research with an entire class for 45 minutes to one hour using the SPM was difficult.
- Administering the SPM for screening large student groups from each class proved to be logistically unfeasible.
- Practically, it was challenging to identify adolescents above the 95th percentile, prompting a necessary adjustment of the screening threshold to the 90th percentile (SPM), although this diverged from the originally intended method. The WISC-IV selection criterion ($IQ \geq 125$) was retained.
- The final two objectives of the study could not be pursued in the same school due to the sudden closure of schools during the COVID-19 pandemic. Hence, to explore the psychopathology among intellectually gifted adolescents and to find out the psychosocial factors associated with such adolescents, the study was further carried out in a clinical setting.

2. Setting: Mental health clinics.

The second phase of the pilot study was conducted in a clinical setting. The clinical setting allows the researcher to know whether intellectually gifted adolescents are accessing the psychological help and to unveil those adolescents

who are already presenting with psychosocial or behavioural difficulties. A deeper exploration of psychosocial aspects is indeed in the preliminary phase preceding the main study. The objectives of conducting research in a clinical setting are the following:

- To explore the psychosocial attributes of clinically referred Intellectually gifted adolescents (IGA) using the Developmental Psychopathology Checklist (DPCL) and thereby to understand which area of psychosocial aspects to be studied in main study.
- To identify specific psychosocial domains that require deeper exploration in the main study.
- To understand the nature of psychopathology associated with clinically referred intellectually gifted adolescents.

a) Sample:

The study was conducted among 25 adolescents aged 11 to 16 years, of both sexes, who were identified as intellectually superior during the study period, specifically those in Grade 1 with an SPM score above the 95th percentile. Purposive sampling was used to select participants. The adolescents attended the clinic either directly or were referred from other centres for the management of various mental health concerns (Vijayan & Francis, 2023).

Inclusion criteria

- The IQ score at or above the 95th Percentile was only considered to be intellectually gifted.
- The adolescents in the age range of 11 -16 years, of boys and girls, were chosen for the study.

- Adolescents who sought psychological help for the first time were considered for the study.
- Parent and adolescent who is willing to participate.

Exclusion criteria

- Those who have pervasive developmental disorders.
- Adolescents with severe visual, auditory, and speech impairments were also excluded.
- Those who were suggested or underwent pharmacotherapy were also excluded.

b) Measures:

1) Standard Progressive Matrices (SPM)

As described in Setting 1, (More details regarding SPM are described in the method section of the main study).

2) Developmental Psychopathology Checklist (DPCL)

The Developmental Psychopathology Checklist (DPCL) was developed by Kapur and colleagues in 1994 at the National Institute of Mental Health and Neurosciences, Bangalore, as a screening tool for assessing psychopathology in children. The checklist evaluates developmental history, developmental problems, psychopathology, psychosocial factors, temperament profile, and social support and assets (Chatterjee, 2006). Cluster analysis of 221 child psychiatric cases identified seven clusters: emotional disorders, hyperkinesis, childhood psychoses, learning disorders, hysterical syndrome, conduct disorder, and autism. Those who covered the symptom score above the cutoff score belong to that cluster. Interrater reliability assessed for 25 cases by two independent raters showed an intraclass correlation of 0.968. Validation

against the Child Behaviour Checklist indicated satisfactory external validity. For the current study, only the psychopathology and psychosocial factors were considered.

c) Procedure:

The study was conducted for a period of 6 months in two private child and adolescent mental health clinics in Thrissur district. The formal consent was taken from the respective clinics to conduct the study. The researcher briefed the description of samples, scheduling of time and procedure of the study to the respective authorities in the clinics. Detailed discussions on intellectually gifted adolescents and their characteristics were conducted with clinicians who referred such cases. Adolescents aged 11–16 years who were referred to the research scholar/clinical psychologist for assessment and psychological management during the study period were included (Vijayan & Francis, 2023). Referrals came from psychiatrists, clinical psychologists, and other clinicians from various clinics. Parental consent was obtained for all participants. These adolescents presented with concerns such as academic decline over recent years, disobedience, anger outbursts, difficulty concentrating, distractibility, emotional vulnerability, and low self-esteem. Other clinicians referred the children based on a provisional identification of high intelligence combined with behavioural, emotional, or social difficulties, or with diagnoses according to ICD-10 criteria.

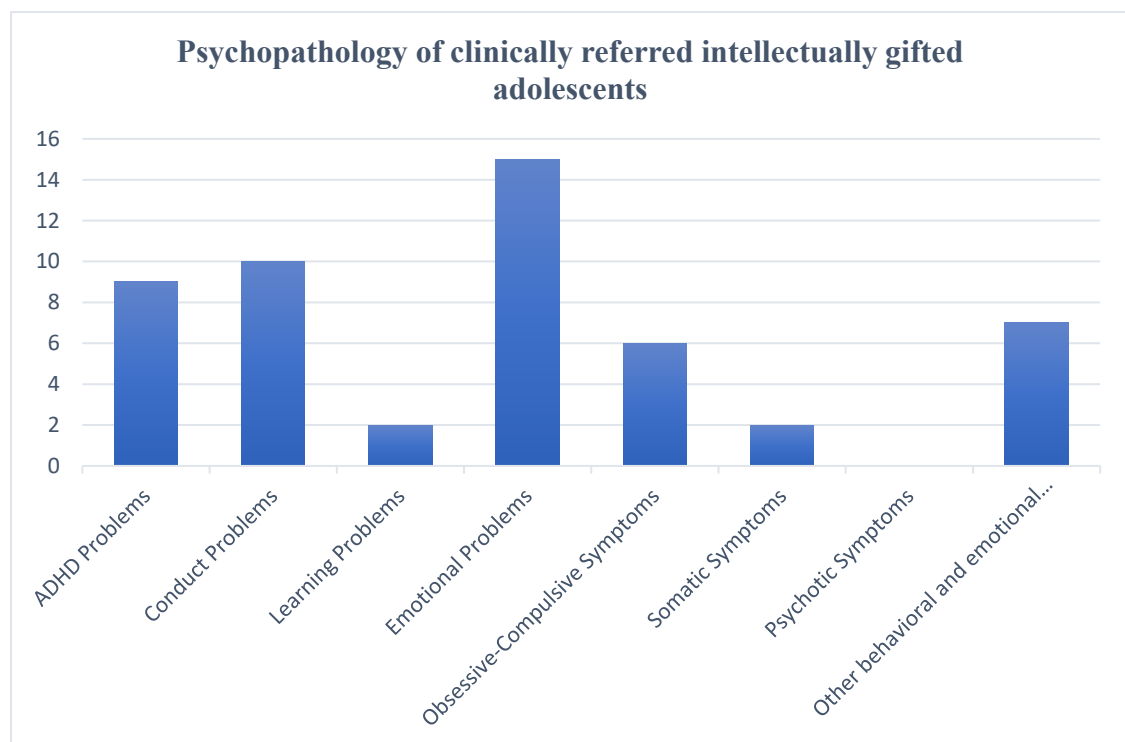
Prior appointment with the parent and child was taken. Confidentiality was strictly maintained. The referred children were administered SPM and those who scored Grade 1, SPM IQ > 95th Percentile, above were considered as intellectually gifted. About 25 children were identified during the tenure (6 months). The identified children and their parents were interviewed and completed the Developmental Psychopathology Checklist (DPCL). Hence detailed evaluation was done, approximately 2 to 3 hours in

duration over a span of two sessions. The ethical approval was obtained from the Institutional Review Board of the Research Centre.

Results and Major findings:

Figure 2.2

Distribution of psychopathology related to clinically referred intellectually gifted adolescents.



Findings from the Developmental Psychopathology Checklist indicate that intellectually gifted children primarily exhibited internalizing problems, including emotional difficulties (60%), obsessive-compulsive symptoms (24%), and somatic or neurotic symptoms (8%). They also showed externalizing problems, with ADHD symptoms (36%), conduct problems (40%), and learning difficulties (8%). Approximately 28% of children displayed behavioural and emotional issues that did

not fit into any specific cluster. None of the participants was classified under the psychosis cluster.

Table 2.3

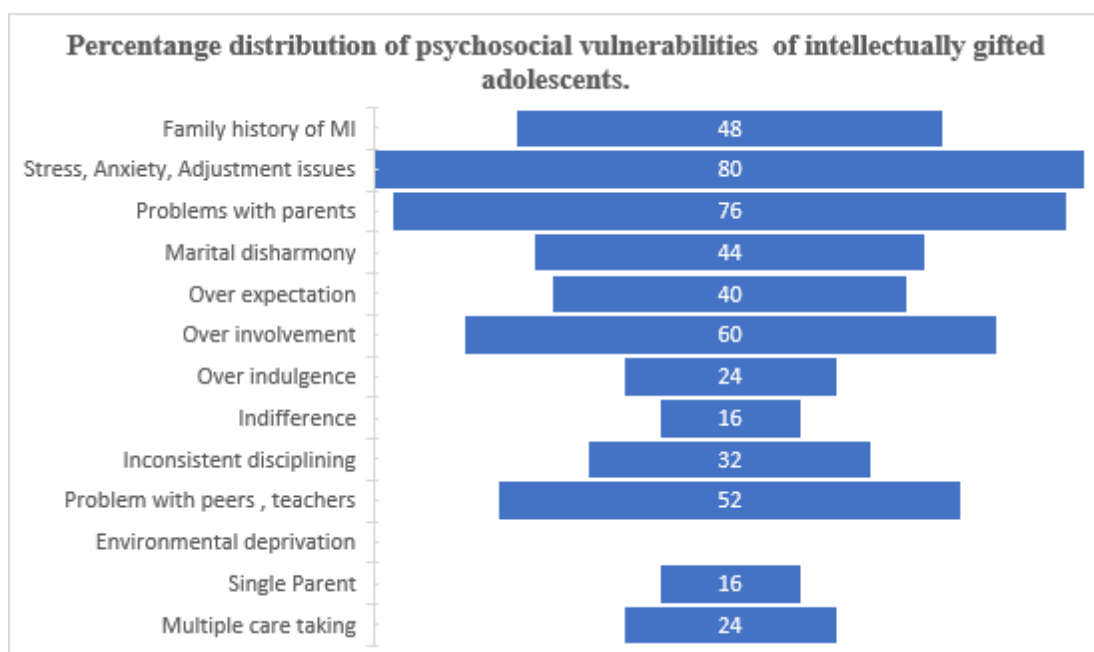
Distribution of psychosocial vulnerabilities among clinically referred intellectually gifted adolescents.

Psychosocial Issues	N	%
Present	22	88
Absent	3	12

Psychosocial stressors are usually associated with increased emotional and behavioral problems in adolescents. In our study also, psychosocial vulnerabilities were present in 88% of clinically referred intellectually gifted adolescents who had been referred to the scholar (Vijayan & Francis,2023).

Figure 2.3

Psychosocial vulnerabilities of intellectually gifted adolescents.



The majority of parents of adolescents with intellectual giftedness had undergone stress and anxiety (80%) in their lives. Most of the adolescents with intellectual giftedness had problems with their parents (76%). About 60% percent of parents are over-involved with children, 40% with over-expectation and overindulgence (24%). About 44% of parents reported having marital disharmony in their marital life. About 32% of parents followed inconsistent disciplining and 16% showed indifference. About 24% of children were under multiple caretaking. Few of them are in single-parenting (16%). Apart from familial constraints, 52% of children reported having problems with peers, teachers and the school setting. None of them commented on environmental deprivation as a stressful factor (Vijayan & Francis,2023).

Reflections from clinic setting:

- Identified the psychosocial vulnerabilities in adolescents with intellectual giftedness. The vulnerabilities in our context include stress difficulties, problems with their parents - overinvolvement, over-expectation and overindulgence in parents, marital disharmony, problems with peers, teachers and school settings.
- Findings on DPCL suggested that psychological problems such as emotional problems, conduct problems, and ADHD problems are prominent in IGA and show a willingness to seek psychological help. The least elicited problems were learning problems, OC symptoms and somatic symptoms compared to others.
- Getting consent from parents and spending hours with the scholar for research purposes seems to be a longer process.

- Both parents and children were needed to complete the DPCL for more accuracy. More time and parental involvement are needed to figure out the outcome.

3. Expert suggestions

Experts in the field bring in-depth knowledge, clinical insights, and practical experience that contribute to refining research tools, interpreting findings, and ensuring the study aligns with current theoretical and empirical developments. In this study, the researcher sought expert suggestions during the stages of the scoping review and pilot work to ensure both methodological soundness and contextual relevance.

The experts consulted included psychologists and special educators working with gifted children, psychiatrists, clinical psychologists, and school teachers. These professionals emphasized the importance of identifying gifted children and adolescents within our society and providing psychosocial support to their families. Experts from gifted education centres specifically recommended considering teacher nomination criteria in addition to traditional assessments to capture a broader understanding of giftedness and also to refine a better group of talented ones, where the researcher could administer the IQ tests to that talented pool.

Clinicians highlighted the need to explore and focus on family dynamics, social interactions, and mental health aspects among gifted adolescents, noting that giftedness is often misunderstood or overlooked in clinical settings. Some parents considered the topic insignificant due to their child's high academic performance or perceived potential, while a few teachers noted unusual traits or behaviours among gifted students. However, most teachers viewed these students as advanced and well-adjusted, possibly missing signs of underlying psychosocial challenges.

By integrating expert feedback through formal discussions, the researcher was able to bridge the gap between research and practice, ensuring that the study findings are not only academically rigorous but also applicable to real-world educational and clinical contexts.

4. Selection of variables and tools used for the study

Based on the research gaps on scoping review, findings of pilot work done in school and clinical setting and suggestions from experts, the following variables and tools were selected and implemented in the main study (Phase II):

For identification of intellectually gifted adolescents:

Identification process of IGA would be carried out in three stages-

✓ Stage 1 /Nomination

Teacher Nomination was included to screen adolescents for giftedness. Teachers, who are familiar with students over an extended period (at least one year), were identified as reliable sources for this process.

✓ Stage 2/Screening

Following teacher nomination, the Standard Progressive Matrices (SPM) was administered to confirm whether he/she belongs to the top 10th percentile group (>90th percentile).

✓ Stage 3/Selection

The WISC-IV India was subsequently applied to determine intellectual giftedness (IQ ≥ 125).

To assess the cognitive skills:

Scoping review unveils the necessity of assessing cognitive domains among IGA in our culture. The review highlights the exploration of cognitive domains, including attention

and concentration, working memory, perceptual skills, fluid reasoning, verbal comprehension, and learning and processing speed. The cognitive functions of IGA were widely studied in foreign places over the last 10 years with WISC-IV adaptations of respective countries (Erden et al.,2022; Molinero et al., 2015; Sparrow et al.,2005) and such a comprehensive approach is still missing in the Indian context. Hence, cognitive domains from WISC-IV, India, were selected for the study. The WISC-IV India focuses on four cognitive domains covering all the above selected cognitive functions:

1. Verbal Comprehension -VC (Verbal reasoning, social judgement and Learning ability)
2. Perceptual Reasoning -PR (Visual perception and organization, Abstract reasoning and Fluid reasoning)
3. Processing Speed – PS (visuomotor coordination and short-term visual memory)
4. Working Memory -WM (Attention and concentration and short-term auditory memory)

To address psychosocial domains:

The pilot work revealed that the gifted adolescents primarily faced

- Problems with parents (e.g., overinvolvement) and related adjustment difficulties

The observed psychological vulnerabilities included:

- Emotional problems.
- Conduct problems
- ADHD
- Peer problems

While the DPCL (Developmental Psychopathology Checklist) is widely used for assessing psychopathology and psychosocial attributes, particularly in clinical settings, it posed challenges in school settings due to the requirement of parental involvement for more clarification in certain aspects. In Phase 1, conducted in a clinical setting, the Developmental Psychopathology Checklist (DPCL) was used to explore the nature and range of psychopathological features in gifted adolescents. The DPCL was selected due to its comprehensive coverage of developmental psychopathology domains and its suitability for detailed clinical profiling. Findings from this phase informed the selection of psychosocial domains for Phase 2 of the study. Moreover, the elicited prominent issues and reviews from the school setting were more concerned with emotional and behavioural problems. To address these limitations, the Strengths and Difficulties Questionnaire (SDQ) by Robert Goodman was selected for the main study. In Phase 2, conducted in school settings, the Strengths and Difficulties Questionnaire (SDQ) is employed as a brief screening measure to assess emotional and behavioural difficulties in a larger, non-clinical sample of gifted and non-gifted adolescents. The SDQ was chosen because it captures core domains identified in the clinical phase while being appropriate for large-scale screening, easy administration, and reduced respondent burden. Thus, the use of SDQ in Phase 2 was empirically grounded in the findings of the DPCL, ensuring continuity and relevance across study phases.

Although existing literature reports the presence of obsessive-compulsive features among intellectually gifted adolescents, the present study did not include obsessive-compulsive symptomatology in the school-based screening phase. In Phase 1, the Developmental Psychopathology Checklist broadly identified obsessive-compulsive symptoms without specifying distinct obsessional or compulsive features.

Clinical interviews further indicated that obsessive–compulsive phenomena in gifted adolescents rarely present as isolated symptoms and often encompass a constellation of characteristics such as perfectionism, excessive neatness, orderliness, rigidity, and a heightened need for structure. These features may reflect personality traits or developmental characteristics associated with giftedness rather than discrete obsessive-compulsive disorder. Given the conceptual overlap between obsessive-compulsive traits, personality characteristics, and clinical OCD, obsessive-compulsive features were considered beyond the scope of this research. Accordingly, they are proposed as a distinct area for future investigation using specialised instruments and diagnostic frameworks. Hence the subdomains of SDQ were considered.

- The SDQ is a self-reported questionnaire that evaluates emotional and behavioural problems across four areas:
 1. Emotional symptoms
 2. Inattention and hyperactivity
 3. Conduct problems
 4. Peer problems

The SDQ uses a statement-based approach with examples, offering a more nuanced assessment compared to the Yes/No format of the DPCL. Researchers stated that SDQ can be used in gifted groups and ensures a good estimate of reliability and validity. (Peters & Pereira, 2019; Fonseca, 2011)

To address parenting styles:

- PAQ (Parental Authority Questionnaire): Assesses three parenting styles- Authoritative, Authoritarian and Permissive.

These tools align closely with the findings from the pilot work. These changes aim to refine the study methodology, making it more robust and better aligned with the objectives of the main study. Though parents' stress and other environmental factors have also been part of psychopathology (pilot work conducted in a clinical setting), getting parental consent from a general setting like schools may not be feasible and hence the parenting style of mothers from an adolescent perspective was taken into consideration. Moreover, the reviews suggest the inflexibility in parenting patterns and styles that play a major role in emotional and behavioural problems in psychosocial aspects, and hence, parenting style was selected for the research.

Concluding, Phase 1 offered a framework for the Phase II(main study) to focus on intellectual giftedness through cognitive and psychosocial lenses, utilizing the WISC-IV India as the primary (selection) assessment tool, to examines key cognitive abilities and associated psychosocial factors, aiming to identify patterns and challenges that characterize gifted IGA and to compare it with IAA in our cultural contexts, to compare with the levels of giftedness and to further aims to assess the emotional and behavioural problems (EBP), association between IG and EBP and to evaluate the cognitive- psychosocial correlates of EBP and finally, clustering the IGA for tailored interventions.

Phase-II

(Main study)

It highlights, identification of intellectually gifted adolescents (IGA) from school settings, understanding their cognitive domains, parenting style and emotional and behaviour problems of IGA and to compare it with intellectually average adolescents (IAA), also to compare with levels of giftedness, to assess the prevalence of EBP among IGA, to find out the association between intellectual giftedness and emotional and behaviour problems, to find out the cognitive and psychosocial predictors of emotional and behavioural problems among IGA and finally to form the clusters of IGA with similar cognitive-psycho social characteristics which would be helpful for further enhancement of such adolescents through tailored interventions.

Research design

The present study follows the descriptive correlational research design, which aims to use comparative and relational analyses to explore the cognitive and psychosocial domains of intellectually gifted adolescents. A descriptive correlational research design is a non-experimental approach used to systematically describe the characteristics of a population and explore the relationships between variables without manipulating them. In the descriptive component, the study identifies and compares cognitive and psychosocial domains of intellectually gifted adolescents with a control group (IAA), using standardized assessments. It further explores variations in these characteristics based on socio-demographic factors such as gender, type of family, etc and also with the level of giftedness. In the correlational component, the study examines associations between key variables, such as the relationship between intellectual giftedness and emotional and behavioural problems among IGA and to find out the

predictive role of cognitive variables and parenting style in EBP problems among IGA. Finally, the researcher also made an effort to cluster the IGA based on similar cognitive-psychosocial characteristics, which would be beneficial for intervention. For the purpose of the study, all the cognitive variables and parenting style were considered as independent variables and EBP were considered as the dependent variable.

Participants

The study was conducted in various schools of Thrissur district, as per the convenience of the school. The sample was drawn from both State and Central Board of Secondary Education (CBSE) schools, including 9 aided, 5 unaided, and 6 government schools under the state syllabus, and 16 CBSE-affiliated schools. Multi-stage purposive sampling was used to identify the intellectually gifted adolescents. Multistage purposive sampling involves selecting samples in stages, where at each stage participants are chosen deliberately based on certain characteristics relevant to the research. It allows the researcher to narrow down the sample progressively using purposeful criteria at every level. Initially, a pool of adolescents was nominated by teachers by employing teacher nomination criteria. Nominated adolescents were then screened using Raven's Standard Progressive Matrices (SPM), and those scoring above the 90th percentile were considered for further assessment. The final identification of intellectually gifted adolescents (IGA) was done using the Wechsler Intelligence Scale for Children – Fourth Edition, India (WISC-IV India). Only those with an $IQ \geq 125$ in WISC IV, India, were classified as intellectually gifted. Similarly, those who scored grade III, 25-75th percentile on SPM, were screened as intellectually average and an IQ (90-109 on WISC-IV) was selected as an intellectually average adolescent (IAA). The final sample consisted of 106 adolescents who were identified as intellectually gifted

and 106 average-intelligent adolescents, as determined by WISC-IV India. The experimental group (IGA) was matched with a control group (IAA) based on gender and school board affiliation to control for potential confounding variables.

Inclusion and Exclusion Criteria

For Experimental Group (Intellectually gifted adolescents (IGA))

Inclusion Criteria:

- $IQ \geq 125$ as per WISC-IV India
- Aged 13 to 15 years
- Both boys and girls
- Regular school attendance
- Screened through teacher nomination and SPM > 90th Percentile.
- Teacher should be familiar with adolescent at least for one year
- English as a medium of instruction in schools
- Could read and write English and Malayalam
- Informed parental consent

Exclusion Criteria:

- Age below 13 or above 15 years
- Residing in institutional care
- Diagnosed neurological conditions (e.g., epilepsy, cerebral palsy)
- Pervasive developmental disorders and Learning disability
- Severe visual, auditory, or speech impairments

For Control Group (Intellectually average adolescent) (IAA):

Inclusion Criteria:

- IQ between 90 and 109 as per WISC-IV India
- Aged 13 to 15 years
- Both boys and girls
- Regular school attendance
- Screened through SPM, having 25-90th percentile.
- English as medium of instructions
- Could read and write English and Malayalam
- Informed parental consent

Exclusion Criteria:

- Age below 13 or above 15 years
- Diagnosed neurological conditions
- Pervasive developmental disorders and Learning disability
- Severe visual, auditory, or speech impairments

Measures

The following measures were employed in the main study.

1. Personal data sheet
2. Teacher Nomination criteria
3. Standard Progressive Matrices (SPM)
4. Wechsler Intelligence Scale for Children (WISC-IV)
5. Parenting Authority Questionnaire (PAQ)

6. Strength and Difficulty Questionnaire (SDQ)

1. Personal Data Sheet

The Personal Data Sheet, designed by the researcher for this study, gathers essential background information about the participants. It includes details such as age, gender, class, residence, family type, ordinal position, board of school, parents' education and occupation levels, socioeconomic status, academic achievements, scholarships attained, and subject excellence. It ensures the demographic and academic characteristics of the adolescents who are selected for the study.

2. Teacher Nomination

Rationale:

- Traditional methods of identifying giftedness primarily relied on Intelligence Quotient (IQ) or achievement tests.
- Over time, and with advances in research, identification procedures have evolved into more comprehensive approaches, incorporating multiple instruments such as portfolios, teacher, parent, and self-ratings, as well as nominations (Azano et al., 2017; Brown et al., 2005; Coleman & Gallagher, 1995; Evans, 1996; Pfeiffer, 2003).
- Teachers are among the most effective sources of information for identifying gifted and talented students. They can highlight an adolescent's specific academic and non-academic strengths (Wu, 2010) and are able to observe and interact with students extensively (Harradine et al., 2014; Johnsen, 2018; Merrick & Targett, 2004; Neumeister et al., 2007; Webb et al., 2004).
- To narrow down the adolescents with high cognitive ability from their large pool of peer group at the class level (Each class consists of approximately 30-45 students).

- Less time-consuming for the teachers who are well known to the adolescents.
- The present tool is intended as a first-level nomination/referral only.
- In our research, we use teacher nomination due to the aforesaid reasons.

The introductory session on intellectual giftedness includes the importance of identifying and enhancing IGA, the inclusion criteria for nominating adolescents with superior ability and introducing the teacher nomination characteristics, for gifted children and adolescents. (Details enclosed in procedure section)

3. Standard Progressive Matrices (SPM)

Rationale:

- The SPM is used to assess the mental abilities regardless of age, education, ethnicity or any physical condition.
- Tests were developed for research purposes and to be used with clinical expertise.
- Tests are independent of language and reading and writing skills.
- Very simple in use and interpretation.
- Could administer in groups also.
- Also able to rule out the intellectually superior persons from their peer group.
- Studies have reported a strong correlation between matrix analogy tests and the Performance IQ (PIQ) and Full Scale IQ (FSIQ) scores of the Wechsler Scales (Desai, 1955; Hall, 1957; Levine & Iscoe, 1954; Watson & Klett, 1974; Wechsler, 1997, 2002).
- These tasks are also relatively fair in culture, free of language and manual manipulation is not required.

- So, it could be used as a screening tool in our research, as the test serves to rule out the top 10% (>90th Percentile) of adolescents from their peer group in terms of intelligence.

Tool description and scoring:

Raven's Standard progressive matrices, or SPM, is designed as a non-verbal test to measure the general intelligence of humans. The abstract reasoning is the cognitive element measured by this. It is also regarded as a nonverbal estimate of fluid intelligence. The Standard Progressive Matrices was originally developed in the mid-1930s by J Raven, J C Raven and J H Court. The test was constructed to measure the educative component of 'g' as defined in Spearman's theory of cognitive ability. The essential feature of educative ability is the ability to generate new, largely non-verbal, concepts which make it possible to think clearly (Raven, Court & Raven,1992). The tool is used in workplaces, school settings, homes and laboratories.

The test consists of five sets of diagrammatic puzzles showing serial change in two dimensions simultaneously. One part is missing from each puzzle, and the person must find the missing part from the provided options and note it in a record. The standard test consists of 60 problems divided into five Sets (A, B, C, D, and E), each containing 12 problems. In each set, the first problem is as nearly as possible self-evident. The items are arranged in ascending level of difficulty in each set, and its complexity of the set increases, so that previous strategies prepare the individual for the construction of the coming logical assertive strategies for the more difficult items. The order of the items provides the standard training in the method of working. The five sets provide five opportunities to grasp the method of thought required to solve the problems and five progressive assessments of a person's capacity for intellectual

activity. The test can be given as an individual, a self, or a group test. Each problem is scored as '1' (correct answer) or '0' (wrong answer) (Introduction to standard progressive matrices, n.d.). The total of all correct answers in five sets is the total raw score. The raw score is then converted to percentile scores using the given tables in the manual. The researcher followed the tables of Indian norms (Pune and Maharashtra) by Ojha and Ojha. The percentile scores are further categorised as follows:

Grade I – Intellectually Superior: Scores at or above the 95th percentile compared to peers of the same age.

Grade II – Definitely Above Average: Scores at or above the 75th percentile. Scores at or above the 90th percentile may be designated as Grade II plus.

Grade III – Intellectually Average: Scores between the 25th and 75th percentiles. Scores above the 50th percentile may be designated as Grade III plus, and scores below the 50th percentile as Grade III minus.

Grade IV – Definitely Below Average: Scores at or below the 25th percentile. Scores at or below the 10th percentile may be designated as Grade IV minus.

Grade V – Intellectually Impaired: Scores at or below the 5th percentile for the age group (Raven, Court & Raven, 1992).

Reliability and Validity:

The majority of the split-half internal consistency coefficients reported in the literature exceed 0.90, having a model value of 0.91. In the original work with SPM reliabilities range from 0.83 to 0.93, with the higher values being associated with younger respondents, i.e., under 30. For English-speaking children and adolescents, reliable correlations of SPM with the Binet and Wechsler scales range from 0.56 to

0.86. Validity coefficients reported in studies with English and non-English-speaking children and adolescents generally range up to 0.70 (Machaka,2019).

4. Wechsler Intelligence Scale for Children (WISC-IV) India

Rationale:

- The Wechsler intelligence scales have undergone frequent revisions over the past 60 years to reflect advances in intellectual assessment, address emerging practical and clinical needs, and remain aligned with contemporary societal contexts. The development of the WISC-IV continues this progression.
- The WISC-IV provides composite scores that represent intellectual functioning in specific cognitive domains (i.e., Verbal Comprehension Index, Perceptual Reasoning Index, Working Memory Index and Processing Speed Index), as well as providing a composite score that represents a child's general intellectual ability (i.e, Full scale IQ).
- Special group samples have been included in the WISC-IV standardisation, including cognitively/intellectually gifted samples.
- WISC-IV India norms are available.
- Literature reveals that WISC-IV is a good measure for identifying intellectually gifted adolescents among English-speaking adolescents of 6- 16 years of age.
- Gifted Education Research centres like the National Institute of Advanced Studies, Kaveri Gifted Education and Research centre, etc, and Membership groups like Mensa India consider the WISC as one of the comprehensive tools for identifying intellectually gifted adolescents along with cognitive explorations.

- So, the WISC-IV India was used as a selection tool to identify intellectually gifted adolescents.

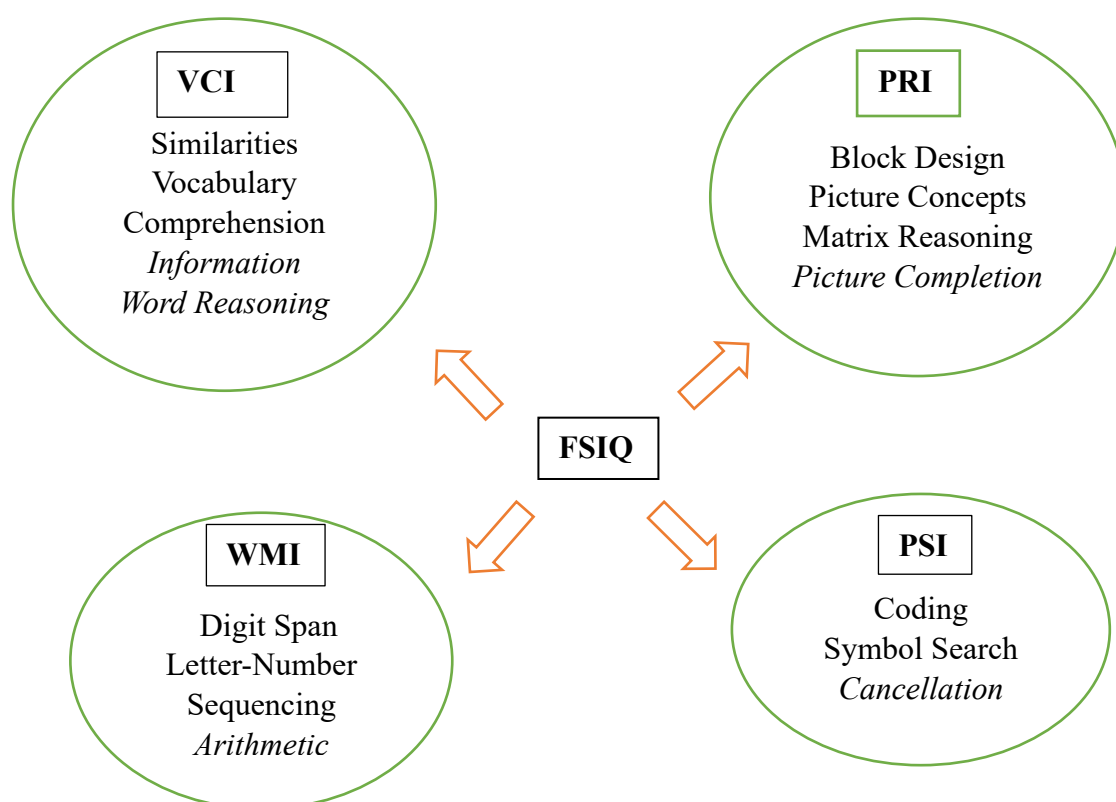
Tool description and scoring:

The Wechsler Intelligence Scale for Children -Fourth edition (WISC-IV) is an individually administered comprehensive clinical instrument for assessing the intelligence of children ages 6 years 0 months through 16 years 11 months (6:0-16:11). It provides subtest and composite scores that represent intellectual functioning in specific cognitive domains, as well as a composite score that represents general intellectual ability (Full scale IQ) (Pearson Clinical Assessment India, 2013). The WISC-IV India is the Indian adaptation of the WISC-IV, UK. The WISC-IV India is composed of 15 subtests from the WISC-IV UK, with minor modifications in some of the items. The WISC-IV India edition was modified by India Project Team members, Dr Michelle Joseph, PhD, Dr Angelina Mao, PhD and Pearson Clinical and Talent Assessment, India. The standardization data were collected on children studying in English medium schools. The general rule currently applied by PsyCorp concerning the Wechsler Scales is that availability should be restricted to Clinical or Educational Psychologists or Psychologists with a relevant PhD. It could be administered by a trained technician under supervision, but it should be interpreted by individuals with appropriate training. The WISC-IV provides a measure of general intellectual functioning (FSIQ) and four index scores. It reflects the nature of contributing subtests and the cognitive abilities measured by each index. The core subtests are used in our research. The four index scores are:

- Verbal Comprehension Index (VCI) – The VCI is composed of subtests measuring verbal abilities utilizing reasoning, comprehension and conceptualization.
- Perceptual Reasoning Index (PRI) – The PRI is composed of subtests measuring perceptual reasoning and organization.
- Working Memory Index (WMI) – The WMI is composed of subtests measuring attention, concentration and working memory.
- Processing Speed Index (PSI) – The PSI is composed of subtests measuring the speed of mental and graphomotor processing (Pearson Clinical Assessment India, 2013).

Figure 2.4

WISC -IV subtests within the four-index test framework.



Note: Supplemental tests are shown in italics. Not used for current research.

The WISC-IV has ten core subtests and five supplemental tests. Core subtests are administered when composite scores are desired. When necessary, supplemental subtests can also be used as substitutes for core subtests. Figure 2.4 depicts the core subtests and supplemental subtests (*italics*) within the four-index framework. Similarities, vocabulary and comprehension are the three core subtests that comprise the Verbal Comprehension Index. The three core Perceptual Reasoning subtests are Block design, Picture Concepts and Matrix Reasoning. Digit Span and Letter-Number Sequencing are the two core working memory subtests and coding and symbol search are the two core processing speed subtests. All 10 core subtests comprising the four indices contribute equally to the Full-scale Intelligence (FSIQ) score (Pearson Clinical Assessment India, 2013). The FSIQ is used in the research to identify IGA and IAA, and 10 core subtests and Index scores to explore the cognitive domains of the same groups. Considering the research purpose, supplemental tests are not used in this study.

I. Verbal Comprehension Subtests

1. Similarities

It is designed to measure verbal reasoning and concept formation. It also involves auditory comprehension, memory, distinction between nonessential and essential features and verbal expression (Groth-Marnat, 1997; Kaufman, 1994; Sattler, 2001). In this subtest, the child is presented two words that represent common objects or concepts and describes how they are similar (Pearson Clinical Assessment India, 2013). It has 23 items.

2. Vocabulary

It measures a child's fund of knowledge, learning ability, long term memory and degree of language development (Pearson Clinical Assessment India, 2013). Other

abilities that may be used by the child during this task include auditory perception and comprehension, verbal conceptualization, abstract thinking and verbal expression (Groth-Marnat,1997; Kaufman,1994; Sattler,2001). In this subtest, there are two items, picture items and verbal items. For picture items, the child names pictures that are displayed in the stimulus book. For verbal items, the child gives definitions for words that the examiner reads aloud (Pearson Clinical Assessment India, 2013). Vocabulary has 36 items, including 4 picture items and 32 verbal items.

3. *Comprehension*

It is designed to measure social judgement, verbal reasoning and conceptualisation, verbal comprehension and expression, the ability to evaluate and use experience and the ability to demonstrate practical information. It also involves knowledge of conventional standards of behaviour, social judgement and maturity and common sense. (Groth-Marnat,1997; Kaufman,1994; Sattler,2001). In this subtest, items require the child to answer questions based on his or her understanding of general principles and social situations. It has 21 items (Pearson Clinical Assessment India, 2013).

II. Perceptual Reasoning Subtests

4. *Block design*

It is designed to measure the ability to analyse and synthesize abstract visual stimuli. It also involves nonverbal concept formation, visual perception and organisation, simultaneous processing, visuomotor coordination, learning and the ability to separate figure and ground in visual stimuli (Cooper,1995; Groth-Marnat,1997; Kaufman,1994; Sattler,2001). In this subtest, all items require the child to view a constructed model or a picture in the stimulus book and use red and white

blocks to recreate the design within a specified time limit. It has 14 items.(Pearson Clinical Assessment India, 2013)

5. *Picture concepts*

It is a new subtest designed to measure abstract, categorical reasoning ability. Items are sequenced to reflect increasing demands on abstract reasoning ability (Deak& Maratsos,1998; Flavell,1985; Shulman, Yirmiya & Greenbaum,1995). In this subtest, for each item, the child is presented with two or three rows of pictures and chooses one picture from each row to form a group with a common characteristic. It has 28 items (Pearson Clinical Assessment India, 2013).

6. *Matrix Reasoning*

It has long been recognised that the matrix analogy tasks are good measures of fluid intelligence and reliable estimates of general intellectual ability (Brody,1992; Raven & Court,1998). In this subtest, for each item, the child looks at an incomplete matrix and selects the missing portion from 5 response options. It has 35 items. Four types of items were designed to provide a reliable measure of visual information processing and abstract reasoning skills. These four types of matrices are: continuous and discrete pattern completion, classification, analogical reasoning and serial reasoning (Pearson Clinical Assessment India, 2013).

III. Working Memory Subtests

7. *Digit Span*

It is designed as a measure of auditory short-term memory, sequencing skills, attention and concentration (Groth-Marnat,1997; Kaufman,1994; Sattler,2001). The Digit span forward task involves rote learning and memory, attention, encoding and

auditory processing. Digit span backward task involves working memory, transformation of information, mental manipulation and visuospatial imaging (Groth-Marnat,1997; Kaufman,1994; Sattler,2001). The shift from the Digit span forward task to the Digit span backward requires cognitive flexibility and mental alertness. This subtest is composed of two parts: Digit span forward and Digit span backwards. Digit span forward requires the child to repeat numbers in the same order as read aloud by the examiner, and Digit span backwards requires the child to repeat the numbers in the reverse order of that presented by the examiner. Each item of the digit span forward and digit span backwards is composed of two trials with the same span length. There are eight items in the Digit span forward and eight items in the Digit Span backwards (Pearson Clinical Assessment India, 2013).

8. *Letter-Number Sequencing*

The task involves sequencing, mental manipulation, attention, short-term auditory memory, visuospatial imaging and processing speed (Crowe,2000; Sattler,2001). The child is read a sequence of numbers and letters and recalls the numbers in ascending order and the letters in alphabetical order. It consists of 10 items with three trials each (Pearson Clinical Assessment India, 2013).

IV. Processing Speed Subtests

9. *Coding*

It is designed to measure processing speed, short-term memory, learning ability, visual perception, visuomotor coordination, visual scanning ability, cognitive flexibility, attention and motivation (Groth-Marnat,1997; Kaufman,1994; Sattler,2001). It may also involve visual and sequential processing (Kaufman,1994; Sattler,2001). In this subtest, the child copies symbols that are paired with simple

geometric shapes or numbers. Using a key, the child draws each symbol in its corresponding shape or box within a specified time limit (Pearson Clinical Assessment India, 2013).

10. Symbol Search

In addition to processing speed, the subtest also involves short-term visual memory, visuomotor coordination, cognitive flexibility, visual discrimination and concentration (Kaufman,1994; Sattler,2001). It may also tap auditory comprehension, perceptual organisation and planning and learning ability. In this subtest, the child scans a search group and indicates whether the target symbol matches any of the symbols in the search group within a specified time limit (Pearson Clinical Assessment India, 2013).

Administration and Scoring

The common materials used in the testing include: Record form, Stimulus book, Response Booklet 1, Response Booklet 2, Block Design Blocks (9 red and white blocks), Scoring Key for Coding, Scoring Key for Symbol Search, Scoring Template for Cancellation and Pencil. The administration of the core subtests takes approximately 65 to 80 minutes for most children. The entire test battery must be administered in one session or if in 2 sessions, the second session should occur as soon as possible after the first testing, preferably within 1 week (Pearson Clinical Assessment India, 2013). A short break could be provided at the end of the subtest if the child is fatigued. The WISC-IV includes a variety of subtests designed to measure different aspects of a child's cognitive functioning. The researcher followed the subtest administration order, subtest substitution, start points, reverse and discontinue rules, timing, teaching items,

queries and recording responses as per the manual while administering the tests. The following points were considered while administering the test:

- Block design is the first subtest administered. It provides a nonverbal introduction to the scale and most children enjoy the task. Verbal comprehension and Perceptual reasoning subtests are administered in alternating order, with Working Memory and Processing Speed subtests interspersed. This subtest order was formulated to increase interest, maintain variety throughout testing and minimise fatigue effects(Pearson Clinical Assessment India, 2013).
- Administration of each subtest begins at the age-specific start point, which is clearly designated in the manual and on the record form(Pearson Clinical Assessment India, 2013).
- Items before an age-appropriate start point are considered reversal items.
- Discontinue rules indicate criteria for determining when to cease subtest administration after the child receives a score of 0 on a specified number of consecutive items.
- The scoring is based on the accuracy of the response. For subtests that do not have noted time limits, 10-30 seconds should be sufficient for the child to begin responding.
- Many subtests provide practice items for the child to complete before the actual scored items are administered. On those subtests that do not have specific practice items, corrective feedback is provided on initial teaching items to ensure the child's understanding of the task(Pearson Clinical Assessment India, 2013).

- Queries are used to elicit additional information when a child's response is incomplete, vague, or unclear.
- Prompts are used to teach or remind the child of the subtest task(Pearson Clinical Assessment India, 2013).
- Repetition of instructions often serves to redirect the child's attention to the task and ensures his or her understanding of an item.

The following table depicts the details of cognitive domains measured, materials required, description of each subtest and scoring procedure.

Table 2.4

The cognitive domains measured, materials required, description and scoring of each subtest.

Cognitive domains	Subtest	Materials Required	Description	Scoring
Verbal reasoning	Similarity	<ul style="list-style-type: none"> ✓ Administration and scoring manual ✓ Record form 	In this subtest, the child is presented two words that represent common objects or concepts and describes how they are similar. It has 23 items.	Score 2 points for a pertinent similarity and 1 point for a minor or less pertinent similarity
Social Judgement	Comprehension	<ul style="list-style-type: none"> ✓ Administration and scoring manual ✓ Record form 	In this subtest, items require the child to answer questions based on his or her understanding of general principles and social situations. It has 21 items.	A 2 or 1 point response to an item . 2 points for at least two different general concepts and 1 point for same concept.

Cognitive domains	Subtest	Materials Required	Description	Scoring
Learning ability	Vocabulary	<ul style="list-style-type: none"> ✓ Administration and scoring manual ✓ Record form ✓ Stimulus book 	For picture items, the child names pictures that are displayed in the stimulus book. For verbal items, the child gives definitions for words that the examiner reads aloud. Vocabulary has 36 items, including 4 picture items and 32 verbal items.	Score each item 2,1 or 0 based on the quality of responses.
Verbal comprehension	Comprised of similarity, comprehension and vocabulary. The raw scores of each subtest is converted to scaled score. Total scaled score is further converted to VCI score.			
Visual perception & organization	Block design	<ul style="list-style-type: none"> ✓ Administration and scoring manual ✓ Record form ✓ Stimulus book ✓ Block design blocks ✓ Stop watch 	In this subtest, all items require the child to view a constructed model or a picture in the stimulus book and use red and white blocks to recreate the design within a specified time limit. It has 14 items.	Score ranges from 1-7 including time bonus scores with respect to time and to construct designs.
Abstract reasoning	Picture concepts	<ul style="list-style-type: none"> ✓ Administration and scoring manual ✓ Record form ✓ Stimulus book 	In this subtest, for each item, the child is presented with two or three rows of pictures and chooses one picture from each row to form a group with a common characteristic. It has 28 items.	Score 1 point only if he chooses the correct pictures from all rows of an item. Score 0 for incorrect response.

Cognitive domains	Subtest	Materials Required	Description	Scoring
Fluid reasoning	Matrix reasoning	<ul style="list-style-type: none"> ✓ Administration and scoring manual ✓ Record form ✓ Stimulus book 	In this subtest, for each item, the child looks at an incomplete matrix and selects the missing portion from 5 response option. It has 35 items.	Score 1 point for a correct response and 0 points for an incorrect response.
Perceptual reasoning	Comprised of block design, similarity and matrix reasoning. The raw scores of each subtest is converted to scaled score. Total scaled score is further converted to PRI score.			
Attention & Concentration	Digit span	<ul style="list-style-type: none"> ✓ Administration and scoring manual ✓ Record form 	Digit span forward requires the child to repeat numbers in the same order as read aloud by the examiner, and Digit span backward requires the child to repeat the numbers in the reverse order of that presented by the examiner.	For each trial, score 1 point for a correct response and 0 points for an incorrect or no response. Total raw score is the sum of the item score of both forward and backward.
Short term auditory memory	Letter number sequencing	<ul style="list-style-type: none"> ✓ Administration and scoring manual ✓ Record form 	The child is read a sequence of numbers and letters and recalls the numbers in ascending order and the letters in alphabetical order. It consists of 10 items with three trials each.	For each trial, score 1 point if he recalls all the number and letters. For each item he can score up to 3 points.

Cognitive domains	Subtest	Materials Required	Description	Scoring
Working memory	Comprised of digit span & letter number sequencing. The raw scores of each subtest is converted to scaled score. Total scaled score is further converted to WMI score.			
Visuomotor coordination	Coding	<ul style="list-style-type: none"> ✓ Administration and scoring manual ✓ Record form ✓ Response booklet 1 ✓ Pencil without eraser ✓ Stopwatch ✓ Scoring key for coding 	In this subtest, the child copies symbols that are paired with simple geometric shapes or numbers. Using a key, the child draws each symbol in its corresponding shape or box within a specified time limit.	Score 1 point for each correctly drawn symbol within the time limit of 120 seconds
Short term visual memory	Symbol search	<ul style="list-style-type: none"> ✓ Administration and scoring manual ✓ Record form ✓ Response booklet 1 ✓ Pencil without eraser ✓ Stopwatch ✓ Scoring key for symbol search 	In this subtest, the child scans a search group and indicates whether the target symbol matches any of the symbols in the search group within a specified time limit.	Total raw score is the number of correct responses minus the number of incorrect responses.
Processing Speed	Comprised of coding & symbol search. The raw scores of each subtest is converted to scaled score. Total scaled score is further converted to PSI score.			
Full scale IQ	The total score of scaled scores of four subtests are converted to full-scale composite score. (FSIQ)			

Finally, the responses are entered in the Record Form for every administered item to distinguish them from omitted or unadministered items. The entry was in the form of a score, a tick, or the child's response. The chronological age of the adolescent was noted in the summary page of the record form along with the raw scores of each subtest. A total raw score for each subtest is the sum of the item scores. The raw scores are

converted into scaled scores with the help of equivalent tables in the manual. The sum of scaled scores is then used to derive the composite scores, including Full scale IQ (i.e., VCI, PRI, WMI, PSI and FSIQ). Table 2.5 depicts the descriptions of the indicators of composite scores.

Table 2.5

Qualitative descriptions of composite scores of WISC IV

Composite	Classification
130 and above	Very superior
120-129	Superior
110-119	High average
90-109	Average
80-89	Low average
70-79	Borderline
69 and below	Extremely low

Psychometric Properties

The WISC-IV India standardization project was conducted at Pearson Clinical and Talent Assessment (Bangalore), India, under the leadership of the Product Development Team. Pearson Assessment, UK, provided technical advice, support and consultancy throughout all stages of the project. Minor changes have been made with particular images of subtests without compromising item difficulty after conducting pilot study. Thirteen cities were selected to represent five geographic regions of India (North, South, East, West and North East). The southern region includes samples from Bangalore, Hyderabad, Thiruvananthapuram and Chennai. The WISC-IV India sample comprised of 334 children, 181 boys (54%) and 153 girls (46%). The sampling procedure includes snowball sampling apart from directly approaching the school. The sample

was drawn from government/aided($n=48, 14.4\%$) and private($n=286, 85.6\%$) English medium schools, which followed the central and state boards of education. The confidence in WISC-IV India score Interpretation is based on the US standardization study, the UK validation study as well as the INDIA standardization study. The average split-half reliability coefficients ranged from .70 to .90, with most in the range of .81 to .90, therefore indicating good reliability. The WISC-IV India norms are based on the scores of children in the India sample (Pearson Clinical Assessment India, 2013).

Children Identified as Intellectually Gifted:

Several studies have examined the performance of children identified as intellectually gifted on measures of cognitive ability (Sevier, Bain & Hildman, 1994; Wechsler, 2002). In general, results suggest that children identified as intellectually gifted obtain significantly higher verbal, nonverbal and FSIQ scores than do children in the general population. Although it is more common for gifted children to perform well on both the verbal and nonverbal subtests of the Wechsler intelligence scales, some gifted children may show unusually large discrepancies between their verbal and nonverbal scores (Wechsler, 1991, 1997). The composite scores for the intellectually gifted group were significantly higher than those obtained in the matched control group and ranged from 110.6(PSI) to 124.7(VCI). With the exception of the WMI and PSI, which had moderate effect sizes, effect sizes for the mean composite score differences were large. The PSI was relatively lower than the other composites, with the lowest mean scores for the intellectually gifted group on the cancellation and coding subtests. Mean subtest scaled scores were significantly higher in the gifted group than the matched control group for all subtests except Cancellation. Additional analysis indicates that 84% of children identified as intellectually gifted had VCI, PRI or FSIQ

scores of 120 points or higher, versus only 13% of children achieving these scores in the matched group. The high scores obtained by children in the intellectually gifted group are consistent with their previous identification as intellectually gifted as well as the results of previous comparison studies (Wechsler,1991,2002). The consistency of results between the WISC-IV and previous Wechsler scales also suggests that the instruments are measuring similar constructs. These results provide strong evidence that the WISC-IV provides scores that are useful in the assessment of intellectual giftedness (Pearson Clinical Assessment India, 2013).

5. Parenting Authority Questionnaire (PAQ)

Rationale:

- The construct of parenting style is used to describe parents' practices in socialising their children (Baumrind, 1991) and thereby shaping them to reach their potential.
- It is based on Baumrind's (1971) three major parenting styles, reflecting distinct patterns of responsiveness and demandingness: authoritative, authoritarian, and permissive, which are relevant in the current scenario.
- Literature says parenting styles have been associated with differences in adolescents' behaviours and problems.
- The items are simple and comprehensive.
- It consists of 30 items only with 10 items per scale.
- The questionnaire is highly respectable in terms of the values of reliability and validity.
- Easy to administer and less time-consuming.

- As the response to the questionnaire is in a Likert scale, the adolescents could think and differentiate the severity of responses to each statement, which makes them more comfortable responding accurately.
- Reviews reported that mothers' attachment and warmth to children and adolescents are more significant to their mental health than fathers.
- So, PAQ was used in the research focusing on mothers' parenting style.

Tool description and scoring:

The Parenting Authority Questionnaire was developed by John R. Buri in 1991 to measure Baumrind's permissive, authoritarian and authoritative parental authority prototypes. It consists of 30 items per parent and yields permissive, authoritarian and authoritative scores for both the mother and the father. Each of these scores is derived from the phenomenological appraisals of the parents' authority by their son or daughter. The researcher measured the mother's parental authority only. ie; mother's permissiveness, mother's authoritarianism and mother's authoritativeness. Responses to each of the items are made on a 5-point Likert scale ranging from *strongly disagree (1)* to *strongly agree (5)*. Scores on each of these variables can range from 10 to 50; the higher the score, the greater the appraisal level of the parental authority prototype measured. It's a self-administered questionnaire that high school students and college students can easily respond to (Buri,1991).

Reliability and Validity:

The test-retest reliability of the questionnaire is .81 for mother's permissiveness,.86 for mother's authoritarianism, .78 for mother's authoritativeness, .77 for father's permissiveness,.85 for father's authoritarianism and .92 for father's authoritativeness. The internal consistency reliability of six PAQ scales are measured

with Cronbach Alpha values: .75 for mother's permissiveness,.85 for mother's authoritarianism,.82 for mother's authoritativeness,.74 for father's permissiveness,.87 for father's authoritarianism and .85 for father's authoritativeness. The discriminant validity reveals mother's authoritarianism was inversely related to father's permissiveness ($r=-.38, p<.0005$) and to mother's authoritativeness ($r=-.52, p<.0005$). Also mother's permissiveness was not significantly related to mother's authoritativeness ($r=.07, p>.10$).The criterion related validity was obtained with Parental Nurturance Scale(Buri et.al,1988), and Social desirability scale by Marlowe-crowne,1964)The bivariate correlations between PAQ and Parental Nurturance Scale reveals, the authoritative parents were found to be highest in parental nurturance for both mothers($r=.56, p<.0005$) and fathers($r=-.68, p<.0005$); authoritarian parenting was inversely related to nurturance for both mothers($r=-.36, p<.0005$) and for fathers ($r=-.53, p<.0005$) and parental permissiveness was unrelated to nurturance for both mothers($r=.04, p<.10$) and fathers($r=.13, p>.10$). The bivariate correlations between the PAQ scores and Marlowe-Crowne Social Desirability Scale reveals: $r=.23$ for mother's permissiveness, $r=-.14$ for mother's authoritarianism, $r=.10$ for mother's authoritativeness, $r=.10$ for father's permissiveness, $r=.01$ for father's authoritarianism and $r=.05$ for father's authoritativeness. None of the values was statistically significant and therefore, PAQ does not appear to be vulnerable to social desirability response biases (Buri,1991).

6. Strengths and Difficulties Questionnaire (SDQ)

Rationale:

- The Strengths and Difficulties Questionnaire (SDQ) is a tool that is easy and quick to administer and has been translated into around 80 languages.

- The questionnaire can be completed in about 5 minutes by parents or teachers of children aged 4–17 years. A self-report version is also available for adolescents.
- Studies reported that SDQ was significantly better than the CBCL at detecting inattention and hyperactivity, and at least as good at detecting internalising and externalising problems (Goodman & Scott, 1999).
- Few studies advocate the use of SDQ to assess the mental health issues of gifted children and adolescents.
- Could be used in child and adolescent mental health settings and communities like schools, homes etc..
- Hence, SDQ could be used as a behavioural screening measure in our research to identify adolescents from the school setting whose behaviour is of concern and thereby prompting further assessment or intervention at the earliest.

Tool description and scoring:

The Strengths and Difficulties Questionnaire (SDQ) is developed by Dr. Robert Goodman in 1997, to screen the psychological problems in children and adolescents(4-17yrs). The questionnaire can be completed in about 5 min by parents or teachers of children aged 4–17yrs. The SDQ consists of three questionnaire versions: Teacher reported, Student reported and Parent reported. The researcher used Self-reported version as the sample group is adolescents(13-15yrs). The SDQ comprise of 25 questions, some of which question positive behavioural characteristics and some of which question negative ones. The five scales or psychological attributes of SDQ are: Emotional symptoms scale, Conduct problem scale, Hyperactivity/inattention Scale, Peer problem scale and Prosocial scale. The Emotional Symptoms, Hyperactivity/Inattention, Conduct Problems, and Peer Problems subscales of the

Strengths and Difficulties Questionnaire assess internalising emotional difficulties, attention regulation and activity level, behavioural control, and peer relationship difficulties, respectively (Goodman, 1997). An extended version rates the impact of psychiatric symptoms in terms of distress, social impairment or burden to others (Goodman, 1997).

Scoring

Each attribute has 5 items. Each item has a score of 0, 1, or 2. Somewhat True is always scored as 1, but the scoring of Not True and Certainly True varies with each item. A few items have reverse scoring. For each of the 5 scales, the score can range from 0-10 if all 5 items were completed. The Total difficulty score is equal to the sum of scores of emotional symptoms, conduct problems, hyperactivity and peer problems (Goodman, 1997). Prosocial behaviour is not added to the total difficulty score. The total difficulty score ranges from 0-40. The SDQ was interpreted under three bands:

Table 2.6

Interpretation of SDQ

Self-Completed Versions	‘This score is close to average-clinically significant problems in this area are unlikely’	‘This score is slightly raised, which may reflect clinically significant problems’	‘This score is high-there is a substantial risk of clinically significant problems in this area’
Emotional symptoms score	0-5	6	7-10
Conduct problem score	0-3	4	5-10
Hyperactivity/inattention score	0-5	6	7-10
Peer problem score	0-3	4-5	6-10
Total Difficulties Score	0-15	16-19	20-40

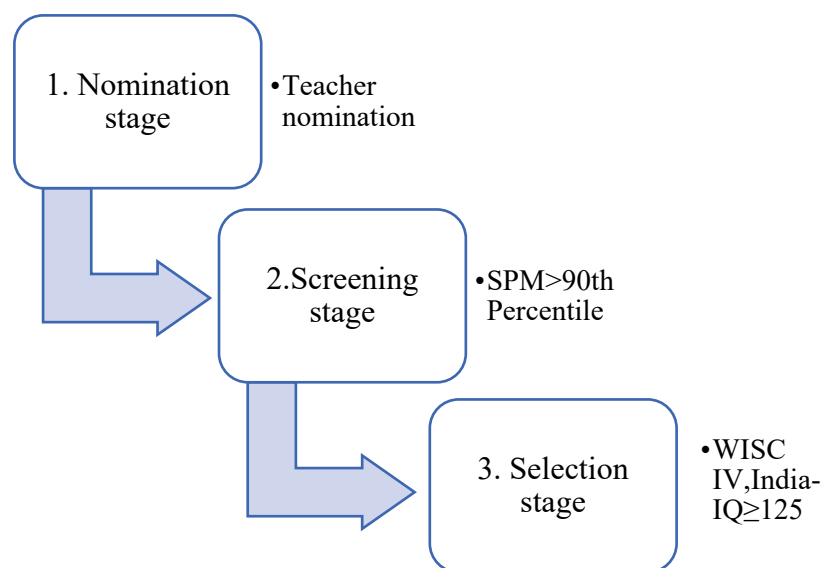
Psychometric Properties

The SDQ has an acceptable reliability and validity, performing at least as well as the Rutter Questionnaire and the Child Behaviour Checklist. The SDQ is validated across 80 countries with various languages. The questionnaire is available in various Indian languages, such as Bengali, Hindi, Kannada, Malayalam, Punjabi, Tamil and Urdu. The researcher used the English version for the research. The SDQ discriminated reliably between clinical and community samples for the SDQ total score and its subscales in Malayalam over a sample of 150 children from a psychiatric clinic and 1984 children from a community sample. The validation study was done by Phillips Owen and Mirza, K A H. Within the clinic sample, 49 % of patients qualified for more than one broad diagnostic grouping. Based on the cut-offs that generated the highest combined value of sensitivity and specificity, the estimated rate of psychiatric disorder in the community sample was 13.6 % (parent-report) and 7.3 % (self-report) (Goodman, 1997).

The Strengths and Difficulties Questionnaire (SDQ), was administered along with Rutter questionnaires to parents and teachers of 403 children drawn from dental and psychiatric clinics. Scores derived from the SDQ and Rutter questionnaires were highly correlated; parent-teacher correlations for the two sets of measures were comparable or favoured the SDQ (Goodman, 1997).

Procedure

Permission has been sought from the schools to conduct the research. A total of 36 schools were permitted to do so. The identification process includes three stages.

Fig 2.5*Stages of Identification of Intellectually Gifted Adolescents**Stage 1: Nomination stage*

A brief introduction on intellectually gifted adolescents has been given by the researcher to the teachers of various schools. The introductory part was conducted in a classroom setting with a group of 4 to 5 high school teachers who were selected at the convenience of the school authorities. The session lasted about 20 to 30 minutes. The teacher who knew the adolescents for a period of one year was suggested to participate in the nomination stage. The session includes the importance of identifying and enhancing IGA, inclusion criteria for nominating adolescents with superior ability and introducing a teacher nomination checklist for gifted children and adolescents.

Inclusion criteria for nomination

- The teacher should know the adolescent for at least for minimum of one year.
- Adolescents with 13-15 years of age and in the high school section.
- The class teachers or subject teachers can be part of the nomination.

The following points to be kept in mind when teachers nominate the adolescents:

1. The nominated adolescent should be very superior among their peers in the differences described by- the Characteristics of Giftedness Scale (Silverman, L. K., 2012), culture- and gender-fair items. A student showing 75% or more of 20 characteristics is deemed to be gifted.
2. There is no cut off in nominating the number of adolescent's but he/she/they should be superior among their peers.
3. The nomination should be made regardless of their academic marks or percentages. The aforesaid characteristics should be important.

Here, the researcher selected the adolescents who had above said behaviours as per the teacher's observation and nominated them for the second level of screening. The nomination criteria are only used to get a general awareness about behaviours and patterns of gifted adolescents. Since the teachers who spend most of the time with adolescents in school, they could observe their performance in the school setting and could refer them for the second level of screening. The nomination criteria are not used as selection criteria. Nominating the superior adolescents from the large pool of peer groups based on the teacher's report is the main purpose. The teachers nominated a few superior students from each class based on this and handed over the list to the researcher. Finally, a total of 294 adolescents were nominated by teachers of both the state and CBSE syllabi for the study. One teacher or counsellor from each school jointly coordinated with the researcher in further processes.

Stage 2: Screening stage

The nominated adolescents (n=294) were screened with SPM and those who secured grade II with above 90th percentile were considered for further evaluation. The SPM was administered in small groups of 5 to 8 adolescents for screening. Approximately 30-40 minutes had taken to complete the test by each one. The group

administration was done in the classrooms of each school. The record sheet and booklet were provided and they completed the task as per the instructions. About 178 adolescents screened on the aforesaid percentile and selected for the identification stage.

Stage 3: Selection stage

The screened adolescents were administered by WISC-IV , India. For this, the researcher was provided with either a free classroom or a counselling room in schools to administer the tools. Maximum efforts were taken to minimise the external distractions in school to focus the adolescent's attention on the tasks presented. For eg; Prior scheduling of testing was arranged to avoid the rush and to save the time, requested to allocate space in a well-lit, quiet room that is free from distractions, Minimum seating arrangement with one table and two chairs was requested, adolescents were not interrupted with other school activities in between the testing, No other than adolescent, researcher and the allotted teacher/school staff were permitted to enter the room. The consent was taken from parents over the phone and a Google form/written form at this stage. A few parents contacted the researcher over the phone and clarified the procedures.

The WISC-IV India was administered individually to each adolescent who scored at or above the 90th percentile in SPM. The intelligence testing with WISC-IV was done in one or two sessions. Each session was approximately 45 minutes. If the testing was done in 2 sessions, the researcher prefers to complete the second session within one week. If the adolescent seems fatigued, adequate breaks were given at the end of a subtest. They were motivated to do his/her best after establishing a good rapport with them. Finally, those who score at or above 125 Intelligence Quotient (IQ)

in WISC-IV India are selected as intellectually gifted adolescents. Fig 2.5 represents the identification procedure.

The adolescents were quiet interested in completing the tasks of WISC-IV. Few queried the questions like 'What are you going to assess with this? Is there any issue if I am able to perform well? Would this be added to our curriculum? etc... All queries were handled cautiously without losing the content of testing. Corrective feedbacks were also provided by praising the adolescent's effort if he worked hard to solve the task and by reassuring him regarding the hardness of the task and moving on with other tasks, if he performed poorly. The researcher followed the subtest administration in the standard order given in the WISC-IV Record form. The subtest order helps to increase interest, maintain variety throughout testing and minimize fatigue effects. Finally, 106 IGA adolescents were identified and selected for the study.

Table 2.7 and 2.8 show a detailed evaluation of the identification process on IGA adolescents.

Table 2.7*Board of school, class, total number of adolescents screened and selected for the study*

No	School	Class (Strength)				No: of adolescents screened		No: of adolescents identified
	CBSE	8 th	9 th	10 th	Total	Teachers Nomination Criteria	SPM (>90 th Percentile)	WISC (IQ>=125)
1	School 1	40	82	42	164	15	11	9
2	School 2	25	24	25	74	11	6	4
3	School 3	35	42	78	155	14	10	8
4	School 4	-	164	-	164	14	10	6
5	School 5	64	36	35	135	18	15	12
6	School 6	40	-	44	84	12	6	4
7	School 7	45	42	-	87	10	6	4
8	School 8	25	20	-	45	5	5	3
9	School 9	30	24	25	79	4	1	0
10	School 10	22	20	20	62	6	5	2
11	School 11	-	32	30	62	4	2	1
12	School 12	-	36	35	71	8	5	3
13	School 13	-	45	46	91	10	6	4
14	School 14	-	70	30	100	8	6	3
15	School 15	20	18	18	56	7	2	0
16	School 16	28	26	26	80	7	4	1
Total		394	681	454	1529	153	100	64(4.19%)
State								
1	Unaided	84	45	42	171	16	12	6
2	Govt	-	15	-	15	2	1	0
3	Aided	25	17	32	74	7	5	3
4	Aided	-	42	82	124	11	7	6
5	Unaided	42	40	40	122	12	9	6
6	Unaided	38	36	36	110	8	6	4
7	Aided	47	45	45	137	8	4	2
8	Unaided	24	22	20	66	5	2	1
9	Aided	34	35	35	104	6	4	2
10	Aided	-	-	26	26	3	1	0
11	Aided	20	22	22	64	5	2	0
12	Aided	-	-	30	30	6	1	0
13	Govt	24	-	-	24	3	0	0
14	Unaided	34	35	-	69	8	4	2
15	Aided	35	34	32	101	11	7	4
16	Govt	35	34	-	69	8	5	3
17	Aided	22	20	-	42	6	4	2
18	Govt	18	16	15	49	5	1	0
19	Govt	24	22	-	46	6	3	1
20	Govt	19	-	12	31	5	0	0
Total		525	480	469	1474	141	78	42(2.85%)

The table reveals the board of school, class, total number of adolescents screened and selected for the study. About 16 schools with the CBSE syllabus and 20 schools with the state syllabus have been part of the study. About 2.85% of adolescents from the state syllabus were identified through WISC IV as IGA and 4.19% from CBSE were identified.

Table 2.8

Screening and selection of intellectually gifted adolescents.

	Teacher nomination		Screening Stage	Selection Stage
	Total		SPM (>90th Percentile)	WISC-IV(IQ>=125)
		<i>(Stage 1)</i>	<i>(Stage 2)</i>	<i>(Stage 3)</i>
State	1474	141	78	42(2.85%)
CBSE	1529	153	100	64(4.19%)
Total	3003	294(9.79%)	178(5.92%)	106(3.60%)

Out of 3003, teachers nominated 294 adolescents through teacher nomination criteria. i.e; approximately 9.79%. A total of 178 adolescents (5.92%) were screened with SPM of above 90th percentile for identification or selection stage. Finally, 106(3.60%) were selected (WISC-IV) as intellectually gifted adolescent.

The selected adolescents were further administered with a Personal Data Sheet, Strengths and Difficulties Questionnaire (SDQ) and Parenting Authority Questionnaire (PAQ). These tests were administered in small groups or individually, as per the convenience of school authorities. Approximately 2 to 2^{1/2} hours is needed for each adolescent to complete the whole testing. All the measures were scored as per the manual's instructions and the scores were entered into the data entry for data analyses.

Similarly, the adolescents with average intelligence were selected with respect to gender and board of studies. It's a three-stage selection process. The teachers nominated a few adolescents initially. The SPM was administered to nominated adolescents of 13-15 of age in the high school section as a screening phase. Those who scored 25 -75th percentile on SPM was selected for the selection phase with WISC IV, India. The adolescents who scored between the IQ= 90-109 were considered as intellectually average. The sample size of 106 (equal sample size with IGA) matched with respect to gender and syllabus was considered to compare the groups. Table 3.2 (Chapter 3, Result and discussion) explains the distribution of IAA samples).

Ethical Considerations

The ethical approval for the present research was obtained from the Institutional Ethical Committee of Prajyoti Niketan College, Research Centre affiliated to University of Calicut. Prior to the research, permission to collect data was granted by schools. The study involved adolescents aged 13 to 15 years, selected for intellectual giftedness using the WISC-IV India, followed by assessments of psychosocial variables. Due to the involvement of minors, informed consent was obtained from the parents of all participants. Participants and parents were informed about the study's nature, objective and procedure and their right to withdraw at any point of the research. They were assured that their participation is entirely voluntary and confidentiality of responses would be strictly maintained. Proper care was taken to minimise the psychological distress during the administration of the IQ test and other measures. The counselling referrals were provided who sought help and the needy ones after informing parents. The anonymity was protected as the outcomes were for research purposes, but the parents who insisted on knowing about their children's outcomes were personally called

up and responded with utmost care. Maximum efforts were taken to research to adhere to the ethical principles of the research ethics committee.

Statistical Analysis

The collected data were scored and entered into a Microsoft Excel Spreadsheet in the coded form. IBM SPSS version 21(Statistical Package for Social Science Researchers-Version 21) software was used for statistical analyses and made use of Microsoft Word to create tables.

The normality of distribution was assessed using the Kolmogorov-Smirnov test. Both descriptive and inferential statistics were used in the study. The following statistical techniques were used for analysing the data:

- Descriptive statistics
- Kolmogorov-Smirnov test
- Chi-square test
- Mann-Whitney U test
- Spearman's rank correlation rho
- Multiple Regression
- Cluster analysis

Descriptive statistics

Descriptive statistics are used to summarize, organize, and describe the basic features of a dataset. The purpose of descriptive statistics is to describe the sample characteristics and to understand the distribution of responses. For categorical and ordinal variables, we use percentages and frequencies to describe the sample.

- Frequency- The count of how many times a particular response/category occurs.

- Percentage- The proportion of that frequency out of the total, expressed as a percentage.
- Graphs, bar charts and pie diagrams were also used.

In Phase 1, descriptive statistics, namely frequency, percentage and bar diagrams, were used to measure the proportion of differences in levels of intelligence among adolescents, psychopathology and contributing psychosocial factors.

In Phase II, the frequency and percentages are calculated to assess the characteristics, socio-demographic aspects, proportion of IGA in school settings and prevalence of emotional and behavioural problems among IGA and AAI.

Kolmogorov-Smirnov test

The Kolmogorov–Smirnov test is used to assess whether the sample follows normal distribution. If the P-value is greater than 0.05, the data is normal. If the P value is equal to or less than 0.05, the data is said to be not normal (non-normal distribution).

Chi-square test

The chi-square test was used to analyse the association between the variables in two groups. The chi-square test of independence is used to examine whether there is a significant association or relationship between two or more groups. Likelihood ratio chi-square was also employed if any of the categories had fewer than five counts. The Chi-square test of independence examines whether two categorical variables are significantly associated or independent of each other. In our research, we examines the association of demographic characteristics of adolescents , (IGA) , the group with intellectually gifted and (IAA) , the intellectually average group or not a intellectually gifted group.

Mann-Whitney U test

The Mann-Whitney U test is a non-parametric statistical test. The test is used to compare differences between two independent groups on a continuous or ordinal variable, especially when the data are not normally distributed. It serves as a nonparametric alternative to the independent t-test.

In the research, it was used to determine the differences in cognitive and psychosocial domains with respect to sociodemographic aspects such as gender, board of studies and type of family among IGA, to find out differences between IGA and IAA and to elucidate differences between low-gifted and high-gifted groups. The level of significance is kept at 5% ($\alpha=0.05$). It accepts 5% chance of making a Type 1 error. It sets the threshold for deciding whether a p-value is considered statistically significant. A p-value less than 0.05 was considered statistically significant in the results. If we reject the null hypothesis, it means that 95% confident to be a real effect or difference exists and only 5 % probability to be the result is a chance. It includes 1% and 0.1% alpha levels also.

Spearman's rank order correlation rho

Spearman's rank order correlation (ρ) is a non-parametric test that measures the strength and direction of a monotonic relationship between two ranked variables. A monotonic relationship is one where the direction of the relationship is consistent, either always increasing or always decreasing but not necessarily at a constant rate. It's used when the data is ordinal or not normally distributed and does not meet the assumptions of Pearson's correlation (like linearity or normality). It helps to determine whether higher (or lower) values of one variable are associated with higher (or lower) values of another. It means, as one variable increases, the other consistently increases (positive

monotonic) or as one variable increases, the other consistently decreases (negative monotonic).

The correlation analysis is used to quantify the strength of link between two variables. The correlation coefficients range from -1.00 to +1.00, with 1.00 indicating a complete negative correlation and +1.00 indicating a perfect positive correlation. The sign of the correlation coefficient indicates the direction of the relationship. The other coefficient ranges are $\rho = 0.1$ to 0.39, indicating weak correlation and 0.40 to 0.69 indicates moderate correlation and 0.70 to 0.99 indicates strong correlation.

In line of research, it was used to assess the relationship between intellectual giftedness and emotional and behavioural problems, cognitive domains and EBP, parenting style and EBP among IGA. The level of significance is kept at 5% ($\alpha = 0.05$).

Multiple Linear Regression

Multiple linear regression is a statistical technique used to predict the value of one continuous dependent variable using two or more independent variables. In the frame work of research, it was used to determine the cognitive and psychosocial predictors of emotional and behaviour problems among IGA. The cognitive variables and Parenting style were considered as independent variables and EBP (EP, CP, IH, PP, Total EBP) as dependent variable.

Cluster analysis

Cluster Analysis is an unsupervised statistical technique that groups individuals (or cases) into clusters based on similarity across multiple variables. It answers- Which participants are naturally similar to each other? The purpose of cluster analysis is to identify hidden patterns or subgroups in the data and to classify them. Hierarchical

clustering is used here as the study has small to medium-sized data sets. It builds nested clusters step by step. It functions as if heterogeneous clusters with homogeneity in each cluster.

In the context of research, it was made to group the IGA into different clusters based on the cognitive and psychosocial similarity of each adolescent in the intellectually gifted group.

CHAPTER 3

RESULTS AND DISCUSSION

Section A: Distribution of samples.

Section B: Test of Normality.

Section C: Analysis of sociodemographic, academic and non-academic characteristics.

Section D: Analysis of cognitive domains.

Section E: Analysis of psychosocial domains.

Section F: Relationship between different variables and sub-variables among IGA.

Section G: Determining the predictive role of cognitive domains and parenting style on EBP among IGA.

Section H: Clustering the IGA in terms of cognitive and psychosocial characteristics.

PHASE II

(Main study)

This chapter methodically reveals the findings and discussion of the present research work, providing a thorough analysis of empirical findings. The obtained data were consolidated, coded, and analyzed with different statistical techniques. The results obtained from the statistical tests are presented in subsequent sections. The findings are organized according to the objectives of the study and are presented in subsequent sections.

Phase I provides an overview of variables and tools to be studied in our context in the area of intellectual giftedness. Thereby, the purpose of the main study (Phase II) was to identify the intellectually gifted adolescents from the school setting, exploring their cognitive and psychosocial aspects, comparing with IAA and with the level of giftedness and finally to ascertain the association between intellectual giftedness and emotional and behavioural problems. Descriptive and inferential statistics are used in the research to provide better empirical testimony. Frequency and percentage were used to describe the data. A test of normality with the Kolmogorov-Smirnov test was used to assess the deviations in variable distributions. Statistical methods such as the Chi-square test, Mann-Whitney U test, Spearman's rho correlation, Multiple linear regression and Cluster analysis have been employed to interpret the data and to reach conclusions of research questions. The graphical formats and tables further ensure the trends, patterns and relationships identified within the data. These results are then discussed in light of existing literature to provide meaningful insights and implications regarding the cognitive and psychosocial aspects of gifted adolescents.

The Section-wise presentations offer more clarity, coherence, and transparency, which help generate clearer explanations by critically analysing previous literature and ensuring a logical flow. The following are the eight sections:

Section A: Distribution of samples.

Section B: Test of Normality.

Section C: Analysis of sociodemographic, academic and non-academic characteristics of IGA and IAA.

Section D: Analysis of cognitive domains.

Section E: Analysis of psychosocial domains.

Section F: Relationship between different variables and sub-variables among IGA.

1. Exploring the relationship between Intellectual giftedness and emotional and behavioural problems (EBP) among IGA
2. Exploring the relationship between cognitive domains and EBP among IGA
3. Exploring the relationship between parenting style and EBP among IGA

Section G: Determining the predictive role of cognitive domains and parenting style on EBP among IGA.

Section H: Clustering the IGA in terms of cognitive and psychosocial characteristics.

Section A: Distribution of samples

The distribution of samples examines the descriptive statistics of screening and selection for intellectually gifted adolescents and those with average intelligence. Frequency and percentage were used to describe the data.

Table 3.1

Frequency and percentage distribution of screened and selected intellectually gifted adolescents from the State and CBSE boards

		Teacher nomination	Screening Stage	Selection Stage
	Total		SPM (>90 th Percentile)	WISC-IV(IQ>=125)
		(Stage 1)	(Stage 2)	(Stage 3)
		n (%)	n (%)	n (%)
State	1474	141(9.56%)	78(5.29%)	42(2.85%)
CBSE	1529	153(10.00%)	100(6.54%)	64(4.19%)
Total	3003	294(9.79%)	178(5.92%)	106(3.60%)

Note: n=number of adolescents, %=percentage of adolescents, SPM=Standard progressive matrices, WISC-IV=Wechsler Intelligence Scale for Children-IVth edition, CBSE=Central Board of Secondary Education.

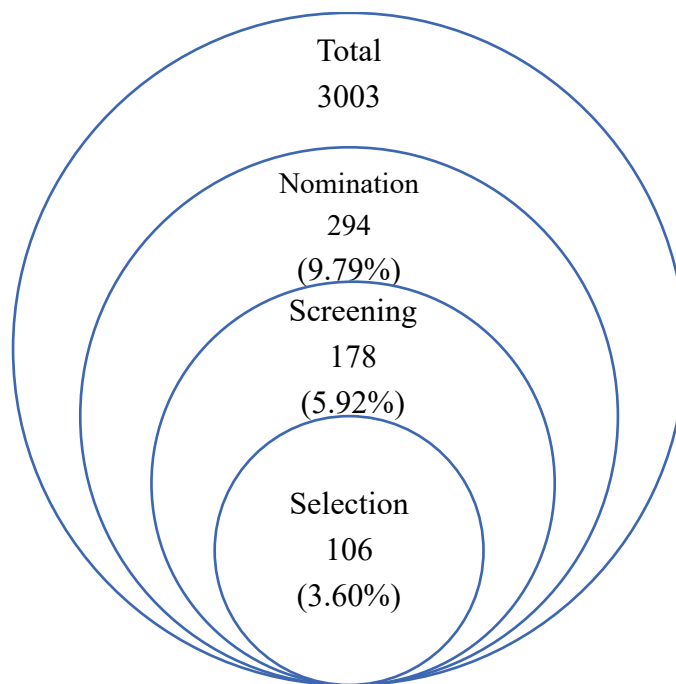
Participants were selected based on multi-stage purposive sampling. It was a three-stage process of criterion-based identification. The participants from each class were recruited to the screening stage after the nomination by the teacher who knew him/her for about a year. They were further assessed with WISC-IV India, a comprehensive tool to assess intelligence and cognitive domains and the adolescents who had a Full-scale IQ score of 125 or above were selected or identified as intellectually gifted.

About 141 adolescents were nominated from the school that offers the state board of studies and recruited to stage two. Stage two was the screening phase, where SPM was administered to find out whether he or she belonged to the top ten per cent group, 90th percentile or above and 78 adolescents were chosen for the same. The 78(5.29%) adolescents were administered to WISC IV as a part of the identification process and 42 (2.85%) were selected on the criteria of FSIQ 125 or above. Similarly, through the Central Board of Secondary Education (CBSE), 153 nominated adolescents

were recruited to the screening stage and 100(6.54%) enrolled on the selection stage. Finally, 64(4.19%) adolescents were identified as intellectually gifted in the CBSE board. A total of 106(3.60%) adolescents were finally recruited for the study. The identification process was depicted in Figure 3.1.

Figure 3.1

Number of participants in the stages of the identification process



The figure represents a clear snapshot of the proportion of intellectually gifted adolescents identified in a school setting. Out of 3003, teachers nominated 294 adolescents through teacher nomination criteria. i.e., approximately 9.79%. A total of 178 adolescents (5.92%) were screened with an SPM above the 90th percentile for the identification or selection stage. Finally, 106(3.60%) were selected as intellectually gifted adolescents. Results reveal that though the state and CBSE board have nominated adolescents approximately equal in number, the CBSE board lead in the screening

stage. There is a gross difference in the selection stage, too. The adolescents from the CBSE board tend to be more identified as intellectually gifted than state board.

Though none of the literature directly measures or compares IQs between the State and CBSE boards, a few reported that the cognitive skills like problem-solving ability (Ramzan, 2020), logical reasoning (Sarkar & Panda, 2020), vocabulary and language fluency/verbal competency in English (Rasheed & Shahana, 2023) were comparatively better in CBSE studies. The reasoning and problem-solving mode of learning and early exposure in the CBSE pattern and score on verbal cognitive skills in the IQ test might help the adolescents to perform better.

Literature reveals divergence in the identification methods of gifted groups. Most of the studies rely on cognitive assessments, while others use different sources like teacher nomination, parent nomination, portfolios, achievement tests and rating scales. (McClain & Pfeiffer, 2012). Research by CDE (2017). Few considered the use of comprehensive assessment methods, multimethod approaches, etc, for identifying such students (Merrick & Targett, 2004; Almeida et al., 2016; CDE, 2017; Merrick & Targett, 2004; Pfeiffer, 2012). Our study attempted to identify intellectually gifted children through three stages. The screening stage includes the administration of SPM after a teacher's referral, followed by classifying the adolescents who scored at or above the 90th percentile in SPM and finally, the selection stage includes the use of WISC with an IQ equal to or greater than 125. The conventional mode of defining intellectual giftedness was IQ scores at the 95th, 98th or 99th percentile. Students who were significantly advanced were referred by teachers to school psychologists, who administered individual IQ tests, and the global score was used to determine placement. Our study also did the same. Pfeiffer (2015) and Pawlusch, Thompson and Ferrier (2014)

suggested that the Wechsler intelligence test for children is now the most widely used individual IQ test for identifying gifted. Similarly, state legislation and district eligibility guidelines for gifted programs often mandate the use of full-scale IQ (FSIQ) scores (Rimm, Siegle & Davis, 2018). Sparrow, Pfeiffer, and Newman (2005) refer to the IQ test as “a core tool” to identify intellectually gifted children. In children and adolescents, the most often used IQ test is the Wechsler Intelligence Scale for Children (Guénolé et al., 2013 & Gordana et al., 2013). We used WISC as a selection tool for identifying gifted children and 106 children out of 294 nominated came under the category of intellectual superiority, $IQ \geq 125$. About 3.60 % of adolescents were identified as intellectually gifted in our study, considering the total sample. The distribution is consistent with the prevalence data, suggesting the gifted group represents a small percentage of the population and that the proportion decreases as IQ scores increase (Silverman, 2013; Gross, 2004). The findings are also consistent with Marland's (1972) report that 3-5% of the students were identified as gifted, which involves the use of a cognitive assessment in the identification process. Few studies identified approximately 10% of Children as intellectually gifted. (NAGC, 2017). There might be slightly more in the number if we categorized the IGA based on their cognitive indices and set the cutoff as $IQ = 120$ for gifted adolescents. But here, we choose the full-scale IQ for more uniformity. We have more adolescents who belong to the ‘above-average intelligence’ ($IQ = 110-129$) category (in our study, 110-124), and hence, there might be more probable cases of moderately giftedness. Few researchers supported the same (Wechsler, 2005; Flanagan and Kaufman, 2004).

Table 3.2*Distribution of intellectually average adolescents (IAA)*

	Teacher nomination (Stage 1)	Screening Stage SPM (25th -75th percentile) (Stage 2) N	Selection Stage WISC-IV (IQ=90-109) (Stage 3) N
State	100	60	42
CBSE	95	75	64
Total	195 (6 dropouts)	135 (5 dropouts)	106

Note: n=number of adolescents, SPM=Standard progressive matrices, WISC-IV=Wechsler Intelligence Scale for Children-IVth edition, CBSE=Central Board of Secondary Education.

The selection of adolescents with average intelligence was a three-stage process and criterion-based. The sample size of IAA was equivalent to IGA, who matched with respect to the board of studies and gender, to maintain the homogeneity in academic curriculum. The adolescents who had average performance in school-related activities were the nomination criteria for IAA for teacher nomination. The nomination was done at the convenience of the school authorities. Thus, only a subset of adolescents from each class was identified for nomination. A total of 135 adolescents were screened through SPM from a pool of nominated high school students (n=195). Here, we had six dropouts after teacher nomination, as a few were absent during the screening stage and were not willing to participate. Five SPM reports had high discrepancy scores, suspecting the accuracy and were not considered for the selection stage. Then the adolescents were ruled out with respect to inclusion criteria and WISC-IV cutoff's and 106 adolescents matched to gender and board of studies were chosen for the research. The literature also aligns with the researchers using the WISC IV as the tool in studies

of adolescents with average intelligence (Malini & Thomas, 2022; Varghese et al., 2021). Comparatively, it seems a smaller number to screen out the average adolescents with SPM and WISC IV, as they were more in the group. This is consistent with the Gaussian curve, which displays the average category as 66.6%.

Table 3.3

Split up of various levels of giftedness

Levels of giftedness	N	(%)
LG (125-134)	80	75.47
HG (≥ 135)	26	24.52
Total	106	

Note: LG= Low gifted, HG= Highly gifted

Table 3.3 presents the split up of intellectually gifted adolescents as low gifted (IQ=125-134) and highly gifted (135 and above). The split up of levels of giftedness into two categories was supported by the study of Shaywitz et al. (2001), who examined the different variables across four groups, including low gifted and highly gifted, in a total sample of 87. The levels of giftedness were defined using IQ cutoffs (140-154 for highly gifted and 124-139 for the low gifted). In our study, the majority of adolescents were classified into low gifted (75.47%) and only 24.52% fell into the highly gifted range. The distribution is consistent with the prevalence data, suggesting the gifted group represents a small percentage of the population and that the proportion decreases as IQ scores increase (Silverman, 2013; Gross, 2004). Prior studies have similarly reported a greater representation of adolescents in the moderately or low gifted range compared to the highly gifted range (Shaywitz et al., 2001). For instance, research by Renzulli (2005) and Subotnik et al. (2011) noticed that while giftedness spans a wide

spectrum, highly gifted individuals remain relatively rare in school-based identification. The studies of Kiran (2018), Vijayan & Francis (2025) and Kurup & Nayar (2003, 2010) also reflected that most identified students clustered in the lower gifted range, with fewer in the highly gifted range.

Section B: Test of Normality

The following table represents the test of normality in both groups. The variables such as intelligence, verbal comprehension, perceptual reasoning, working memory, processing speed, parenting style and emotional and behavioural problems are tested for normality.

Table 3.4

Test of normality

Variables	IGA		IAA	
	n	Sig	n	Sig
Intelligence Quotient (IQ)		.020		.000
Verbal comprehension (VC)		.001		.139*
Perceptual reasoning (PR)	106	.192*	106	.016
Working memory (WM)		.029		.021
Processing speed (PS)		.000		.112*
Authoritarian parenting style (AN)		.000		.004
Authoritative parenting style (AT)		.200*		.000
Permissive parenting style (PRMS)		.029		.003
Emotional and behavioural problems total (Total EBP)		.000		.000
Emotional Symptoms (ES)		.000		.000
Conduct problems (CP)		.011		.000
Inattention/hyperactivity (IH)		.200*		.000
Peer problems (PP)		.000		.000

Note: IGA=Intellectually gifted adolescents, IAA=Intellectually average adolescents

**P>0.05*

The data were tested for normality using the Kolmogorov-Smirnov test, and the results indicated a violation of the normality assumption ($p < 0.05$). Only three sub-variables met the assumptions of normality ($p > 0.05$) among IGA. Consequently, non-parametric statistical analyses were deemed appropriate. Furthermore, since the data was obtained through multistage purposive sampling, which inherently deviates from assumptions underlying parametric tests, the use of non-parametric methods was considered more suitable for the present study.

Section C: Analysis of sociodemographic, academic and nonacademic characteristics of IGA and IAA

1. Demographic characteristics of IGA and IAA

Exploring demographic and academic characteristics of intellectually gifted adolescents provides a fair insight into the data of the main study. Moreover, the demographic profiles would help us to understand the diversity within the sample group and how it is different or similar to the control group. The characteristics included for the analysis are gender, age, syllabus/board of studies, residence, type of family, educational and occupational level of parents, socioeconomic status and ordinal position. The group with intellectual giftedness was the adolescents who had an IQ of 125 or above on WISC IV and the group without intellectual giftedness, ie, IAA, was the adolescents who had an IQ score of 90-109. They were addressed as categorical variables as ‘Yes’ (with intellectual giftedness, intellectually gifted group) or ‘No’ (without intellectual giftedness ie., intellectually average group) for the sake of statistical analysis of demographic variables. The chi-square test was used to analyse the association between the variables in two groups. The chi-square test of independence is used to examine whether there is a significant association or

relationship between two or more groups. Likelihood ratio chi-square was also employed if any of the categories had fewer than five counts. The results are tabulated in table below.

Table 3.5

Association of Intellectual giftedness and demographic characteristics of adolescents

Variable	Category	Intellectual giftedness				χ^2	<i>p</i> value
		Yes (IGA) (n=106)		No (IAA) (n=106)			
		N	%	n	%		
Gender	Male	50	47.2	50	47.2	0.00	1.00
	Female	56	52.8	56	52.8		
Age	13 years	30	28.3	33	31.1	2.64	0.29
	14 years	36	34.0	41	38.7		
	15 years	40	37.7	32	30.2		
Syllabus	State	42	39.6	42	39.6	0.00	1.00
	CBSE	64	60.4	64	60.4		
Residence	Rural	45	42.5	46	43.4	0.02	0.90
	Urban	61	57.5	60	56.6		
Family type	Nuclear	63	59.4	49	65.1	0.72	0.48
	Joint	43	40.6	37	34.9		
Education level of father	Primary	0	0	1	0.9	49.66 ^a	0.00***
	High school	15	14.2	52	49.1		
	Graduation	40	37.7	41	38.7		
	Post graduation	19	17.9	6	5.7		
	Professional courses	32	30.2	6	5.7		
Education level of Mother	Primary	0	0	1	0.9	42.08 ^a	0.00***
	High school	7	6.6	29	27.4		
	Graduation	40	37.7	38	35.8		
	Post graduation	29	27.4	35	33.0		
	Professional courses	30	28.3	3	2.8		
Occupation level of father	Unskilled	1	0.9	7	6.6	27.45 ^a	0.00***
	Semiskilled	33	31.1	-	46.2		
	Skilled	28	26.4	37	34.9		

Variable	Category	Intellectual giftedness				χ^2	<i>p</i> value
		Yes (IGA) (n=106)		No (IAA) (n=106)			
		N	%	n	%		
Occupation level of mother	Highly professional	42	39.6	12	11.3	23.50 ^a	0.00***
	Unemployed	2	1.9	1	0.9		
	Unskilled	0	0	0	0		
	Semiskilled	17	16.0	14	13.2		
	Skilled	18	17.0	26	24.5		
Socioeconomic status	Highly professional	39	36.8	11	10.4	43.14 ^a	0.00***
	Unemployed	32	30.2	55	51.9		
	Upper class	15	14.2	21	19.8		
	Upper middle class	42	39.6	58	54.7		
	Lower middle class	40	37.7	23	21.7		
Ordinal position	Upper lower class	9	8.5	4	3.8	1.43 ^a	0.70
	Lower class	-	-	-	-		
	First born	41	38.7	36	34.0		
	Last born	45	42.5	52	49.1		
	Middle born	1	9	2	1.9		
	Single born	19	17.9	16	15.1		

*** $p < 0.001$, ^a Likelihood ratio chi-square ($LR\chi^2$)

Table 3.5 examines the association of demographic characteristics of adolescents with (IGA) and without intellectual giftedness (IAA). It also shows the sociodemographic characteristics and percentage-wise distribution of intellectually gifted adolescents and adolescents with average intelligence. It also reveals similarities and differences across multiple sociodemographic domains. While some variables showed no significant association with giftedness, others demonstrated a strong relationship, highlighting the role of parental education, occupation, and socioeconomic status in shaping cognitive potential.

Relative to gender, there was no significant association between gender and intellectual giftedness ($\chi^2=0.00$, $p=1.00$). The gender wise distribution of IGA shows that the females ($n=56$, 52.8%) tend to be slightly more in number than males ($n=50$, 47.2%). The researcher has taken intellectually average adolescents matched to gender and syllabus of IGA. Hence, commenting on between-group differences in distribution in these two variables may not be true to the research.

Similarly, for age, the distribution was relatively balanced between two groups ie; 28.3% belongs to 13 yrs, 34.0% belongs to 14 yrs and 37.7 % belongs to 15 yrs in intellectually gifted group and 31.1% to 13yrs,38.7% in 14yrs and 30.2% in 15 yrs in terms of IAA. The chi-square results reveal that age has no effect upon intellectual giftedness ($\chi^2=2.64$, $p=0.29$).

Though it was found that there is no significant association between the board of studies/syllabus and intellectual giftedness ($\chi^2=0.00$, $p=1.00$), the syllabus-wise distribution within the group reveals that about 60.4 % adolescent was identified from the CBSE board, though the initial pool of adolescents was almost similar in both syllabus. Only 39.6% were qualified from the state syllabus. This highlights the exposure and resources of the school in shaping cognitive skills.

Regarding residence, 57.5% of IGA were from an urban background and 42.5% were from rural areas. And about 56.6% of IAA were from an urban background and 43.4% were from rural areas. There is not much difference in IAA when describing between groups, indicating there was no significant relation between residence and intellectual giftedness ($\chi^2=0.02$, $p=0.90$).

There is a difference in family type, where more IGA were identified from those who came from nuclear family (59.4%) and 40.6% from joint family. Again, there is

not much disparity between two groups in terms of residence, indicating no significant association between residence and intellectual giftedness ($\chi^2=0.72$, $p=0.48$).

It was interesting to view the striking difference emerged in the educational qualifications of parents. Fathers of IGA participants were more likely to have pursued professional courses (30.2%), graduation (37.7%), post-graduate degrees (17.9%), whereas in the IAA group, a substantial proportion had only completed high school (49.1%) followed by graduation (38.7%) and others, revealing significant association between educational level of father and intellectual giftedness ($LR\chi^2=49.66$, $p=0.00$). Similarly, mothers in the IGA group had higher levels of education, with a greater number holding professional qualifications (28.3%), postgraduate degrees (27.4%), and graduates (37.7%). Majority of IAA mothers, more likely to have completed only high school (27.4%) and graduation (35.8%). It is noteworthy to notice that only 2.8% of mothers belong to the professional courses category. This significance shows the association of intellectual giftedness and the education level of mothers ($LR\chi^2=42.08$, $p=0.00$). These findings align with research suggesting that parental education plays a critical role in fostering intellectual development, providing an enriched learning environment and academic achievement in children (Gottfried et al., 2015).

Parental occupational levels further reinforced these educational patterns. Fathers in the IGA group were more frequently engaged in highly professional occupations (39.6%), whereas a larger proportion of IAA fathers were semi-skilled (46.2%) or skilled (34.9%), suggesting significant differences ($LR\chi^2=27.45$, $p=0.00$). A similar trend was observed among mothers, with a higher proportion of highly professional mothers in the IGA group (36.8%), compared to only 10.4% in AAI. Conversely, more IAA mothers were homemakers (51.9%) compared to IGA (30.2%).

It was found that there is a significant association between the occupational level of the mother and intellectual giftedness ($LR\chi^2 = 23.50, p=0.00$). This suggests that greater parental exposure to intellectually stimulating environments may contribute to the development of cognitive abilities in children, consistent with findings by Subotnik et al. (2011).

Furthermore, socioeconomic status (SES) also shows a significant association with giftedness ($\chi^2 = 43.14, p = 0.00$). More adolescents of the intellectually average group were from the upper class, upper middle class and upper lower class than the intellectually gifted group. A higher proportion of gifted adolescents belonged to the lower middle class than IAA. This finding suggests that financial stability and access to resources such as facilities may not impact the intellectually gifted group. Rather, the education and occupation of parents of IGA play a role in developing and stimulating home environments that contribute to cognitive development and the identification of intellectual giftedness.

The ordinal position is not significantly associated with intellectual giftedness ($LR\chi^2 = 1.43, p=0.70$). Though the percentage distribution was more among firstborns and last borns than middleborns and singleborns, the disparity is not evident within groups and between groups.

Despite the output of the results, it is wise to look at the past literature and associations regarding demographic aspects of IGA. Some researchers studied gifted children in the age range of 6 -16 years (Erden et al.,2022, Opengin & Bilge,2023) and with the age range of 6-13years (Molinero et al.,2015). We considered the adolescent age group of 13-15 years as our sample. Identifying them in the middle period of adolescence, allows educators to tailor educational experiences to match their advanced

cognitive abilities, ensuring they are adequately challenged and engaged. Even the programs of Jagadis Bose National Science Talent Search (JBNSTS), India's oldest talent search organisation focus on students from the age groups of 13-21 years. Moreover, these groups are at the border of both career and social changes. More cognitive advancements and emotional rollercoasters were about to be driven in this period. Hence, focusing on high school adolescents would be beneficial to society. We identified more girls than boys in our research. The sample of Molinero et al. (2015) has more boys than girls is a contrary finding to us. Some researchers recruited from the Gifted Education Research and Practice Centre (GERPC) and identified more boys than girls with intellectual giftedness (Opengin & Bilge, 2023). Our findings agree with the study of Erden et al. (2022) who recruited more girls than boys from a special educational institution that was designed for gifted education. Limited studies screened the adolescents from a school setting (Molinero et al., 2015). Notably, we preferred to identify in the school setting. Gifted children identified within the school setting can be integrated into enrichment programs, advanced coursework, or special educational tracks while still interacting with their peers. Inclusive education is also needed for them for their socioemotional development. This integration promotes socialisation and reduces the risk of gifted adolescents feeling isolated or disconnected from their classmates. The above studies also compared continuous gifted and non-gifted children using the Wechsler tests.

In terms of ordinal position, our study reveals that about 38.7% of intellectually gifted adolescents are firstborns and 42.5% are lastborns, but giftedness and ordinal position are not associated. This is contrary to some researchers who found that first-born children tend to have higher IQ scores compared to later-born siblings, suggesting

a potential influence of ordinal position on cognitive abilities (Zajonc & Gregory, 1975; Kanazawa, 2012 & Rodger, 2000).

Considering the residential living in our study, the identified intellectually gifted adolescents were more from urban backgrounds than rural areas. Though there is a lacuna in research on giftedness and the influence of residential types, findings of a few related studies suggested that gifted adolescents in rural areas may face limited access to specialised educational resources and enrichment opportunities compared to their urban counterparts, highlighting the importance of understanding how urbanisation influences the development and support of giftedness. (Joshi, 2016 & Levine, 2017). Another influencing factor might be parental education and socioeconomic status. In our study, it was found that mothers seem to be highly qualified, with a major percentage occupied as highly professional (36.8%) and 30.2% as homemakers with educated backgrounds. Similarly, fathers seem to be highly professional, post-graduated and graduated and most of them were occupied as highly professional and skilled. None of the parents comes under the cluster below high school education. Higher levels of parental education may provide children with access to a more stimulating home environment, greater educational resources, and increased opportunities for intellectual development, all of which contribute to the emergence and nurturing of gifted abilities. Few studies (Lubinski, 1997 & Sirin, 2005) supported the same. Similarly, we identified the association between socioeconomic status and intellectual giftedness. Results reveal that it's the parental education rather than economic status, reflects in the cognitive development of the adolescents in our study. The findings also highlight the importance of identifying and nurturing giftedness in all socio-economic groups to address disparities in educational opportunities and

outcomes. Though many studies suggest that positive family interactions and supportive sibling relationships may contribute to overall child development, which could potentially include the emergence and nurturing of intellectual giftedness (Jeynes, 2007 & Pfeiffer, 2008), these studies underscore the significance of family environments and dynamics in nurturing intellectual giftedness directly and highlight the need for research to further explore the complex interactions between family types and gifted development.

2. Academic and non-academic characteristics of IGA and IAA

Table 3.6

Association of intellectual giftedness and academic characteristics

Variable	Category	Intellectual giftedness				χ^2	p value
		Yes (IGA)		No (IAA)			
		(n=106)		(n=106)			
		N	%	N	%		
Academic achievement	>95%	32	30.2	2	1.9	55.98	0.00***
	90-95%	45	42.5	28	26.4		
	80-89%	18	17.0	35	33.0		
	70-79%	11	10.4	29	27.4		
	60-69%	0	0	12	11.3		
Level of scholarship	Class level	28	26.4	22	20.8	58.06	0.00***
	School level	23	21.7	0	0		
	District level	5	4.7	0	0		
	State level	10	9.4	0	0		
	National level	2	1.9	0	0		
Subjects Excellence	Nil	38	35.8	84	79.2	48.15 ^a	0.00***
	Language	8	7.5	4	3.8		
	Maths	20	18.9	4	3.8		
	Physics	13	12.3	2	1.89		
	Chemistry	2	1.9	1	0.94		
	Biology	9	8.5	2	1.89		
	Social studies	9	8.5	4	3.8		
	CS/IT	6	5.7	0	0		
	AI	2	1.9	0	0		
	Science	16	15.1	0	0		
	Nil	21	19.8	83	78.30		

*** $p < 0.001$, ^a Likelihood ratio chi-square ($LR\chi^2$)

Table 3.6 provides the analysis of the association of academic variables and intellectual giftedness. The percentage obtained in the annual exam of the last academic year was marked as academic achievement. The results show a strong association between intellectual giftedness and academic performance. A significantly higher proportion of IGA achieved academic scores above 90% compared to IAA ($\chi^2 = 55.98$, $p = 0.00$). Specifically, 30.2% of IGA scored above 95%, whereas only 1.9% of IAA achieved this level. This suggests that intellectual giftedness is associated with higher academic achievement, reinforcing the role of cognitive abilities in scholastic performance.

The scholarships ensure a structured method to support academically excellent students and serve as a financial tool for the needy ones. Most of the scholarship exams have level-wise competitions and only the toppers can be promoted to the next higher levels as per the criteria of the scholarship. The main purpose of scholarships is to identify students of subject excellence. As it fosters cognitive skills too, the role of the level of scholarships was preferred in the analysis. The scholarship exam qualified in the last 3 years at the highest level, and were considered for the study. The level of scholarship was significantly associated with intellectual giftedness ($\chi^2 = 58.06$, $p = 0.00$). A higher proportion of IGA has been qualified for higher levels. While 35.8% of gifted students reported receiving no scholarships, the remaining adolescents had secured scholarships at the class (26.4%), school (21.7%), district (4.7%), state (9.4%), or national level (1.9%). In contrast, 79.2% of IAA had not received any scholarships, highlighting the academic distinction of the gifted group. About 20.8% of IAA managed to be toppers at the class level scholarship exams. This suggests that gifted students are more likely to be recognised and rewarded for their academic excellence. Contrary to

this, it is noteworthy that few adolescents with IAA also secured class level toppers in scholarship exams highlighting they may be stimulated with other factors such as hard work, achievement motivation, commitment and persistence among such adolescents in academic excellence. The subjects of scholarships are detailed in Table 3.7.

The chi-square test results ($\chi^2 = 18.15$, $p = 0.03$) indicate a significant association between intellectual giftedness and being a subject topper. Notably, IGA were more likely to excel in subjects like mathematics (18.9%) and physics (12.3%) compared to IAA. This aligns with previous studies suggesting a strong correlation between giftedness and superior performance in science, technology, engineering and maths (STEM) -related subjects. The higher representation of gifted among toppers in AI (1.9%), CS/IT (5.7%), and social studies (8.5%) further underscores their broad academic proficiency.

Despite few studies focused on the underachievement of intellectually gifted adolescents (Barbier,2017; Ramos et al., 2022), a vast number of studies reported that high intellectual capacity is related to children's cognitive (Miller & Vernon,1992; Paulus & Brown,2007) and scholastic development (Laidra et al., 2007; Palaniappan,2007; Deary et al.,2007; Mchen,2021) Concerning academic achievement, about 80% of intellectually gifted adolescents scored above 90% in our study. Findings also revealed that 10.4% of gifted adolescents are below an 80% score, suggesting that without proper mediating or influencing factors, such as students, they can also fall below the expected range in academics. Only a few IAA became excellent in certain subjects such as language, maths and social studies. The majority of IAA were not subject to excellence, revealing the scope of high intelligence in academics.

Table 3.7*Frequency and percentage of subjects which the adolescents won the scholarship*

Variable	Category	Adolescents			
		IGA (n=106)		IAA (n=106)	
		N	%	n	%
Subjects which Scholarship won	Maths	24	22.64	3	2.83
	Science	8	7.55	6	5.7
	Social science	2	1.89	0	0
	English	2	1.89	1	0.94
	Reasoning	1	0.94	0	0
	GK	6	5.7	1	0.94
	Hindi	1	0.94	0	0
	Science & Maths	4	3.77	0	0
	NMMS	3	2.83	1	0.94
	DCL	6	5.66	3	5.7
	LSS	0	0	0	0
	USS	6	5.66	1	5.66
	PCM	3	2.83	1	0.94
	Thalir	0	0	1	0.94
	Spelling bee	0	0	2	1.88
	Sanskrit	0	0	2	1.88
	Nil	38	35.85	84	79.25

Note : IGA=Intellectually gifted adolescents, IAA=Intellectually average adolescents

Table 3.7 highlights the frequency and percentage of subjects who won the scholarship. The results were almost similar to the category of subject toppers. IGA scored high in maths and science-related scholarships. The scholarships include IMO (International Maths Olympiad), ISO(International Science Olympiad, MTSE (Maths talent search examination), etc. IGA were far more likely to win scholarships in Mathematics (22.64%) and Science (7.55%) than their peers (Math: 2.83%, Science: 5.7%). This supports existing literature on the strong cognitive abilities of gifted

students in science and engineering-related subjects. More gifted students (5.7%) won scholarships in General Knowledge (GK), while very few average students (0.94%) received it. Additionally, only one gifted student won a reasoning-based scholarship, compared to none in the average group. These findings suggest that intellectual giftedness may be linked to broader cognitive abilities beyond subject-specific skills. Notably, IGA showed a higher rate of success in nationally and regionally recognized scholarship exams, such as NMMS (National Means-cum-Merit Scholarship) and USS (Upper Secondary Scholarship). In contrast, only a small proportion of IAA managed to secure scholarships in these categories. 79.25% of IAA did not receive any scholarships, compared to only 35.85% of IGA. This highlights the academic distinction between the two groups, reinforcing the role of intellectual giftedness in competitive academic achievement.

Some studies provide insights into the effectiveness of using scholarship exams and competitive assessments to highlight exceptional talent, particularly in the context of India, where exams like NTSE (National Talent Search Examinations) and various Olympiads are widely used for this purpose. The methods focus on the use of scores from various Olympiad exams, such as the Science Olympiad, Mathematics Olympiad, etc., by NCERT, through competitive examinations (Sharma, 2017), few investigate the predictive validity of NTSE scores (Sharma, 2017), include competitive examinations like Olympiads and NTSE in identifying intellectually gifted adolescents, particularly in Indian context. In our study, many have won the scholarship exams at the school-level district/zonal level, state level, and national level. The scholarship includes the Olympiad, National Talent Search Examination (NTSE), Deepika Children Leaf (DCL), Upper Secondary Scholarship (USS), Lower Secondary Scholarship (LSS), and

National Means cum Merit Scholarship (NMMSE). About 65% of the adolescents have won scholarships. Major subjects were maths, physics and science as such. About 35% of identified intellectually gifted adolescents did not attain any scholarships. Few studies reported that although scholarship and competitive exams may result in high scores in various subjects and indicate cognitive excellence, identifying gifted children through this may underscore the results, as many high achievers would be pursuing the scholarships. Our research reflects that about 22.64% and 7.55% of intellectually gifted adolescents show excellence in maths and science, respectively. Some researchers concluded that the gifted scored higher in math performance (Bergold et.al, 2020; Lynn & Vanhanen,2012; Roth et.al,2015), in science (Roth et.al,2015; Dunn et.al,2020) and language abilities (Dunn et.al,2020).

Table 3.8 presents the distribution of extra-curricular activities of IGA and IAA. It reveals that the majority of IGA have participated in diverse forms of extra-curricular activities. The most preferred activities are arts and sports (12.3), sports (19.8) and Verbal skills (8.5%). Only 5.7% of IGA did not prefer any activities, but almost 22.6% of IAA prefer not to be in such activities. Verbal Skills (8.5%) and technical Skills (3.8%) are more prominent in IGA, suggesting a tendency for gifted adolescents to engage in intellectually stimulating activities. Leadership roles are slightly more common in IGA (2.8%) compared to IAA (0.9%). Literary activities appear in both groups at a low frequency but remain more prevalent in IGA. Drawing skills and craft-related works were more preferred by IAA than by IGA. The results aligned with the studies on gifted adolescents consistently show that they tend to be multitalented and versatile, demonstrating strengths across multiple cognitive, academic, and creative domains (Renzulli, 2016; Sternberg, 2021; Winner, 1996).

Table 3.8*Frequency and percentage distribution of Co-curricular activities of IGA and IAA*

Co-curricular activities	IGA		IAA	
	N	%	N	%
Music	5	4.7	2	1.9
Dance	5	4.7	2	1.9
Sports	21	19.8	15	14.2
Craft	7	6.6	8	7.5
Verbal skills	9	8.5	2	1.9
Technical skills	4	3.8	2	1.9
Art and craft	7	6.6	5	4.7
Music and dance	5	4.7	13	12.3
Arts and sports	13	12.3	12	11.3
Others	1	.9	0	0
Nil	6	5.7	24	22.6
Leadership	3	2.8	1	.9
Drawing	7	6.6	8	7.5
Literary and Arts	2	1.9	1	.9
Sports/Arts/Literary	1	.9	1	.9
Drawing and Sports	2	1.9	0	0
Arts/Sports/Craft	1	.9	7	6.6
Abacus/Sports	4	3.8	1	.9
Leadership/Literary	1	.9	1	.9
Music/Drawing	2	1.9	1	.9
Total	106		106	

Note: IGA=Intellectually gifted adolescents, IAA=Intellectually average adolescents

The study of intellectually gifted adolescents (IGA) remains incomplete without a comprehensive understanding of their cognitive characteristics, beyond mere identification and demographic profiling.

Section D: Analysis of cognitive domains

1. Understanding the cognitive markers of intellectual giftedness and cognitive diversity in intellectually gifted adolescents.
2. Differences in cognitive domains between IGA and IAA
3. Differences in cognitive domains between low-gifted and highly gifted adolescents.
4. Differences in cognitive domains between males and females of IGA

1. Understanding the cognitive markers and diversity of intellectually gifted adolescents.

This section unfolds the cognitive markers and diversity of intellectual giftedness through four cognitive indices - Verbal comprehension, Perceptual reasoning, Working memory and Processing speed and also to know whether diversity exists in cognitive domains within IGA.

Table 3.9

Distribution of cognitive domains of IGA with differences in the level of performance

Indexes	Level of Performance							
	Average (90-109)		Above average (110-125)		Low gifted (126-139)		Highly gifted (>140)	
	n	%	N	%	N	%	N	%
VC	2	1.9	44	41.5	51	48.1	9	8.5
PR	19	17.9	33	31.1	46	43.4	8	7.5
WM	15	14.2	38	35.8	37	34.9	16	15.1
PS	9	8.5	27	25.5	48	45.3	22	20.8

Note: VC Verbal comprehension, PR=Perceptual reasoning, WM=Working memory, PS=Processing speed

The table reveals the distribution of intragroup variability in the performance of cognitive indices among intellectually gifted adolescents (IGA), categorized by level

of functioning on WISC-IV. About 48.1% of IGA are mildly gifted and 41.5% are above average intelligence in the cognitive domain, verbal comprehension (VC). Only a small portion reaches the highly gifted levels (8.5%) in VC. Nearly half of the group are in the mildly gifted range (43.4%) for perceptual reasoning (PR), followed by above average range (31.1%), average range (17.9%) and highly gifted (8.5%). Though the highest proportion of working memory (WM) in above average intelligence (35.8%) which followed by mildly gifted (34.9%), it also shows the highest percentage in the highly gifted range, indicating 15.1% IGA with very strong working memory. Regarding processing speed (PS), most even distribution was followed in all levels of performance; the highest proportion (20.8%) in the highly gifted range among all indices suggests processing speed is a major strength for some gifted adolescents. Results further reveal that there is no single index where all IGA perform uniformly at the same gifted level. The different IGA excel in different domains, such as few excel in VC while others excel in WM or PR. There is a discrepancy in the highly gifted group where WM and PS are higher in percentage level than the other two indices, revealing both stand out as the most exceptional domains for a significant subset of IGA. This suggests a group of IGA (highly gifted) individuals have exceptionally fast processing and efficiency and diverse working memory capacities. The table clearly demonstrates that the IGA group is not homogeneous in cognitive aspects, even though all are classified as intellectually gifted based on full scale intellectual quotient (FSIQ). In turn, there are few IGA who have an average level in cognitive domains, disclosing the discrepancy and differences. These findings also strongly support the idea of cognitive diversity within gifted populations revealing cognitive strength and weakness/relative weakness in each gifted adolescent.

It is also noteworthy to look into the WM and PS, which may serve as markers that distinguish highly gifted adolescents ($IQ \geq 140$) from those with mildly gifted or above average profiles at least for few IGA. This suggests that while not all IGA excel in these domains, those who do reach the higher extremes of giftedness are more likely to have exceptional working memory or processing speed. It is also to be noted that about 17.9% of IGA have an average range in perceptual reasoning and 14.2% are average in working memory, another unusual disparity in the group. This reveals the cognitive weakness of a few IGAs in PR and WM domains, as they only satisfy the average performance compared to VC (1.9%) and PS (8.5%).

Thus, distribution of levels of performance in four main cognitive indices among intellectually gifted adolescents (IGA), as assessed by the WISC-IV, revealed considerable variability across the indices, highlighting cognitive diversity within the gifted group.

Table 3.10

Median, Range and Interquartile range of cognitive indices of IGA as assessed by WISC-IV

Indices	Median		Minimum		Maximum		Range		IQR	
	IGA	IAA	IGA	IAA	IGA	IAA	IGA	IAA	IGA	IAA
VCI	126	106	108	82	148	132	40	50	12 ^s	16 ^s
PRI	126	94	102	76	153	128	51	52	21 ^h	14 ^s
WMI	124.50	98	95	69	155	144	60	75	19 ^h	18 ^m
PSI	130	103	94	63	155	144	61	81	17 ^m	24 ^h
FSIQ	132.50	103	125	88	155	109	30	21	11 ^s	12 ^s

Note: VCI=Verbal comprehension index, PRI=Perceptual comprehension index, WMI=Working memory index, PSI=Processing speed index, FSIQ=Full scale intelligence quotient, IGA=Intellectually gifted adolescents, IAA=Intellectually average adolescents, IQR=Interquartile range, s-small variability, m-moderate variability, h-high variability.

The table presents the descriptive statistics for the cognitive indices of IGA and IAA. The violation of normality shifts attention away from the mean toward other parameters. The median, range and interquartile range (IQR) are used to assess the cognitive profiles of both groups. It provides key insights into the cognitive abilities of adolescents. The median is the middle value of the data. Range (Max-Min) is the total spread of the data. The IQR is the spread of the middle 50% of the data. A small IQR ($\leq 10\%$ of range) suggests that most scores are clustered around the median, meaning less variability. A larger IQR ($\geq 30\%$ of the range) suggests greater variability in cognitive abilities within the group. A moderate variability is the IQR in between 10-30% of range.

Regarding IGA, the median of VCI score is 126, PRI score is 126, WMI score is 124.5 and the PSI is 130. It also unfolds the fact that all the cognitive indices come under the category of mildly gifted (125 or above), revealing that IGA demonstrates strong verbal reasoning skills like understanding, explaining and using languages, excellent spatial and visual reasoning, fast processing and strong working memory. The range and IQR manifest more about the spreading of IGA in all indices. The range of PRI is 51, with a minimum score is 102 and a maximum score is 153. There is a wider spread in PRI, meaning some intellectually gifted adolescents did extremely well in PRI, while a few scored closer to the average level. The IQR of 21 unveils high variation in perceptual reasoning as it is greater than 30% of range. It further reveals the diversity in PRI. The WMI (Range= 65(95-155) and PSI (Range=61(94-155)) also had the widest ranges, suggesting a large gap between the lowest and highest performers. The IQR also reveals high variation in WMI 9(IQR=19) and moderate variation in PSI(IQR=17), revealing heterogeneity in working memory and processing speed. It discloses that not

all IGA are equally strong in holding and manipulating information in memory and fast in processing. The range of VCI is 40, with a minimum 108 and a maximum of 148. Though there is variability in range, the IQR of 12 shows low variability and more consistency in verbal skills among IGA. It further shows that verbal comprehension may act as a strong cognitive component among all four domains, as it shows better consistency with gifted adolescents. The median of IQ is 132.50, revealing high intellectual ability or overall cognitive ability. The range is 30, with a minimum score of 125 and a maximum score of 155 and the IQR is 11, low variability indicating consistency across the group.

The findings are contradictory with the evaluation of Morrone et al. 2019; Rimm et al. 2008; Rowe et al. 2014, as they found that working memory ability and speed of cognitive processing, despite being typically higher than the general population average, were found to be a “weak” point in the profile. Though the median of working memory (124.5) was found to be low compared to other domains, the difference is not much communicable, and high variability exists. Moreover, all four cognitive domains are placed under the mild gifted category. Another study reported that processing speed is the lowest score obtained by the group of children with giftedness (Rimm, 2006). In our study, processing speed is the highest score of median obtained, but with moderate variability, revealing another relative strength and heterogeneity in the group. The special population norms of IGA in WISC-IV India also found differences in cognitive abilities of the study group.

Regarding IAA, the median of all indices is in the average range. But the PRI and WMI had a median of 94 and 98, presenting, below the mean of 100. This suggests that the IAA have weaker nonverbal reasoning and working memory. The moderate and

high variability exists in WMI (IQR=18) and PSI(IQR=24), suggesting differences in working memory, attention and processing efficiency. There is a small variability in VCI, PRI and FSIQ, suggesting more consistency in the indices. IAA was found to be more homogenous.

Hence, putting all the statistical evidence together, the research findings highlight that though all the cognitive indices (VCI, PRI, WMI and PSI) might act as cognitive markers of intellectual giftedness in IGA, as all the medians of cognitive indices belong to the mild gifted range. Remarkably, the consistency across verbal comprehension and high median in processing speed represents the core performance strengths within the gifted group among other cognitive domains. The moderate to high variability in PRI, WMI and PSI manifests the heterogeneity in cognitive markers within the group of IGA. Findings bring to light that IGA was more heterogeneous in cognitive ability when compared to IAA.

Notably, it also shows that VCI act as a common cognitive strength among IGA and may indeed serve as a core cognitive marker of giftedness as the sample shows less variability. This aligns with the findings of Sparrow et al. (2005), revealing verbal comprehension as an important defining factor in determining giftedness. Many studies reported the same, as VCI yielded the highest score by Sparrow et al.2005 and verbal ability was the best fit for the gifted population by Molinero et al. 2015. Though PSI have a high median score, the data spread shows high variability, indicating differences within the group. Also, only a marginal disparity is seen in working memory(m=124.50) compared to the other three components. Moreover, working memory often conceptualized as a higher-level skill than processing speed, was not more influential in defining the gifted group (Sparrow et al,2021). But in our study, the median of WMI

was less than PSI and also had high variability in the group. Considering the median scores, all four cognitive indices have scored in a five-point difference only, ie, WMI =124.50 to PSI=130, revealing verbal comprehension, perceptual reasoning, working memory and processing speed had almost equally marked as cognitive markers of giftedness in our sample. Many researchers also emphasized the same in gifted identification frameworks as they reflect abstract reasoning, language-based reasoning and problem solving, which align with traditional conceptions of intellectual giftedness.

Figure 3.2

Boxplot of WISC-IV Index scores of IGA and IAA



The boxplot shows the distribution of WISC-IV index scores among the IGA and IAA. The boxes represent the interquartile range (IQR), where the middle 50% of the scores lie. The horizontal line inside each box is the median. The whiskers show the minimum and maximum scores. The visuals of the box plot unveil that PRI, WMI and PSI have higher variability and VCI and FSIQ is more consistent in IGA. PSI is higher

than other indices to a minimum extent. The plot also shows that the median of all cognitive indices of IGA is far greater than IAA.

2. Understanding differences in cognitive domains between IGA and IAA.

This section presents potential differences in cognitive variables between IGA and IAA. The main cognitive variables selected for the research were verbal comprehension, perceptual reasoning, working memory and processing speed as assessed by WISC-IV. The subdomains under the verbal comprehension include verbal reasoning as assessed by the similarity subtest, social judgement as assessed by the comprehension subtest and learning ability as assessed by the vocabulary subtest. Visual perception, abstract reasoning and fluid reasoning are the subdomains of perceptual reasoning as evaluated by the subtests such as block design, picture concept and matrix reasoning, respectively. Similarly, the two domains under the working memory are attention and concentration and short-term auditory memory as assessed by digit span and letter number sequencing. Finally, the last subdomains, short-term visual memory and visuomotor coordination of processing speed, are assessed with coding and symbol search. The findings of cognitive domains are discussed with the structural and functional aspects of the brain.

The table presents a comparative analysis of cognitive domain scores between two groups, intellectually gifted adolescents (IGA) and intellectually average adolescents (IAA). Nonparametric statistical analysis was considered as the normality was violated. Hence, to compare the two groups Mann-Whitney U test is used. As evident from the table, there is a significant difference in all the cognitive domains between the groups. The U values are lower for the most significant differences, showing strong divergence in performance. In this study, the cognitive profile in

domains of verbal comprehension, perceptual memory, working memory and processing speed of IGA was contrasted with a control group of IAA similar in gender distribution and board of studies. The demographic details also reveal no significant differences among age distribution, family type, ordinal position and residence between the two groups, highlighting the approximate similarity in environmental resources other than parental education and occupation.

Table 3.11

Differences in cognitive variables and their subdomains among IGA and IAA

Cognitive Domains/ Subdomains (subtests)	Group	Mean Rank	U	Sig
Verbal comprehension (VC)	IGA	151.38	860.50	0.00***
	IAA	61.62		
Verbal reasoning (Similarity)	IGA	141.92	1863.50	0.00***
	IAA	71.08		
Social judgment (Comprehension)	IGA	144.77	1561.00	0.00***
	IAA	68.23		
Learning ability (Vocabulary)	IGA	144.15	1627.50	0.00***
	IAA	68.85		
Perceptual reasoning (PR)	IGA	156.15	355.50	0.00***
	IAA	56.85		
Visual perception (Block design)	IGA	150.26	979.50	0.00***
	IAA	62.74		
Abstract reasoning (Picture concepts)	IGA	147.89	1230.50	0.00***
	IAA	65.11		
Fluid reasoning (Matrix reasoning)	IGA	152.32	761.00	0.00***
	IAA	60.68		
Working memory (WM)	IGA	152.30	763.50	0.00***
	IAA	60.70		
Attention and concentration (Digit span)	IGA	143.01	1747.50	0.00***
	IAA	69.99		
Short-term auditory memory (LN sequencing)	IGA	148.06	1212.50	0.00***
	IAA	64.94		
Processing speed (PS)	IGA	147.63	1258.00	0.00***
	IAA	65.37		
Short-term visual memory (Coding)	IGA	142.96	1753.50	0.00***
	IAA	70.04		
Visuomotor coordination (Symbol search)	IGA	139.65	2104.00	0.00***
	IAA	73.35		
Intelligence	IGA	159.50	2102.00	0.00***
	IAA	53.50		

Note: IGA= Intellectually gifted adolescents, IAA=Intellectually average adolescents

*** $P < 0.001$

Henceforth, the differences in cognitive resources have to be uncovered. The results indicated that participants in the gifted group scored higher than IAA in all cognitive domains. The differences in cognitive abilities were consistent across all areas, meaning that cognitive abilities show marked differences. Previous research has revealed the significant differences in cognitive profiles obtained in WISC-IV between children of average intelligence and children of superior intelligence (NAGC, 2010; Rimm et al., 2008; Volker & Smerbeck, 2009 & Sparrow, 2005). Another study by Rowe et al. (2014) concluded that the results supported the four-factor solution of WISC-IV as the general structure to assess the cognitive skills of the gifted children. Our study also incorporates the four-factor structure of WISC-IV, India to define the cognitive skills and thereby to get a better understanding of cognitive structure rather than a unitary concept of intelligence alone.

For verbal comprehension($U=860.50$) and its subdomains such as verbal reasoning ($U=1863.50$), social judgment($U=1561.00$) and learning ability($U=1627.50$) the mean ranks of IGA were significantly higher than those of IAA and hence the hypothesis has been rejected at 0.1% ($p<0.001$) level. Similarly high significance was shown in perceptual reasoning($U=355.50$) and its subdomains, visual perception ($U=979.50$), abstract reasoning (1230.50) and fluid reasoning (761.00) between the groups. The mean ranks of IGA are significantly higher than IAA, revealing that IGA are superior in perceptual reasoning. The study also found that there is a significant difference in working memory($U=763.50$) and its subdomains, such as attention and concentration ($U=1747.50$) and short-term auditory memory (1212.50) between IGA and IAA. Moreover, the mean ranks of working memory and its subdomains reveal that the IGA has prominent working memory skills than IAA. Another highly significant difference

is found in processing speed ($U=1258.00$) and its subdomains, such as short-term visual memory ($U=1753.50$) and visuomotor coordination ($U=2104.00$), between the two groups. The mean ranks suggest that the IGA have faster processing skills than the IAA. The effect size of VC ($r=.85$) indicates a very large effect, showing a large difference in Verbal Comprehension between the gifted (IGA) and average intelligence (IAA) groups. The effect size of .94, indicates an extremely large effect, a very strong difference in Perceptual Reasoning (PR) between the gifted (IGA) and average intelligence (IAA) groups. The effect size ($r=.87$) indicates a very large effect, suggesting a large difference in Working Memory (WM) between the gifted (IGA) and average intelligence (IAA) groups. The effect size (.77) indicates a very large effect, suggesting that the gifted adolescents (IGA) performed substantially better than the average intelligence adolescents (IAA) on the Processing Speed Index (PS).

The present study demonstrated the superior performance of IGA in verbal comprehension (VC), including verbal reasoning, social judgment, and vocabulary skills, when compared to IAA. Superior verbal reasoning indicates enhanced abstract thinking, the capacity to detect conceptual similarities, and the use of metacognitive strategies in language were much advanced than IAA. Their higher vocabulary reflects rich verbal knowledge and strong linguistic memory, likely nurtured through self-initiated learning. Advanced social comprehension suggests they grasp social nuances and moral implications earlier than peers. These abilities allow gifted individuals to process and understand complex verbal information more efficiently than their peer group. In turn, the IAA may show more concrete thinking, depend on rote learning, and need more structured support to interpret complex verbal or social information. Many studies reported higher levels of verbal comprehension in gifted children (Sparrow et al., 2015 & Molinero et al., 2015). The findings also align with the research of Sweetland

et al. (2006), that gifted children have higher verbal IQ scores, which correlate with their advanced verbal comprehension abilities. It further suggests that gifted adolescents may demonstrate advanced verbal comprehension abilities as a result of their more efficacious neural functioning and greater capacity for intermodule information processing. The neuroanatomical findings also align with research indicating that gifted individuals often possess advanced metalinguistic awareness and verbal conceptualization skills (Silverman, 2020), which are associated with enhanced activation in the left perisylvian language areas, including Broca's and Wernicke's regions (Shaw et al., 2006).

Similarly, in the perceptual reasoning domain, significant differences were found in visual perception, abstract reasoning, and fluid reasoning. The perceptual reasoning was higher in IGA than in IAA. And the mean rank differences were higher in the PR domain compared to other domains, revealing the strongest differentiator between IGA and IAA. These gifted adolescents may excel at problem-solving without verbal instructions, have strong spatial visualization skills and mostly conceptualize at a nonverbal level. They may challenge the normal learning process and need novelty. High PRI adolescents also prefer thinking in images rather than words and solve problems without step-by-step instructions. In turn, the IAA performs adequately on structured, familiar tasks but struggles with novel or ambiguous visual stimuli that require flexible thinking. High perceptual reasoning reflects the stronger activation of fronto-parietal networks. It also aligns with right hemisphere dominance. Consistent with our research, findings of Asensio (2023) also indicated that gifted children and adolescents scored higher in perceptual reasoning compared to a control group with normotypical development. Structural MRI studies have shown that gifted children tend

to have greater parietal lobe efficiency and faster white matter transmission (Haier et al., 2004), supporting abstract and visual-spatial problem-solving.

The IGA also outperformed IAA in working memory and its subdomains, attention and concentration and short-term auditory memory, indicating superior cognitive flexibility, memory retention, and manipulation of information in IGA. It further reflects that IGA ability to hold, process, and manipulate auditory information in conscious awareness is much higher than IAA. It also supports their goal-directed behaviour, problem-solving skills and self-regulation dominantly. The high working memory capacity also facilitates their academic skills, particularly in mathematics, reading comprehension, and attention control. The current consensus is that working memory is the ability to store a limited amount of information and use it in the execution of cognitive tasks (Cowan, 2014). In this sense, working memory can be viewed as one of the processes that contribute to intelligence, defined as the variance shared by cognitive tasks requiring problem solving (Schneider, 2013 & Kovacs & Conway, 2016). In line with this idea, many studies have shown that intellectually gifted children consistently demonstrate higher working memory capacity than intellectually typical children (Calero et al., 2007; Hoard et al., 2008; Leikin et al., 2013; van Viersen et al., 2014; Rodríguez-Naveiras et al., 2019). In others words, effective working memory seems characteristic of intellectual giftedness (Hoard et al., 2008; Kornmann et al., 2015; Rodríguez-Naveiras et al., 2019; Vock & Holling, 2008). In parallel, intellectually gifted children seem to outperform typical children in tasks involving executive control, one of the main determinants of working memory capacity (Arffa, 2007; Duan et al., 2009; Liu et al., 2011a, 2011b). The neuropsychological researches also underlies that gifted adolescents have enhanced working memory, particularly in attention,

concentration, and mental manipulation, functions regulated by the dorsolateral prefrontal cortex (DLPFC) and related executive networks (Nagel et al., 2013).

While Processing Speed is sometimes variable among gifted individuals, the current study observed significantly higher performance in tasks like coding and symbol search, suggesting more efficient white matter connectivity and visuomotor coordination (Navas-Sánchez et al., 2014). It further emphasized that the rate at which IGA can perceive, interpret, and respond to visual or auditory information is much higher than that of IAA. This fundamental cognitive ability also influences tasks such as reading, problem-solving, and reaction time. The processing speed in IGA entails visual scanning (quickly recognizing and interpreting visual stimuli), attention to detail, motor speed (writing or selecting responses) and cognitive efficiency (handling repetitive or simple tasks rapidly). Many reviews reported that intellectually gifted children outperformed non-gifted peers in information processing speed (Duan et al., 2003; Duan & Jhiannong, 2014). Another study indicates that gifted pupils solved mathematical problems better and faster than average pupils, suggesting a difference in processing speed. They also reported that gifted pupils required less assistance and processed information differently across the subprocesses of orientation, execution, and evaluation. (Span & Corsmith, 1986). Contrary to this finding, few studies reported the lower processing speed of gifted individuals compared to other tasks (Beljian, 2024). The finding, processing speed, demonstrates no significant differences between gifted and matched control and thus not a distinguishing characteristic of giftedness, was cited by Sparrow et al. (2021) and Kaufman (1993).

The above findings of cognitive domains on gifted individuals align with previous research showing gifted individuals perform more quickly and efficiently on

various cognitive tasks. (Duan & Jhiannong, 2014). Few researchers reported that gifted children's greatest cognitive strengths were in verbal reasoning, visual perception, working memory and fluid reasoning in analysis of the WISC-IV cognitive profiles of gifted children (Liratni & Pry 2007,2012; Rimm et al., 2008; Silverman, 2009)

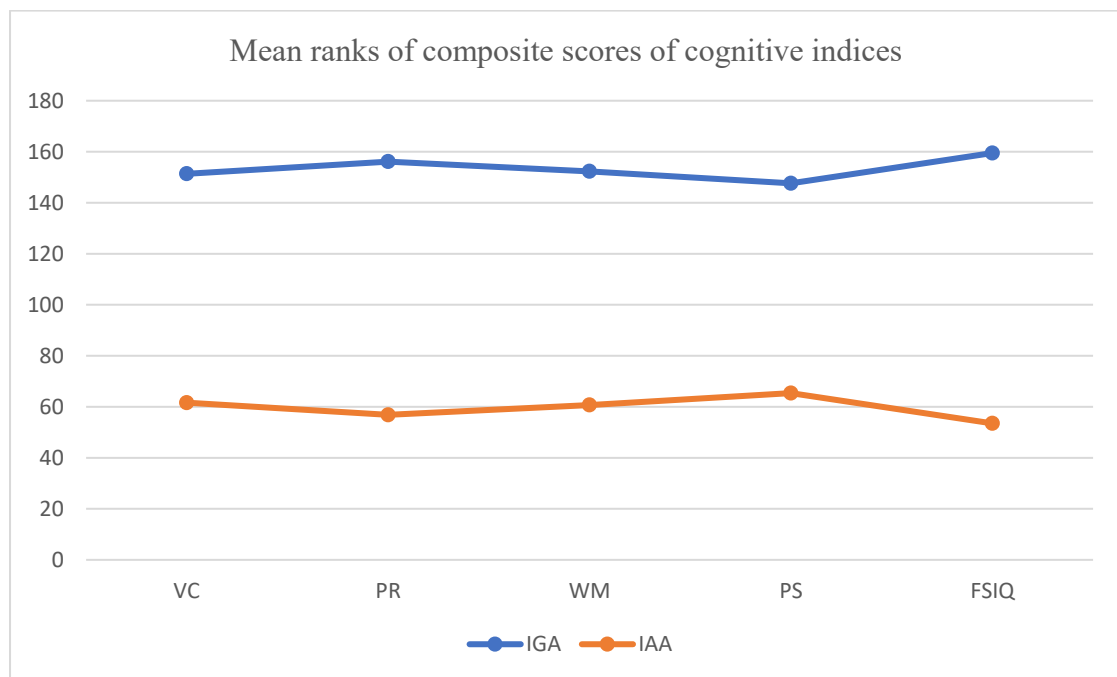
The cognitive explanations with functional and structural aspects of the gifted group were explained with the help of Wechsler intelligence and cognitive tests, in previous literature. Though most of the studies reported the superior performance of cognitive areas like verbal comprehension, perceptual reasoning, working memory, and processing speed with Wechsler assessments few literature findings contradicted this, as stated above.

It is worth noting the functioning of the brain in this consensus. The subtests and indexes of WISC IV are conceptualized based on the cognitive domains, which further contribute to the structural and functional aspects of brain regions. It is also used as a neuropsychological assessment to assess the cognitive functions, which could further corroborate with structural aspects of the brain. Brain-based evidence supports the structural and functional efficiency across the prefrontal, parietal, and temporal lobes, along with white matter integrity. It also aligns with Jung and Haier's P-FIT model, which links intelligence to efficient integration of information across fronto-parietal networks. The model synthesizes evidence from neuroimaging studies to explain how intelligence (especially fluid and general intelligence, or "g") arises from the coordinated activity of specific brain regions. Gifted individuals often show enhanced activation or greater efficiency in these networks. They work together to process information, solve problems and think logically and hence have higher processing in cognitive areas than peer groups. The cognitive differential functioning

of this group could also be explained by greater plasticity and efficiency, which contribute to having extensive attentional processes facilitating the high level of cognitive skills, complexity, and sometimes, precocity of manifestation (Geake, 2009). These results help to identify a more precise cognitive profile of gifted individuals, yielding a better understanding of the cognitive abilities and intelligence. The study provides evidence that allows delving into the most differential and characteristic aspects of giftedness, which further enhances the implications in cognitive and educational aspects.

Figure 3.3

Mean ranks of composite cognitive indices



The figure depicts the line graph of the mean ranks of cognitive indices between IGA and IAA. The visual plot clearly brings a snapshot of cognitive diversity in two groups. The IGA show superior cognitive performance across all domains compared to the IAA. Though there are no marked differences among the four domains, the largest gap appears in perceptual reasoning, followed by working memory and verbal

comprehension. Processing Speed, while significantly different, shows relatively smaller mean rank differences compared to the other domains.

Comparing the cognitive skills of IGA among themselves is indeed a thing, just like IAA. Looking into the profile of gifted subtypes, such as low-gifted and highly gifted, will provide a more nuanced understanding of IGA.

3. Differences in cognitive domains between low-gifted and highly gifted adolescents.

Table 3.12

Mean rank differences in cognitive domains based on level of giftedness

Cognitive domains/ Subdomains	Level of giftedness	N	Mean rank	U	Sig
Verbal comprehension	LG	80	44.41	312.50	0.00**
	HG	26	81.48		
Verbal reasoning (<i>Similarity</i>)	LG	80	45.59	407.00	0.00**
	HG	26	77.85		
Social judgment (<i>Comprehension</i>)	LG	80	44.96	357.00	0.00**
	HG	26	79.77		
Learning ability (<i>Vocabulary</i>)	LG	80	47.37	549.50	0.00**
	HG	26	72.37		
Perceptual reasoning	LG	80	42.76	180.50	0.00**
	HG	26	86.56		
Visual perception (<i>Block design</i>)	LG	80	45.29	383.00	0.00**
	HG	26	78.77		
Abstract reasoning (<i>Picture concept</i>)	LG	80	44.59	327.00	0.00**
	HG	26	80.92		
Fluid reasoning (<i>Matrix reasoning</i>)	LG	80	45.72	417.50	0.00**
	HG	26	77.44		
Working memory	LG	80	46.62	489.50	0.00**
	HG	26	74.67		
Attention and Concentration (<i>Digit span</i>)	LG	80	48.25	620.00	0.00**
	HG	26	69.65		
Short-term auditory memory	LG	80	47.34	547.50	0.00**
	HG	26	72.44		

<i>(Letter number sequencing)</i>					
Processing Speed	LG	80	49.65	732.00	0.02*
	HG	26	65.35		
Short-term visual memory <i>(Coding)</i>	LG	80	50.19	775.00	0.06
	HG	26	63.69		
Visuomotor Coordination <i>(Symbol search)</i>	LG	80	50.26	781.00	0.06
	HG	26	63.46		

Note: LG=Low gifted, HG=Highly gifted

**P<0.05, **P<0.001*

The table displays the differences in cognitive domains in IGA in terms of level of giftedness, low gifted and highly gifted. The adolescents who have an IQ in the range of 125-140 belong to the category of low gifted and those who have an IQ of above 140 are categorized as highly gifted. The differences help to understand whether higher IQ within the gifted range leads to distinct cognitive strengths or weaknesses, and whether cognitive profiles vary meaningfully within the group itself. Regarding verbal comprehension($U=312.50$) and its subdomains, verbal reasoning (407.00), social judgement($U=357.00$) and learning ability($U=549.50$), there is a significant difference between the two groups. The mean ranks of verbal reasoning, social judgement and learning ability of highly gifted adolescents are higher than low gifted adolescents. Similarly, highly gifted adolescents scored significantly higher in perceptual reasoning ($U=180.50$) and its subdomains, visual perception($U=327.00$), abstract reasoning ($U=327.00$) and fluid reasoning ($U=417.50$). It is also noted that the mean rank of the perceptual reasoning index is the highest among the four indices, revealing the cognitive strength of highly gifted adolescents. Regarding working memory ($U=489.50$), highly gifted adolescents outperformed low-gifted peers in attention and concentration($U=620.00$) and short-term auditory memory (547.50), revealing significant differences. Though processing speed was significant in terms of levels of giftedness, the difference is marginal. The results further indicate that highly gifted

adolescents tend to have high verbal ability, learning skills, superior memory capacity recall abilities compared to their low-gifted counterparts. They often excel in complex reasoning tasks and problem-solving scenarios, demonstrating the ability to grasp abstract concepts and apply them effectively. It also reveals that they may process information more quickly and efficiently, allowing them to grasp concepts and solve problems faster. The high gifted adolescents often display greater strengths in executive functions like working memory, attention, and cognitive flexibility, which are crucial for academic success. They tend to learn new information more quickly and with less repetition.

These findings underscore the importance of recognizing intra-gifted differences. An adolescent with IQ of 125 and one with 145 IQ may both be gifted, but their cognitive styles, needs, and challenges can be vastly different. Though the literature on the cognitive profile of different level of giftedness is comparatively less, the existing studies have concluded the advanced cognitive skills of exceptionally gifted children. The findings are consistent with Gagne (2005) who observe that adolescents with $IQ \geq 145$ outperform those around 130 on complex reasoning tasks across verbal, visual, and abstract domains. Similarly, Hollingworth's (1942) work with children above 180 IQ reported that the children develop exceptionally earlier than average in talking, reading, and imagination, revealing the excellence in learning ability, verbal comprehension and abstract reasoning. Feldman (cited in Morelock & Feldman, 1991), using Terman's original data, compared moderately and exceptionally gifted adults in degree of eminence attained and mentioned that high abstract reasoning ability is found in highly gifted children. Another observation by Gross, 1993 mentioned differences in abstract reasoning ability at an early age and complexity of thinking. Lovecky (1994)

studied children with $IQ > 170$ and a comparison group with $IQ \leq 140$ and found that exceptionally gifted displayed early abstract reasoning, rapid grasp of complex ideas, high precision and deep immersion in topics, advanced metacognition. These differences suggest that as IQ crosses thresholds (e.g., 145–170), new cognitive qualities emerge, beyond just “more of the same”. The results agree with the general trend of previous findings that intellectual characteristics in intellectually gifted children tend to increase in strength in accordance with IQ (Silverman, 2002).

Considering the mean rank differences, the PR had 42-point differences followed by VC with 37-point difference, WM with 30-point difference and PS with 15-point difference between low gifted and high gifted adolescents. Though processing speed was significant the mean rank differences were about 15-point only and moreover, the subdomains short term visual memory and visuomotor coordination was not significant. This highlights that PR and VC are the differentiating cognitive component among highly gifted adolescents from low gifted adolescents. The findings agree with the observation of Silverman, 2007 as he identified verbal comprehension index and the perceptual reasoning index act as influential factors in the selection to gifted programs.

Figure 3.4

Plot on cognitive indices of mean ranks of low-gifted vs highly gifted

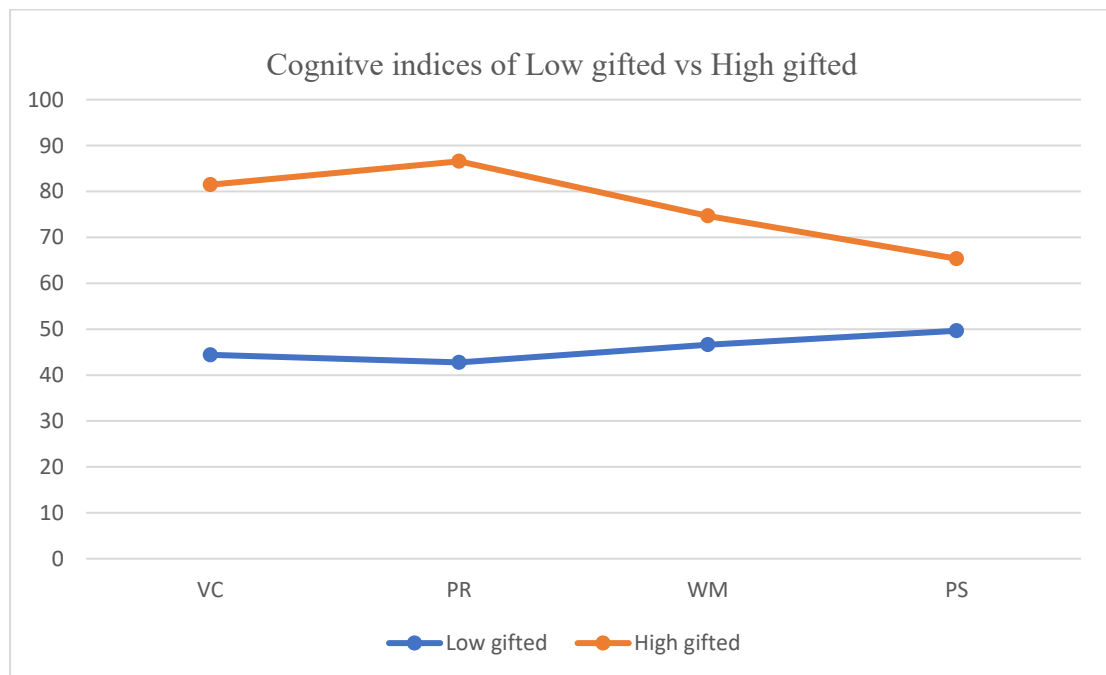


Figure depicts the line graph of mean ranks of cognitive indices between low gifted and highly gifted adolescents. The snapshot illustrates the heterogeneity in cognitive aspects in two groups. The highly gifted adolescents show superior cognitive performance across all domains compared to low gifted group. Figure portrays marked difference in perceptual reasoning where the largest gap appears between two groups. The smallest gap appears in processing speed revealing that it may not differentiating the groups.

The within-group evaluation of cognitive domains and intellectual giftedness is not complete without detailing the gender differences, as gender plays a crucial role in shaping the manifestation of cognitive skills among IGA.

4. Differences in cognitive domains between males and females of IGA

The table shows the comparison of cognitive domains between intellectually gifted males and females. There is a significant difference between males and females

in terms of working memory (U=1075.50) and its subdomain short-term auditory memory (U=1059.50) and processing speed (U=1014.50) and its subdomain short-term visual memory (U=1054.00). The males performed significantly better than females in working memory and females had significantly better processing speed than males. Though there is no significant difference in verbal comprehension between the two groups, the subdomain verbal reasoning seems to be highly significant (U=1113.00). The other two subdomains, social judgment and learning ability, showed no significant differences. Similarly, the study found no significant difference in perceptual reasoning between males and females. It is noteworthy to note the mild significance of one of its subdomains, abstract reasoning. The males performed significantly better than the females.

Table 3.13

Mean rank differences in cognitive domains based on gender

Cognitive domains/ Subdomains (subtests)	Gender	N	Mean rank	U	Sig
Verbal comprehension	M	50	57.10	1220.00	0.25
	F	56	50.29		
Verbal reasoning (<i>Similarity</i>)	M	50	62.20	1113.00	0.005**
	F	56	45.73		
Social judgment (<i>Comprehension</i>)	M	50	53.84	1383.00	0.91
	F	56	53.20		
Learning ability (<i>Vocabulary</i>)	M	50	54.76	1337.00	0.69
	F	56	52.38		
Perceptual reasoning	M	50	58.62	1144.00	0.10
	F	56	48.93		
Visual perception (<i>Block design</i>)	M	50	59.24	965.00	0.07
	F	56	48.38		
Abstract reasoning (<i>Picture concept</i>)	M	50	59.65	1092.50	0.04*
	F	56	48.01		
Fluid reasoning (<i>Matrix reasoning</i>)	M	50	57.01	1224.50	0.26
	F	56	50.37		

Working memory	M	50	59.99	1075.50	0.04*
	F	56	47.71		
Attention and Concentration (Digit span)	M	50	58.13	1168.50	0.14
	F	56	49.37		
Short-term auditory memory (Letter number sequencing)	M	50	60.31	1059.50	0.03*
	F	56	47.42		
Processing Speed	M	50	45.79	1014.50	0.01**
	F	56	60.38		
Short-term visual memory (Coding)	M	50	46.58	1054.00	0.03*
	F	56	59.68		
Visuomotor Coordination (Symbol search)	M	50	51.24	1287.00	0.47
	F	56	55.52		
Intelligence	M	50	58.05	1172.50	0.15
	F	56	49.44		

Note: M=male, F=female

$P < 0.001$ **, $P < 0.05$ *

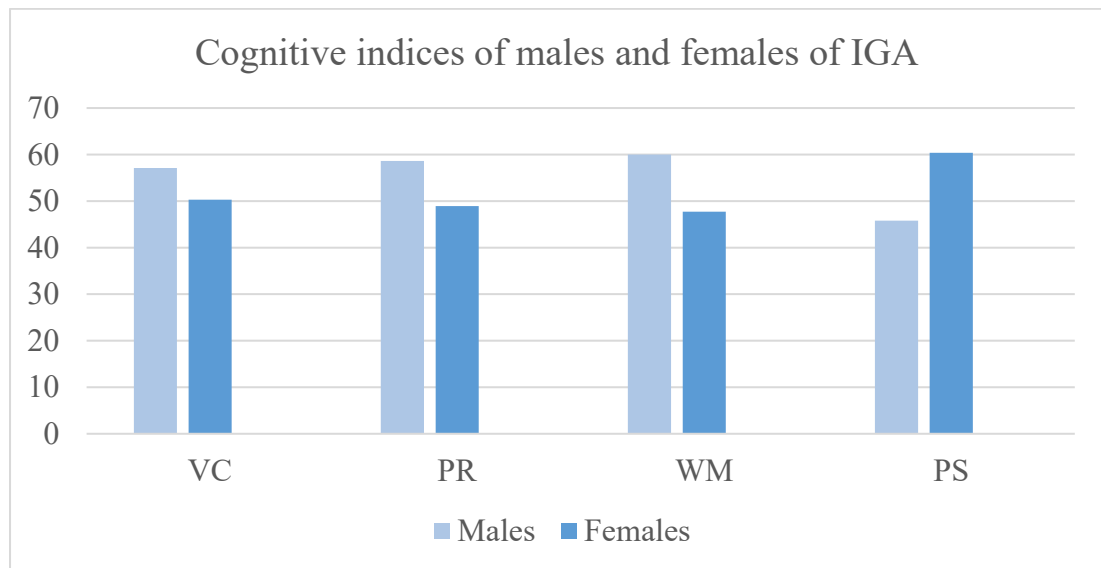
The other two subdomains, fluid reasoning and visual perception, showed no significant differences. The study found that females performed better in processing speed than males. In other cognitive abilities, the males consistently scored higher with working memory, verbal reasoning and abstract reasoning, having a significant difference. Though not significant, boys show more intellectual skills than girls in the study. The finding that males seem to be high in verbal comprehension, constituting verbal reasoning, and learning ability is contrary to the general conclusion that females show higher skills in verbal areas (Lynn & Irwing, 2008 and Vock & Holling, 2008). The boys in our context may more frequently engage in verbal reasoning, problem solving, academic competitions and debates and such interactions act as cognitive scaffolds for more verbal outputs, words, knowledge and learning ability and hence score high scores on similarity and vocabulary. It is also noteworthy to note that the social judgment is similar in both genders despite the differences in the other two domains. It reflects that

the boys and girls with IGA possess equally well-developed abilities in understanding social norms, responsibilities and moral reasoning. These findings align with theories of affective and moral development, indicating that gifted adolescents, regardless of gender, tend to exhibit strong social cognition. In our culture, where both boys and girls are equally exposed to social and moral education, this result reflects a gender-neutral pattern in domains that involve empathy and practical judgment. Our results do not support the idea of previous findings that verbal fluency is more in females (Sherwin, 2003). Similarly, the boys often engage more with spatial games such as puzzles, blocks and video games and hands-on problem solving and hence fostering of perceptual reasoning skills. The result is consistent with the previous finding of Sherwin (2003), that males outperform females in visuospatial abilities. The neurological explanations also entertain the weightage of fluid reasoning, abstract reasoning and visual perception in males than females. Moreover, boys may have more practice with mentally demanding tasks such as complex math, logical puzzles, and multi-step reasoning, revealing high working memory capacity than girls. The result is contrary to the finding of Upadhyay & Sanjeev G (2014), that male showed poorer performance in working memory. But there is a striking difference in processing speed with respect to gender in the study. Girls demonstrate higher processing speed and its domains, short-term auditory memory and visuomotor coordination, than boys, revealing better concentration, attention to detail, handwriting fluency, and task persistence. In our context, girls generally show better discipline, completing things on time, organized, accurate, obedient and careful than boys (Rao & Suneetha, 2010; Devi & Kumari, 2012). This might enhance their performance on tasks that demand speed, accuracy, and sustained attention. Another explanation by Gur et al. (2012) shows faster neural

processing in adolescent girls. More specifically, our findings fit with other results that the speed is more in females (Sherwin, 2003).

Notably, the mean rank differences between boys and girls gifted were comparatively less, from 5 points to 15 points maximum, conveying both the disparity and subliminal merging of the two groups. Also, the boys tend to be more intelligent than the girls. Few studies supported the same, as a study from the UK indicated greater male variability for verbal, quantitative, and nonverbal scales of the cognitive abilities test (Lohman & Lakin, 2009; Strand et al., 2006). The boys are more likely to be identified at the top of the IQ distribution than girls in the IQ distribution, for “almost everyone born in Scotland in 1921”(Deary et.al., 2003).

Cognition can be defined as all mental activities that are involved in the acquisition, processing, storage and retrieval of information. And such cognitive attributes are different in males and females. The current findings also reported the same trend. The findings suggest that cognitive strengths vary between genders in domain-specific ways rather than indicating a general cognitive advantage. Males demonstrated higher abilities in reasoning- verbal and abstract, mental manipulation tasks whereas females excelled in processing speed and short-term visual memory tasks. Though perceptual reasoning is not significant, the mean ranks shows that males are higher in related tasks. These results align with the aforementioned existing literature, indicating that males often perform better on spatial and reasoning tasks, while females tend to outperform males in tasks requiring rapid information processing and memory efficiency.

Figure 3.5*Plot on cognitive indices of males and females of IGA*

The bar chart displays a clear view of the comparison of males and females in all four cognitive indices where the males have more skills on verbal comprehension, perceptual reasoning and working memory. Females tend to have more processing speed in our research.

Concluding the cognitive profile, the VC and PS are relatively higher cognitive strengths compared to the other two domains within IGA and the perceptual reasoning is the most distinguishing cognitive domain that differentiates IGA from IAA. Regarding levels of giftedness, VC and PR are the discriminating cognitive domains of highly gifted adolescents from low-gifted gifted. The processing speed is the only cognitive domain in which higher processing in girls and boys tends to have higher VC, PR and WM.

While sociodemographic, academic and cognitive factors provide a structural understanding of intellectual giftedness, they do not capture the full complexity of the gifted adolescents. It is equally important to examine psychosocial aspects, including

emotional and behavioural problems, because giftedness extends beyond cognitive ability to encompass the individual's emotional aspects, interpersonal relationships, familial patterns and overall mental well-being.

SECTION E: Analysis of psychosocial domains

This section presents marked differences in selected psychosocial variables between IGA and IAA. The main psychosocial variables selected for the research were parenting style and emotional and behavioural problems. The three parenting styles – Authoritarian, authoritative and permissive parenting styles assessed through Parenting Authority Questionnaire and four emotional and behavioural problems - emotional symptoms, inattention/hyperactivity, conduct problems and peer problems and total emotional and behavioural problems were assessed through Strengths and Difficulties Questionnaire. The findings were discussed under the following headings:

1. Differences in parenting style

1.1 Differences in parenting style between IGA and IAA.

1.2 Differences in parenting style between low-gifted and highly gifted adolescents.

1.3 Differences in parenting style between intellectually gifted males and females.

2. Differences in Emotional and behavioural problems (EBP)

2.1 Differences in Emotional and behavioural problems (EBP) between IGA and IAA.

2.2 Differences in Emotional and behavioural problems (EBP) between low-gifted and highly gifted adolescents.

2.3 Differences in Emotional and behavioural problems (EBP) between intellectually gifted males and females.

1. Differences in parenting style

1.1 Differences in parenting style between IGA and IAA

The three parenting styles – Authoritarian, authoritative and permissive parenting styles were assessed through the Parenting Authority Questionnaire. The frequency and percentage of parenting styles followed by mothers from adolescents' perspectives are shown below.

Table 3.14

Distribution of parenting styles of IGA and IAA

Parenting style	IGA		IAA	
	n	%	N	%
Authoritative	63	59.4	64	60.4
Authoritarian	40	37.7	37	34.9
Permissive	3	2.8	5	4.7

Note: IGA -Intellectually gifted adolescents, IAA-Intellectually average adolescents, number of adolescents, %= percentage of adolescents.

Most mothers in both groups follow an authoritative parenting style (IGA=59.4%, IAA=60.4%). About 37.7% of intellectually gifted adolescents and 34.9% of intellectually average adolescents' mothers follow an authoritarian parenting style. Permissive parenting is comparatively less in both groups.

Table 3.15

Mean rank differences in the parenting style of IGA and IAA

Domains	Groups	N	Mean rank	U	Sig
Authoritative	IGA	106	111.80	5056.50	0.28
	IAA	106	101.20		
Authoritarian	IGA	106	105.38	5499.00	0.79
	IAA	106	107.62		
Permissive	IGA	106	103.15	5262.500	0.46
	IAA	106	109.85		

Note: IGA -Intellectually gifted adolescents, IAA-Intellectually average adolescents

The table presents the mean rank differences in parenting style of IGA and IAA. The Mann-Whitney U test was conducted to compare perceived parenting styles between intellectually gifted adolescents (IGA) and intellectually average adolescents (IAA). The results showed no statistically significant differences in authoritative ($U = 5056.50$), authoritarian ($U = 5499.00$), or permissive parenting styles ($U = 5262.50$) between the groups. Comparing the mean ranks, the authoritative parenting style was higher in IGA than in IAA. And the mean ranks of authoritarian and permissive parenting styles were slightly higher in IAA than in IGA.

Though the study reported no significant differences in parenting styles of gifted adolescents, the scores reveal that the mother of gifted adolescents seems to be more authoritative, less authoritarian and less permissive compared to the mother of the average intelligent group. The mothers of gifted adolescents may display better nurturing skills and practice moderate parental control by allowing the adolescent to become more autonomous rather than emphasising in controlling the child and restricting the autonomy. Also, the less permissive aspect of mothers of gifted adolescents suggests that they tend to keep moderate expectations of their children and place normal limits on their behaviour by enabling them to make their own decisions and a moderate level of regulating their own activity compared to the average group. The findings agree with the observations of Dwairy (2004) on the parenting authority questionnaire, indicating that the parents of gifted adolescents tend to be more authoritative and less authoritarian than parents of non-gifted adolescents. The results also fit with previous findings that indicate a higher authoritative mode and less authoritarian mode of parenting of IGA on PAQ (Yazdani & Golrokh, 2016). A literature review by Yildiz & Altay (2021) and another study performed by Rudasill et al. (2013)

also supported our conclusions that such children perceived parenting attitude as tolerant and democratic, while peer groups perceived them as authoritarian and permissive. The lack of significance in our research might be due to the marginal differences between the two groups, revealing that the intelligence of adolescents may not impact the parenting practices of our mothers in our culture. They may be following the traditional practices like normal adolescents.

It is also to be noted that three different types of parenting styles in gifted adolescents are evident in the present investigation with 37.7% % of IGA belongs to authoritarian type, 59.4% authoritative and 2.8% permissive type (Table 3.16), highlighting the existence of different parenting practices in gifted group.

1.2 Differences in parenting style between low gifted and highly gifted adolescents

Table 3.16

Mean rank differences in the parenting style of IGA based on the level of giftedness

Domains	Level of giftedness	N	Mean rank	U	Sig
Authoritative	LG	82	52.77	924.50	0.65
	HG	24	55.98		
Authoritarian	LG	82	51.43	814.00	0.19
	HG	24	60.58		
Permissive	LG	82	54.46	905.00	0.55
	HG	24	50.21		

Note: LG-Low gifted, HG-Highly gifted

The table presents the mean rank differences in parenting style based on level of giftedness. The Mann-Whitney U test was conducted to compare perceived parenting styles between low gifted and highly gifted adolescents. The results showed no statistically significant differences in authoritative ($U = 924.50$), authoritarian ($U = 814.00$), or permissive parenting styles ($U = 905.00$) between the groups.

The present analysis revealed no statistically significant differences in perceived parenting styles -authoritative, authoritarian, and permissive -between low gifted and highly gifted adolescents. Although the highly gifted group showed slightly higher mean ranks for authoritarian and authoritative styles, and the low gifted group scored slightly higher for permissive parenting, these variations did not reach significance, suggesting that level of giftedness may not be strongly associated with differing perceptions of parenting style in these adolescents. This finding aligns with some previous literature indicating that giftedness alone may not predict how adolescents perceive their parents' behaviour. According to Moon (2001), while parenting practices certainly play a critical role in the psychosocial development of gifted children, variations in parenting style may not differ significantly across levels of intellectual giftedness unless other moderating factors such as personality, emotional intensity, or family context are considered. Furthermore, Neihart (2002) suggested that highly gifted children are not necessarily raised in drastically different environments compared to their moderately gifted peers. While they may face distinct psychosocial challenges, such as heightened sensitivity, or asynchronous development, these factors may influence their needs and internal states more than their outward perceptions of parenting behaviour. A relevant meta-analysis by Baumrind (1991) and subsequent studies (Chan, 2005) noted that authoritative parenting is generally associated with more positive outcomes in gifted children, including academic motivation and emotional regulation. However, the lack of significant difference in the current study could indicate that both LG and HG adolescents are equally likely to benefit from or perceive authoritative parenting, and that parenting style may be more reflective of family values and parental awareness than the child's intellectual level.

The slightly higher mean rank for authoritarian parenting in the HG group, although not significant, may warrant further exploration. It is possible that parents of highly gifted children, in an attempt to manage high expectations or maintain structure, may adopt more controlling or rigid practices (Mofield & Peters, 2015). This may be perceived as authoritarian, especially if the child experiences a mismatch between their cognitive autonomy and parental expectations. On the other hand, the lack of a significant difference in permissive parenting suggests that overindulgence or leniency is not particularly prevalent in either group. This supports findings from Gottfried et al. (2009), who emphasised that parents of gifted children often seek to provide structure while supporting autonomy, thus avoiding extremes of permissiveness.

1.3 Differences in parenting style based on gender

Table 3.17

Mean rank differences in the parenting style of IGA based on gender

Domains	Gender	N	Mean rank	U	Sig
Authoritative	M	50	57.05	1222.50	0.26
	F	56	50.33		
Authoritarian	M	50	55.10	1320.00	0.61
	F	56	52.07		
Permissive	M	50	55.71	1289.50	0.48
	F	56	51.53		

Note: M=Male, F=Female

The table presents the mean rank differences in parenting style of IGA based on gender. The Mann-Whitney U test was conducted to compare perceived parenting styles between males and females of intellectually gifted adolescents (IGA). The results showed no statistically significant differences in authoritative ($U = 1222.50$), authoritarian ($U = 1320.00$), or permissive parenting styles ($U = 1289.50$) between the groups. The mean ranks also did not show marked differences between groups. The

literature finds that the differences in parenting practices based on gender among gifted adolescents are an unexplored area. Hence, exact studies on the above topic are less and observations were made on other aspects. The findings of Lin et al. 2025 reported girls having more positive emotional expression in response to emotionally warm parenting, suggesting that girls might be more sensitive to emotional aspects of parenting, but our study is not support the gender differences. Similarly, another indicated that girls respond more positively to emotionally supportive (authoritative) parenting, whereas boys may not benefit as much from the same style (Singh et al., 2025). But here, the parent perceives both genders as equal at least in the last decade, where they allowed the parenting practices to be general rather than differentiating. Moreover, gifted ones who had more cognitive capacity and advanced thinking parents found similar in treating such groups. The absence of significant differences in parenting styles between the two groups suggests that parenting practices may not vary based on the degree of giftedness alone, at least not in ways that are perceptible to adolescents.

The different modes of parenting practices may impact the mental health of the adolescents either positively or negatively. Hence, there is a need to assess the intellectually gifted adolescent's emotional and behavioural problems.

2. Differences in emotional and behavioural problems

2.1 Differences in emotional and behavioural problems between IGA and IAA

The four emotional and behavioural problems - emotional symptoms, inattention/hyperactivity, conduct problems and peer problems and total emotional and behavioural problems were assessed through Strengths and Difficulties Questionnaire.

The frequency and percentage of severity of EBP expressed by adolescents are shown below.

The distribution of emotional and behaviour problems among adolescents in our sample shows that many intellectually gifted adolescents are in the ‘close to average’ range revealing ‘nil problematic other than few characteristics’ for most domains, a small proportion are in the ‘slightly raised’(at risk category or borderline category) or ‘High risk’ categories (Clinically significant EBP), particularly for emotional symptoms, peer problems and inattention/ hyperactivity problems. Our findings reveal that the most common clinically significant EBPs in IGA were emotional symptoms (22.6%), followed by peer relationships (14.2%), inattention and hyperactivity (9.4%) and conduct problems (8.5%).

Table 3.18

Distribution of Severity of Emotional and Behavioural Problems (SDQ) associated with adolescents.

	IGA						IAA					
	Average		At risk		High risk		Average		At risk		High risk	
	N	%	N	%	N	%	n	%	n	%	n	%
ES	69	65.1	13	12.3	24	22.6	65	61.3	14	13.2	27	25.5
CP	86	81.1	11	10.4	9	8.5	82	77.4	13	12.3	11	10.4
IH	75	70.8	21	19.8	10	9.4	89	84.0	13	12.3	4	3.8
PP	62	58.5	29	27.4	15	14.2	92	86.8	8	7.5	6	5.7
Total EBP	59	55.7	35	33.0	12	11.3	74	69.8	13	12.3	19	17.9

Note: IGA -Intellectually gifted adolescents, IAA-Intellectually average adolescents, ES -Emotional symptoms, CP-Conduct problems, IH-Inattention/Hyperactivity problems, PP-Peer problem, Total EBP- Total emotional and behavioural problems.

On the other side, the most common EBP among IAA were emotional symptoms (25.5%), followed by conduct symptoms (10.4%), peer problems (5.7%) and inattention and hyperactivity (3.8%). All the EBP crosses the 'high risk band' category at least to a small extent, revealing that IGA is not at par with vulnerabilities like their peers. About 11.3% of IGA were in the clinically significant high-risk category. And this was comparatively lower than IAA (17.9%). However, a larger share of gifted adolescents were clustered in the 'slightly raised' category (33%), revealing the subclinical elevation /features of EBP. This aligns with Pfeiffer's (2015) risk-resilience paradox, highlighting the borderline features of psychosocial difficulties. This finding is consistent with Francis et al (2012), who stated that a subset of intellectually gifted adolescents are at risk of their mental health and a minority requires intervention. Another systematic review by Tasca et al 2022 also observed that socioemotional problems were found in 3 out of 8 studies, internalizing disorders were found in 5 out of 9, and externalizing disorders, such as hyperactivity /attention deficit disorder, were found in 5 out of 9.

Both groups had a quarter of adolescents in the 'high risk' range (IGA=22.6% & IAA=25.5%) on emotional symptoms. This suggests that emotional problems are common across groups, not unique to the gifted group. Also, it is noteworthy to think that the IGA also have significant emotional problems though they are cognitively high. Prior studies (Neihart,19990; Pfeiffer,2015) supported that the gifted adolescents are as vulnerable to internalising problems as their peers. Although significant conduct problems were less prevalent compared to other symptoms in IGA, the slightly high category had a rate of 10.4%, highlighting the elevation of symptoms in the high cognitive group, similar to their peer group (IAA: 10.4% at risk, 8.5% High risk).

The starkest difference was in peer relationships (14.2% High risk, 27.5% at risk) for IGA and 5.7% High risk & 7.5% at risk for IAA. This suggests greater vulnerability to peer rejection, isolation or mismatch in social maturity among IGA than IAA, consistent with the results of Gross (2004) and Cross and Coleman (2014) , displaying that gifted youth often struggle with belongingness and peer acceptance.

Compared to average intelligent adolescents (IAA= 3.8% High risk,12.3% at risk), gifted adolescents tend to have more problems with inattention and hyperactivity (IGA=9.4% High risk,19.8% at risk). This resonates with research showing overlaps between giftedness and ADHD, ADHD like behaviours such as overexcitabilities, inattention in unchallenging classrooms and asynchronous development (Shaywitz et al.,2001; Webb et al.,2004 & Gomez et al.,2019). Tasca et al. 2022 also investigated ADHD as the most comorbid condition in gifted children and adolescents.

Table 3.19

Mean rank differences in emotional and behavioural problems of IGA and IAA

Domains	Groups	N	Mean rank	U	Sig
Emotional symptoms	IGA	106	106.78	5588.00	0.95
	IAA	106	106.22		
Conduct problems	IGA	106	107.06	5558.50	0.89
	IAA	106	105.94		
Hyperactivity /Inattention	IGA	106	118.61	4334.50	0.004**
	IAA	106	94.39		
Peer problems	IGA	106	123.69	3795.50	0.00***
	IAA	106	89.31		
Total EBP	IGA	106	115.83	4628.50	0.02*
	IAA	106	97.17		

*Note: IGA -Intellectually gifted adolescents, IAA-Intellectually average adolescents
Total EBP- Total emotional and behavioural problems.*

$P < 0.001^{***}$, $P < 0.01^{**}$ $P < 0.05^{*}$

The results obtained in the above table suggest the mean rank differences in emotional and behavioural problems between IGA and IAA. The Mann-Whitney U test indicates a significant difference in total difficulty, with IGA exhibiting more emotional and behavioural problems than IAA. The subdomains, hyperactivity/inattention ($U=4334.50$) and peer problems ($U=3795.50$), also show highly significant differences in SDQ scores between IGA and IAA. The mean ranks of hyperactivity/inattention and peer problems were higher in IGA than in IAA, revealing the psychological vulnerabilities in such adolescents. Conversely, there is no significant difference in emotional symptoms and conduct problems between IGA and IAA, though IGA shows a marginal increase in conduct problems. Also, it is noteworthy to observe the two views of Neihert, 1999 who pointed out two contrasting views as giftedness enhances resiliency in individuals and giftedness increases psychological vulnerabilities. The first view assumes that giftedness protects children from maladjustment because they are “capable of greater understanding of self and others due to their cognitive capacities and therefore cope better with stress, conflicts, and developmental asynchrony than their peers”. The results fit with the second view that giftedness increases psychological vulnerabilities as supporting the existence of asynchronous development. The cognitive advancement in hyper brain individuals may step back the emotional and behavioural aspects. Only difference is in emotional problems as both the groups have undergone similar levels of problems and this could be justified with the fact that, usually, emotional crisis is the first thing that happens to every adolescent, as this is a transition phase and this might be the reason we were not able to differentiate through our findings. But it is to be noted that the emotional problems are persisting in IGA, like

IAA. Even the descriptive data also reveal a high percentage of emotional problems in both groups (Table 3.18).

Recent studies on emotional and behavioural problems among intellectually gifted adolescents reveals mixed findings. While some research suggests that gifted adolescents may experience socio-emotional and behavioural challenges, others indicate that these individuals are not necessarily at a higher risk for such issues compared to their peers. The variability in findings can be attributed to differences in study design, sample selection, and the measures used to assess emotional and behavioural problems. Our findings are consistent with the conclusions of Shaywitz et al. (2001) and Rost and Czeschlik (1994), as behavioural problems are more prevalent in gifted adolescents than non-gifted group. The most common reported behavioural problems in the literature on gifted adolescents were peer problems and ADHD. Our findings also showed the same.

The score of peer problems is highly significant compared to other problems. Peer problems and emotional problems are two areas assessed under internalizing problems in SDQ. The peer problems include preferring to be alone, not being liked by others and getting along better with adults, etc... The gifted adolescents may have interests, vocabulary, and way of thinking that may differ significantly from age-matched peers, making peer bonding harder. They may even be perceived as a teacher's pet or a know-it-all person, triggering social exclusion. In classrooms, there may be a few peers who share their intellectual interests or intensity. Also, there might be pressure to excel in academics may limit the time for social engagement at home or school. Lacour & Zdanowicz (2019) found that gifted adolescents aged 12-16 reported having fewer real-life friends and fewer virtual friends than a non-gifted group.

Additionally, Neihart (1999) assumes that “the gifted are more sensitive to interpersonal conflicts and experience a greater degree of alienation and stress than do their peers as a result of their cognitive capabilities”. Moreover, poor peer relationships were observed in gifted adolescents by Wellich & Brown (2012), and Plucker & Levy (2001) also found support for this finding.

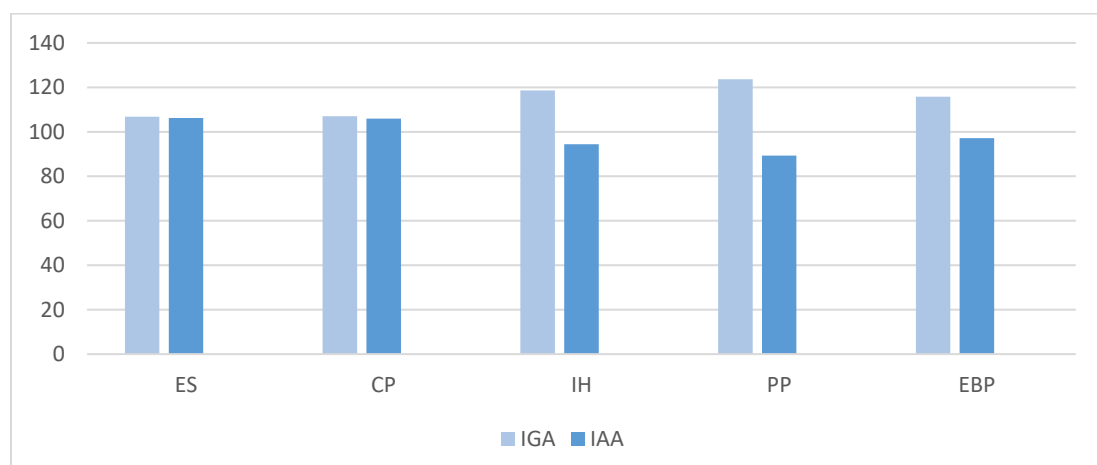
More specifically, our findings fit with other results that have found that gifted adolescents tend to have more inattention/hyperactivity problems relative to the non-gifted group, as revealed by the child-rated SDQ (Eren et al., 2018). Similarly, findings by Rommelse et al. (2017) concluded that parents reported more attention problems in children with high IQ, though teachers were not able to report it when compared to peers. The hyperactivity scale involves restless, constantly fidgeting, easily distracted, attention span difficulties etc.. The hyper-brain functions of gifted adolescents may be more likely to have psychomotor overexcitabilities as suggested by Dabrowski et al, 1972. McCoach et al (2020) investigated the presence of inattention and hyperactivity/impulsivity problems in gifted children and adolescents, according to the ADHD-IV rating and reported significantly greater inattention problems in the gifted compared to the non-gifted group, with greater frequency in the classroom than at home.

Interestingly, our study does not support the view of significant differences in conduct problems and emotional problems among IGA and IAA. The mean ranks were also similar, which indicates that both groups are similar in eliciting such problems. The type of environment, more or less stimulating, plays a major role in determining the conduct problems and since the school is a cognitively more stimulating environment, it could elicit very less conduct problems in IGA than IAA. The severity table is also

consistent with this finding. Though high-risk groups exist in the intellectually gifted adolescent group, there are not many disparities between IGA (22.6% emotional problems and 8.5% conduct problems) and IAA (25.5% emotional problems and 10.4% conduct problems) in terms of emotional problems and conduct problems. Moreover, emotional problems were the most prominent high-risk area of both groups, though there were nil differences. Since the adolescent period is one of the roller coasters of emotional problems, both groups may be undergoing the same transitions. The findings on nil differences in emotional problems between the two groups are contrary to previous findings, as the gifted adolescents tend to have more emotional vulnerabilities than their peer group (Papadopoulos et al., 2021; Guignard et al., 2012). Conversely, Dwairy, M, 2004 observed that conduct disorder was significantly higher among the non-gifted than the gifted sample. But here, the sample selection was done from gifted education centres rather than the community. However, the results of the present investigation on emotional and behavioural problems have mixed outcomes, revealing that gifted adolescents also have psychological vulnerabilities as the normative group does, or they are more asynchronous in development.

Figure 3.6

Plot on emotional and behavioural problems among IGA and IAA



The bar chart provides a clear view of the comparison between IGA and IAA in terms of emotional and behavioural problems. The IGA has more inattention/hyperactivity and peer problems when compared to the IAA. The total EBP were also higher in IGA.

Table 3.20

Mean rank differences in EBP of IGA based on level of giftedness

Domains	LOG	N	Mean rank	U	Sig
Emotional symptoms	LG	82	54.09	935.50	0.71
	HG	24	51.48		
Conduct problems	LG	82	50.59	745.50	0.07
	HG	24	63.44		
Hyperactivity & inattention	LG	82	51.68	834.50	0.26
	HG	24	59.73		
Peer problems	LG	82	49.87	686.50	0.02*
	HG	24	65.90		
Total EBP	LG	82	51.15	791.50	0.16
	HG	24	61.52		

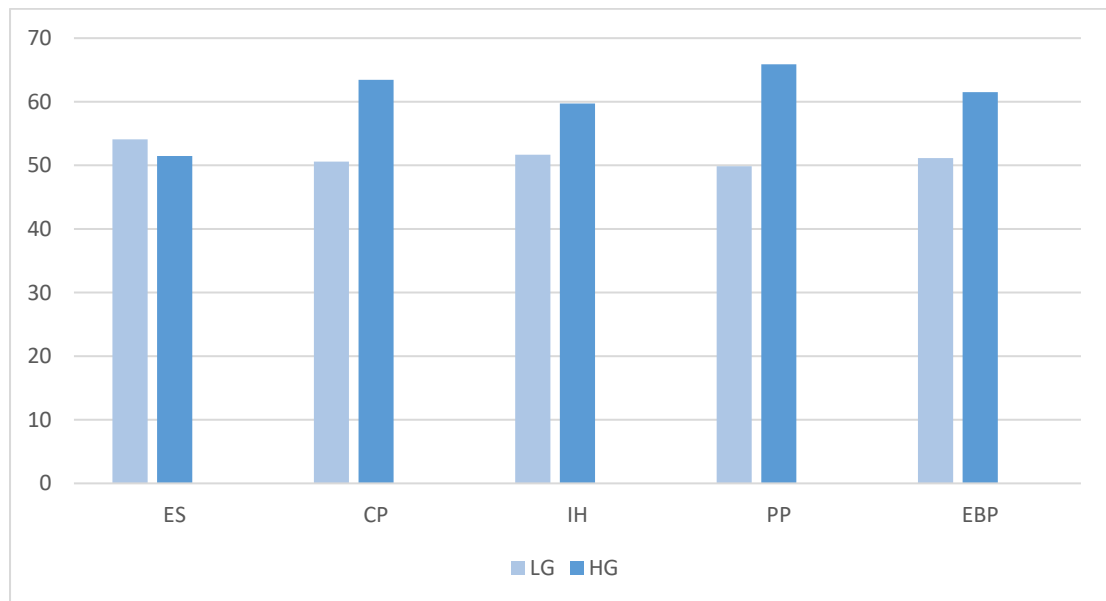
Note: LG= Low gifted, HG=Highly gifted, Total EBP=Total emotional and behavioural problems.

*P<0.05**

The results obtained in the above table indicate the mean rank differences in emotional and behavioural problems of low low gifted and highly gifted groups of adolescents. The analysis with the Mann-Whitney U test reveals that there is a significant difference in peer problems (U=686.50) with highly gifted adolescents having more problems than the low gifted group. Though other subdomains seem not to be significant, the mean ranks of externalizing problems such as hyperactivity and inattention and conduct problems, reveal that the highly gifted group has more problems

than the low gifted. Similarly, emotional symptoms are more in low-gifted than in highly gifted, though it also shows no significant difference. The total difficulty was also higher in the highly gifted group when compared to low gifted adolescents. Though not significant, externalizing behavioural problems such as conduct problems, hyperactivity and total difficulty were more common in the highly gifted group than the low gifted in our findings.

This aligns with findings from a systematic review by Terrassier (2022), which reported that gifted individuals often face socio-emotional difficulties, including peer relationship issues, due to asynchronous development and heightened sensitivity. Additionally, Brody and Benbow (1986), observed that highly gifted children may be more at risk in terms of their relationships with their peers. The results are also consistent with the findings of Shaywitz et al. (2001) study, who found evidence of difficulties in the subset of highly intellectually gifted students with IQ=140-154, who appeared to display the behavioural problems, which is significantly higher than those of a low gifted group (IQ=124-139). Our findings are also supported by Hollingworth, who reported the socioemotional difficulties to people who have above 150 in IQ. The data could not address these problems as environmentally determined or biologically inherent. But it is noted that the supersensitive nervous systems may account for the description of highly gifted children as hyperactive or distractible, as observed by Cruickshank (1963). In contrast to our results on emotional symptoms, Guénolé et al. 2013, found that the higher gifted subgroup reported a higher percentage of emotional symptoms. However, “low giftedness” was associated with more somatic problems than “high giftedness”. Beyond the contrasting findings, the latter two studies revealed that the “level” of intellectual giftedness might impact behaviour.

Figure 3.7*Emotional and behavioural problems in terms of levels of giftedness*

The plot shows the differences in emotional and behavioural problems among IGA in terms of level of giftedness. The emotional and behavioural problems, including conduct problems, inattention/hyperactivity and peer problems were comparatively higher for highly gifted adolescents.

Table 3.21*Mean rank differences in emotional and behavioural problems of IGA based on gender*

Domains	Gender	N	Mean rank	U	Sig
Emotional symptoms	M	50	46.51	1050.50	0.03*
	F	56	59.74		
Conduct problems	M	50	51.14	1282.00	0.45
	F	56	55.61		
Hyperactivity & concentration	M	50	49.78	1214.00	0.24
	F	56	56.82		
Peer problems	M	50	54.48	1351.00	0.75
	F	56	52.63		
Total EBP	M	50	48.76	1163.00	0.13
	F	56	57.73		

Note: Total EBP= Total emotional and behavioural problems, M=male, F=Female

*P<0.05**

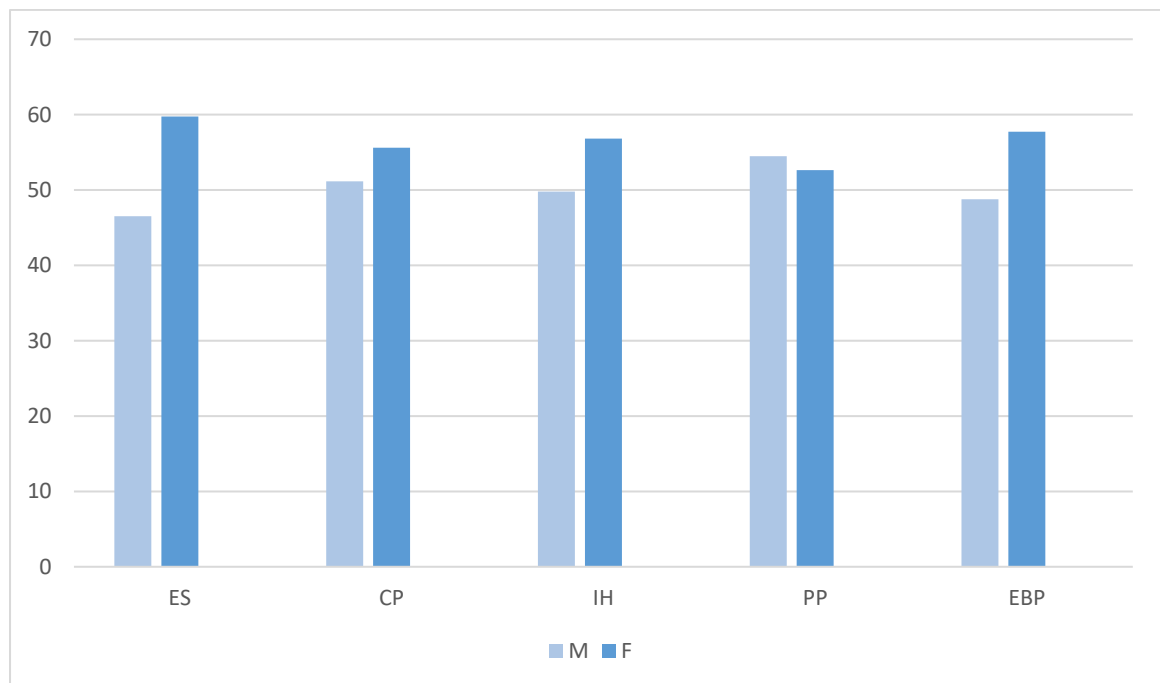
The results obtained in the above table suggest the mean rank differences in EBP of IGA with respect to gender. The analysis with the Mann-Whitney U test reveals that there is a significant difference in emotional symptoms ($U=1050.50$), with girls having more difficulty than boys. The subdomains, hyperactivity and inattention and conduct problems were more in girls than boys and peer problems are more prevalent in boys than girls, though these domains are not statistically significant enough to compare. The girls show EBP than boys when looking into the total difficulty.

The finding that gifted girls report higher emotional symptoms aligns with recent studies indicating that females, in general, tend to exhibit greater internalizing symptoms than males, particularly during adolescence. For instance, a study by Zeidner and Matthews (2017) highlighted that gifted girls often display heightened emotional sensitivity and awareness, which can contribute to increased emotional difficulties. Additionally, research by Oliveira and Barbosa (2018) found that gifted girls scored higher on emotional overexcitability compared to boys, suggesting a greater predisposition to internalizing problems such as anxiety and depression. The absence of significant gender differences in conduct problems and hyperactivity/inattention is noteworthy. While boys are generally more prone to externalizing problems in the general population, recent studies suggest that gifted status may mitigate these tendencies across genders. For example, a study by Zeidner and Matthews (2017) indicated that gifted individuals often possess advanced emotional regulation skills, which can reduce the likelihood of externalizing behaviours. Here in our research, emotional problems were comparatively less for males, revealing better emotional regulation and this may reduce conduct-related issues. The non-significant gender difference in peer problems suggests that both gifted boys and girls may experience

similar challenges in peer relationships, possibly due to their unique cognitive and emotional profiles. A study by Alkhateeb et al. (2025) emphasized that gifted children often face social adjustment difficulties, regardless of gender, due to their advanced intellectual abilities and differing interests from their peers. Moreover, teacher ratings on peer relationships yielded no difference between gifted boys and girls; this shows that boys across groups were rated significantly higher than girls (Bain & Bell, 2008) and this finding is similar to our results. The study of Eren et al. 2018 examined the impact of gender in the gifted group and found that males reported more frequent peer problems, whereas females reported higher social behaviours, which is contrary to our findings.

Figure 3.8

Emotional and behavioural problems in terms of gender



Although girls had a slightly higher mean rank for total difficulties, the difference did not reach statistical significance. This may be due to variability within the sample or a compensatory effect of stronger social skills in girls despite higher

emotional distress. The findings are also similar to the work of Magai et al. (2018) on self-reported CBCL, that girls scored higher than boys, particularly in internalizing problems, attentional problems, somatic problems and externalizing problems.

The graph represents the EBP in terms of gender. All the EBPs were higher for females, except for peer problems.

Section F: Relationship between different variables and sub-variables among IGA

The section provides the results and discussion of the relationship obtained among the variables such as intellectual giftedness, cognitive variables such as verbal comprehension, perceptual reasoning, working memory and processing speed, psychosocial variables such as parenting style and emotional and behavioural problems among intellectually gifted adolescents. The correlation between the study variables was examined using Spearman's rank correlation(ρ). The degree of relationship between two variables is described by correlational analysis. The strength and direction of the ρ influence the association. The value of the correlation coefficient lies between -1 and +1. Based on direction, a correlation of +1 indicates a positive correlation where the variable goes in the same direction, that is, when one increases, the other also increases and when one decreases other decreases as well. A correlation of -1 indicates a negative correlation where the variable moves in the opposite direction, that is, when one variable increases, the other decreases and when one decreases other will increase. Based on strength, a strong correlation denotes the ρ value above 0.7 (positive or negative), a moderate correlation between 0.4 to 0.6 and a weak correlation between 0.1 to 0.3. The +1 or -1 denotes a perfect positive or negative correlation and a value close to zero denotes no correlation. The strong-to-weak correlation, which is significant at the 0.05 level, was considered for the interpretation. The research

facilitates the relationship between intellectual giftedness and emotional and behavioural problems (emotional symptoms, conduct problems, Inattention/hyperactivity and peer problems), cognitive variables and EBP, parenting style and EBP. The findings were discussed under the following headings:

1. Exploring the relationship between intellectual giftedness and emotional and behavioural problems among IGA.
2. Exploring the relationship between cognitive domains and emotional and behavioural problems among IGA.
3. Exploring the relationship between parenting style and emotional and behavioural problems among IGA.

1. Exploring the relationship between intellectual giftedness and emotional and behavioural problems among IGA.

Table 3.22

Correlation between intellectual giftedness and emotional and behavioural problems

Variable	Emotional problems	Conduct problems	Inattention/Hyperactivity	Peer problems	Total difficulty
Intellectual giftedness	-0.009	0.26**	0.11	0.14	0.17

**** $P < 0.01$**

Table 3.22 displays the correlation between intellectual giftedness and emotional and behavioural problems among IGA. It uncovers that there is a positive correlation between intellectual giftedness and conduct problems($\rho=0.26$). Hence, there is a positive relationship between intellectual giftedness and conduct problems, but the strength of the association is comparatively weak. It further reveals that the high intelligence and the possibility of evolving conduct features are weakly associated.

This finding of association could be supported with the theory of asynchronous development where their cognitive abilities develop more rapidly than their emotional and social skills. This discrepancy can lead to heightened emotional sensitivity and behavioural issues in some people (Guenole et al.,2015). Emotional and behavioural problems arise from the overactivity of the brain (hyper brain) rather than hypo brain functions in gifted adolescents. This developmental asynchrony is not a cognitive deficit, rather its atypical patterns of brain function that predispose certain emotional and behavioural vulnerabilities, particularly due to imbalances such as verbal-performance discrepancy or other disparities.

In the Gaussian curve of normal distribution, one SD from the mean to the left side is lower intelligence and 2 SD is a retardation of intelligence. And 2 SD to the right tail of the distribution is intellectual giftedness. Both are the extremes of population, ie, special populations to be taken care. One is in deficit mode and the other is in excess mode. So just like hypofunction of the brain, hyperfunction of the brain could lead to mismatches in emotional/attention self-regulation problems. The brain areas supporting high cognitive performance may not be a neurological deficit or structural damage, but rather over engaged or finely-tuned circuits that, when not balanced with emotional maturity or coping strategies, can manifest as behavioural or emotional concerns.

Another explanation could be stated with Dabrowski's theory of overexcitabilities, suggests that gifted individuals may exhibit heightened responses in five areas: psychomotor, sensual, emotional, intellectual, and imaginal, contributing to their emotional and behavioural challenges. Simply, intelligence is the ability to adapt, learn and engage in abstract thought (Sattler,2001). High intelligence could be a component of Dabrowski's intellectual overexcitabilities as asking probing

questions, curiosity, avidity for knowledge and analysis, independent thinking, search for knowledge and truth, love of ideas and theoretical analysis, though OE is more into a personality trait. So, the heightened arousal with unmet high cognitive needs may leads to conduct symptoms. Conduct symptoms are characterized by a consistent pattern of aggressive behaviours, actions that harm the well-being of others and they often violate rules and societal norms. To the adolescents in a school setting, it is usually manifested as frustration, rebellion, manipulation and boredom. The adolescents with high IQ without having proper environmental stimulation might be cognitively challenged and hence the possibility of manifesting such symptoms. Further interaction effects have to be carried out in highly problematic group of intellectual giftedness to know about it. Similarly, the findings such as high intellectual capacity (hyper brain) possess overexcitabilities in various domains that may predispose them to certain psychological disorders (Karpinski et al.,2018). This correlation highlights the researcher to look into the more cognitive aspects related to conduct problems. The majority of reviews stated that children with low verbal IQ are more prone to externalizing behaviours due to frustration and impaired communication (Pears & Moses, 2003) few studies reported contradictory findings, as high IQ is also a reason for emerging conduct symptoms.

Remaining emotional problems, hyperactivity/inattention, peer problems and total difficulty in our study are not correlated to intellectual giftedness. No significant links were found with internalizing problems in our study, indicating that giftedness alone may not increase emotional distress, though this might vary across contexts. Again, the relationship between high intelligence and emotional problems, ADHD and peer problems are inversely correlated in the literature for most cases. These findings

are contrary to the observations of Peyre et al.2016 that a marginally significant association between high-IQ and emotional difficulties and findings of Heggstad (1997) revealing moderate negative correlations between the levels of test anxiety and intelligent scores. Another study by Aykutulu, H. C., et al. (2024) observed that gifted children exhibited lower resilience and higher negative reactivity, with negative reactivity predicting psychopathology, indicating a correlation between giftedness and emotional challenges. Similarly, findings of Eren et al. (2017) indicate that gifted children exhibit more depressive symptoms and perceive themselves as more inattentive and hyperactive, suggesting a correlation between intellectual giftedness and increased emotional and behavioural problems, particularly in social functionality and mental health risks. Another finding of Shaywitz et.al,2001 reveals that highly gifted boys exhibit behavioural problems similar to learning disabled boys, suggesting a correlation between higher IQ and increased behavioural issues, while low Gifted boys show significantly lower levels of behavioural problems.

Summarizing, gifted children may be more likely to exhibit conduct symptoms , possibly due to unmet cognitive needs, poor fit with their environment, or emotional intensities associated with giftedness. Another notion that, intellectual giftedness does not immunize children against behavioural issues, it may elevate risk for externalizing behaviours like defiance or oppositional/conduct problems, may be in the absence of appropriate supports like absence of cognitive challenges. Such elevated conduct issues in gifted children may be misinterpreted as misbehaviour rather than a mismatch between cognitive needs and environmental expectations. Hence putting them in appropriate environment for unveiling their cognitive needs is a needy task, at least for few gifted adolescents.

It is also noteworthy to reveal that most of the research papers does not specifically address correlations and causal relationships between intellectual giftedness and emotional or behavioural problems among adolescents. They either look in to the comparisons with gender, average intelligent group, subsets of gifted groups, prevalence or theoretical assumptions on it and kept the casual relationships and interaction effects with other variables as their further recommendations for the study. Putting this research gap, the present researcher actually proposed the link between intellectual giftedness and emotional and behavioural problems and if necessary to delves into other psychosocial variables. In this context, our results confirmed that there is no significant correlation between intellectual giftedness and total emotional and behavioural problems and only a weak correlation has been found between intellectual giftedness and conduct problems. This finding prompts further exploration into the cognitive underpinnings associated with conduct issues and also to look into the contextual factors associated with emotional and behavioural problems among IGA in our study.

2. Exploring the relationship between cognitive domains and emotional and behavioural problems among IGA.

The table displays the correlation between cognitive domains and emotional and behavioural problems among IGA. A significant association was found between perceptual reasoning and conduct problems($\rho=0.40$), with a moderate level of strength in the relationship, perceptual reasoning and peer problems (0.32), with a moderate level of strength in the relationship and perceptual reasoning and total difficulty (0.22), with a weak strength. The direction of the relationship to perceptual reasoning is positive, indicating that higher perceptual reasoning is associated with increased conduct problems. Similarly, a positive correlation with peer problems

suggests that intellectually gifted adolescents with higher perceptual reasoning experience increased difficulties in peer relations. A positive correlation with total difficulty indicates a general increase in emotional and behavioural problems among those with higher perceptual reasoning.

Table 3.23

Correlation between cognitive domains and emotional and behavioural problems among IGA

Variables	Emotional symptoms	Conduct problems	Inattention/Hyperactivity	Peer problems	Total EBP
VC	-0.06	0.04	0.03	0.07	.01
PR	-0.44	0.40**	0.13	0.32**	0.22*
WM	-0.15	-0.008	0.05	0.01	-0.34
PS	0.25	0.11	0.30	0.03	-0.12

Note: VC=Verbal comprehension, PR=Perceptual reasoning, WM=Working memory, PS=Processing speed, IGA=Intellectually gifted adolescents, Total EBP=Total emotional and behavioural problems.

*** $P < 0.01$, * $P < 0.05$, Note: Spearman's rho values are reported.*

There exists a negative correlation between working memory and total difficulty, although it is not marked as significant, but rather close to a moderate effect, which suggests that better working memory may be related to fewer emotional and behavioural problems overall. Conversely, verbal comprehension shows negligible correlations across all domains. There is a notable association, but not marked as significant; processing speed has low positive correlations with emotional problems and moderate positive correlations with hyperactivity/inattention.

The above subset of findings suggests that the intellectually gifted adolescents with stronger perceptual reasoning may still struggle behaviourally, possibly due to

frustration, impulsivity, or social misattunement. Findings of Harty et al. (2004) stated that high Verbal IQ was linked to increased substance use in adolescents who had childhood conduct disorder. It also challenges the expectation that higher cognitive function always aligns with fewer behavioural problems. These children might be intellectually capable but there are possibilities of behavioural and emotional dysregulation. Perceptual reasoning reflects non-verbal problem-solving, visual-spatial processing, and the ability to analyse and synthesize abstract visual information. It is often associated with fluid intelligence, the capacity to solve novel problems without relying on learned knowledge. This inherent trait of a lack of skills in relying on learned knowledge through experience may at times hinder the intellectually gifted adolescents from being behaviourally stable and from getting along with peers. This finding is supported by the asynchronous developmental model of developmental psychology, suggesting children with advanced cognitive skills may exhibit uneven social-emotional development, leading to frustration, boredom, or social difficulties when their environment doesn't match their intellectual level. Another theory of Dabrowski's, overexcitabilities in giftedness, aligns with this, stating intellectually gifted children often show heightened sensitivity and emotional reactivity, which may manifest as conduct issues or peer conflicts if poorly supported. Similarly, there may be a gap in social cognition, revealing that high visual-spatial ability may not always equate to social-emotional intelligence. These children may solve puzzles well but struggle with interpreting social cues, leading to peer difficulties. The research findings of section D could also remind us that PRI was higher in IGA.

The verbal comprehension and processing speed showed minimal or inconsistent relationships, suggesting that not all cognitive strengths mitigate

behavioural risks and some may even coincide with behavioural challenges. The pattern of processing speed and hyperactivity suggests that possibly faster processors show signs of inattention but may not suffer from broader behavioural issues. This positive link to hyperactivity could reflect impulsivity traits, that fast processors may act before thinking. Though not significant, the moderate effect of working memory in the study appears as a potential protective factor, aligning with the literature linking it to emotional regulation and better executive function.

It is again to be noted that the WISC-IV is useful to assess the functional aspects of the brain and in another way, it also paves the way to structural aspects. But it could not be substantiated without any evidence from physiological markers like CT, MRI, PET, etc Hence, the results of the relationship between heightened cognitive aspects and emotional and behavioural issues among intellectually gifted adolescents could not be corroborated without such neurobiological findings. But definitely we could say there exists a link between IG and conduct problems among intellectually gifted adolescents, which further highlights the role of perceptual reasoning in conduct problems, peer problems and total emotional and behavioural problems. Also, it has to be kept in mind that no other behavioural problems were correlated with any of the cognitive domains in our research. Hence, the role of other aspects has to be considered while interpreting results. So, apart from cognitive aspects, there is a necessity to look into the link between parenting style and emotional and behavioural problems primarily.

3. Exploring the relationship between parenting style and emotional and behavioural problems among IGA.

Table 3.24

Correlation of parenting style and emotional and behavioural problems

Variables	Emotional symptoms	Conduct problems	Inattention/Hyperactivity	Peer problems	Total EBP
Authoritative	-0.40**	-0.19*	-0.21*	-0.20*	-0.37*
Authoritarian	0.43**	0.41**	0.14	0.30**	0.45**
Permissive	-0.37**	0.07	0.09	-0.13	-0.15

** $P < 0.01$, * $P < 0.05$.

Note: Spearman's rho values are reported.

Table 3.24 illustrates the relationship between parenting style and emotional and behavioural problems among IGA. The authoritative parenting is negatively correlated with emotional symptoms ($\rho = -0.40$), conduct problems ($\rho = -0.19$), hyperactivity/Inattention ($\rho = -0.21$), peer problems ($\rho = -0.20$) and total difficulty ($\rho = -0.37$) and that is significant. The total problems and emotional problems have a moderate effect on the correlation with significance. Remaining problems seem to be weakly correlated. The possibility of low emotional and behavioural problems with authoritative parenting has been rectified here. Authoritative parenting seems to be providing clear and firm direction for their children, but disciplinary clarity is moderated by warmth, reason, flexibility and verbal give and take (Baumrind, 1971). With such parenting, the emotional and behavioural problems were usually low, have opened in pending up the emotions, ventilated by warm parenting and is a needed style.

The authoritarian parenting has found to be positively correlated with emotional symptoms ($\rho=0.43$), conduct problems ($\rho=0.41$), peer problems ($\rho=0.30$) and total difficulty ($\rho=-0.45$) in the study. This highly significant association reveals that the authoritarian parenting has moderate level of strength in developing emotional and behavioural problems. Authoritarian parents tend to be highly directly with their children and value unquestioning obedience in their exercise of authority over their children. They being detached and less warm than other parents, the authoritarian parents discourage verbal give and take and favour punitive measures to control their children's behaviour.

It has been also found that there is a significant negative correlation between permissive parenting style and emotional symptoms revealing that the kind of parenting may lower the issues. The permissive parents are relatively noncontrolling and tend to use a minimum of punishment with their children.

Parenting styles play a fundamental role in the mental health of children and adolescents because with them, parents set limits and rules as well as an affective exchange with their children. The attitudes exhibited by parents towards their gifted children also have various effects on the mental health of children (Dwairy, 2004; Morawska & Sanders, 2008). Copious research on parenting style and emotional and behavioural problems shows the same findings with gifted groups. Few reported positive attitudes towards children may positively impact the social development of children (Olszewski-Kubilius et al, 2014). It has been found that a democratic parental attitude has a positive effect on the academic success of children, a high interaction between the mother and the child play a significant role in the cognitive development of children and a supportive and respectful family environment towards the gifted child

has positive impacts on the development of interpersonal skills of children and contribute to their relationships with their peers. Our findings on parenting style are also consistent with the above findings, as authoritative parenting style was inversely related to emotional and behavioural problems. The high warmth and high behavioural control of such parents lead the intellectually gifted adolescent to have fewer conduct problems, peer problems and hyperactivity issues (Pinquert,2017). These results are consistent with the findings, such as positive impacts on parenting helping the development of interpersonal skills of children, contributing to their relationships with their peers and reduce emotional problems (Olszewski-Kubilius et al., 2014 & Huey et al., 2013). Another study conducted by Olszewski-Kubilius et al. (2014) has determined that parental warmth, behavioural control, autonomy granting, and an authoritative parenting style showed very small to small negative concurrent and longitudinal associations with externalizing problems (conduct problems and hyperactivity). Moreover, gifted children advised their parents, the children expressed themselves to their parents comfortably, and the problems they experienced were shared with their parents (Morawska & Sanders,2008).

The present study also investigated the positive correlation between authoritarian parenting and emotional and behavioural problems, which corroborate with the results of Yazdani & Daryei,2016 whom determined that authoritarian parental attitude negatively affect the mental developments, anxiety level, sense of self, domestic relationships and well-being levels of the gifted adolescents which leads to a high level of emotional problems including anxiety, depression. The positive association suggests the possibility that as the authoritarian style (low warmth and high/harsh control) is higher, there is a tendency to have more psychological

vulnerabilities among intellectually gifted adolescents. More specifically, such parenting has a positive link to emotional problems, conduct problems and peer problems.

Moreover, few researchers have demonstrated that correlation between positive and negative perfectionism, a component of anxiety and authoritative parenting style (Besharat et al., 2011; Biran & Reese, 2007 & Basirion et al. (2014) indicated that the authoritarian attitude of the mother is more effective in the development of negative perfectionism than the authoritarian attitude of the father. According to the results emerged in their study, rigid families with strict and coercive discipline and a low capacity for change in situations that require family readjustment, such as those related to the child's entry into school and the possible emergence of emotional and social complexities made more evident during this transitional period, can limit the understanding of the child's needs and their possible developmental difficulties, as well as undermine the process of individuation and their autonomy and independence, leading to an increase in both internalizing and externalizing problems. This rigidity may be related to difficulties in dealing with a gifted child and their needs, feelings of inadequacy, and a tendency to be less compliant while displaying an authoritarian style, which in turn may influence psychological well-being and contribute to individual relational problems. This could also correspond to the work of Dwairy et al. (2004), as higher levels of conduct problems were linked to harsh control, psychological control and authoritarian parenting. On the other hand, the inattention/hyperactivity was not significantly associated, though positively correlated. The study only found a significant negative link between emotional problems and to permissive style, and the

remaining EBP are not associated. It further reveals that high warmth and low control of parenting reduce emotional problems.

Parents play a critical role in the organisation and provision of enriched early interventions, child-appropriate education, and long and sustainable development practices (Kiewra & Rom, 2019; Witte et al., 2015) and hence look into the parenting styles and encourage them to be more authoritative, especially in the case of gifted adolescents.

Concluding this section, the link between perceptual reasoning, processing speed and parenting style on EBP are confirmed and now whether these variables may act as predictors in developing EBP has to be ruled out.

Section G

Determining the predictive role of cognitive domains and parenting style on EBP among IGA.

The objective of this section is to examine the predictive role of cognitive variables- verbal comprehension, perceptual reasoning, working memory and processing speed and parenting style (Authoritarian, Authoritative, Permissive) on emotional and behavioural problems (emotional problems, conduct problems, peer problems, hyperactivity and inattention and total EBP). Here, the predictors are the independent variables (cognitive domains and parenting style) and the outcome variable (EBP) is the dependent variable. The multiple linear regression is used to examine the prediction of variables. The intercorrelation of variables and sub-variables are depicted in Tables 3.22 to 3.24. As few cognitive variables and parenting styles are correlated to emotional and behavioural problems in IGA, the researcher tries to understand the

contribution of predictors to variation in the outcome variable. The results are discussed in terms of the unique contribution of each explanatory variable and their combined influence on predicting variation in the outcome variable.

Table 3.25

Predictive value of explanatory variables on total emotional and behavioural problems of IGA

Model	Unstandardized coefficients		Standardized coefficients	T
	B	Std. Error	B	
(Constant)	-0.094	10.895		-0.009
VC	-0.006	0.062	-0.009	-0.101
PR	0.084	0.045	0.171	1.877*
WM	-0.027	0.038	-0.062	-0.710
PS	0.067	0.038	0.149	1.770
AT	-0.414	0.124	-0.335	-3.340**
AN	0.276	0.086	0.308	3.221**
PRMS	0.134	0.110	0.118	1.224

*Note: $R^2=0.317$, $Adj R^2=0.268$, $F= 6.484$ ($p<0.001$)), ** $P<0.01$, * $P<0.05$*

The above table explores the predictive value of several independent variables- cognitive variables and parenting style on total emotional and behavioural problems of IGA. The model explains 31% of the variance in total problems, which indicates a strong explanatory power ($R^2=0.317$). The model fit remains good even after adjusting for the number of predictors ($Adj R^2 =0.268$). The overall model is statistically significant ($F=6.484$). Authoritarian parenting is a strong positive predictor of total emotional and behavioural problems. It further suggests that higher authoritarian parenting, characterized by harsh discipline, low warmth and strict rules, is strongly associated with more psychological problems in IGA. This aligns with research

showing authoritarian parenting can cause anxiety, low self-esteem, depression and withdrawal due to lack of emotional support and autonomy. Perceptual reasoning, one of the cognitive variables, is another predictor that contributes to the evolving features of emotional and behavioural problems. This again proves the asynchronous development pattern of IGA results in cognitive overexcitabilities. The authoritative parenting style acts as a negative predictor in our study, revealing that high warmth and moderate control may be protective against emotional and behavioural problems.

Table 3.26

Predictive value of explanatory variables on emotional problems of IGA

Model	Unstandardized coefficients		Standardized Coefficients	T
	B	Std. Error	B	
(Constant)	6.535	4.490		1.455
VC	-0.011	0.025	-0.036	-0.419
PR	-0.016	0.019	-0.074	-0.858
WM	-0.027	0.016	0.141	-1.694
PS	0.053	0.016	0.273	3.405**
AT	-0.144	0.051	-0.269	-2.816**
AN	0.117	0.035	0.302	3.313**
PRMS	-0.049	0.045	-0.099	-1.079

*Note: $R^2=0.380$, $Adj R^2=0.336$, $F= 8.590$ ($p<0.001$)), $**P<0.01$*

The above model summary uncovers $R^2=0.380$ revealing, about 38% of the variance in emotional problems is explained by the predictors included in the model. The values of adjusted $R^2=0.336$, account for the number of predictors, indicating a fairly good model fit. The overall model is statistically significant ($F=8.591$), meaning that the combination of predictors significantly explains variance in conduct problems. Findings reveal that processing speed and authoritarian parenting style are the strong

positive predictors of emotional problems. It further suggests that IGA with high processing speed skills is more vulnerable to emotional problems such as anxiety, depression or withdrawal. An authoritarian parenting style is another positive predictor of more emotional problems. The rigid, low warmth and overcontrolled way of nurturing IGA may cause too much dysregulation in them. The authoritative parenting style is the only negative predictor in our study that may reduce emotional problems in IGA.

Table 3.27

Predictive value of explanatory variables on conduct problems of IGA

Model	Unstandardized coefficients		Standardized coefficients	T
	B	Std. Error	B	
(Constant)	-0.7048	2.882		-0.2445
VC	0.003	0.016	0.018	0.202
PR	0.045	0.012	0.341	3.796***
WM	-0.003	0.010	-0.022	-0.261
PS	0.014	0.010	0.119	1.436
AT	-0.075	0.033	-0.227	-2.291*
AN	0.071	0.023	0.297	3.151**
PRMS	0.077	0.029	0.252	0.009**

*Note: $R^2=0.336$, $Adj R^2=0.289$, $F= 7.096$ ($p<0.001$)), $**P<0.01$*

The above model summary uncovers $R^2=0.336$ revealing, about 33.6% of the variance in conduct problems is explained by the predictors included in the model. The values of adjusted $R^2=0.289$, account for the number of predictors, indicating a fairly good model fit. The overall model is statistically significant ($F=7.096$), meaning that the combination of predictors significantly explains variance in conduct problems. Findings reveal that perceptual reasoning is a strong positive predictor of conduct

problems. It further suggests that IGA with high nonverbal reasoning skills may exhibit rule-breaking, defiance or non-conformist behaviour, possibly due to boredom, unmet intellectual needs or frustration with rigid structures. Authoritarian parenting style is another positive predictor of high conduct problems. The rigid, low warmth and overcontrolled way of nurturing IGA may cause too much defiance in them. Permissive parenting style also positively predicts conduct problems. It implies that less warmth and a less controlling nature of guardians may lead the adolescent to violate the routine activities, not valuing others' concerns, and irresponsible and excessive freedom. This non-directional parenting pattern thus creates more conduct issues in children and adolescents. The authoritative parenting is the only negative predictor, meaning a better parenting approach may reduce conduct problems in IGA. The finding that high PRI predicts conduct problems suggests that gifted adolescents may act out if their cognitive needs are unmet, or if their emotional/social maturity lags behind their intellectual abilities.

Table 3.28

Predictive value of explanatory variables on inattention/hyperactivity of IGA

Model	Unstandardized coefficients		Standardized coefficients	T
	B	Std. Error	B	
(Constant)	0.512	4.608		0.111
VC	0.013	0.026	0.052	0.511
PR	0.013	0.019	0.070	0.679
WM	0.004	0.016	0.024	0.248
PS	0.007	0.016	0.043	0.450
AT	-0.159	0.052	-0.344	-3.032**
AN	0.015	0.036	0.045	0.419
PRMS	0.118	0.046	0.277	2.546*

*Note: $R^2=0.127$, $Adj R^2=0.064$, $F= 2.028$ ($p<0.05$)), ** $P<0.01$, * $P<0.05$*

The above regression analysis shows the predicting nature of cognitive variables and parenting style on hyperactivity and inattention among IGA. The model explains 12.7% of the variance in hyperactivity and inattention ($R^2=0.127$). After adjusting for predictors, the explained variance drops to 6.4%, which is low, indicating that the other variables may better explain this behaviour (Adj $R^2=0.064$). The overall model is statistically significant, though the effect size is modest. Among the predictors, permissive parenting style is the only significant predictor of hyperactivity and inattention. The inconsistent, overly lenient, low in discipline and unstructured pattern of parenting is often linked to increased externalizing behaviours like inattention and impulsivity due to lack of clear rules and expectations. In contrast, authoritative parenting behaviour act as a negative predictor to hyperactivity and inattention, revealing that more structured, warm, responsive parenting are associated with low overactivity and inattention. This finding is consistent with the research showing that authoritative parenting protects against attention and behaviour problems, even in gifted adolescents. These parents provide structure, emotion regulation support and autonomy, all of which could help to reduce such maladaptive behaviours. However, authoritarian parenting is not significant due to poor explanatory power. These findings highlight the critical role of parenting style, particularly warmth and discipline, in managing behavioural symptoms in gifted adolescents. The cognitive variables are insignificant in explaining the predictors in the study.

The regression model for peer problems among IGA is statistically significant ($F=2.767$). though the explanatory power is moderate. $R^2=0.165$, indicates about 16.5% of the variation in peer problems can be explained by cognitive variables and parenting style. Two predictors emerged as significant: perceptual reasoning and authoritarian

parenting. Higher perceptual reasoning scores were associated with increased peer problems, possibly due to social-emotional asynchrony or differences in communication styles that make peer interactions more challenging for highly gifted adolescents. Those with high nonverbal intellectual functioning may struggle with social pragmatics and their cognitive advancement may create a gap in social-emotional understanding, leading to peer rejection, isolation or feeling misunderstood. Authoritarian parenting also positively predicted peer problems, suggesting that a rigid or harsh way of parenting behaviour may hinder the development of social competence and autonomy needed for healthy peer relationships. The adolescents may lack autonomy, emotional expression or conflict resolution skills. They may also internalise rigid or suppressed behaviours, which can affect peer relationships.

Discussion on Regression analysis,

Table 3.29

Predictive value of explanatory variables on peer problems of IGA

Model	Unstandardized coefficients		Standardized Coefficients	T
	B	Std. Error	B	
(Constant)	-0.679	4.269		-0.159
VC	-0.010	0.024	-0.041	-0.408
PR	0.044	0.018	0.254	2.522*
WM	-0.002	0.015	-0.013	-0.131
PS	-0.007	0.015	-0.047	-0.504
AT	-0.035	0.049	-0.080	-0.720
AN	0.072	0.034	0.228	2.154*
PRMS	-0.014	0.043	-0.034	-0.321

*Note: $R^2=0.165$, $Adj R^2=0.105$, $F= 2.767$ ($p<0.05$)), $*P<0.05$*

The present study sought to examine the relationship between cognitive domains, parenting style and emotional-behavioural problems among adolescents, with particular attention to the cognitive indices of the WISC-IV India. Findings revealed that among the cognitive domains, the perceptual reasoning (PR) showed significant correlations with peer problems, conduct problems and total EBP, though the strength of the relationship was modest. In contrast, Verbal Comprehension (VC), Working Memory (WM), and Processing Speed (PS) did not demonstrate significant associations with emotional or behavioural difficulties. Further regression analyses identified perceptual reasoning and parenting style as significant predictors of emotional and behavioural problems, and also processing speed and parenting style, indicating that both cognitive and parenting factors contribute to adolescents' behavioural outcomes.

The observed association between perceptual reasoning and emotional-behavioural problems can be interpreted within cognitive-affective and neurodevelopmental frameworks. Perceptual reasoning involves non-verbal reasoning, fluid reasoning, problem-solving, and visual-spatial integration, which are functions of the fronto-parietal neural systems responsible for executive control and emotional regulation (Diamond, 2013). Difficulties in the coordination of these systems, due to high neuronal activity, even in intellectually capable adolescents, may manifest as problems in social understanding, impulse control, or peer interactions. Thus, the significant link between PRI and peer problems and conduct problems suggests that specific cognitive processing mechanisms, rather than overall intelligence, may influence EBP.

Additionally, the finding that parenting style predicted emotional and behavioural problems highlights the role of environmental regulation in adolescent psychosocial outcomes. Consistent with Baumrind's (1991) typology and Steinberg's (2005) work on adolescent development, supportive and consistent parenting fosters self-regulation and adaptive coping, whereas inconsistent or authoritarian styles may exacerbate behavioural issues. The combined predictive role of PR and parenting style, therefore, underscores the interaction between cognitive and psychosocial systems, where individual cognitive capacities interface with environmental inputs to shape behavioural manifestations.

These results are supported by cognitive–psychosocial and ecological models such as the Cognitive-Affective Processing System, which posits that cognitive competencies interact with affective processes in shaping behaviour, and Bronfenbrenner's Ecological Systems Theory (1979), which emphasizes the contextual influence of family and environment. Within the context of intellectual giftedness, this aligns with the asynchronous development perspective (Neihart, 1999; Kim, 2016), suggesting that cognitive advancement without parallel emotional maturity or optimal environmental support may increase vulnerability to emotional-behavioural difficulties.

These findings directly address the research lacuna observed in previous Indian studies, which have largely treated cognitive and psychosocial domains as independent constructs. Few studies have empirically examined their interrelations, but predictive pathways is missing. By employing both correlational and predictive analyses, the present study extends the understanding of cognitive–psychosocial integration in intellectually gifted adolescent development. The identification of perceptual reasoning and parenting style as key correlates of emotional and behavioural functioning provides

a foundation for a cognitive–psychosocial model of EBP among intellectually gifted adolescents, suggesting that interventions should focus not only on cognitive enrichment but also on promoting adaptive family and emotional regulation contexts.

Concluding this section, both cognitive variable and parenting style act as predictors of EBP in conduct problems, emotional problems, peer problems and total EBP. The inattention/hyperactivity symptoms were predicted by parenting style only. These results highlight the complex interaction between intrinsic cognitive capacities and extrinsic environmental influences in shaping emotional and behavioural outcomes. Taken together, these findings proved the need for psychological interventions that integrate both cognitive and psychosocial perspectives when addressing EBP among intellectually gifted adolescents (IGA). Before implementing such interventions, forming cognitively and psychosocially homogeneous groups would enhance the effectiveness of targeted strategies. Moreover, clustering IGA subgroups based on cognitive profiles, parenting styles and patterns of emotional-behavioural problems could offer valuable insights for cognitive and psychosocial support and for future research exploring cognitive-psychosocial typologies within gifted populations.

Section H

Cluster analysis, a multivariate analysis is the method used to distinguish subgroups within the sample of intellectually gifted adolescents, based on selected cognitive (VC, PR, WM, PS) and psychosocial domains (parenting style, EBP). The number of clusters was optimised according to the largest jumps in stages of the agglomeration schedule, serving as an indicator of cohesion and separation, namely, how closely individuals align with their respective clusters compared to other clusters.

These findings provide valuable insights into the diversity among gifted adolescents and have significant theoretical, practical, and intervention-related implications.

Table 3.30

Stages and notable jumping of the agglomeration coefficient to identify potential clusters.

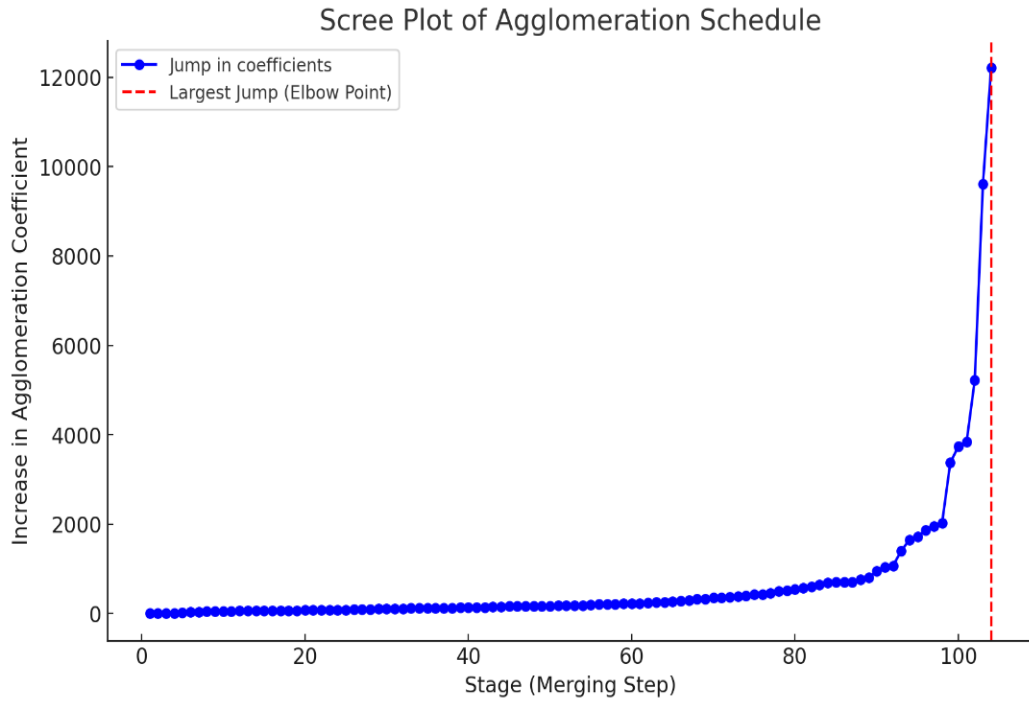
Stages	Coefficient	Jumps
96	27599.574	1720.510
97	29471.207	1871.633
98	31417.461	1946.254
99	33441.357	3023.896
100	36812.825	3371.468
101	40554.545	3742.280
102	44392.366	3837.821
103	49616.573	5224.207
104	59233.036	9616.463
105	71444.821	12211.785

Hierarchical cluster analysis was performed to identify homogeneous profiles of adolescents with intellectual giftedness. The researcher included both the cognitive variables (VCI, PRI, WMI & PSI) and psychosocial domains (Parenting style, emotional and behavioural problems) to create the clusters. The optimal number of clusters was determined based on the agglomeration schedule shown above. The largest jumps in the coefficient serves as an indicator where dissimilar clusters were merged, suggesting a possible cutoff point for clustering. From stage 100 onwards there is a significant increase in the coefficients consecutively (36812.825 - 40554.545 (stage 100 to 101), with a jump of 3742.280, 40554.545 - 44392.366 (stage 101 to 102) with a jump of 3837.821 and so on). The biggest jump occurs between stages 104 and 105

and other notable jumps are at stages 103,102 and 101 indicating potential 3 to 5 clusters.

Figure 3.9

Scree plot of optimal number of clusters



The scree plot displays the increase in agglomeration coefficients at each stage of the clustering process. The clustering process is based on an agglomeration schedule and dendrogram. The dendrogram helps to visualise the hierarchical structure of the data. The red dashed line in the above scree plot represents the largest jump in the coefficients, which suggests the optimal number of clusters (elbow point). The curve remains relatively stable with small increases at early stages. There is a sharp jump in the coefficients at the final stages (stages 100 to 105), indicating that merging beyond this point significantly increases within-cluster variance. The largest jumps in cluster merging correspond to significant reductions in the number of clusters. Finally, five clusters of intellectually gifted adolescents were extracted with hierarchical clustering.

Table 3.31*Frequency distribution and percentage of IGA in five clusters*

Clusters	N	%
Cluster 1	16	15%
Cluster 2	32	30.18%
Cluster 3	19	17.92%
Cluster 4	25	23.58%
Cluster 5	14	13.21%
Total	106	

Table 3.31 reveals the frequency distribution and percentage of cluster membership. Cluster membership comprises five clusters, in which homogeneous members are profiled in similar clusters (within a cluster) and heterogeneous members are grouped in different clusters. Here, Cluster 2 comprises 30.18% intellectually gifted adolescents, followed by Cluster 4 (23.58%), Cluster 3 (17.92%), Cluster 1 (16%), and Cluster 5 (13.21%). The most homogenous group of adolescents is cluster 2 with 30.18% adolescents and the least homogenous group of adolescents is cluster 5 (13.21%).

Table 3.32*Mean ranks of cognitive and psychosocial domains based on five clusters.*

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
VCI	63.97	47.34	38.79	74.60	37.89
PRI	67.44	37.30	65.66	78.92	12.71
WMI	54.94	32.42	42.53	82.62	62.93
PSI	9.63	76.61	42.42	70.84	34.89
ES	47.81	66.22	44.84	44.78	58.25
CS	55.03	55.72	62.84	57.54	26.79
HS	60.25	52.31	63.11	47.08	46.93
PP	64.84	48.86	47.42	58.24	50.93
Total	44.91	45.28	71.87	59.70	46.11
AT	43.19	47.44	73.11	59.20	42.36
AN	61.22	63.58	44.97	53.08	33.96
PRMS	61.44	47.39	78.34	49.48	31.86

Table 3.33*Labelling the clusters based on characteristics of each cluster*

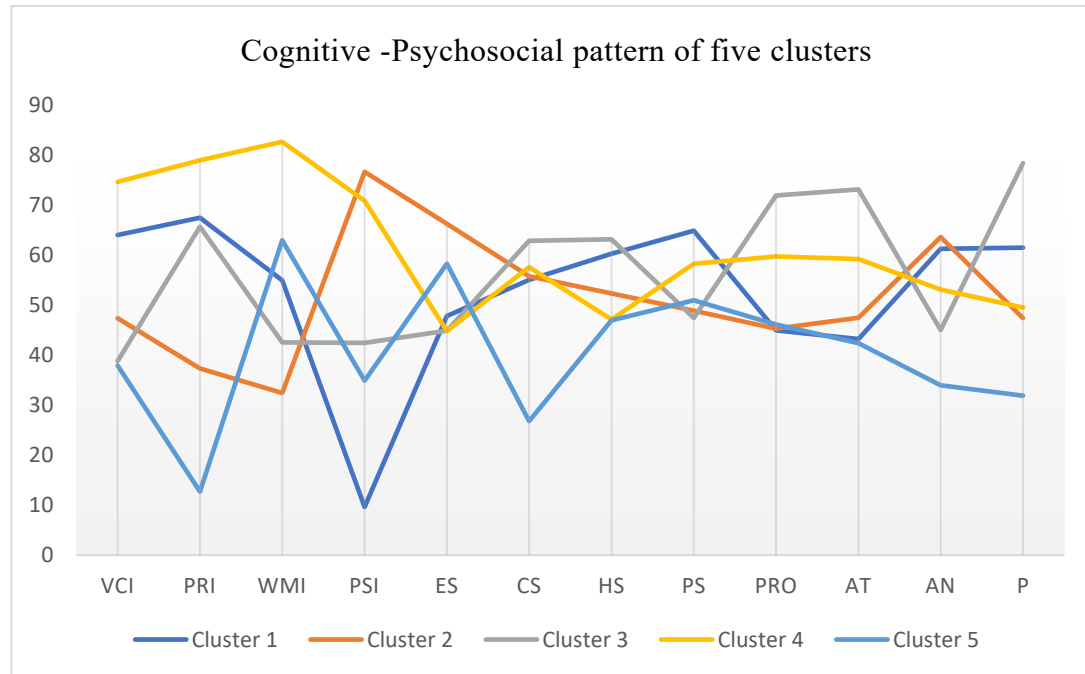
	Characteristics	Cluster name
Cluster 1 (15%)	High perceptual reasoning (PRI), Low processing speed (PSI) with high hyperactivity and peer problems, with authoritarian and permissive parenting type.	Strategic thinkers with social challenges
Cluster 2 (30.18%)	High processing speed (PSI) with high emotional symptoms with authoritarian parenting.	Efficient processor with emotional and cognitive imbalances
Cluster 3 (17.92%)	High perceptual reasoning (PRI), low verbal comprehension (VCI) with high conduct symptoms and hyperactivity with permissive parenting type.	Intuitive but behaviourally challenged
Cluster 4 (23.58%)	Nil cognitive variations among four domains, Cognitively advanced with comparatively less emotional, hyperactive symptoms, conduct and peer problems with authoritative parenting type	Cognitively well rounded and emotionally stable
Cluster 5 (13.21%)	High working memory (WMI), low perceptual reasoning (PRI) with high emotional symptoms, with authoritative parenting.	Emotionally reactive with strong memory

Table 3.32 reveals the mean ranks of cognitive and psychosocial domains based on five clusters and Table 3.33 reveals labelling the clusters based on characteristics of each cluster. The mean ranks denote the differences in each variable under each cluster. It further helps to categorise each cluster based on similarities in variables and then

coined the names for each cluster. The following figure provides a clearer depiction of the variations in different variables across clusters.

Figure 3.10

Line graph of five clusters based on cognitive and psychosocial domains



The analysis yielded five different heterogeneous clusters with homogeneity within clusters. The five clusters of the gifted subtype emerged and were named according to the pattern of strength and weakness across variables. Cluster 1 comprises 16 intellectually gifted adolescents who are characterised by high perceptual reasoning (PRI), low processing speed (PSI), with high hyperactivity and peer problems, dominated by authoritarian and permissive parenting types. Additionally, they exhibit moderate levels in verbal comprehension and working memory. We called cluster 1 “Strategic thinkers with social challenges.” Cluster 2 comprises 32 individuals with high processing speed (PSI) with high emotional symptoms dominated by authoritarian parenting. They are called as “Efficient processors with emotional and cognitive

imbalances “Adolescents with Cluster 3 exhibit high perceptual reasoning (PRI), low verbal comprehension (VCI), with high conduct symptoms and hyperactivity, dominated by a permissive parenting type. They were termed as “Intuitive but behaviourally challenged”. Cluster 4 exhibits an advanced level of cognitive expressions in all four domains with nil variations. Additionally, they exhibit balanced symptomatology, dominated by authoritative parenting. Therefore, we called them “Cognitively well-rounded and emotionally stable”. Finally, Cluster 5 with 14 adolescents, termed as “Emotionally reactive with strong memory” as is characterised by high working memory (WMI), low perceptual reasoning (PRI) with high emotional symptoms, dominated by authoritative parenting. Few studies supported the clustering of the gifted population by considering its heterogeneity. The study by Vecchio et al. (2013) examined the cognitive heterogeneity among gifted children by exploring subtypes of giftedness distinguished across standardised cognitive variables using the Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV) as the primary cognitive measure. The study sought to identify distinct cognitive profiles within a high-ability population. Findings with the cluster analysis and descriptive comparisons revealed multiple subgroups differentiated by patterns of strengths and relative weaknesses (for example, high working memory but average processing speed, or dominant verbal comprehension relative to perceptual reasoning). The subtypes include linguistic, logistic, linguistic/logistic and linguistic/logistic/spatial. Castogen et al. (2016) explored different profiles of gifted students using the latent cluster analysis and identified four distinct sub-profiles of gifted students (e.g., “gifted achievers”, “cognitive gifted”, “creative gifted”, “high achievement & cognitive gifted”). All these findings underscore the importance of moving beyond a single criterion (e.g., overall IQ) in the identification and educational planning for gifted learners, emphasising that

cognitive variation within the gifted population has implications for tailored instruction, enrichment strategies, and support services. Though cluster analysis on the gifted population is more focused on cognitive subtypes, other related studies also considered the psychosocial aspects. In a related study, Aonso-Diego et al. (2024) conducted a cluster analysis to classify gamblers based on gambling-related characteristics and mental health variables. Their study identified three distinct clusters within a clinical population of gamblers: (1) high gambling severity with good mental health, (2) high gambling severity with poor mental health, and (3) low gambling severity with good mental health. The clusters were further differentiated by psychological variables such as emotional dependence, alexithymia, and stressful life events. The authors concluded that identifying such profiles enhances understanding of gamblers' psychological needs and supports the development of targeted prevention and intervention strategies. Our study also lines up with cognitive-psychosocial clustering in the gifted group.

In conclusion, the current study identified five distinct subgroups of intellectually gifted adolescents by analysing the cognitive and psychosocial characteristics. Grouping IGA provides a more comprehensive assessment to better understand them in terms of their strength and weaknesses, which would, in turn, allow tailoring prevention and intervention strategies to their needs. Thus, the intervention group could be classified according to the above clusters, where they could benefit from different cognitive, educational and psychosocial practices depending on their cognitive differences and psychosocial vulnerabilities.

Chapter 4

SUMMARY AND CONCLUSION

- Resume of the study
- Tenability of hypothesis
- Major findings and conclusion

This chapter summarizes the findings of the present study, evaluates the tenability of hypotheses, drawn conclusions and offers insights into the research.

Resume of the study

Research on giftedness in India spans across 50 years, but lacks systematic and empirical grounding. India has a huge talent pool, but millions remain unidentified and unrecognised. The growth of science and technology fields has been slow for many decades, resulting in gifted Indian students migrating overseas for better opportunities. There is a need to explore, identify, assess their needs and vulnerabilities and develop systems and processes by which they can find their niche within our place. Nurturing such children will eventually lead to contributions to India's knowledge bank. Hence, understanding their cognitive strength and weaknesses, making them aware of the skills will benefit them in terms of academic, career and behavioural aspects. The notion that giftedness, high ability or creativity are extra endowments for a child and that he/she is already 'the lucky one' is prevalent in Indian society, which expects such students to excel on their own with minimum additional support. Researchers have produced substantial evidence on many factors contributing to intellectual giftedness, such as high IQ, academic achievement, heightened sensitivity and creativity, and quality of life. However, there is a dearth in reviews of the vulnerabilities of gifted children as there is a common misconception that they are mentally fit due to intellectual excitabilities. Through the study, the researcher attempts to provide insight into intellectual giftedness and its exploration in cognitive and psychosocial aspects by comparing them with adolescents with average intelligence and within themselves. Even though a highly intelligent individual has a remarkable capacity for seeing and internalising these vast uncertainties, possibilities, and problems, this gift can either be a catalyst for empowerment or it can be a predictor of dysregulation and debilitation.

Therefore, the present study has been designed to identify intellectually gifted adolescents, explore the cognitive and a few psychosocial aspects, and explore the link between intellectual giftedness and emotional and behavioural problems, where the findings of the present study will shed more light on teachers and parents who promote awareness and positive mental health of gifted children.

The current research aimed to identify intellectually gifted adolescents from the school setting, explore the cognitive and psychosocial domains among IGA and compare them with intellectually average adolescents (IAA). The study also delves into the comparison within IGA (levels of giftedness). The study would also focus on identifying emotional and behavioural problems among IGA and assessing if there is any association between intellectual giftedness and emotional and behavioural problems. Apart from intellectual and cognitive domains, the study would also attempt to establish the link between parenting styles and emotional and behavioural problems. It further examines the predictive role of cognitive domains and parenting style on emotional and behavioural problems among IGA. Finally, the research delves into forming heterogeneous clusters of intellectually gifted adolescents based on similar/homogenous cognitive-psychosocial characteristics, which could be utilised for intervention purposes. Hence, the study is entitled: “INTELLECTUAL GIFTEDNESS: AN EXPLORATORY STUDY ON COGNITIVE AND PSYCHOSOCIAL DOMAINS”.

The present study was conducted in two phases:

Phase I

Exploration of variables and tools

Phase II

Main study

PHASE I

Exploration of variables and measures used in the study

It incorporates:

1. Scoping review
2. Pilot study
3. Expert suggestions

And finally, the selection of research variables and tools to identify and explore the cognitive and psychosocial domains of intellectually gifted adolescents (IGA) in our context.

1. Scoping review:

The reviewed studies were sourced from databases such as Google Scholar, PubMed, Academia, Elsevier, Springer, and other open-access journals. Through a scoping review, the research gaps were addressed in the Indian context by comparing with a global perspective. First, only a few studies systematically examine all cognitive domains within a single framework, particularly in relation to intra-individual discrepancies. Moreover, quantitative data on the identification of IGA in a school setting in a comprehensive way are lacking. Second, the interaction between cognitive strengths and psychosocial functioning has not been sufficiently addressed, despite theoretical claims that uneven cognitive profiles may contribute to psychosocial vulnerabilities. Third, the majority of existing research is cross-sectional, relies on convenience samples, and applies inconsistent criteria for defining giftedness (e.g., varying IQ cut-offs, teacher nominations, or achievement-based criteria), limiting comparability across studies. Finally, longitudinal, large-scale, and culturally diverse studies are notably absent. Addressing these gaps is essential to building a complete

understanding of both the cognitive profiles and psychosocial adaptation of gifted adolescents.

2. Pilot study

In the present study, the pilot study was conducted in two settings: one is in a school and the other is clinic-based.

2) Setting: School

The pilot study in a school setting is conducted based on the following objectives:

- To find out differences in levels of intelligence among adolescents at the class level.
- To get a baseline on how many intellectually gifted adolescents are present at the class level.
- To confine the tool for identifying IGA by practically administering the SPM and WISC IV, India.
- To ensure the practicality of selection in terms of the time, resources and support.
- To explore the psychosocial attributes of selected intellectually gifted adolescents.
- To understand the psychopathology associated with intellectually gifted adolescents

Research design: Descriptive research design.

Participants: The study was conducted in three schools of Thrissur district (Aided school, Govt school and CBSE school) selected on convenience. The purposive sampling method was used to identify intellectually gifted adolescents from schools. Here, the criterion of IQ at or above the 95th percentile, Grade 1, Intellectually superior in Standard progressive matrices (SPM), was the initial criterion for screening

intellectually gifted adolescents and $IQ \geq 125$ was considered as the selection cut-off in WISC IV India. The adolescents aged between 13 and 15 years were selected. The adolescents who were enrolled in high school, both male and female adolescents and those who enrolled in English medium (state and CBSE) were the inclusion criteria. The adolescents with a history of seizure disorder/epilepsy/ brain injury, with severe visual, auditory, and speech impairments and physical impairments that would impact the performance of the test were also excluded.

Measures Used: Standard Progressive Matrices (SPM) and Wechsler Intelligence Scale for Children (WISC-IV) India.

Procedure: After obtaining permission from school authorities, the three convenient high school classes from different schools were selected to identify IGA. The data collection span around 2 months. The identification process includes two stages: screening and selection. The screening phase of participant selection involved the administration of the Standard Progressive Matrices (SPM) in small groups consisting of 8 to 10 adolescents. Similarly, the whole adolescents of selected classrooms were assessed. The assessment was conducted in convenient classroom settings and took approximately 30 to 40 minutes to complete. Adolescents who scored above the 95th percentile on the SPM, indicating intellectually superior performance (Grade I), were referred for the next stage of selection. The WISC-IV India was administered to the screened adolescents by the research scholar. The consent was taken from parents of respective adolescents prior to testing over phone. The research scholar was a Clinical Psychologist who had undergone intensive training in administering WISC-IV India. The tests were administered individually to each participant at the counselling unit of the school or the private spaces like free classrooms, board rooms or mini-conference

rooms. The selection process was done over a period of two weeks in two or three leisure or Art club hours with 45 minutes/for each period. Prior appointment was fixed with adolescent and teachers. Those who score greater than or equal to 125 on intellectual quotient were considered to be intellectually gifted. The data was analysed with descriptive statistics.

Findings: The screening phase with SPM reveals,

- Only 2(1.96%), out of 102 adolescents come under the category of intellectually superior in SPM, >95th Percentile, Grade 1.
- About 60.78% of adolescents come under the category of average intelligence (25-75th Percentile), Grade IV.
- About 16.66% and 6.86% come under the category of above average (>75th percentile, Grade II and 90-95th percentile, Grade II Plus, respectively).
- About 13.73% comes under the category of below average intelligence, Grade V (<25th Percentile).

The selection phase reveals,

- Initially, only two adolescents met the predetermined criteria- scoring above the 95th percentile on the SPM (intellectually superior) and having an IQ $\geq$ 125 on the WISC-IV India - thus qualifying as intellectually gifted.
- Given that only 2 out of 102 adolescents were identified in the screening phase, the criteria were broadened to include those scoring in the 90th–95th percentile range on the SPM (Grade II – intellectually above average). Among these seven adolescents, three were found to have an IQ $\geq$ 125 on the WISC-IV.
- Thus, a total of five adolescents (4.90%) out of 102 were classified as intellectually gifted based on the WISC-IV (IQ $\geq$ 125).

- Therefore, the initial SPM screening threshold was revised from the 95th percentile to the 90th percentile, while the final selection criterion based on the WISC-IV ($IQ \geq 125$) remained unchanged.

The final two objectives of the study could not be pursued in the same school due to the sudden closure of schools during the COVID-19 pandemic. Hence, to explore the psychopathology among intellectually gifted adolescents and to find out the psychosocial factors associated with such adolescents, the study was further carried out in a clinical setting.

3) Setting: Mental health clinics.

The second phase of the pilot study was conducted in a clinical setting. The objectives of conducting research in a clinic setting are the following:

- To explore the psychosocial attributes of clinically referred Intellectually gifted adolescents using the Developmental Psychopathology Checklist (DPCL) and thereby to understand which area of psychosocial aspects to be studied in the main study.
- To identify specific psychosocial domains that require deeper exploration in the main study.
- To understand the nature of psychopathology associated with clinically referred intellectually gifted adolescents.

Participants: The study was conducted among 25 adolescents with an age range of 11 to 16 years of both sexes who were identified as intellectually superior during the study period - Grade 1, SPM $IQ > 95^{\text{th}}$ Percentile. The purposive sampling was used. The participants came to the clinic either directly or were

referred from other places for management of various mental health issues. The adolescents whose IQ scores were at or above the 95th Percentile in SPM were only considered to be intellectually gifted. The adolescents in the age range of 11 to 16 years of both sexes were chosen for the study. The adolescents who sought psychological help for the first time were considered for the study. Those who had pervasive developmental disorders were excluded. The adolescents with severe visual, auditory, and speech impairments were also excluded. The adolescents who were referred or underwent other treatments other than psychological help like pharmacotherapy, were also excluded.

Measures: Standard Progressive Matrices (SPM) and Developmental Psychopathology Checklist (DPCL)

Procedure: The study was conducted for a period of 6 months in two private child and adolescent mental health clinics, Thrissur district. The formal consent was taken from respective clinics to conduct the study. The researcher briefed up the description of samples, scheduling of time and procedure of the study to the respective authorities in the clinics. Detailed discussions on intellectually gifted adolescents and their characteristics were done with clinicians who referred such cases. Adolescents in the 11–16-year age group who were referred to the research scholar come clinical psychologist for assessment and psychological management, after evaluation by psychiatrists/ clinical psychologists, and other clinicians from various clinics during the study period were taken up for the study. Parental consent was taken. They presented with the complaints such as deterioration in the study from the past few years, disobedience, anger outbursts, not concentrating in the study, easily being distracted, anxiety and low self-

esteem. The other clinicians referred the children to the scholar with a provisional criteria of high intelligence who had some behavioural, emotional and social issues or with diagnosis according to ICD10-criteria.

Prior appointment with the parent and child was taken. Confidentiality was strictly maintained. The referred children were administered SPM and those who scored Grade 1, SPM IQ>95th Percentile, above were considered as intellectually gifted. About 25 children were identified during the tenure (6 months).The identified children and their parents were interviewed and completed the Developmental Psychopathology Checklist (DPCL). Hence detailed evaluation was done approximately 2 to 3 hours in duration around a span of two sessions. The ethical approval was obtained from the Institutional Review Board of the Research Centre.

Findings:

- Findings on the Psychopathology checklist reveal that, children with intellectual giftedness clustered under the category of internalizing problems such as emotional problems (60%), obsessive-compulsive symptoms (24%) and somatic symptoms and neurotic kind (8%) also tend to have externalizing problems with ADHD problems (36%), conduct problems (40%), and learning problems (8%).
- About 28% of children have certain behavioural and emotional problems without amounting to any specific cluster.
- None were ascribed under the cluster of psychosis.
- In our study, psychosocial vulnerabilities were present in 88% of clinically referred intellectually gifted adolescents who had been referred to the scholar.

- Most of the adolescents with intellectual giftedness had problems with their parents (76%).
- About 60% percent of parents are over-involved with children, 40% with over-expectation and overindulgence (24%).
- About 32% of parents followed inconsistent disciplining and 16% showed indifference.
- Apart from familial constraints, 52% of children reported having problems with peers, teachers and the school setting.
- None of them commented on environmental deprivation as a stressful factor.

3. Expert suggestions

In this study, the researcher sought expert suggestions during the stages of the scoping review and pilot work to ensure both methodological soundness and contextual relevance. The experts consulted included psychologists and special educators working with gifted children, psychiatrists, clinical psychologists, and school teachers. These professionals emphasized the importance of identifying gifted children and adolescents within our society and providing psychosocial support to their families. Experts from gifted education centres specifically recommended considering teacher nomination criteria in addition to traditional assessments to get a broader idea and to be scrutinised by other adolescents. Clinicians highlighted the need to explore family dynamics, social interactions, and mental health aspects among gifted individuals, noting that giftedness is often misunderstood or overlooked in clinical settings. Most of the clinicians considered them as the ones with ADHD or LD rather than someone with cognitive excellence and no specific interventions other than usual cognitive training are carried out. Some parents considered the topic insignificant due to their child's high academic performance or perceived potential, while a few teachers noted unusual traits or

behaviours among gifted students. However, most teachers viewed these students as advanced and well-adjusted, possibly missing signs of underlying psychosocial challenges. By integrating expert feedback through formal discussions, the researcher was able to bridge the gap between research and practice, ensuring that the study findings are not only academically rigorous but also applicable to real-world educational and clinical contexts.

4. Selection of variables and tools used for the study

Based on the research gaps on scoping review, findings of pilot work done in school and clinical setting and suggestions from experts, the following variables and tools were selected and implemented in the main study (Phase II):

For identification of intellectually gifted adolescents:

Identification process of IGA would be carried out in three stages-

✓ Stage 1 /Nomination

Teacher Nomination criteria of () was included to screen adolescents for giftedness. Teachers, who are familiar with students over an extended period (at least one year), were identified as reliable sources for this process.

✓ Stage 2/Screening

Following teacher nomination, the Standard Progressive Matrices (SPM) was administered to confirm whether he/she belongs to the top 10th percentile group (>90th percentile).

✓ Stage 3/Selection

The WISC-IV India was subsequently applied to determine intellectual giftedness ($IQ \geq 125$).

To assess the cognitive skills:

The cognitive domains from WISC-IV, India, were selected for the study. The WISC-IV India focuses on four cognitive domains in a comprehensive way:

1. Verbal Comprehension-VC (Verbal reasoning, social judgement and Learning ability)
2. Perceptual Reasoning -PR (Visual perception and organization, Abstract reasoning and Fluid reasoning)
3. Working Memory-WM (Attention and concentration and short-term auditory memory)
4. Processing Speed – PS (visuomotor coordination and short-term visual memory)

To address psychosocial domains:

The pilot work revealed that the gifted adolescents primarily faced problems with parenting, stress of parents and adjustment issues with them. The Developmental Psychopathology Checklist is used to identify the broad areas of psychopathology of IGA in the clinical setting and thereby prioritising the problems to be ruled out in the school setting. The psychological problems elicited in DPCL were included emotional problems, ADHD, conduct problems and Peer problems. Other elicited features, like OCD were not included in the current research as they may need further detailed evaluations. Considering this, the focus of the main study was to identify the emotional and behavioural problems, which have been ruled out by DPCL. The Strengths and Difficulties Questionnaire (SDQ) by Robert Goodman was selected for the main study. The SDQ is a self-reported questionnaire that evaluates emotional and behavioural problems across four areas -Emotional symptoms, Inattention and hyperactivity,

Conduct problems, Peer problems. Moreover, it is a widely used questionnaire used in school settings to assess emotional and behavioural problems. Similarly, to address parenting styles, PAQ (Parental Authority Questionnaire), another self-reported questionnaire that assesses three parenting styles- Authoritative, Authoritarian and Permissive is used in school settings.

Concluding, Phase 1 offered a framework for Phase II (main study) to focus on intellectual giftedness through cognitive and psychosocial lenses, utilizing the WISC-IV India as the primary(selection) assessment tool, to examine key cognitive abilities and associated psychosocial domains, aiming to identify patterns and challenges that characterise IGA.

PHASE-II

(Main study)

It highlights, identification of intellectually gifted adolescents (IGA) from school settings, understanding their cognitive domains, parenting style and emotional and behaviour problems of IGA and to compare it with intellectually average adolescents (IAA) and within themselves (levels of giftedness), to assess the prevalence of EBP among IGA, to find out the association between intellectual giftedness and emotional and behaviour problems among IGA, to find out the cognitive and psychosocial predictors of emotional and behavioural problems and finally to form the clusters of IGA with similar cognitive-psycho social characteristics which would be helpful for further enhancement of such adolescents through tailored interventions.

Objectives of the research

- ✓ To determine the percentage of intellectually gifted adolescents in the school setting using WISC-IV, India.

- ✓ To understand the sociodemographic characteristics (e.g., age, gender, socioeconomic status, educational background of parents etc..) of intellectually gifted adolescents.
- ✓ To understand the academic and nonacademic characteristics of intellectually gifted adolescents.
- ✓ To identify the key cognitive characteristics of intellectually gifted adolescents as measured by the WISC-IV.
- ✓ To compare the cognitive domains of IGA with those of IAA.
- ✓ To investigate the differences in cognitive domains among intellectually gifted adolescents with varying levels of giftedness.
- ✓ To compare the cognitive domains of IGA with respect to gender.
- ✓ To explore the parenting styles of intellectually gifted adolescents.
- ✓ To understand the varying levels of emotional and behavioural problems among IGA and IAA.
- ✓ To compare the psychosocial domains of IGA with those of IAA.
- ✓ To investigate the differences in psychosocial outcomes among intellectually gifted adolescents with varying levels of giftedness.
- ✓ To compare the psychosocial domains of IGA with respect to gender.
- ✓ To examine the relationship between intellectual giftedness and emotional and behavioural problems among intellectually gifted adolescents.
- ✓ To examine the relationship between cognitive domains and emotional and behavioural problems among intellectually gifted adolescents.
- ✓ To examine the relationship between parenting style and emotional and behavioural problems among intellectually gifted adolescents.

- ✓ To find out the predictive role of cognitive domains (VC, PR, WM, PS) and parenting style (Authoritative, Authoritarian, Permissive) on emotional and behavioural problems among IGA.
- ✓ To identify the various clusters among IGA based on cognitive and psychosocial characteristics.

Research design

The present study follows the descriptive correlational research. For the study, all the cognitive variables and parenting style were considered as independent variables and EBP were considered as the dependent variable.

Participants

The study was conducted in various schools of Thrissur district through convenience sampling. The sample was drawn from both State and Central Board of Secondary Education (CBSE) schools, including 9 aided, 5 unaided, and 6 government schools under the state syllabus, and 16 CBSE-affiliated schools. Multi-stage purposive sampling was used to identify the intellectually gifted adolescents. Multistage purposive sampling involves selecting samples in stages, where at each stage participants are chosen deliberately based on certain characteristics relevant to the research. It allows the researcher to narrow down the sample progressively using purposeful criteria at every level. Initially, a pool of adolescents was nominated by teachers by employing teacher nomination criteria. Nominated adolescents were then screened using Raven's Standard Progressive Matrices (SPM), and those scoring above the 90th percentile was considered for further assessment. The final identification of intellectually gifted individuals was done using the Wechsler Intelligence Scale for Children – Fourth Edition, India (WISC-IV India). Only those with an $IQ \geq 125$ in

WISC IV, India was classified as intellectually gifted. Similarly, those who score grade III ,25-75th percentile on SPM was screened as intellectually average and IQ (90-109) on WISC-IV was selected as adolescents with average intelligence. The final sample consisted of 106 adolescents who are identified as intellectually gifted and 106 average-intelligent adolescents, as determined by WISC-IV India. The experimental group (IGA) was matched with a control group (Intellectually average adolescents (IAA) based on gender and school board affiliation to control for potential confounding variables.

Inclusion and Exclusion Criteria

For Experimental Group (Intellectually gifted adolescents (IGA))

Inclusion Criteria:

- IQ $\geq$ 125 as per WISC-IV India
- Aged 13 to 15 years and in high school
- Both boys and girls
- Regular school attendance
- Screened through teacher nomination (with a minimum one-year familiarity)
- SPM > 90th Percentile.
- English as a medium of instruction in schools
- Could read and write English and Malayalam
- Informed parental consent

Exclusion Criteria:

- Age below 13 or above 15 years
- Residing in institutional care
- Diagnosed neurological conditions (e.g., epilepsy, cerebral palsy)

- Pervasive developmental disorders and Learning disability
- Severe visual, auditory, or speech impairments
- Under psychiatric medication

For Control Group (Intellectually Average Adolescents (IAA):

Inclusion Criteria:

- IQ between 90 and 109 as per WISC-IV India
- Aged 13 to 15 years and in high school
- Both boys and girls
- Regular school attendance
- Screened through SPM, having 25th -75th percentile.
- English as the medium of instruction
- Could read and write English and Malayalam
- Informed parental consent

Exclusion Criteria:

- Age below 13 or above 15 years
- Residing in institutional care
- Diagnosed neurological conditions
- Pervasive developmental disorders and Learning disability
- Severe visual, auditory, or speech impairments
- Under psychiatric medication

Measures

The following measures were employed in the main study.

7. Personal data sheet
8. Teacher Nomination Criteria
9. Standard Progressive Matrices (SPM)

10. Wechsler Intelligence Scale for Children (WISC-IV)

11. Parenting Authority Questionnaire (PAQ)

12. Strength and Difficulty Questionnaire (SDQ)

Procedure

Permission has been sought from the schools to conduct the research. A total of 36 schools were permitted to do so. The identification process includes three stages.

Stage 1: Nomination stage

A brief introduction to gifted adolescents or gifted learners has been given by the researcher to the teachers of various schools. The introductory part was conducted in a classroom setting with a group of 4 to 5 high school teachers who were selected at the convenience of the school authorities. The session lasted about 20 to 30 minutes. The teacher who knew the adolescents for a period of one year was suggested to participate in the nomination stage. The session includes the importance of identifying and enhancing IGA, the inclusion criteria for nominating adolescents with superior ability and introducing the teacher nomination checklist for gifted children and adolescents.

- Inclusion criteria for nomination-
 - The teacher should know the adolescent at least for minimum of one year.
 - Adolescents with 13-15 years of age and in the high school section.
 - The class teachers or subject teachers can be part of the nomination.
 - The following points to be kept in mind when teachers nominate the adolescents:
 1. The nominated adolescent should be superior among their peers in the differences described by the Characteristics of Giftedness Scale

(Silverman, 2012), culture- and gender-fair items. A student showing 75% or more of 20 characteristics is deemed to be gifted.

2. There is no cut off in nominating the number of adolescent's but/she/should be superior among their peers.
3. The nomination should be made regardless of their academic marks or percentages. The aforesaid characteristics should be important.

Here, the researcher selected the adolescents who had above said behaviours as per the teacher's observation and nominated them for the second level of screening. The nomination checklist is only used to get a general awareness of behaviours and patterns of gifted adolescents. Since the teachers who spend most of the time with adolescents in school, they could observe their performance in the school setting and could refer them for the second level of screening. The nomination criteria are not used for selection purposes. Nominating the superior adolescents from the large pool of peer groups based on the teacher's observation is the main purpose. The teachers nominated a few superior students from each class based on this and handed over the list to the researcher. Finally, a total of 294 adolescents were nominated by teachers of both the state and CBSE syllabi for the study. One teacher from each school jointly co-ordinated with the researcher in further processes.

Stage 2: Screening stage

The nominated adolescents (n=294) were screened with SPM and those who secured grade II with above 90th percentile were considered for further evaluation. The SPM was administered in small groups of 5 to 8 adolescents for screening. Approximately 30-40 minutes had been taken to complete the test by each one. The group administration was done in the classrooms of each school. The record sheet and

booklet were provided and they completed the task as per the instructions. About 178 adolescents screened on the aforesaid percentile and selected for the identification stage.

Stage 3: Selection stage

The screened adolescents were administered by WISC IV, India. For this, researcher was provided with either a free classroom or counselling room in schools to administer the tools. Maximum efforts were taken to minimise the external distractions in school to focus the adolescent's attention on the tasks presented. For eg; Prior scheduling of testing was arranged to avoid the rush and to save the time, requested to allocate space in a well-lit, quiet room that is free from distractions, Minimum seating arrangement with one table and two chairs was requested, adolescents were not interrupted with other school activities in between the testing, No other than adolescent, researcher and the allotted teacher/school staff were permitted to enter the room. The consent was taken from parents over the phone and a Google form/written form at this stage. A few parents contacted the researcher over the phone and clarified the procedures.

The WISC-IV India was administered individually to each adolescent who scored at or above the 90th percentile in SPM. The intelligence testing with WISC-IV was done in one or two sessions. Each session was approximately 45 minutes. If the testing was done in 2 sessions, the researcher prefers to complete the second session within one week. If the adolescent seems fatigued, adequate breaks were given at the end of a subtest. They were motivated to do his/her best after establishing a good rapport with them. Those who score at or above 125 Intelligence Quotient (IQ) in WISC-IV India are selected as intellectually gifted adolescents.

The adolescents were quite interested in completing the tasks of WISC-IV. Few queried the questions like 'What are you going to assess with this? Is there any issue if I am not able to perform well? Would this be added to our curriculum? etc... All queries were handled cautiously without losing the content of testing. Corrective feedbacks were also provided by praising the adolescent's effort if he worked hard to solve the task and by reassuring him regarding the hardness of the task and moving on with other tasks, if he performed poorly. The researcher followed the subtest administration in the standard order given in the WISC-IV Record form. The subtest order helps to increase interest, maintain variety throughout testing and minimize fatigue effects. Finally, 106 adolescents were identified and selected for the study.

Similarly, the adolescents with average intelligence were selected with respect to gender and board of studies. It's a three-stage selection process. The teachers nominated adolescents who were average in school-related tasks. The SPM was administered to nominated adolescents of 13-15 years of age in the high school section as a screening phase. Those who scored 25 -75th percentile on SPM were selected for the selection phase with WISC IV, India. The adolescents who scored between the IQ=90-109 were considered to have average intelligence. The sample size of 106 (equal sample size with IGA) was considered to compare the groups.

The selected adolescents were further administered a Personal Data Sheet, Strengths and Difficulties Questionnaire (SDQ) and Parenting Authority Questionnaire (PAQ). These tests were administered in small groups or individually, as per the convenience of school authorities. Approximately 2 to 2^{1/2} hour is needed for each adolescent to complete the whole testing. All the measures were scored as per the manual's instructions and the scores were entered into the data entry for data analysis.

Statistical Analysis

The collected data were scored and entered into a Microsoft Excel Spreadsheet in the coded form. IBM SPSS version 21(Statistical Package for Social Science Researchers-Version 21) software was used for statistical analyses and made use of Microsoft Word to create tables.

The normality of distribution was assessed using the Kolmogorov-Smirnov test. Both descriptive and inferential statistics were used in the study. The following statistical techniques were used for analysing the data:

- Descriptive statistics
- Kolmogorov-Smirnov test
- Mann-Whitney U test
- Spearman's rank correlation rho
- Multiple Regression
- Cluster analysis

Tenability of hypotheses

Hypothesis 1

There is no significant association between intellectual giftedness and sociodemographic variables.

Hypothesis 1.1

There is no significant association between intellectual giftedness and gender.

The results revealed that there is no significant association between intellectual giftedness and gender. Hence, the hypothesis is accepted.

Hypothesis 1.2

There is no significant association between intellectual giftedness and school curriculum.

The results revealed that there is no significant association between intellectual giftedness and school curriculum. Hence, the hypothesis is accepted.

Hypothesis 1.3

There is no significant association between intellectual giftedness and residence.

The results revealed that there is no significant association between intellectual giftedness and residence. Hence, the hypothesis is accepted.

Hypothesis 1.4

There is no significant association between intellectual giftedness and the type of family.

The results revealed that there is no significant association between intellectual giftedness and the type of family. Hence, the hypothesis is accepted.

Hypothesis 1.5

There is no significant association between intellectual giftedness and parents' education level.

The results revealed that there is a significant association between intellectual giftedness and parents' educational level. Hence, the hypothesis is rejected.

Hypothesis 1.6

There is no significant association between intellectual giftedness and the occupational level of parents.

The results revealed that there is a significant association between intellectual giftedness and the occupational level of parents. Hence, the hypothesis is rejected.

Hypothesis 1.7

There is no significant association between intellectual giftedness and socioeconomic status.

The results revealed that there is a significant association between intellectual giftedness and socioeconomic status. Hence, the hypothesis is rejected.

Hypothesis 1.8

There is no significant association between intellectual giftedness and ordinal position.

The results revealed that there is no significant association between intellectual giftedness and ordinal position. Hence, the hypothesis is accepted.

Hypothesis 2

There is no significant association between intellectual giftedness and academic variables.

Hypothesis 2.1

There is no significant association between intellectual giftedness and academic achievement.

The results revealed that there is a significant association between intellectual giftedness and academic achievement. Hence, the hypothesis is rejected.

Hypothesis 2.2

There is no significant association between intellectual giftedness and level of scholarship.

The results revealed that there is a significant association between intellectual giftedness and level of scholarship. Hence, the hypothesis is rejected.

Hypothesis 2.3

There is no significant association between intellectual giftedness and subject excellence.

The results revealed that there is a significant association between intellectual giftedness and subject excellence. Hence, the hypothesis is rejected.

Hypothesis 3

There are no significant differences in the cognitive variables between intellectually gifted adolescents and intellectually average adolescents.

.Hypothesis 3.1

There is no significant difference in the verbal comprehension and its sub-variables (verbal reasoning, social judgement and learning ability) between intellectually gifted adolescents and intellectually average adolescents.

The results revealed that there is a significant difference in the verbal comprehension and its sub-variables (verbal reasoning, social judgement and learning ability) between intellectually gifted adolescents and intellectually average adolescents. Hence, the hypothesis is rejected.

Hypothesis 3.2

There is no significant difference in the perceptual reasoning and its sub-variables (visual perception and organization, abstract reasoning and fluid reasoning) between intellectually gifted adolescents and intellectually average adolescents.

The results revealed that there is a significant difference in the perceptual reasoning and its sub-variables (visual perception and organization, abstract reasoning and fluid reasoning) between intellectually gifted adolescents and intellectually average adolescents. Hence, the hypothesis is rejected.

Hypothesis 3.3

There is no significant difference in the working memory and its sub-variables (attention and concentration & short-term auditory memory) between intellectually gifted adolescents and intellectually average adolescents.

There is a significant difference in the working memory and its sub-variables (attention and concentration & short-term auditory memory) between intellectually gifted adolescents and intellectually average adolescents. Hence, the hypothesis is rejected.

Hypothesis 3.4

There is no significant difference in the processing speed and its sub-variables (visuomotor coordination and short-term visual memory) between intellectually gifted adolescents and intellectually average adolescents.

The results revealed that there is a significant difference in the processing speed and its sub-variables (visuomotor coordination and short-term visual memory) between intellectually gifted adolescents and intellectually average adolescents. Hence, the hypothesis is rejected.

Hypothesis 4

There are no significant differences in cognitive variables with respect to levels of giftedness (low vs high) among intellectually gifted adolescents.

Hypothesis 4.1

There is no significant difference in verbal comprehension and its sub-variables (Verbal reasoning, social judgment and learning ability with respect to levels of giftedness (low vs high) between intellectually gifted adolescents.

There is a significant difference in verbal comprehension and its sub-variables (Verbal reasoning, social judgment and learning ability with respect to levels of giftedness (low vs high) between intellectually gifted adolescents. Hence, the hypothesis is rejected.

Hypothesis 4.2

There are no significant differences in perceptual reasoning and its sub-variables (Visual perception and organization, abstract reasoning and fluid reasoning) with respect to levels of giftedness (low vs high) between intellectually gifted adolescents.

There is a significant difference in perceptual reasoning and its sub-variables (Visual perception and organization, abstract reasoning and fluid reasoning) with respect to levels of giftedness (low vs high) between intellectually gifted adolescents. Hence, the hypothesis is rejected.

Hypothesis 4.3

There are no significant differences in working memory and its sub-variables (Attention and concentration & short-term auditory memory) with respect to levels of giftedness (low vs high) between intellectually gifted adolescents.

There are significant differences in working memory and its sub-variables (Attention and concentration & short-term auditory memory) with respect to levels of giftedness (low vs high) between intellectually gifted adolescents. Hence, the hypothesis is rejected.

Hypothesis 4.4

There are no significant differences in processing speed and its sub-variables (Visuo-motor co-ordination and short-term visual memory) with respect to levels of giftedness (low vs high) between intellectually gifted adolescents.

The results revealed that there are significant differences in processing speed and its sub-variables (Visuo-motor coordination and short-term visual memory) with respect to levels of giftedness (low vs high) between intellectually gifted adolescents. Hence, the hypothesis is rejected.

Hypothesis 5

There are no significant differences in cognitive variables with respect to gender among IGA.

Hypothesis 5.1

There is no significant difference in verbal comprehension and its sub-variables (Verbal reasoning, social judgment and learning ability) with respect to gender among intellectually gifted adolescents.

The results revealed that there is no significant difference in verbal comprehension and its sub-variables, social judgment and learning ability, except verbal reasoning, with respect to gender among intellectually gifted adolescents. Hence, the hypothesis is partially rejected.

Hypothesis 5.2

There is no significant difference in perceptual reasoning and its sub-variables (Visual perception and organization, abstract reasoning and fluid reasoning) with respect to gender among intellectually gifted adolescents.

The results revealed no significant difference in perceptual reasoning and its sub-variables, visual perception and organization, and fluid reasoning, except abstract reasoning, with respect to gender among intellectually gifted adolescents. Hence, the hypothesis is partially rejected.

Hypothesis 5.3

There is no significant difference in working memory and its sub-variables (Attention and concentration & short-term auditory memory) with respect to gender among intellectually gifted adolescents.

The results revealed that there is a significant difference in working memory and its sub-variable, short-term auditory memory, except attention and concentration, with respect to gender among intellectually gifted adolescents. Hence, the hypothesis is rejected.

Hypothesis 5.4

There is no significant difference in processing speed and its sub-variables (Visuo-motor coordination and short-term visual memory) with respect to gender among intellectually gifted adolescents.

There is a significant difference in processing speed and its sub-variable, short-term visual memory, except for visuospatial coordination, with respect to gender among intellectually gifted adolescents. Hence, the hypothesis is rejected.

Hypothesis 6

There are no significant differences in the parenting style (authoritarian, authoritative and permissive) among intellectually gifted adolescents and intellectually average adolescents.

The results revealed that there are no significant differences in the parenting style (authoritarian, authoritative and permissive) among intellectually gifted adolescents and intellectually average adolescents. Hence, the hypothesis is accepted.

Hypothesis 7

There are no significant differences in parenting style (authoritarian, authoritative and permissive) with respect to levels of giftedness (low vs high) among intellectually gifted adolescents.

The results revealed that there are no significant differences in parenting style (authoritarian, authoritative and permissive) with respect to levels of giftedness (low vs high) among intellectually gifted adolescents. Hence, the hypothesis is accepted.

Hypothesis 8

There are no significant differences in parenting style (authoritarian, authoritative and permissive) with respect to gender among intellectually gifted adolescents.

The results revealed that there are no significant differences in parenting style (authoritarian, authoritative and permissive) with respect to gender among intellectually gifted adolescents. Hence, the hypothesis is accepted.

Hypothesis 9

There is no significant difference in emotional and behavioural problems (total) among intellectually gifted adolescents and intellectually average adolescents.

Hypothesis 9.1

There is no significant difference in emotional symptoms between intellectually gifted adolescents and adolescents with average intelligence.

The results revealed no significant difference in emotional symptoms between intellectually gifted and intellectually average adolescents. Hence, the hypothesis is accepted.

Hypothesis 9.2

There is no significant difference in inattention/hyperactivity symptoms among intellectually gifted adolescents and intellectually average adolescents.

The results revealed that there is a significant difference in inattention/hyperactivity symptoms among intellectually gifted adolescents and intellectually average adolescents. Hence, the hypothesis is rejected.

Hypothesis 9.3

There is no significant difference in conduct problems among intellectually gifted adolescents and intellectually average adolescents.

The results revealed that there is no significant difference in conduct problems among intellectually gifted adolescents and intellectually average adolescents. Hence, the hypothesis is accepted.

Hypothesis 9.4

There is no significant difference in peer problems among intellectually gifted adolescents and intellectually average adolescents.

The results revealed that there is a significant difference in peer problems among intellectually gifted adolescents and intellectually average adolescents. Hence, the hypothesis is rejected.

Hypothesis 9.5

There is no significant difference in emotional and behavioural problems (total) among intellectually gifted adolescents and intellectually average adolescents.

The results revealed that there is a significant difference in total EBP among intellectually gifted adolescents and intellectually average adolescents. Hence, the hypothesis is rejected.

Hypothesis 10

There is no significant difference in emotional and behavioural problems between low-gifted and highly gifted adolescents.

Hypothesis 10.1

There is no significant difference in emotional symptoms between low-gifted and highly gifted adolescents.

The results revealed that there is no significant difference in emotional symptoms between low-gifted and highly gifted. Hence, the hypothesis is accepted.

Hypothesis 10.2

There is no significant difference in inattention/hyperactivity symptoms between low-gifted and highly gifted.

The results revealed that there is no significant difference in inattention/hyperactivity symptoms between low-gifted and highly gifted. Hence, the hypothesis is accepted.

Hypothesis 10.3

There is no significant difference in conduct problems between low-gifted and highly gifted.

The results revealed no significant difference in conduct problems between low-gifted and highly gifted. Hence, the hypothesis is accepted.

Hypothesis 10.4

There is no significant difference in peer problems between low-gifted and highly gifted.

The results revealed that there is a significant difference in peer problems between low-gifted and highly gifted. Hence, the hypothesis is rejected.

Hypothesis 10.5

There is no significant difference in emotional and behavioural problems (total) between low-gifted and highly gifted adolescents.

The results revealed that there is no significant difference in emotional and behavioural problems (total) between low-gifted and highly gifted. Hence, the hypothesis is accepted.

Hypothesis 11

There are no significant differences in emotional and behavioural problems with respect to gender among IGA.

Hypothesis 11.1

There are no significant differences in emotional symptoms with respect to gender among IGA.

The results revealed that there are no significant differences in emotional symptoms with respect to gender among IGA. Hence, the hypothesis is accepted.

Hypothesis 11.2

There are no significant differences in conduct problems with respect to gender among IGA.

The results revealed that there are no significant differences in conduct problems with respect to gender among IGA. Hence, the hypothesis is accepted.

Hypothesis 11.3

There are no significant differences in inattention/hyperactivity with respect to gender among IGA.

The results revealed that there are no significant differences *with respect to gender among IGA*. Hence, the hypothesis is accepted.

Hypothesis 11.4

There are no significant differences in peer problems with respect to gender among IGA.

The results revealed significant differences in peer problems with respect to gender among IGA. Hence, the hypothesis is rejected.

Hypothesis 11.5

There are no significant differences in total EBP with respect to gender among IGA.

The results revealed that there are no significant differences in total emotional and behavioural problems with respect to gender among IGA. Hence, the hypothesis is accepted.

Hypothesis 12

There is no significant relationship between intellectual giftedness and EBP among IGA.

The results revealed no significant relationship between intellectual giftedness and emotional and behavioural problems, except for a weak relationship with conduct problems. Hence, the hypothesis is accepted.

Hypothesis 13

There is no significant relationship between cognitive domains and EBP among IGA.

Hypothesis 13.1

There is no significant relationship between verbal comprehension and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

The results revealed no significant relationship between verbal comprehension and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA. Hence, the hypothesis is accepted.

Hypothesis 13.2

There is no significant relationship between perceptual reasoning and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

The results revealed a significant relationship between perceptual reasoning and EBP (conduct problems, peer problems and total EBP) except for emotional problems and inattention/hyperactivity. Hence, the hypothesis is partially rejected.

Hypothesis 13.3

There is no significant relationship between working memory and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

The results revealed no significant relationship between working memory and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA. Hence, the hypothesis is accepted.

Hypothesis 13.4

There is no significant relationship between processing speed and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

The results revealed no significant relationship between processing speed and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA. Hence, the hypothesis is accepted.

Hypothesis 14

There is no significant relationship between parenting style and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

Hypothesis 14.1

There is no significant relationship between authoritative parenting style and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

The results revealed a significant relationship between authoritative parenting style and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA. Hence, the hypothesis is rejected.

Hypothesis 14.2

There is no significant relationship between authoritarian parenting style and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

The results revealed a significant relationship between authoritarian parenting and EBP (emotional problems, conduct problems, peer problems and total EBP) except inattention/hyperactivity. Hence, the hypothesis is partially rejected.

Hypothesis 14.3

There is no significant relationship between permissive parenting style and EBP (emotional problems, inattention/hyperactivity, conduct problems, peer problems, total EBP) among IGA.

The results revealed no significant relationship between permissive parenting style and EBP (inattention/hyperactivity, conduct problems, peer problems, total EBP) except emotional problems among IGA. Hence, the hypothesis is partially rejected.

Hypothesis 15

The cognitive domains (VC, PR, WM, PS) and parenting style do not have a predictive role in EBP among IGA.

Hypothesis 15.1

The cognitive domains (VC, PR, WM, PS) and parenting style do not have a predictive role in total EBP among IGA.

Perceptual reasoning, authoritative parenting and authoritarian parenting have a predictive role in total EBP among IGA. Hence, the hypothesis is partially rejected.

Hypothesis 15.2

The cognitive domains (VC, PR, WM, PS) and parenting style do not have a predictive role in emotional problems among IGA.

Processing speed, authoritarian parenting and authoritative parenting have a predictive role in emotional problems among IGA. Hence, the hypothesis is partially rejected.

Hypothesis 15.3

The cognitive domains (VC, PR, WM, PS) and parenting style do not have a predictive role in conduct problems among IGA.

Perceptual reasoning, authoritarian parenting, authoritative parenting and permissive parenting have a predictive role in conduct problems among IGA. Hence, the hypothesis is partially rejected.

Hypothesis 15.4

The cognitive domains (VC, PR, WM, PS) and parenting style do not have a predictive role in inattention/hyperactivity symptoms among IGA.

Authoritative parenting and permissive parenting have a predictive role in inattention/hyperactivity problems among IGA. Hence, the hypothesis is partially rejected.

Hypothesis 15.5

The cognitive domains (VC, PR, WM, PS) and parenting style do not have a predictive role in peer problems among IGA.

Perceptual reasoning and authoritarian parenting have a predictive role in conduct problems among IGA. Hence, the hypothesis is partially rejected.

Major findings (Phase II)

Regarding the identification of IGA,

- About 3.60% intellectually gifted adolescents were identified from the school setting using WISC-IV.
- About 75.47% of IGA belong to the low gifted adolescents and 24.52 % highly gifted adolescents were identified.

Regarding sociodemographic aspects,

- The results indicate that gender, age, syllabus type, residence, family type, and ordinal position are not significantly associated with intellectual giftedness.
- More females than males were identified as intellectually gifted.
- A higher proportion of adolescents studying under the CBSE curriculum achieved the cutoff score for intellectual giftedness than their counterparts from the State board.
- More IGA and IAA were from nuclear families and urban backgrounds.
- More identified IGA are firstborns and lastborns.
- More IGA and IAA were from the upper middle-class strata.
- Compared to the parents of IAA, the parents of IGA have professional and post-graduation qualifications. More parents of IGA were highly professional.

Regarding academic aspects,

- Intellectual giftedness is associated with higher academic achievement.
- A higher proportion of IGA has qualified for scholarship exams at various levels than IAA.

- A significant association between intellectual giftedness and subject excellence. IGA students were more likely to excel in subjects like mathematics (18.9%) and physics (12.3%) compared to IAA.
- IGA were far more likely to win scholarships in Mathematics (22.64%) and Science (7.55%) than their peers (Math: 2.83%, Science: 5.7%).
- The most preferred activities of IGA are arts and sports (12.3), sports (19.8) and Verbal skills (8.5%). And the majority preferred any sort of activities apart from academics.

Regarding cognitive domains,

- Though all the cognitive domains (VC, PR, WM and PS) might act as cognitive markers of intellectual giftedness, VC and PS relatively act as a higher cognitive strength among IGA.
- Perceptual reasoning is the most distinguishing cognitive domain that differentiates IGA from IAA.
- VC and PR are the discriminating cognitive domains of highly gifted adolescents from low-gifted.
- The processing speed is the only cognitive domain in which higher processing in girls and boys tends to have higher VC, PR and WM.

Regarding psychosocial domains,

- A subset of IGA has EBP at a ‘clinically significant level’. Among those, peer problems and inattention/hyperactivity in IGA are more prevalent than IAA.
- More than half of the mothers follow an authoritative parenting style in both groups. Nearly 40% follow an authoritarian parenting style also.

- There is no significant difference in parenting style between IGA and IAA. The mean rank comparison reveals that the mother of gifted adolescents tend to be more authoritative, less authoritarian and less permissive than parents of IAA.
- No differences are found in three parenting styles while comparing low-gifted and highly gifted adolescents. Still authoritarian parenting style is higher in mothers of highly gifted adolescents.
- Parenting practices of IGA may not vary based on gender differences.
- Emotional and behavioural problems tend to be high in IGA when compared with IAA. Peer problems and inattention/hyperactivity problems seem to be higher in IGA than in IAA.
- The level of giftedness has an impact on EBP. Highly gifted adolescents have more peer problems than the low-gifted group, and is significant. Compared to low gifted, conduct problems and hyperactivity issues were more common in the highly gifted.
- Gender has a role on emotional symptoms of IGA, where females have higher problems than males. Though not significant, the total EBP were also higher for females when compared to males.

Regarding the association of variables among IGA,

- Intellectual giftedness and conduct problems have a positive association but a weak relationship is noted.
- The perceptual reasoning has a significant positive association with conduct problems, peer problems and total EBP.
- The authoritative parenting is negatively correlated with emotional symptoms, conduct problems, hyperactivity/Inattention, peer problems and total difficulty.

- The authoritarian parenting is positively correlated with emotional symptoms, conduct problems, peer problems and total difficulty in the study.

Regarding predictors of EBP among IGA,

- Perceptual reasoning and parenting style act as predictors for total EBP, conduct problems and peer problems among IGA.
- Perceptual reasoning and authoritarian parenting positively predicted total EBP and authoritative parenting negatively predicted total EBP.
- The processing speed and authoritarian parenting positively predicted emotional problems and authoritative parenting style negatively predicted emotional problems among IGA.
- Perceptual reasoning, authoritarian parenting and permissive parenting positively predicted conduct problems and authoritative parenting negatively predicted conduct problems.
- For inattention/hyperactivity symptoms, the only predictor was parenting style. The permissive parenting positively predicted and authoritative parenting negatively predicted the symptoms.
- Perceptual reasoning and authoritarian parenting positively predicted peer problems.
- The study identified five distinct subgroups/clusters of intellectually gifted adolescents by analysing the cognitive and psychosocial characteristics, which would benefit from a tailored intervention plan.

In conclusion, this study embarked on a comprehensive journey to address the research gaps in the gifted population. Findings suggest that though the intellectually gifted adolescents are cognitively excellent compared to peers, a subset of such adolescents are facing more emotional and behavioural

problems than their peer group. Both the parenting styles and cognitive overexcitabilities play a role in it. Hence, channelising the cognitive domains like perceptual reasoning while modulating the parenting style is appropriate for the positive mental health of IGA. The findings advocate for comprehensive identification and intervention frameworks that integrate cognitive excellence with psychosocial well-being.

CHAPTER 5

RECOMMENDATIONS

- Implications
- Limitations
- Suggestions for future research

This section provides implications, limitations and suggestions for future research.

IMPLICATIONS

The National Education Policy, 2020, clearly states the need for the identification and nurturing of giftedness in India's children. School is the community where students, teachers, and parents interact, and it is the place where integration begins and continues until 17 years age of. Hence, identifying such talents and nurturing them through school education in terms of intellectual and cognitive stimulations, focusing on academic and non-academic aspects, improving their mental health and social support will definitely contribute to India's aspirations for the future. The human talent has to be flourished and indeed is part of our national development. In this scenario, current research findings have shed light on making changes at the school level, clinical field, research field, community level, policy making and to oneself.

1. School level

✓ *Cognitive well-being through a cognitive-based academic curriculum*

- Identifying IGA with the composite ability test (WISC-IV) rather than the mono-ability test provides a wide opening to school authorities in terms of exploring their different cognitive skills and thereby focusing on their cognitive strength and improving their cognitive weakness. The academic curriculum could be altered in a way to more accelerated way of experiential learning based on their strength-based skill. For eg; In gifted adolescents with high perceptual reasoning, academic programs benefit immensely from visual-spatial, design-oriented, and problem-solving-rich approaches. Aligning the curriculum with

their cognitive strengths supports deeper understanding, reduces boredom, and allows them to demonstrate their actual intellectual potential.

- Gifted children crave mental stimulation. When their schoolwork is too easy or repetitive, they can become bored, disengaged, or even depressed. The schools could offer enrichment activities (independent projects, research based assignments, logic puzzles and advanced reading. Teachers can encourage creative problem solving or allow them to explore areas of interest deeply. Providing autonomy in learning (eg; choice of project topics/self paced learning) may helps them to excel in their own areas.
- Our schools can implement a cognitive-based academic curriculum, rather than relying on a single prescribed textbook. This approach involves more practically oriented teaching methods with hands-on experiences, and students are encouraged to ask questions freely. Students are also encouraged to develop self-study skills and undergo continuous and comprehensive evaluation by tracking their progress through the IGA. The curriculum should challenge the students' intellect and creativity.

✓ ***Associating with national institutes***

- Schools can initiate more exposure to intellectually gifted adolescents, like minor research works associated with national institutes, which would help them to share and explore their ideas, improving thinking skills and getting to know about it in their adolescent period would benefit them as they are at the crossroads of their careers.

- The schools could incorporate curriculum compacting, acceleration methods in subjects and classes, and modify curriculum content to accommodate advanced learners.

✓ ***Gifted education centres***

- Schools can open resource centres for gifted education and for counselling services for IGA, just like we had BRCs focusing on learning disability, autism, intellectual disability, etc, and training teachers to look into their cognitive potential and their psychological vulnerabilities.

✓ ***Awareness on scholarship programmes***

- The findings also help to develop awareness and readiness about the competitive examinations like Olympiad, talent development, etc, where an advanced level of learning experiences can be seen and trained.

✓ ***Addressing their emotional needs***

- The identification can extend to lower grades as enrichment programmes can start earlier and also to observe their behavioural and emotional aspects. A portfolio can be kept for monitoring and tracking their progress. Regular mentoring with experts, counselling and nurturing sessions help in ensuring the development of gifted adolescents.
- The clustering of IGA with cognitive-psychosocial variables underscores that gifted adolescents deal with cognitive diversity along with psychosocial issues. Understanding and correctly addressing these related problems allows us to offer them a therapeutic alternative adaptive to their needs in a holistic way.

- Teach emotional regulation through mindfulness, journaling or self-reflection activities, normalise failure and help them see mistakes as part of growth, use growth mindset language (eg, “You are learning from this challenge”) instead of ability-focused praise (‘You are so smart’). Guiding them to reflect on effort and the learning process rather than score fosters resilience and happiness.

✓ ***Peer mentoring***

- Pair with empathetic peers rather than only high achievers to reduce competitiveness and loneliness. Associating with peers who are similar in mental age rather than chronological age, facilitates mixed-age interactions and encourages friendships with intellectual peers or like-minded peers may be helpful.
- Teach social emotional skills like empathy, teamwork and perspective taking.

✓ ***Membership and connect to the Gifted clubs and associations***

- The researcher connects a few adolescents to Menza India, the national chapter of the High IQ Society. They will get an opportunity to meet up different human intellectual resources with different expertises in science, finance, art, politics, astronomy, chess, puzzles, sports, social work, spirituality etc.. Teen special interest group can discuss topics of mutual concerns and prepare for their future career aspects.
- The researcher makes aware about the at-risk features and clinically significant problems of EBP to teachers and parents based on findings. Few parents consider the issues with utmost care and take the necessary psychological help. Also introduced and referred to the Kaveri Gifted Education centre, Pune, where

education for the gifted population is considered and mental health issues have been addressed.

2. Clinical field

✓ *Understanding their dual needs*

- Recognising and addressing their gifted adolescents' co-occurring difficulties such as ADHD, emotional problems, and behavioural issues, along with high cognitive ability, would help them to validate both their talent and struggles. Other wise if the problem behaviour is treated without attending to giftedness, he may feel misunderstood as 'broken', deepening distress. Hence, validating both sides -cognitive strength and psychosocial vulnerabilities is the key.

✓ *Therapeutic approaches*

- Findings reveal that high PRI is associated with conduct problems, peer problems and total EBP. In such cases, strength-based counselling and emotion regulation and mindfulness from early years may be beneficial.
- In strength-based counselling, the focus is on what they do well and this cognitive strength can be used to reframe challenges logically, giving them control over emotions.
- Teaching them self-awareness skills, breathing techniques, guided imagery, using metacognitive reflection is a part of mindfulness.
- Addressing and making them 'why' 'something works, implementing rational analysis, and encouraging problem-solving autonomy.

✓ ***Family-based interventions***

- The authoritarian parenting is associated with EBP in our study. This could be intervened by
- Psychoeducation for parents - Understanding asynchronous development. a child may think like a 16-year-old but behave emotionally like a 10-year-old.
- Promote acceptance over achievement.
- Encourage realistic goal-setting, open communication, and unstructured time for play and relaxation.

3. Community level

✓ ***Encouraging social happiness***

- Social mismatch (feeling “different”) is a key unhappiness trigger. Peer relationships are addressed in our study. The community could facilitate interest-based groups (coding, robotics, literature, arts), teach social reasoning and perspective-taking - understanding others’ viewpoints helps gifted children feel more connected and provide community or volunteer projects to let them use their abilities for meaningful causes - this boosts self-worth.
- The community can regional regional-based (district-based or state-wide) intellectual meet-ups. The region-wise adults who passed out from national institutes in different subjects can provide mentorships to them and hence a community growth could happen.
- Awareness programmes, identifying gifted ones through panchayath level and guiding them would develop the community strength in intellectual way.

4. Policy making

The findings of this study can help shape education and child development policies in India, especially as the country moves toward implementing the National Education Policy (NEP 2020). The points to be implicated are :

- Schools could be asked to use simple, standardized tests and teacher checklists to spot gifted children early, in line with NEP 2020 goals.
- Policies can focus on outreach programs in government and rural schools, ensuring that gifted children from all sections of society are recognized and nurtured.
- Policies should make it mandatory for schools to have trained counsellors and psychologists as part of gifted education programs, so that children's mental health needs are supported alongside academics.
- Teachers are often the first to notice a child's talent. Policy should ensure that teacher-training programs include modules on identifying and handling gifted learners.
- Since parenting style was found to affect children's behaviour and well-being, government programs and policy frameworks could include awareness campaigns for parents on effective and supportive parenting practices.
- India can benefit from creating a national centre or unit for gifted and talented education under NCERT or the education ministry. Such a body can guide schools, collect data, train teachers, and support research like this one to improve gifted education policy.

- Platforms like Mensa India, Project Dhruv, and Tribal Mensa already identify and nurture gifted children. Policies could collaborate with such programs to expand reach, especially in rural and government school settings.
- The government could include long-term follow-up of identified gifted children to understand their educational progress and well-being. This information can help improve gifted education plans over time.

LIMITATIONS

A few limitations of the study have to be acknowledged:

- The sample size was somewhat limited and also geographically localised to a specific region, which may pose some constraints concerning the generalisation of results.
- The teacher nominated the adolescents, without attending/completing any prior training programmes conducted by gifted education centres. They may not have a vast knowledge in nominating intellectually gifted adolescents and the researcher was the only source of contact.
- The underachieving high-ability/ IG students were not overlooked, as the identification is through a purposive method. Our study includes a higher proportion of high achievers.
- The study failed to incorporate all the adolescents for the screening of giftedness through IQ tests and relied on teacher nomination initially.
- Adolescents from lower strata and Malayalam medium were not included.
- The General Ability Index, a combination of VCI and PRI, was considered to identify gifted children and adolescents in WISC-IV. We do not think this

because it was not within the scope of our main purpose and there was no norm study from India related to GAI.

- In the present study, Block Design was scored using time bonuses, as outlined in the WISC-IV scoring procedure. While this approach captures efficiency and quick visual-spatial reasoning, it may unintentionally exclude adolescents who demonstrate high conceptual ability but work at a more deliberate pace. Such adolescents often arrive at accurate solutions but take longer to do so, which reduces their overall score and can lower their Full-Scale IQ below cutoff.
- The academic curriculum training is different for the State and CBSE streams and the tools are not adjusted to such training effects and this might influence the CBSE students' high performance to a certain extent, at least in the domains of VC and PS.
- The research does not go beyond the IQ score to measure intellectual giftedness. Qualitative assessments that determine creativity and motivation, as well as continuous evaluation from teachers, including curriculum-based measures, could be added for a more comprehensive understanding.
- The study is limited to the incorporation of qualitative analysis and case study discussion, thereby restricting a comprehensive understanding of individual differences in terms of cognitive diversity and psychosocial problems among IGA.
- The reliance on self-reported data on parenting style and emotional and behavioural problems may be overrated or underrated due to social desirability bias, stigma and fear of judging parents. Parent-reported data is a lacuna.

SUGGESTIONS FOR FUTURE RESEARCH

Several key recommendations can be made based on the lacunae identified in our study to facilitate more accurate and meaningful future research.

- **Reducing the IQ cutoffs for gifted education programmes:** Though the adolescents with Full-scale Intelligence Quotient of 125 and above (SD+2) are defined as gifted in some sources, the technical book of WISC-IV suggested a superior intelligence of 120 and above and very superior intelligence of 130 and above. Few others used the cutoff score of 119 (Karnes and Brown,1980), the cutoff score of 127(Fishkin et al., 1996) and 130 (Hollinger and Kosek,1986). Considering an IQ score of 120 and above would be more beneficial for gifted education programmes, as PSI may be lower for gifted adolescents at times, which may hinder the score from reaching 125 and above.
- **Practical considerations while administering tests:** Scoring without a time bonus in the block design test may provide a more accurate representation of visual-spatial reasoning and problem-solving ability in adolescents whose strength lies in thoughtful, methodical analysis rather than speed. This approach will help capture a wider and more equitable spectrum of gifted learners, including those with asynchronous cognitive profiles or comparatively lower Processing Speed.
- **Broadening the conceptualisation of cognitive giftedness:** Some adolescents who display gifted-level verbal comprehension may show only an average level of processing speed, making it difficult for them to reach the full-scale threshold of 130 or 125. Therefore, the four core WISC-IV domains- Verbal comprehension, Perceptual reasoning, Working memory and Processing speed

should be considered as distinct categories of cognitive giftedness. Future studies should explore identification and evaluation procedures that recognize these domain-specific strengths, as the prevalence of different cognitive giftedness profiles might be substantial.

- **Incorporating multiple dimensions of giftedness:** The dimensions such as talent, creativity, task commitment and motivation should be included in comprehensive assessment frameworks. Future research should also assess adolescents' strength in specific domain such as music, art, mathematics and other areas of high ability to provide a more holistic understanding of giftedness.
- **Exploring psychosocial moderators and mediators:** As the present study found no significant association between intellectual giftedness and emotional or behavioural problems and only a weak relationship with conduct problems future research should investigate the interaction effects of family dynamics , temperament and self esteem. These factors may play an important role in shaping the mental health outcomes of intellectually gifted adolescents.
- **Quantitative examination of cognitive discrepancies:** Case studies suggest that a discrepancy between verbal and performance IQ may contribute to psychopathology. Future studies can quantitatively examine discrepancy profiles to determine their predictive value for psychosocial outcomes among gifted adolescents to determine the predictive value for psychosocial outcomes among gifted adolescents.
- **Longitudinal research designs:** Given that the study employed a cross-sectional design with a limited time horizon, longitudinal research is needed to

examine the developmental trajectories, transitions, and long-term interactions among cognitive and psychosocial variables.

- **Interpretive considerations in assessing gifted adolescents:** Elevated scores on the Strengths and Difficulties Questionnaire among gifted adolescents may reflect heightened emotional intensity, sensitivity, or developmental asynchrony rather than underlying psychopathology. Given that standard screening instruments are normed on general populations, such measures may not fully capture the unique socio-emotional characteristics associated with giftedness. Accordingly, the interpretation of SDQ findings in gifted samples requires caution to avoid over-pathologisation. Future research may benefit from the inclusion of giftedness-specific assessment tools to more accurately differentiate between adaptive characteristics of giftedness and clinically significant psychosocial difficulties.
- **Prospective study of obsessive-compulsive characteristics:** Obsessive-compulsive features in gifted adolescents were not assessed in the present study due to the lack of disorder-specific tools and the complex overlap with adaptive gifted traits such as perfectionism, orderliness, and need for structure. These features require careful, disorder-informed investigation in future research to distinguish between normative giftedness characteristics and clinically significant obsessive-compulsive traits.
- **Recognising heterogeneity within the gifted group:** The heterogeneous nature of intellectually gifted adolescents underscores the need for research that considers multiple domains and psychometric indicators collectively to improve identification and support strategies.

- **Multi-informant assessment approaches:** Parallel evaluations combining intelligence testing with parent and teacher assessments may provide a richer and more reliable picture of adolescents' functioning. Future studies should consider such multi-informant methods for continuous monitoring.
- **Providing intervention to different clusters of IGA:** Cluster-based profiles offer homogenous subgroups that can be used to design need-based interventions. Future research should focus on developing and evaluating academic, cognitive and psychosocial interventions tailored to these subgroup profiles to enhance overall quality of life.
- **Promoting self-awareness in adolescents and families:** Research may explore programs that help IGA and parents develop awareness of their cognitive and psychosocial strengths and weaknesses, which could improve expectations, coping strategies and adaptive functioning.
- **Brain-Based or Neuroscientific Investigations:** Emerging neuroimaging methods (EEG, fMRI) may help identify neural correlates of cognitive giftedness profiles. Although resource-intensive, such studies could provide deeper biological insights into giftedness. Such investigations would be an addition to the cognitive-psychosocial profiling of EBP of IGA.

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APPENDICES

Appendix A

CONSENT FORM TO PARTICIPATE IN RESEARCH

Parent Consent Form for Adolescents

Subject's Name: _____

Your ward is being requested to participate in a research study conducted by Vimy V Vijayan, from the Post Graduate and Research Department of Psychology at Prajyoti Niketan College, Thrissur. The results of this study will be kept highly confidential and will be used only for research purposes for the completion of a doctoral degree in Psychology. Your ward has been selected because he/she meets the research's inclusion criteria. We encourage you to ask questions if you have at any point in time while answering these questions. If you decide to participate, you will be asked to acknowledge your consent at the bottom of this page and it will be a record of your agreement to participate in your ward. You may ask for a copy of this page _____ to _____ keep.

At any time during the research, you are free to withdraw your consent and discontinue participation without prejudice to your future care.

Purpose and background:

The purpose of this research is to explore the 'Intellectual Giftedness: An Exploratory Study on Cognitive and Psychosocial Domains'. The findings of the results will be helpful to know much more about gifted adolescents in our culture, their educational and cognitive needs and concerns, their mental health difficulties and finally to think over a tailored intervention plan for them for their psychological well-being.

Procedures:

If you agree to participate in this study and sign the consent form, your ward will be asked to complete the assessments and questionnaires required for the research. If you agree to participate in this study, you and your ward will be interviewed either online or in person, at your convenience, for 5 to 10 minutes as part of consent. Finally, your ward will complete a few psychological tests lasting 2 to 3 hrs across 2 or 3 sessions lasting 45 minutes/session in your ward's school setting. Time and appointments will be scheduled as per the convenience

of the school after getting consent from you. Prior scheduling of assessment duration will be coordinated with the school authorities without interrupting the class hours.

Privacy and confidentiality:

Efforts will be made to keep the personal information in our research records private and confidential. Any identifiable information obtained in connection with this study will remain confidential and will be disclosed only with your permission or as required by law. The members of the research team may access the data for analysis and academic use. Data will be kept for at least 3-5 years after the study is complete and published and then it will be destroyed.

Participation is voluntary:

Your decision to participate in this research study is entirely voluntary. You may withdraw from this research study at any time without penalty of any kind or loss of benefits to which you are otherwise entitled. If you have any concerns or questions about your participation in this study, you may contact via email vimyvvijayan@gmail.com or ask directly over the phone PH:9745240217.

Signature of parent/guardian:

I have read the information provided above. I have been allowed to ask questions and all of my questions have been answered to my satisfaction.

By signing this form, I willingly agree to participate in the research it describes

Name of Subject -

Signature of Parent/Guardian –

Signature of investigator:

I have explained the research to the subject's parent/guardian and answered all of his/her questions. I believe that he/she understands the information described in this document and freely consents to participate.

Name of Investigator – Vimy V Vijayan

Signature of Investigator –

Appendix B

Personal Data Sheet

Name :
Age :
Sex :
School : Govt/ Aided/ Unaided/ CBSE/ICSE
Class :
Residence : Urban/ Rural
Socioeconomic Status : Upper/Upper middle/Lower middle/Upper lower/Lower
Family Income :
Father : Education/ Occupation/
Mother : Education/ Occupation/
Siblings /Education :
Family type : Joint/ Nuclear
Academic achievement : Marks obtained / Grade (Last 2yrs average)
(>95% / >90% / >80% / >70% / <60 %)
Scholarship exams (last 3years) : Yes/No (If Yes, details)
Level of scholarship won : Class/School/District/State/National/Nil
Subject in which scholarship won :
Subject excellence :
Participation in Co-curricular
Activities : Arts / Sports/ Craft/ experiments/Abacus, etc/Nil
Attended any Mentoring/Training
Programmes? :
Class Room Behaviour :
Parental Involvement in academics : Low/medium/ High
Previous history of IQ assessment :
Medical Illness/ Psychiatric illness : Yes/No
reported

Appendix C

STANDARD PROGRESSIVE MATRICES- Record Sheet

SET A		SET B		SET C		SET D		SET E	
1		1		1		1		1	
2		2		2		2		2	
3		3		3		3		3	
4		4		4		4		4	
5		5		5		5		5	
6		6		6		6		6	
7		7		7		7		7	
8		8		8		8		8	
9		9		9		9		9	
10		10		10		10		10	
11		11		11		11		11	
12		12		12		12		12	

Score	
Grade	
Percentile	
Discrepancy	

Appendix D

RECORD SHEET

DEVELOPMENTAL PSYCHOPATHOLOGY CHECK-LIST FOR CHILDREN

Sl.No. :Date:

Name of the Child :Class :

Age :Sex :

Mother Tongue : Languages spoken :

Medium of Instruction :Handedness :

Details regarding the family : Age: Education : Occupation :

Child lives with : Father / Mother / Others

a) Psychopathology

1. Poor attention	0	1
2. Distractible	0	1
3. Restless / Overactive	0	1
4. Impulsive	0	1

**Attention
Deficit Hyper
Activity
Problems**

5. Stubbornness	0	1
6. Disobedient	0	1
7. Disruptive	0	1
8. Quarrelsome	0	1
9. Aggressive	0	1
10. Temper tantrums	0	1
11. Truancy	0	1
12. Lying & stealing	0	1

**Conduct
Problems**

13. School refusal	0	1
14. Poor school performance	0	1

15. Reading difficulty	0	1	
16. Writing difficulty	0	1	
17. Arithmetic difficulty	0	1	
18. Forgetfulness, poor memory	0	1	
			Learning Problems
19. Day dreaming	0	1	
20. Withdrawn/Avoids going to school	0	1	
21. Talks little	0	1	
22. Worrying	0	1	
23. Anxious	0	1	
24. Shyness / timidity	0	1	
25. Fearful	0	1	
26. Clinging	0	1	
27. Cries easily	0	1	Emotional Problems
28. Obsessive and compulsive symptoms	0	1	Obsessive And compulsive Symptoms
29. Dizziness	0	1	
30. Aches and pains	0	1	
31. Tiredness	0	1	
32. Stomach ache	0	1	
33. Fainting spells	0	1	
34. Fits	0	1	
35. Pulling sensation	0	1	
36. Chronic physical illness	0	1	
37. Physical handicaps	0	1	Somatic symptoms
38. Hallucinations	0	1	
39. Catatonic features	0	1	
40. Delusions	0	1	

41. Talking/ laughing to self	0	1	
42. Poor appetite	0	1	
43. Poor sleep	0	1	
44. Incontinence	0	1	
45. Loss of interest	0	1	
46. Psychomotor retardation	0	1	
47. Depression	0	1	
48. Pressure of ideas	0	1	
49. Irritable	0	1	
50. Elated	0	1	Psychotic Symptoms
51. Psychosocial Factors	0	1	
52. Family history of	0	1	
53. Mental illness	0	1	
54. Alcoholism	0	1	
55. Epilepsy	0	1	
56. Learning problems	0	1	
57. Bed wetting	0	1	
58. Speech problems	0	1	
59. Mental retardation	0	1	
60. Precipitating factor	0	1	
61. Problems with parents	0	1	
62. Sibling rivalry	0	1	
63. Marital disharmony	0	1	
64. Punitiveness	0	1	
65. Over expectation	0	1	
66. Over involvement	0	1	
67. Over indulgence	0	1	
68. Indifference	0	1	

69. Inconsistent disciplining	0	1
70. Multiple care taking	0	1
71. Single parent	0	1
<hr/>		
72. Change in school/ medium/ subjects	0	1
73. Problem with teachers	0	1
74. Problem with peers	0	1
<hr/>		
75. Poverty, etc.	0	1

Appendix E

Teacher Nomination Criteria for gifted children and adolescents

Please consider each characteristic below in relation to the adolescent you are nominating. The nominated adolescent should demonstrate superior abilities compared to peers in the areas listed. If the student demonstrates the characteristic, please tick (✓); if not, please cross (✗).

SL.No	Characteristic	
1	Good problem-solving/reasoning abilities	
2	Rapid learning ability	
3	Extensive vocabulary	
4	Excellent memory	
5	Long attention span	
6	Personal sensitivity	
7	Compassion	
8	Perfectionism	
9	Intensity	
10	Moral sensitivity	
11	Unusual curiosity	
12	Perseverant when interested	
13	High degree of energy	
14	Preference for older companions	
15	Wide range of interests	
16	Great sense of humour	
17	Early or avid reading ability	
18	Concerned with justice, fairness	
19	At times, judgment seems mature for age	
20	Keen powers of observation	
21	Vivid imagination	
22	High degree of creativity	
23	Tends to question authority	
24	Shows ability with numbers	
25	Good at jigsaw puzzles	

Appendix F

Weschler Intelligence Scale for Children (WISC-IV) India

Record Form

Name :

Date of Birth :

Age :

Behavioral Observation :

Subtests:

	SI	VC	CO	(IN)	(WR)	Total	
Verbal Comprehension (VC)							
Perceptual Reasoning (PR)	BD	PCn	MR	(PCm)			
Working Memory (WM)	DS	LN	(AR)				
Processing Speed (PS)	CD	SS	(CA)				
Full Scale IQ							

1. Block design

Total Raw score	
Total Raw score (BDN)No time bonus	

2. Similarities

Total Raw Score	
-----------------	--

3. Digit Span

	Raw Score
DSF	
DSB	
Total	

4. Picture Concepts

Raw Score	
-----------	--

5. Coding

Raw Score	
Time	

6. Vocabulary

Raw Score	
-----------	--

7. Letter- Number Sequencing

Raw Score	
-----------	--

8. Matrix Reasoning

Raw Score	
-----------	--

9. Comprehension

Raw Score	
-----------	--

10. Symbol Search

Raw score	
-----------	--

Appendix G

PAQ Pertaining to M

Name:

Class & School:

Instructions: For each of the following statements, circle the number on the 5-point scale.

Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5

Try to read and think about each statement as it applies to you and your mother during your years of growing up at home. There are no right or wrong answers, so don't spend a lot of time on any one item. We are looking for your overall impression regarding each statement. Be sure not to omit any items.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	While I was growing up my mother felt that in a well-run home the children should have their way in the family as often as the parents do. *					
2.	Even if her children didn't agree with her, my mother felt that it was for our own good if we were forced to conform to what she thought was right.**					
3.	Whenever my mother told me to do something as I was growing up, she expected me to do it immediately without asking any questions.**					
4.	As I was growing up, once family policy had been established, my mother discussed the reasoning behind the policy with the children in the family.***					
5.	My mother has always encouraged verbal give and take whenever I have felt that family rules and restrictions were unreasonable.***					
6.	My mother has always felt that what children need is to be free to make up their own minds and to do what they want to do, even if this does not agree with what their parents might want.*					

7.	As I was growing up my mother did not allow me to question any decision she had made.**					
8.	As I was growing up my mother directed the activities and decisions of the children in the family through reasoning and discipline***					
9.	My mother has always felt that more force should be used by parents in order to get their children to behave the way they are supposed to.**					
10.	As I was growing up my mother did not feel that I needed to obey rules and regulations of behavior simply because someone in authority had established them.*					
11.	As I was growing up I knew what my mother expected of me in my family, but I also felt free to discuss those expectations with my mother when I felt that they were unreasonable.***					
12.	My mother felt that wise parents should teach their children early just who is boss in the family.**					
13.	As I was growing up, my mother seldom gave me expectations and guidelines for my behaviour.*					
14.	Most of the time as I was growing up my mother did what the children in the family wanted when making family decisions.*					
15.	As the children in my family were growing up, my mother did what the children in the family wanted when making family decisions. *					
16.	As I was growing up my mother would get very upset if I tried to disagree with her.**					
17.	My mother feels that most problems in society would be solved if parents would not restrict their children's activities, decisions and desires as they are growing up. *					
18.	As I was growing up my mother let me know what behavior she expected of me, and if I didn't meet those expectations, she punished me.**					

19.	As I was growing up my mother allowed me to decide most things for myself without a lot of direction from her. *					
20.	As I was growing up my mother took the children's opinions into consideration when making family decisions, but she would not decide for something simply because the children wanted it. ***					
21.	My mother did not view herself as responsible for directing and guiding my behaviour as I was growing up.*					
22.	My mother had clear standards of behaviour for the children in our home as I was growing up, but she was willing to adjust those standards to the needs of each of the individual children in the family.***					
23.	My mother gave me directions for my behaviour and activities as I was growing up and she expected me to follow her direction, but she was always willing to listen to my concerns and to discuss that direction with me.**					
24.	As I was growing up my mother allowed me to form my own point of view on family matters and she generally allowed me to decide for myself what I was going to do.*					
25.	My mother has always felt that most problems in society would be solved if we could get parents to strictly and forcibly deal with their children when they don't do what they are supposed to as they are growing up.**					
26.	As I was growing up my mother often told me exactly what she wanted me to do and how she expected me to do it.**					
27.	As I was growing up my mother gave me clear direction for my behaviours and activities, but she was also understanding when I disagreed with her.***					

28.	As I was growing up my mother did not direct the behaviours, activities and desires of the children in the family .*					
29.	As I was growing up I knew what my mother expected of me in the family and she insisted that I conform to those expectations simply out of respect for her authority.**					
30.	As I was growing up, if my mother made a decision in the family that hurt me, she was willing to discuss that decision with me and to admit it if she had made a mistake. ***					

Appendix H

Strengths and Difficulties Questionnaire

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of how things have been for you over the last six months.

Your Name.....

Male / Female

Date of Birth.:.....

	Not True	Somewhat True	Certainly True
1. I try to be nice to other people. I care about their feelings	☐	☐	☐
2. I am restless, I cannot stay still for long	☐	☐	☐
3. I get a lot of headaches, stomach aches or sickness	☐	☐	☐
4. I usually share with others (food, games, pens etc.)	☐	☐	☐
5. I get very angry and often lose my temper	☐	☐	☐
6. I am usually on my own. I generally play alone or keep to myself	☐	☐	☐
7. I usually do as I am told	☐	☐	☐
8. I worry a lot	☐	☐	☐
9. I am helpful if someone is hurt, upset or feeling ill	☐	☐	☐
10. I am constantly fidgeting or squirming	☐	☐	☐
11. I have one good friend or more	☐	☐	☐
12. I fight a lot. I can make other people do what I want	☐	☐	☐
13. I am often unhappy, down-hearted or tearful	☐	☐	☐
14. Other people my age generally like me	☐	☐	☐
15. I am easily distracted, I find it difficult to concentrate	☐	☐	☐
16. I am nervous in new situations. I easily lose confidence	☐	☐	☐
17. I am kind to younger children.	☐	☐	☐
18. I am often accused of lying or cheating	☐	☐	☐
19. Other children or young people pick on me or bully me	☐	☐	☐
20. I often volunteer to help others (parents, teachers, children)	☐	☐	☐
21. I think before I do things	☐	☐	☐
22. I take things that are not mine from home, school or elsewhere	☐	☐	☐
23. I get on better with adults than with people my own age	☐	☐	☐
24. I have many fears, I am easily scared	☐	☐	☐
25. I finish the work I'm doing. My attention is good	☐	☐	☐

CERTIFICATE

PEARSON ACADEMY INDIA

This is to certify

Mrs Vimy V Vijayan

has attended a workshop
on the administration, scoring, and interpretation of
the **Wechsler Intelligence Scale for Children IV** ^{INDIA},
held on **15th and 16th November 2022**



Vinay Kumar Swamy

Director,

Pearson India Education Services Pvt. Ltd.

CERTIFICATE

This is to certify that Ms./Mr. Vim� V Vijayan has successfully completed
the Course in Gifted Education (**30** Hours of training) between July 20**23** to August 20**23**.

Modules completed:

- | | |
|--|---|
| ☒ Introduction to Giftedness | ☐ Curriculum for the Gifted |
| ☐ Facilitating a Gifted Program | ☐ Counselling the Gifted for Professionals |
| ☒ Counselling the Gifted for Beginners | ☐ Mentoring the Gifted |



Csilla Fuszek
Secretary

European Talent Support Network,
Hungary, Europe



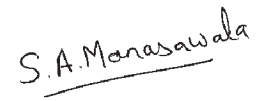
Dr. Devasena Desai
Associate Director, KCEGC

Tribal Mensa Nurturing Program,
TMNP - ETSN Coordinator,
Pune, India



Malati S. Kalmadi
Founder Director

Kaveri Gifted Education
and Research Center
Pune, India



Dr. Sameena Manasawala
Head, Nurturing Domain

Kaveri Gifted Education
and Research Center
Pune, India

Date: 26 / 08 / 2023

Place: Pune