CHAPTER 2

THE REVIEWS OF RELEVANT LITERATURE

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2.1 Preamble

Review of related literature is an important prerequisite to actual planning and execution of any research work. Literature is the mirror which gives the past views and helps to reframe the future study. The previous literature helps to draw some guidelines and helps to develop some insight to carry on further research work. Hence review of literature can be considered to be an important part to carry on investigation into any research work. Researchers emphasize the importance of review as Identification of a problem, development of research design and the determination of the size of a problem which all depend to a great extent on the case and intensity with which a researcher has examined the literature related to intended research”.

A literature review is an evaluative report of studies found in the literature related to the selected area. The review should describe, summarize, evaluate and clarify this literature. It should give a theoretical basis for the research and help you determine the nature of your own research work.

2.2 Classification of the studies

ADHD is one of the most prevalent and vigorously studied psychiatric conditions in child psychology. Yet, despite the large amount of research into this disorder, a number of myths have arisen over the years (Kaplan, 1998). The researcher has studied and gone through few researched related to the present problem under study. Hence all the attempts were made by the researcher to put forth the review related to the present research study. The research suitably located the related studies and identified 18 studies conducted in India and abroad. A brief review of these studies is presented below.
2.3 Study of creativity among ADHD students

1. Anna Abraham et al. (2006), Creative thinking in adolescents with attention deficit hyperactivity disorder (ADHD).

The present study by Anna Abraham widened the attentional focus that is classically associated with ADHD children, has been assumed to be accompanied by enhanced creative ability among adolescent. However, creativity has been only limitedly examined in ADHD. Their Performance across several creativity measures were investigated in three groups: adolescents with ADHD, adolescent with conduct disorder, and a healthy control sample. The ADHD group exhibited selective cognitive advantages and disadvantages by signifying an enhanced ability in overcoming the constraining influence of examples, but a reduced capacity to generate a practical invention during an imagery task. These findings are interpreted with reference to inhibitory control mechanisms and the contextual modulation of creative cognition.


Holly A White & Priti Shah from the University of Memphis University of Michigan respectively published he paper on ADHD and Creativity study showed that, "adults with ADHD showed higher levels of original creative thinking and higher levels of real-world creative achievement, compared to adults without ADHD." They also found that faced with a problem, most people prefer to study the problem or refine ideas, whereas we ADHD adults prefer to generate new ideas … brainstorming (what most people call daydreaming!)

3. Dione Healey & Julia J Rucklidge.(2006) An Investigation into the Relationship Among ADHD Symptomatology, Creativity, and Neuropsychological Functioning in Children

They paper written by Dione & Julia and they examined the relationship between creativity and ADHD symptomatology. First, the presence of ADHD symptomatology within a creative sample was revealed. Secondly, the relationship between cognitive
functioning and ADHD symptomatology was examined by comparing four groups, aged 10–12 years: 1) 29 ADHD children without creativity, 2) 12 creative children with ADHD symptomatology, 3) 18 creative children without ADHD symptomatology, and 4) 30 controls. Creativity, intelligence, processing speed, reaction time, working memory, and inhibitory control were measured as a part of the study. Results showed that 40% of the creative children displayed clinically preeminent levels of ADHD symptomatology, but none met full criteria for ADHD. With regard to cognitive functioning, both ADHD and creative children with ADHD symptoms had deficits in naming speed, processing speed, and reaction time. For all other cognitive measures the creative group with ADHD symptoms outperformed the ADHD group. These findings have implications for the development and management of creative children.

4. Dione Healey & Julia J Rucklidge (April 2016) An Exploration Into the Creative Abilities of Children with ADHD.

The purpose of this study was to explore whether ADHD is associated with high creative ability. Sixty-seven children, ages 10 to 12 (33 ADHD and 34 controls) completed the Torrance Tests of Creative Thinking (TTCT), Maier’s Two-String Problem, and the Block Design and Vocabulary subsets of the Wechsler Intelligence Scale for Children (WISC-III). The results show that there is no significant difference between the ADHD group’s and control group’s performance on either the TTCT, Maier’s Two-String Problem, or WISC-III, suggesting that children diagnosed with ADHD showed more creativity compared to children without the diagnosis.

5. Cramond Bonnie. The Relationship between Attention-Deficit Hyperactivity Disorder and Creativity. (1994)

This study examined the incidence of creativity among individuals with attention deficit hyperactivity disorder (ADHD) and the incidence of ADHD among individuals who are highly creative. The ADHD group consisted of 34 students, between age group 6 to 15. The highly creative group consisted of 76 participants, ages 13 to 15, from the Torrance Creative Scholars Program in Louisiana. Thirty-two percent of the ADHD group scored high enough on the Torrance Test to have qualified for the Creative Scholars program.
The highly creative group completed the Swanson, Nolan, and Pelham Checklist (SNAP), indicating that 20 (26 percent) met the criteria for ADHD, attention deficit disorder with hyperactivity, or attention deficit disorder without hyperactivity, though SNAPs finished by their teachers revealed no elevated levels of hyperactivity, inattention, or impulsivity. The study concludes that a creative child could receive an unwarranted diagnosis of ADHD, and once a diagnosis is made, it is likely that behavior will be seen through that filter and so attributed.


Geraldine also studied creativity among hyperactive children. Discriminant analysis was performed on the combined data from two previous studies of high-IQ children with attention disorder and hyperactivity. The variables that best discriminated these from normal children were left-sided laterality, the ability to perceive coherence tacitly, the use of incidentally acquired information, stimulation seeking, and the use of imagery in problem solving and in a creativity task. Regression analysis indicated that figural creativity is best predicted by the ability to perceive relationships tacitly, by good memory for pictured objects, and by verbal creativity. A model was proposed to help explain the functioning of intelligent and creative attention-disordered individuals.


The objective of this study was to determine whether Ritalin (methylphenidate, MPH) affects cognitive flexibility and creativity in children with Attention Deficit Hyperactivity Disorder (ADHD). Measures were administered included the Wisconsin Card Sorting Test-Revised (WCST-R), the Test of Divergent Thinking (TDT), and the Conners' ADHD rating scale, for both on and off MPH conditions. Comparison of on and off MPH data indicated that MPH administration significantly decreased symptoms of ADHD, as rated by parents on the Conners'. No significant differences were found on the WCST-R as a function of MPH administration. The Elaboration subscale of the TDT was the only scale to show a significant decrease in scores with MPH administration.
2.4 Study of Intelligence among ADHD students

1. Susan Dickerson Mayes & Susan l Calhoun. (WISC-IV and WISC-III Profiles in Children with ADHD)

Wechsler Intelligence Scale for Children, 3rd and 4th editions (WISC-III n = 586 and WISC-IV n = 118), profiles were compared for children with ADHD and normal intelligence. Mean Verbal Comprehension Index (VCI) and Perceptual Organization/Perceptual Reasoning Index (POI/PRI) scores were significantly higher than Freedom from Distractibility/Working Memory Index (FDI/WMI) and Processing Speed Index (PSI), and Symbol Search was higher than Coding. FDI/WMI and PSI scores were similar on both tests, but VCI and POI/PRI were higher on the WISC-IV than on the WISC-III. Therefore, index discrepancies were greater for the WISC-IV, suggesting that the WISC-IV might be better than the WISC-III in delineating the strengths and weaknesses of children with ADHD. All children in the WISC-IV sample scored lowest on WMI or PSI, whereas only 88% of the WISC-III children scored lowest on FDI or PSI. Thus, result established that the WISC-IV may be more helpful in diagnosing ADHD than the WISC-III.

2. Kevin M Antshel (2008). Attention-Deficit Hyperactivity Disorder in the context of a high intellectual quotient/giftedness

The diagnosis of Attention–Deficit Hyperactivity Disorder (ADHD) in children with a high intellectual quotient (IQ) and/or giftedness is controversial with many opinions existing on both sides of the debate. Relationships between IQ and cognitive vulnerabilities frequently described in the ADHD population vary in strength. Data asserting the validity of ADHD in the high IQ/giftedness population were discussed with comparisons made to average IQ ADHD. Educational implications of having ADHD in the context of a high IQ giftedness are presented.

Previous studies show that the symptoms of attention deficit hyperactivity disorder (ADHD) and lower intelligence quotient (IQ) covary in children. They investigated the etiology of this association in a large population – based sample of 5–year old twins. The twins were individually assessed on an IQ test and data on ADHD symptom were obtained from mother interviews and teacher ratings. Confirming previous studies, the phenotypic correlation between ADHD symptom scores and IQ was –0.3 and in a categorical analysis, children with a Diagnostic Statistical Manual of Mental Disorders (DSM-IV) ADHD research diagnosis obtained IQ scores nine points lower, on average than comparison children. The co-occurrence of ADHD and lower IQ has genetic origins: 86% of the association between ADHD symptom scores and IQ and the 100% association between ADHD diagnosis and IQ, was accounted for genetic influence that are shared by ADHD and IQ. Some candidate genes for ADHD could also contribute for variation in IQ or vice versa.


Twenty-six of 30 participants (87%) who took part in a medication study for treatment of ADHD were followed up 2.9 to 4.8 years (Mean = 3.9 years) later. Parent ratings on the Aberrant Behavior Checklist Community (ABC-C) indicated continued problems on the acting-out subscales, and parent assessments on the Stony Brook Checklist-3R showed a high rate of difficulty on domains called ADHD, Conduct Disorder, and Separation Anxiety Disorder. A high percentage of children (69%) were taking psychotropic drugs, substantial numbers of their families had sought nonmedical treatments, children's friendships were often rudimentary, and a significant minority of children had disciplinary problems in school or difficulty with the law. Using Pearson correlations, we identified a number of initial variables that predicted follow-up parent ratings on the ABC-C and Stony Brook. The ABC-C Irritability subscale was useful in predicting both internalizing and externalizing problems at follow-up, whereas parent and teacher
hyperactivity subscales failed to predict later hyperactivity. Children identified with both low intelligence and ADHD appear to have significant behavioral and emotional problems in their early adolescence, and there may be some important qualitative differences in the outcome of these youngsters as compared with that of children identified with ADHD and normal IQ.

5. Kevin M Antshel , Stephen V Faraone et al (2007). Is attention deficit hyperactivity disorder a valid diagnosis in the presence of high IQ?

This study was aimed to assess the validity of diagnosing ADHD in high IQ children and to further characterize the clinical feature associated with ADHD. Total 92 participants were selected with high IQ who did not have ADHD and 49 children with a high IQ that met diagnostic criteria for ADHD. Results showed that children with high IQ and ADHD showed a pattern of familiarity as well as cognitive, psychiatric and behavioral features consistent with the diagnosis of ADHD in children with average IQ.


Results from a Population-Based Study mentioned that ADHD is similar among children with high, normal and low IQ, although high IQ may favourably mediate some outcomes such as reading achievement. Diagnosis and treatment of ADHD are important for all children, regardless of cognitive ability.


This study examined possible differences in children and adults with ADHD. Results indicated that adult self–ratings differed significantly by gender. Adult women reported fewer assets and more problems than did male counterparts, but there was no gender difference with respect to age at referral, intelligence quotient, indicators of neurological performance, or parent or teacher ratings of behaviour. There is non-significant trend for girls with relatively more severe ratings of hyperactivity, conduct disorder, or inattention to be referred earlier than were boys. Overall the results suggest that no evidence of cognitive
or neurological differences by gender in samples that are sensitive to behavioural deviances in girls but adult women’s self-perception is comparatively poorer than that of adult men.

2.5 Study of Academic achievement among ADHD students.

1. D Daley & J Birchwood (2010). ADHD and academic performance: why does ADHD impact on academic performance and what can be done to support ADHD children in the classroom?

   This paper reviews the relationship between ADHD and academic performance. First, the relationship at different development stages is examined, focusing on preschoolers, children, adolescents and adults. Second, the review examines the factors underpinning the relationship between ADHD and academic underperformance.

2. Rachel J Gropper & Rosemary Tannock (2015). Pilot Study of Working Memory and Academic Achievement in College Students with ADHD

   In the present study participants were university students with previously confirmed diagnoses of ADHD \( n = 16 \) and normal control (NC) students \( n = 30 \). Participants completed 3 auditory—verbal WM measures, 2 visual—spatial WM measures, and 1 control executive function task. Also, they self-reported grade point averages (GPAs) based on university courses. After the study the ADHD group displayed significant weaknesses on auditory—verbal WM tasks and 1 visual—spatial task. They also showed a non-significant trend for lower GPAs. Within the entire sample, there was a significant relationship between GPA and auditory—verbal WM. Thus WM impairments are evident in a subgroup of the ADHD population attending university. WM abilities are linked with, and thus may compromise, academic attainment. Parents and physicians are advised to counsel university-bound students with ADHD to contact the university accessibility services to provide them with academic guidance.

To estimate the association between reported medication use and standardized mathematics and reading achievement scores for a US sample of 594 children with attention-deficit/hyperactivity disorder, we used 5 survey waves between kindergarten and fifth grade from the nationally representative Early Childhood Longitudinal Study--Kindergarten Class of 1998-1999 to estimate a first-differenced regression model, which controlled for time-invariant confounding variables. The medication-reading association was lower for children who had an individualized education program than for those without such educational accommodation. The finding of a positive association between medication use and standardized mathematics and reading test scores is important, given the high prevalence of attention-deficit/hyperactivity disorder and its association with low academic achievement. The 2.9-point mathematics and 5.4-point reading score differences are comparable with score gains of 0.19 and 0.29 school years, respectively, but these gains are insufficient to eliminate the test-score gap between children with attention-deficit/hyperactivity disorder and those without the disorder. Long-term trials are needed to better understand the relationship between medication use and academic achievement.

4. U Ek (ullah.ek@specped.su.se)1, J Westerlund2, K Holmberg3, E Fernell4 (2010). Academic performance of adolescents with ADHD and other behavioral and learning problems—a population-based longitudinal study

This study aimed at academic performance (final grades at the age of 16 years) in individuals with) attention-deficit/hyperactivity disorder (ADHD) and ii) other learning and/or behavioral problems. Methods: Of a total population of 591 children, originally assessed at the age of 10–11 years, it was possible to obtain final grades for 536 16-year-olds (in grade 9). Those fulfilling the criteria for ADHD/sub-threshold ADHD (n = 39) and those with ‘Behaviour and Learning Problems’ (BLP group), (n = 80) and a comparison group (n = 417) were contrasted. Results: The ADHD and BLP groups had a
significantly lower total mean grade at the age of 16 years than the comparison group. In addition, the ADHD and BLP groups also qualified for further studies in the upper secondary school to a significantly lesser extent than the controls (72%, 68% and 92%, respectively). All IQ measures (at the age of 10–11 years) were positively correlated with the overall grade after grade 9, with especially strong correlations for verbal capacity.


This literature review synthesizes the available literature that suggests that the underachievement of gifted students may be tied to their inherent and unrecognized creativity. Apparently, many gifted students are underachievers and up to 30% of high school dropouts may be highly gifted. Beginning with the belief that these gifted underachievers may be highly creative, this article first reviews the view that creativity can be a gift, much like intelligence. It then reviews the typical characteristics of gifted underachievers and the similar characteristics of creative underachievers. Finally, it reviews the studies and theories that have shown that once underachievers are placed in an environment that fosters their needs, with motivation, mentors, understanding, freedom, and responsibility, they can become highly productive. Classrooms across the nation are facing ever-increasing pressure to educate every child, especially with the No Child Left Behind (2007) Act. There is a demand for those children who might normally “fall through the cracks” to receive closer attention and potentially greater accommodations than were previously required.

6. Rachel J. Gropper & Rosemary Tannock A Pilot Study of Working Memory and Academic Achievement in College Students with ADHD

To investigate working memory (WM), academic achievement, and their relationship in university students with attention-deficit/hyperactivity disorder (ADHD). **Method:** Participants were university students with previously confirmed diagnoses of ADHD ($n = 16$) and normal control (NC) students ($n = 30$). Participants completed 3 auditory—verbal WM measures, 2 visual—spatial WM measures, and 1 control executive function task.
Also, they self-reported grade point averages (GPAs) based on university courses. **Results:** The ADHD group displayed significant weaknesses on auditory—verbal WM tasks and 1 visual—spatial task. They also showed a non-significant trend for lower GPAs. Within the entire sample, there was a significant relationship between GPA and auditory—verbal WM. **Conclusion:** WM impairments are evident in a subgroup of the ADHD population attending university. WM abilities are linked with, and thus may compromise, academic attainment. Parents and physicians are advised to counsel university-bound students with ADHD to contact the university accessibility services to provide them with academic guidance. (*J. of Att. Dis.* 2008; 12(6) 574-581)


Attention-deficit/hyperactivity disorder (ADHD) is associated with poor grades, poor reading and math standardized test scores, and increased grade retention. ADHD is also associated with increased use of school-based services, increased rates of detention and expulsion, and ultimately with relatively low rates of high school graduation and postsecondary education. Children in community samples who show symptoms of inattention, hyperactivity, and impulsivity with or without formal diagnoses of ADHD also show poor academic and educational outcomes. Pharmacologic treatment and behavior management are associated with reduction of the core symptoms of ADHD and increased academic productivity, but not with improved standardized test scores or ultimate educational attainment. Future research must use conceptually based outcome measures in prospective, longitudinal, and community-based studies to determine which pharmacologic, behavioral, and educational interventions can improve academic and educational outcomes of children with ADHD.


The association between executive function deficits (EFDs) and functional outcomes were examined among children and adolescents with attention-deficit/hyperactivity disorder (ADHD). Participants were children and adolescents with (n = 259) and without
ADHD, as ascertained from pediatric and psychiatric clinics. The authors defined EFD as at least 2 executive function measures impaired. Significantly more children and adolescents with ADHD had EFDs than did control participants. ADHD with EFDs was associated with an increased risk for grade retention and a decrease in academic achievement relative to (a) ADHD alone, (b) controlled socioeconomic status, (c) learning disabilities, and (d) IQ. No differences were noted in social functioning or psychiatric comorbidity. Children and adolescents with ADHD and EFDs were found to be at high risk for significant impairments in academic functioning. These results support screening children with ADHD for EFDs to prevent academic failure. (PsycINFO Database Record (c) 2016 APA, all rights reserved)

2.6 Chapter summary

In this chapter literature review related to Intelligence, Creativity and Academic achievement among ADHD students were collected to give support to the present study.