

Building Resilience among Children and Youth with ADHD through Identifying and Developing Protective Factors in Academic, Interpersonal and Cognitive Domains

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Abstract

Children and youth with ADHD are a vulnerable group susceptible to adversity in wide-ranging life domains. However, many children and youth, irrespective of having ADHD become successful both academically and interpersonally, and improve their cognition. This group can be considered as being "resilient", that is, adapting to the adversity they may face in a positive manner. The overarching goal of this paper is to highlight domains at the academic, interpersonal and cognition levels that are indicative of resiliency among children and youth with ADHD. The secondary goal is to highlight interventions that result in promoting resiliency among this group at these levels. It is necessary for future interventions to be designed and implemented with developing the resiliency of children and youth with ADHD in mind. To achieve this, research needs to begin to identify the strengths of children and youth with ADHD to provide insight into how their strengths can compensate for their weaknesses, and to promote their resiliency leading to success academically, interpersonally and cognitively.

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Introduction

A consistent definition of resilience has not been determined by researchers [1]. However, it is generally accepted that resilience refers to successfully adapting to adverse conditions [2]. Rutter (1990) further proposes that resilience is not a characteristic that is discrete or possessed but that an individual can be resilient to varying degrees depending on the context. It is a result that is dependent on the collaboration and build-up of both environmental and individual components [3]. Attention Deficit/Hyperactivity Disorder (ADHD) can be considered to be indicative of experiencing adversity in multiple life domains [4, 5]. The negative outcomes experienced as a result of ADHD is likely due to the finding that those with ADHD are less resilient compared to their typically developing peers [6]. This is a finding that cannot be attributed to factors including intelligence, anxious and depressive symptomatology, socioeconomic status or age [6].

The adversity children and youth with ADHD experience encompasses the academic, interpersonal and cognitive domains [7, 8, 9, 10, 11, 12]. Nevertheless, approximately 20% of youth with ADHD are able to adapt well despite their diagnosis and as a result are considered resilient. On the other hand, 60%, the majority of those with ADHD, experience outcomes that are considered intermediate, whereas the remaining 20% fare the worst [13, 14]. The group that an individual with ADHD falls into is due to a myriad of interacting factors, including, but not limited to, parenting styles, child characteristics, genes and response to treatment [15, 16, 17].

Because resiliency is a product of the accumulation of protective factors in one's life [18] the overarching goal of this paper is to highlight academic, interpersonal and cognitive protective factors that may promote resiliency among children and youth with ADHD. This will help them to become more successful academically, interpersonally and cognitively. A secondary goal of this paper is to identify existing interventions that lead to the development of protective factors for children and youth with ADHD. The interventions outlined, in part, take a strength-based approach in the context of ADHD. Next, the topic on perceived competency as it relates to protective factors

and resiliency is developed. Finally, concluding remarks are made.

Strength-Based Approach

In order to begin to adopt a strength-based approach to ADHD we need to broaden our understanding of the abilities children and youth with ADHD have, as opposed to their disabilities [20]. Unfortunately, at present, the extant research on ADHD is almost primarily deficit-oriented [21]. However, despite the adversity resulting from the presence of ADHD, children and youth with ADHD can be resilient and as a result become successful in day-to-day life [22]. Thus, what follows describes protective factors in the academic, interpersonal and cognitive domains and outlines interventions aimed at promoting them. The purpose of promoting these three core domains is to help children and youth to become more resilient and thus become more successful as they transition into adulthood.

Academic Protective Factors

Children and youth with ADHD achieve lower grades, perform at lower levels on standardized tests and require special education and school-based services to a greater extent compared to their typically developing peers [23]. However, academic buoyancy and academic resilience may help children and youth with ADHD reach their academic potential.

Academic buoyancy refers to students' ability to overcome various challenges that they may encounter within a day-to-day school context [24]. The concept is related to resiliency because, similar to resiliency, it leads to positive outcomes as it helps children and youth with ADHD overcome obstacles encountered in school and school work [24]. Academic resilience, on the other hand, is defined as the ability to overcome setbacks to one's educational attainment that are considered acute and/or chronic [25].

Academic buoyancy and academic resilience correlate with one another but are distinct [25]. Specifically, lower levels of academic buoyancy include but are not limited to, uncertain control, failure avoidance, poor grades and anxiety and are predictive of minor academic negative outcomes [25]. Lower levels of academic resilience, on the other hand, include but

are not limited to, disengagement, chronic underachievement and self-handicapping and are more predictive of major negative outcomes [25]. It has been determined that academic resilience mediated the relationship between academic buoyancy and major academic negative outcomes [25]. Psychologists and educators can promote academic buoyancy and academic resilience among children and youth with ADHD through a strength-based approach leading them to experiencing greater academic success.

Academic Interventions

Psychologists and educators have a responsibility to promote academic buoyancy and academic resilience among students irrespective of an ADHD diagnosis [25]. A strength-based approach to intervention targeted at children and youth with ADHD recognizes their unique abilities. Likewise, interventions aimed at promoting academic buoyancy and academic resilience among children and youth with ADHD need to identify and target these abilities [21] in order to lead to greater academic success.

In a classroom context, encouraging the students' strengths would then promote their motivation, sense of self-worth and engagement in learning [26,27]. Specifically, the educator, knowing that their student with ADHD is creative, could facilitate group activities where the child or youth with ADHD is given free rein to contribute "out-of-the-box ideas" [21, p. 298]. Their contribution could then be positively recognized and reinforced and, in turn, may help the student with ADHD begin to identify where their strengths exist. This would then foster a better self-concept and respect from peers and educators. Educators could also, to a certain extent, modify academic tasks to be consistent with the student's interests [21]. It has been determined that when children with ADHD are interested in a task they become more motivated and focused to carry it out as well as persist to complete it [28].

Moreover, educators who are enthusiastic, encourage active participation, create novel and diverse learning activities, offer choice and the option to utilize computer-assisted instruction will elicit both interest and successful completion of academic work among students

with a diagnosis of ADHD [27, 28]. With respect to educators interacting with the student, offering praise to the student once he or she demonstrates achievement of a certain objective, such as completing work that has been assigned by the educator, is a common and effective behavioural intervention [29].

Educators can also facilitate their students' ability to self-regulate through demonstrating to them how to monitor, assess and/or ensure their behaviours are reinforced [30]. For instance, both the educator and student can use a Likert scale to evaluate areas of performance, and once ratings between the educator and student closely match one another, the student can be left with the sole responsibility to complete their Likert scale [30]. Self-evaluation has a positive influence on facilitating on-task behavior and academic achievement among students with ADHD [31]. In respect to parent involvement, educators can communicate to the parents of the child or youth with ADHD through a daily report card system which has been demonstrated to be an efficacious home-school method of communication [30]. It is possible that children and youth can be involved in this program to ensure continual communication between all those involved, likely leading to a more positive outcome for the student with ADHD.

Upon entering secondary school, greater levels of academic independence are expected from youth with ADHD [11]. However, like children with ADHD, youth with ADHD continue to struggle academically, especially with respect to on-task behaviour and the organization of information [11]. To help youth with ADHD, Gureasko-Moore, DuPaul and White (2006, 2007) instructed them to monitor their behaviours to successfully prepare themselves for classes and to complete their homework through regular meetings with the school psychologist. The meetings addressed self-management goals and in a scenario where an obstacle was met, the problem was addressed and encouragement for continual development was provided. This program led to improvement in preparation for classes and greater levels of completed homework. These results were maintained over time as the intervention faded [32, 33]. Taken together, these approaches would help children and youth with ADHD

utilize adaptive coping techniques to overcome their areas of weakness [21].

Academic underachievement continues for many college-level youth with ADHD in post-secondary school [34, 35, 36]. ADHD coaching is one form of intervention that has been demonstrated to be successful in helping college-level youth with ADHD achieve academic success [37]. ADHD coaching is a psychosocial intervention that facilitates the development of strategies, skills and behaviours to overcome many of the obstacles a college-level youth with ADHD may face, including time management, planning, organization, solving problems and setting goals [38]. For example, Parker and Boutelle (2009) instructed college-level youth, through coaching, how to form plans of action that were realistic and to use the campus resources at their disposal [38]. In addition to leading to greater academic success, ADHD coaching is associated with the development of improved self-regulation and well-being [37].

The methods to promote academic achievement described here are indicative of fostering academic protective factors such as greater interest in school and becoming more motivated to complete academic tasks. Academic protective factors, including, but not limited to, greater interest and motivation will likely lead children and youth with ADHD to develop academic buoyancy and academic resilience. Finally, this resilience that is brought about through the techniques and strategies discussed above may lead to greater levels of academic success throughout their schooling.

Interpersonal Protective Factors

There exists preliminary cross-sectional support for the presence of quality of relationships and friendships as well as overall support socially for the bolstering of healthy adjustment among children and youth with ADHD [39]. Having high quality relationships with one's own family members could be considered an interpersonal protective factor. An example of interpersonal protective factors for individuals with ADHD is living within a stable and healthy family environment [40, 41]. A positive family environment may lead to better adjustment among individuals with ADHD and diminish the likelihood of the onset of externalizing and internalizing disorders [40, 41, 42].

Specifically, family factors, including time engaging in extracurricular activities together and/or living in a stable healthy home environment, may lead to improved academic outcomes among students with ADHD in college and to a better quality of life [5]. Interestingly, college-level youth with ADHD reported that their fathers served as being the most understanding when it came to meeting their needs emotionally and academically, whereas among college-level youth without ADHD these needs were supported through their friendships [43]. This may mean that family factors, including positive parenting, especially among fathers, may be particularly important among college-level youth with ADHD.

Likewise, the extent of friendship intimacy protects against ADHD symptomatology. Less ADHD symptomatology is predicative of a decrease of in social impairments experienced by children [44]. Importantly, the presence of a friend reduces the likelihood of victimization by peers [45]. Finally, friendships were found to be a mediator in the relationship between quality of life and both internalizing and externalizing disorders [40]. These findings indicate that friendships help children and youth with ADHD and are interpersonal protective factors developing resiliency.

In general, greater levels of social acceptance reported by youth with ADHD are related to improved academic achievement and less impairment as rated by their educators [46]. Moreover, coping well in the presence of adversity in one's life is dependent, in part, on social ability and healthy relationships with peers [47]. Finally, social acceptance protects against inattention in predicting high grades in school [46]. Unfortunately, children with ADHD report lower levels of social support compared to their typically developing peers [48]. Thus, interventions are needed that promote interpersonal skills that lead to the development of healthy family interactions and friendships among children and youth with ADHD.

Interpersonal Interventions

Strengths-based interventions that target interpersonal skills need to include the facilitation of positive relationships as these are a critical interpersonal protective factor among youth at risk [49]. In working with children and youth with ADHD, educators and

parents may experience feelings of ineffectiveness and frustration. These feelings may be defused through interventions targeted at parents and educators that help them to identify the strengths and successes the children and youth with ADHD experience. The identification of strengths is not restricted to children and youth with ADHD. For instance, if interventions also help parents and educators working with this group identify where their own strengths exist and observe the success of interventions they implement, this method may also defuse the ineffectiveness and frustration they may experience as a result of working with children and youth with ADHD [50]. Interventions aimed at improving interpersonal relationships through a strength-based approach can be divided into two categories: family and peers.

Family

Typically, in parent training programs mothers and not fathers participate [51]. It is necessary to involve fathers because, as previously highlighted, healthy relationships with fathers are considered important among individuals with ADHD [43]. This is likely because fathers influence the development of their children with respect to their social cognition and the regulation of emotions, which facilitate their interaction with peers. Furthermore, in positive child-father interactions fewer behavioural problems are observed [52].

One context that may foster positive interactions between the child and the father may be recreational sports [51]. Through recreational sports the child will learn necessary life skills, including working with a team and accepting a loss [51]. For the father of a child with ADHD to overcome his challenges in such contexts he may need the support of a program such as behavioural parent training (BPT) [51]. It has been demonstrated that through the participation of fathers in BPT, improvements were seen in the function of the family and the relationship the father has with his child's mother [53,54]. To corroborate this, McCord (1991) demonstrated in a longitudinal study involving 50 boys that lower levels of conflict between their mother and father led to better adjustment once the boys reached adulthood [55].

Loren et al. (2015) developed an 8-session BPT

intervention. The first session educated parents on ADHD and the effective methods of approaching the symptomatology. The following six sessions explicitly educated parents on behaviour strategies to use in and outside their homes, including interactions with their child, fostering compliance, the use of contingency management methods to encourage behaviour that is positive, as well as various other strategies such as time-outs to limit behaviours seen as challenging. The subsequent session focused on home-school correspondence, such as developing behaviour report cards in addition to formulating methods to ensure homework is complete [56]; this is a concept previously highlighted as necessary for academic achievement [32, 33]. Finally, in the last session, issues discussed in the preceding sessions were covered to ensure maintenance. This BPT intervention led to reduced impairment among children with ADHD, improved relationships among the parent and child and less influence of the child's symptomatology on the family. Importantly, through this BPT intervention, parents indicated greater levels of confidence in their ability to manage their child's ADHD.

In an alternative program to promote a healthy family life, Haydicky, Shecter, Wiener, and Ducharme, (2015) implemented a Mindfulness-Based Cognitive Therapy (MBCT) program, directed at youth with ADHD and their parents. The program included 8 weekly sessions designed to promote mindfulness through meditation. The mindfulness meditation targeted coping with ADHD symptomatology, family relationships, challenging emotions and stress. Concepts that were emphasized included, but were not limited to, developing awareness, being in the moment and openness. This program led to increased attentiveness, fewer externalizing and internalizing problems and better peer relations among youth with ADHD. Finally, through the program, parents reported less stress and more mindful parenting practices [57].

Moreover, research suggests that positive parenting directed at children and youth with ADHD and a cohesive and supportive family has positive influences especially once a child with ADHD transitions to becoming a youth [e.g., 40,41, 42, 58]. Positive parenting is considered one of the most influential resources available for assisting youth to be resilient in

the face of adversity [59, 60]. For instance, a parenting style that is authoritative in nature has been determined to lead to greater academic attainment among youth [61] and to be protective against behaviour deemed to be problematic [62]. Positive parenting may also instil a sense of social support and offer social modeling when interacting with their educators in school and their peers [39]. This notion is in line with research demonstrating that supportive parenting and an authoritative parenting style leads to social competence among youth with a diagnosis of ADHD [e.g., 58].

Importantly, in a literature review and meta-analysis, it was determined by Coates, Taylor and Sayal (2015) that parenting interventions led children to develop their self-esteem and to lower their levels of ADHD symptomatology and externalizing problems [63]. Finally, parenting interventions are critical because research has demonstrated that high levels of stress and greater levels of depression are common among parents who have children with ADHD, and parenting interventions may ameliorate that stress and depression [41]. Overall, it appears that parenting interventions are crucial for fostering protective interpersonal skills such as a harmonious cohesive family environment that have implications for resiliency that extend from both children and youth with ADHD to their parents as well.

Peers

Many children with a diagnosis of ADHD demonstrate impaired styles of interaction with their peers [64]. Interventions are needed to address impaired social skills because failure to intervene early on may lead to persistent peer rejection across settings [65, 66, 67]. In a therapeutic summer camp designed and implemented by Hantson et al. (2012) the goal was to improve the social skills of children with ADHD. Social skills identified for development included: 1) introducing oneself; 2) recognizing emotions; 3) becoming involved in social interactions; 4) managing anger; 5) developing self-control; 6) reacting to teasing and 7) removing oneself from conflict. The therapist demonstrated each skill to the children and encouraged them to role-play and to utilize the skills across settings over the day. The engagement of parents was important, as, by the end of the day, the children auto-evaluated their conduct and entered into a conversation regarding social skills at

their home with them. Feedback from the parents was used by the therapists to help them assess the behaviour of the children while at home. The program additionally offered a parent program involving psychoeducation and training. This program led to improvements in social skills among the children [68].

The goal of social skill interventions is the development of friendships, an interpersonal protective factor and a domain necessary for resiliency among individuals with ADHD [46]. "Friendship is a close relationship between two children that is mutual and reciprocal" [69, p.181]. Unfortunately, compared to their peers, individuals with ADHD are more likely than their typically developing peers to have fewer friendships, and if they have a friendship it is more likely to be characterized as being less stable and of lower quality compared to their typically developing peers [69].

It was reported by Frankel, Myatt, Cantwell and Feinberg (1997) that children with ADHD profited through an intervention that included features encouraging dyadic friendship. In this intervention children were provided with a group-based social skills intervention and their parents participated in parallel sessions whereby they were instructed to reinforce the skills being taught to their children [70]. As previously highlighted, parents are necessary in helping their children with ADHD develop friendships. Parents discussing social skills with their children with ADHD and modelling examples of social skills through their relations increases the likelihood that their children will have exchanges with their peers that are positive [e.g., 71]. Furthermore, the frequent organization of playdates for their children by some parents is related to improving their social abilities. Parents also can instruct their children in behaving in a manner that promotes the development of friendships during play dates [72].

Research aiming to facilitate friendships among children with ADHD also suggests that pairing children with ADHD with a "buddy", based on shared interests and abilities, may be efficacious in developing their friendships [73]. The "buddy system" is suitable in the context of classrooms. This is because educators have a responsibility to promote a classroom environment that accepts and celebrates inclusionary practices. An environment such as this can come about through

valuing the strengths and differences among their students with ADHD in order to promote peer relationships that are positive [72]. For instance, through having been publicly provided with positive feedback and praise, a youth with ADHD will be more socially accepted [74]. Demonstration of interest by the educator in students with ADHD in front of their class is also related to reduced peer rejection and an increase in the value of these students in the eyes of their typically developing peers [75]. Furthermore, praising the strengths of children with ADHD in front of their peers limits peer rejection and facilitates friendships [76].

An intervention called Making Socially Accepting Inclusive Classrooms (MOSAIC) has been developed and implemented by Mikami and her colleagues (2013) with the goal to develop relationships that are positive between the children with ADHD and their peers [77]. The logic behind MOSAIC is based on the impact educators have on the peers' behaviours and perceptions of children with ADHD. The intervention combines behaviour management strategies to encourage social behaviours that are positive in addition to strategies developed to assist educators in encouraging inclusive classrooms where tolerance of children with ADHD by peers is created [77]. The efficacy of MOSAIC has been verified at a summer camp for children with and without ADHD. The results demonstrate that acceptance by the peers of children with ADHD develops, and reciprocal friendships begin to form [77]. As opposed to trying to globally promote social abilities across contexts (typical of many social skills training interventions) that may be ineffective in leading to the development of friendships among individuals with ADHD [69], interventions such as MOSAIC directly facilitate the development of healthy friendships among children with ADHD.

The interventions discussed primarily focus on children with ADHD; however, it is important for future research to further consider implementing friendship interventions designed for youth with ADHD, as they too struggle with interpersonal relationships [78, 79]. From a clinical perspective it may be sensible to promote healthy friendships starting at an early age with the goal to have these friendships maintained from childhood onwards [69].

In general, similar to fostering protective academic factors, it appears that helping children and youth with ADHD develop healthy family relationships and friendships fosters interpersonal protective factors and may lead to feeling more socially supported. As highlighted above, children, and likely youth with ADHD, report feeling less socially supported compared to their typically developing peers [48]. Taken together, the development of protective interpersonal factors through the interventions discussed here may lead to greater levels of resiliency and, as a result, more interpersonal success among children and youth with ADHD.

Cognitive Protective Factors

Through taking a strength-based approach to studying ADHD, it has been determined that children with ADHD have similar levels of ability in reasoning and logical thinking as well as creativity and emotional intelligence compared to their typically developing peers [80, 81, 82]. Unfortunately, as highlighted above, research has demonstrated that children and youth with ADHD typically have more academic and social impairments compared to their typically developing peers [9,83]. Executive functions, a component of cognition, if impaired, may underlie these two domains [9, 84, 85].

Lezak (1995) proposes that executive functions (EFs) are "a collection of interrelated cognitive and behavioural skills that are responsible for purposeful, goal-directed activity and include the highest level of human functioning such as intellect, thought, self-control, and social interaction" [86, p. 42]. Importantly, not all individuals with ADHD have executive dysfunctions and it is possible that certain individuals with ADHD have strengths in one or more areas of EFs leading to academic success. For instance, inhibition and visual-spatial working memory are related to achievement in Science, English and Mathematics, whereas verbal working memory is related to achievement in English [87]. While the extant research centers on executive dysfunctions among children and youth with ADHD, one necessary future avenue for research is to identify where their strengths in EFs exist, as this may allow researchers to understand resiliency among children and youth with ADHD.

In addition to strengths in EFs, high intelligence

is a cognitive protective factor that may promote resiliency. For instance, compared to youth who are solely identified as being gifted, youth who are both gifted and have ADHD have been found to have more creative potential [82]. Furthermore, those who are both gifted and have ADHD prefer to be presented with challenges, competition and pressure compared to those who primarily have ADHD [88]. High intelligence may also protect those who are both gifted and have ADHD from substance abuse disorders, alcohol abuse and antisocial personality disorders [89]. It is likely that children and youth with ADHD do not necessarily have to be identified as “gifted” to lead to these positive outcomes. However, it is likely that higher intelligence, irrespective of an identification of giftedness, is related to these outcomes.

Moreover, intelligence is highly correlated with academic attainment [47, 90, 91]. For instance, higher IQ, irrespective of giftedness, has a negative correlation with school dropout and truancy [92]. Fergusson and Lynskey (1996) concluded that even average IQ is a component that may promote resilience among children coming from high-risk backgrounds [92]. On the other hand, Sameroff, Gutman and Peek (2003) concluded from their study that youth who were deemed less bright but living in low-risk environments fared better than youth deemed to have good intelligence but living in higher-risk environments [93]. This is consistent with the finding that resiliency is lower among individuals with ADHD despite their IQ [6]; because of the adversity they experience their environments could be deemed high-risk.

Overall, regardless of high IQ, children and youth with ADHD will need to be supported educationally through good schools and knowledgeable educators; as well, have good interpersonal skills leading to healthy relationships with their peers and family members. Furthermore, similar to academic and interpersonal interventions, there are cognitive interventions available that would support children and youth with ADHD and help them develop cognitive protective factors leading to greater resiliency and success in their day-to-day lives.

Cognitive Interventions

Medication is the typical form of intervention provided to individuals with ADHD [94] Medication

typically includes psychostimulants (e.g. Methylphenidate) and/or non-stimulants (e.g. Atomoxetine). Psychostimulants such as Methylphenidate are associated with reductions in symptomatology of hyperactivity and impulsivity as well as the promotion of cognition and academic performance among children with ADHD [94, 95]. Strand et al. (2012) found that stimulant medication, in addition to incentives, promotes verbal working memory in contrast to a placebo, no-incentive condition. Importantly, the combination of incentives and stimulant medication improved verbal working memory in comparison to either approach alone [96]. Likewise, Holmes et al. (2009) found that stimulant medication improved visual-spatial working memory [97]. As with stimulant medication, there has been research on the benefits of non-stimulants such as Atomoxetine. Specifically, Atomoxetine leads to improvements in ADHD symptomatology and academic productivity [98, 99]. Further, research suggests that Atomoxetine leads to improvements in inhibitory control [100].

Medication is one approach facilitating cognitive protective factors and research has indicated that receiving medication to treat ADHD improves the social skills and performance on standardized achievement tests among those with the disorder [101,102]. However, research does not indicate that medication used to treat ADHD improves grades or grade retention [102]. On the other hand, Promoting Alternative Thinking Strategies (PATHS) was an intervention designed by Greenberg (2006) that directly promoted resiliency among children through fostering cognitive protective factors [103].

In PATHS, second and third grade children were instructed three times a week with lessons ranging from 20 and 30 minutes. In these lessons children were helped to identify and label their feelings verbally in order for them to then manage them. This was accomplished through integrating “feeling faces” within the intervention whereby the children during the day were to identify both their feelings and the feelings of others. Moreover, the children’s educators facilitated their students’ adoption of PATH skills in the context of their school days in order to help them manage situations eliciting high levels of emotional arousal, such

as conflicts between themselves and the student or the student and their peer(s), or while experiencing frustration academically. The rationale underlying PATHS is that children will develop the ability to plan and to reduce their levels of impulsivity while interacting socially and to adopt language in order to regulate their behaviours and to successfully communicate with their peers and the adults in their life [103].

It was determined that PATHS resulted in a reduction in ratings of both internalizing and externalizing symptomatology by both the children's educators and parents; as well, it led to an increase in emotional and social skills. Importantly, it was found that gains in inhibitory control (an EF) mediated the relationship between being involved in PATHS and educator ratings of externalizing and internalizing symptomatology one year later. It was concluded that neurocognitive functioning is necessary in adaptive functioning at both the emotional and social levels and making direct changes to EFs leads to reducing problematic behaviours among children. Finally, while PATHS is preliminary, it is considered a "case example" of how one might go about implementing a "transdisciplinary" relationship between neuroscientists and prevention scientists [103, p. 146].

Furthermore, educators who help their students compensate for executive dysfunctions through the use of planning and organization strategies that draw on the existing abilities of children and youth with ADHD may also help them become more independent learners and facilitate their self-efficacy [21]. These compensatory strategies that children and youth adopt to overcome their executive dysfunctions can lead to their becoming successful as they transition into adulthood [21].

An alternative approach to developing cognitive skills among individuals with ADHD was the Chicago School Readiness Project (CSRP). CSRP offered Head Start Educators with wide-ranging behaviour-management instruction to limit the stress of educators and promote their ability to instruct students. Strategies included the implementation of clearer rules and procedures, rewarding behaviour that is positive and redirecting behaviour that is negative. CSRP developed the verbal strategies and emotion regulation of educators. Further, mental health consultants led

stress-reduction workshops for the educator throughout the year and children with the most problematic externalizing behaviours were offered individual counselling. Because of CSRP the inhibition, attention and impulsivity of 4-year-olds improved during the course of the year compared to the control group [104].

Moreover, Dowsett and Livesey (2000) demonstrated that repeated exposure to activities designed to facilitate the development of acquiring progressively intricate rule structures may lead to improvements in inhibitory control [105]. These activities encompassed a version of Diamond and Boyer's (1989) Wisconsin Card Sort Task and a change paradigm that was simplified [106,107]. It was suggested that, through practicing these activities, one will begin to acquire the ability to follow complex rules as a result of the development of executive processes. EFs developed included response control, representational flexibility, working memory, ability in error correction and the selective control of attention.

Lastly, restraint inhibition was improved upon through an 8-week (twice each week, 90 minutes each) aquatic exercise intervention including components of both aerobic and coordinative exercise among children with ADHD between the ages of 5 and 10. Specifically, this approach led to improvements in reaction time and accuracy [108]. This result replicates the findings by Smith et al. (2013) and Verret, Guay, Berthiaume, Gardiner, and Béliveau (2012) that physical exercise improves the response inhibition of children with ADHD [109, 110].

Older youth with ADHD in college may benefit from cognitive-behavioural therapy (CBT) as it is considered to be the most efficacious psychosocial intervention for adults living with ADHD [111]. CBT involves reducing thoughts one has about one-self, one's world and one's future that are critical and dysfunctional and brought about by experiences perceived to be difficult [111]. In addition to reducing maladaptive thought patterns it may also be used as a preventive method. For instance, CBT may have the ability to prevent attitudes that are negative that lead to discouragement and impede academic progress among college student youth with ADHD [111].

The research on ADHD and CBT primarily

focuses on adults but has implications for college student youth with ADHD [112]. For instance, Safren et al. (2005) found that compared to adults solely receiving medication to treat their ADHD, those adults both receiving medication and participating in CBT (targeting the reduction of distractibility, promoting planning and organization as well as promoting adaptive thought patterns) led to improvements on the ADHD Rating Scale [114] as well as on the Clinical Global Impressions Scale [113,115]. Ratings came about through assessors blind to the condition of the participants [113]. Moreover, these findings were found to be consistent with self-reported ratings [113].

Similarly, Solanto, Marks, Mitchell, Wasserstein, and Kofman (2008) determined that a CBT treatment program named Meta Cognitive Therapy produced positive results for adults with ADHD that could be transferred to college student youth with ADHD [112; 116]. The emphasis of Meta Cognitive Therapy was to instill the skills and strategies needed to be able to manage one's time, organize and plan effectively. It also addressed thinking patterns contributing to depression and anxiety making it difficult to successfully self-manage [116]. Meta Cognitive Therapy, compared to supportive therapy, led to more reductions in inattentive symptomatology among the adults with ADHD [116]. It was concluded by Green and Rabiner (2012) that these two approaches to CBT provided to adults with ADHD led to the development of skills necessary for academic success among college student youth with ADHD (e.g. planning, organization, time management, adaptive thinking patterns) [112]. Thus, it is necessary for future research to demonstrate whether the outcomes of CBT for adults can be transferred to college student youth. While interventions that aim to develop protective factors among academic, interpersonal and cognitive domains may lead to greater resiliency and, in turn greater levels of success, it is important to address the notion of perceived competency in the context of ADHD, irrespective of receiving an intervention aimed at fostering protective factors in the academic, interpersonal and cognitive domains.

Perceived Competency

Individuals who hold a constructive and realistic

sense themselves are at a greater likelihood to utilize coping mechanisms that are active and effective. On the other hand, individuals with a self-concept that is low and at doesn't reflect reality leads to coping strategies that are ineffective, anxious and depressive symptomatology as well as delinquent behaviour [e.g., 117, 118, 119]. At the individual level, protective factors in the context of perceived competence include positive or modest perceptions of oneself (i.e. self-perceptions of behaviour, academic, social competence) [39]. For instance, in the context of ADHD, positive self-perceptions of overall competence have been found to reduce depressive and internalizing symptomatology [e.g., 120, 121] as well as to lead to perceived greater quality of life (Schei et al. 2015).

The findings of these studies are consistent with extensive research linking self-efficacy and a healthy self-concept to promoting adjustment and protecting one against threats in one's environment among diverse populations [e.g., 49, 122, 123]. This is because individuals' self-concept is influential in how they react and adjust to adversity they may experience [122]. For example, those who think and feel positively about themselves are likely more confident about what the future may hold, have greater self-efficacy, hold the belief that they are able to succeed in the face of setbacks and utilize the resources life presents them with [124, 125].

It is possible that the presence of a self-enhancement bias is a protective factor among children and youth with ADHD. A self-enhancement bias refers to perceiving oneself to be more competent in certain domains compared to more objective reports of the individual by parents and teachers. This bias is typically held among children and youth with ADHD in the domains in which the most impairments exist [126]. The most common explanation for this bias is the self-protective hypothesis [127, 128, 129]. Research has suggested that positive self-perceived academic competence in childhood is related to resilient functioning in youth [121] and reduced self-perceived social acceptance is related to an increase in depressive symptomatology among children with ADHD [120]. However, there is research citing negative implications, such as increased externalizing symptomatology [130].

Thus, determining whether its presence or absence indicates resiliency requires further research. It is possible that a lower or moderate level of the self-enhancement bias is an indicator of resiliency but significantly higher levels are not. For instance, Baumeister (1989) suggests that there is "an optimal margin of illusion" [131, p. 176]. Consequently, there may be a threshold effect, yet to be determined by future research.

Lastly, it is important to note that if the bias is overly positive and leads to negative outcomes, it is the parents' and educator's responsibility to assist children and youth with ADHD in a delicate manner to help them develop insight into their relative strengths and weaknesses [126]. If the child or youth accept treatment, the intervention needs to center on both acceptance and awareness of their abilities [126]. As an adjunct, mindfulness interventions may facilitate this approach [57, 132].

Concluding Remarks

This paper identified educational, interpersonal and cognitive domains considered to be protective factors in the context of ADHD among children and youth. It described interventions promoting these protective factors that may lead to greater resiliency and success among children and youth with ADHD. Despite many of the adverse outcomes associated with ADHD, many individuals with ADHD become successful in the academic, interpersonal and cognitive domains. These individuals are resilient, and to promote greater levels of resiliency among all individuals with ADHD further research is needed.

This paper establishes that all children and youth with ADHD have the potential to be more resilient, given the appropriate intervention(s) promoting protective factors. However, more empirical research that explicitly recognizes resiliency as an outcome through a given intervention is needed. Additionally, more, empirical research that follows children and youth into adulthood to determine whether a given intervention promoted resiliency, indicated by quality of life and success in the different areas of their lives, is required. This paper is intended to blaze a trail for future research to begin to examine ADHD in a different light through a strength-based approach. As opposed to

focusing on impairments, shifting the focus to a strength-based approach is necessary. Developing those strengths to help overcome weaknesses, and in the end, create protective factors that lead to the development of resiliency and success academically, interpersonally and cognitively is critical for higher quality of life among children and youth with ADHD both in the present and as they transition into adulthood.

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