ADHD and academic performance: why does ADHD impact on academic performance and what can be done to support ADHD children in the classroom?

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Abstract
This paper reviews the relationship between attention deficit hyperactivity disorder (ADHD) and academic performance. First, the relationship at different developmental stages is examined, focusing on pre-schoolers, children, adolescents and adults. Second, the review examines the factors underpinning the relationship between ADHD and academic underperformance: the literature suggests that it is the symptoms of ADHD and underlying cognitive deficits not co-morbid conduct problems that are at the root of academic impairment. The review concludes with an overview of the literature examining strategies that are directed towards remediating the academic impairment of individuals with ADHD.

Attention deficit hyperactivity disorder (ADHD) is a developmental, neurobiological condition defined by the presence of severe and pervasive symptoms of inattention, hyperactivity and impulsivity [American Psychiatric Association (APA) 1994]. DSM-IV criteria (APA 1994) state that the child must exhibit a number of inattentive, impulsive and hyperactive behaviours over a period of 6 months, before the age of 7, which should be present in school and at home, and which significantly impair daily functioning. The ADHD individual has difficulty taking turns, talks excessively, often appears not to be listening when being spoken to, and tends to interrupt and intrude on others in games, conversations and classroom discussions (APA 1994). Cases of ADHD tend to be concentrated in school-age children; however, research now shows that ADHD also exists in preschool children (Lavigne et al. 1996; Daley et al. 2009), adolescence (Faigel et al. 1995; Wolraich et al. 2005) and in adulthood (Mannuzza et al. 1993; Barkley et al. 2002).

As well as exhibiting the core symptoms of inattention, hyperactivity and impulsivity, individuals with ADHD often experience other co-morbid problems: 30–50% of ADHD children also have oppositional defiant disorder (ODD), and/or conduct disorder (CD) (Biederman et al. 1991); there is a co-occurrence of anxiety in 20–30% of cases (Biederman et al. 1991; Pliszka 1998); and bipolar disorder in between 11 and 22% (Biederman 1998). Twenty to thirty per cent of ADHD children have an associated learning disorder of reading, spelling, writing and arithmetic (Biederman et al. 1991; Pliszka 1998). Neuro-imaging studies of children with ADHD have shown a decreased size of the prefrontal cortex (Hill et al. 2002; Mostofsky et al. 2002) therefore there are expected deficits in certain prefrontal executive functions, such as response inhibition (Barkley 1997) and working memory (Tannock 1998). Research into underlying neuropsychological deficits of ADHD has been supported by a scholarship from the Economic and Social Research Council, UK awarded to the second author.
has typically fallen into one of two camps: that ADHD is a disorder of dysregulation of thought and action associated with poor inhibitory control (Schachar et al. 2000), and that ADHD is the manifestation of a motivational style associated with altered reward mechanisms (Sonuga-Barke et al. 1996; Sagvolden et al. 1998; Nigg 2001). In a ‘head-to-head’ study (Solanto et al. 2001), these opposing accounts of ADHD were pitted against each other, with each theoretical camp selecting what they viewed as the best measure of their theoretical construct. The results showed that the constructs were not correlated but, when combined, were both highly diagnostic of ADHD cases. It was concluded that they are independent coexisting characteristics of ADHD (Sonuga-Barke 2002).

Individuals with ADHD may experience impairments in all aspects of life (APA 1994); however, it is educationally based impairments that are the subject of this review. The interaction of core ADHD symptoms with co-morbid problems and neuropsychological deficits suggests that individuals with ADHD are likely to experience problems in academic settings. One cannot expect a child to operate successfully in an academic environment if they are inattentive, disruptive and aggressive, and have problems with working memory, planning and organization.

The academic disadvantage of ADHD individuals. A developmental perspective, from pre-school to university

The majority of research on the relationship between ADHD and academic performance is concentrated on school-age children, as ADHD is traditionally viewed as a childhood disorder (Willoughby 2003). However, there has been some research into the relationship in adolescents and adults (university students). In the case of pre-school children, research has focused on the impact pre-school ADHD has on the acquisition of basic academic skills and school readiness (Spira & Fischel 2005).

The pre-school years are a key period of a child’s development, where the building blocks for later success are laid, and where social, behavioural and academic skills necessary for academic development are acquired. However, for a minority of pre-school children their pathways to school readiness are compromised; some children encounter difficulties with impulse control, attentional capacity and hyperactivity, which hinder their ability to acquire crucial skills such as focusing on teachers, interacting with peers and authority figures, and learning emergent literacy, mathematics and language (Lahey et al. 1998; Spira & Fischel 2005). Indeed, ADHD has been identified in 2% of pre-school age children (Lavigne et al. 1996). Research in pre-schoolers has looked at the impact of ADHD on school readiness and later academic development.

In studies comparing individuals with ADHD and controls, ADHD pre-schoolers have been shown to experience problems with memory, reasoning, academic skills, conceptual development, general cognitive ability (DuPaul et al. 2001), and acquiring basic pre-reading and mathematics skills (Mariani & Barkley 1997). Lahey and colleagues (1998) found impaired mathematics abilities, but intact reading skills, in their sample of 4- to 6-year-old children.

In a longitudinal study, McGee and colleagues (1991) followed pre-schoolers who were rated as hyperactive (a key symptom of ADHD) through to adolescence, and found that they had poorer reading ability than controls at ages 7 and 9. By age 15 the hyperactive children were still behind the controls in reading performance, and there were significantly more reading-disabled individuals in the hyperactive group compared with controls. Rabine and colleagues (2000) studied ADHD symptoms and reading achievement in 387 pre-school children. They found that inattentiveness and hyperactivity were negatively associated with reading achievement, with the strongest correlations appearing with inattention. Moreover they found that pre-school inattention was associated with poor long-term reading achievement; this was studied up to 5 years after baseline, where 34% of inattentive pre-schoolers were reading-impaired.

However, it should be noted that not all individuals who show early signs of ADHD go on to express fully the disorder and experience the associated academic impairments. Sonuga-Barke and colleagues (2005) proposed that pre-schoolers who display significant early signs of ADHD but are exposed to proactive, firm limit-setting at home and appropriately structured classrooms can avoid the downward spiral into long-term expression of the disorder and poor school achievement. However, there are pre-school children with ADHD who are likely to enter school without many of the key academic ‘readiness’ skills that their non-ADHD peers will have acquired. It seems that once at school, children with ADHD will struggle with academic work (McGee et al. 1991; Biederman et al. 1996; Rabine et al. 2000).

The literature shows that school-aged children with ADHD experience an abundance of academic and educational problems (Biederman et al. 1996; Barry et al. 2002; Loé & Feldman 2007). Compared with controls, ADHD children are more likely to use remedial academic services and be placed in special education classes (Biederman et al. 1996), and experience behavioural problems that lead to suspension or expulsion (LeFever et al. 2002). The literature also demonstrates that children with
ADHD are likely to show significant academic underachievement; in a review, Loe and Feldman (2007) found that ADHD is associated with poor grades, poor reading and mathematics standardized test scores, and an increased likelihood of repeating a school year. Barry and colleagues (2002) found that ADHD children obtained significantly lower scores than controls in all academic subjects. Kaufmann and Nuerk (2008) investigated specific aspects of academic difficulties experienced by ADHD individuals by looking at various components of mathematical processing. There were no differences between the ADHD-diagnosed and control groups on explicitly trained simple and complex calculation skills, but the ADHD group did perform significantly worse on basic number processing abilities such as comparing the magnitude of single digit numbers. In this study the two groups did not differ on working memory and executive functioning tasks, therefore the authors conclude that ADHD individuals could have specific deficits in magnitude comparisons.

There are a growing number of studies that look at the relationship between childhood ADHD symptoms and academic performance in community-based samples. Merrell and Tymms (2001) found that children who exhibited symptoms of ADHD performed significantly worse than those who did not on Key Stage 1 tests of reading and mathematics. Similarly, Diamantopoulou and colleagues (2007) found that, in a community sample, children’s ADHD symptoms were correlated with poor school performance. In a large-scale study of ADHD symptoms in the general population (n = 13 087), Rodriguez and colleagues (2007) established significant negative associations between core symptoms and reading, writing and mathematics; with a more pronounced relationship for inattentive symptoms.

The academic performance of adolescents with ADHD has faced less empirical scrutiny than the performance of their younger counterparts, but research suggests that adolescents with ADHD are also likely to struggle at school (Barkley et al. 1991; Biederman et al. 1998). Bauermeister and colleagues (2007) found that children and adolescents with ADHD (aged between 4 and 17) were likely to have educational problems; these individuals were more likely to receive counselling or special education, and have a history of suspension or expulsion. In a meta-analysis, Frazier and colleagues (2007) found that adolescents with ADHD displayed significantly lower levels of academic achievement compared with controls.

While direct relationship studies with adolescent samples are few and far between, evidence for adolescent academic impairment has also come from longitudinal studies that follow ADHD individuals from a young age through to adolescence and even adulthood. As mentioned previously, McGee and colleagues (1991) found that 15-year-old adolescents who were rated hyperactive as pre-schoolers displayed poorer reading ability than controls, and were more likely to be reading-disabled than controls. Mannuzza and colleagues (1993) found that at adult follow-up, men who were diagnosed with ADHD as children had completed on average 2.5 years less schooling than controls, and nearly one quarter of the ADHD group did not complete high school, compared with 2% of controls. Childhood hyperactivity has been shown to predict adolescent behavioural problems (such as CD, juvenile delinquency and substance use), and adolescent academic problems, which tend to culminate in leaving school with no qualifications (McGee et al. 2002).

While current DSM-IV criteria (APA 1994) only recognize a child form of ADHD, research shows that ADHD symptoms persist into adulthood, with between 11 and 40% of childhood cases continuing to meet criteria for the disorder in adulthood (Fischer et al. 1993; Mannuzza et al. 1993). However, associated academic underachievement has not been fully demonstrated in adult populations. In their longitudinal study, Mannuzza and colleagues (1993) found that in a sample of adults diagnosed with ADHD as children, only 12% had completed a bachelor’s degree or higher, compared with nearly half of controls; and only 1% had completed a postgraduate degree, compared with 8% of controls.

Studies examining adults who continue to exhibit symptoms of ADHD typically unearth a history of academic underachievement, with many individuals leaving school early (Klein & Mannuzza 1991). Adolescent research shows that individuals with ADHD are likely to perform poorly at school, and leave with few or no qualifications (Barkley et al. 1990; Biederman et al. 1998; McGee et al. 2002), therefore university prospects seem bleak. However, a small body of literature suggests that some individuals with ADHD manage to cope with their symptoms and continue with their education to university level. Some research suggests that these individuals do not find themselves at an academic disadvantage (Sparks et al. 2004); however, other findings suggest otherwise. Heiligenstein and colleagues (1999) compared a small number of students who were classified as having ADHD (n = 26) with non-ADHD students (n = 28). They found that the ADHD group had lower grade averages and were more likely to be on academic probation. Also, university students with ADHD encounter problems with tasks and processes that are synonymous with the requirements of higher education, such as study strategies, note taking, summarizing and outlining, test taking, test strategies, time management, concentration, motivation, information...
processing and self-testing (Javorsky & Gussin 1994; Reaser et al. 2007). Therefore from a developmental prospective the negative impact of ADHD symptoms on academic attainment can be seen across the lifespan of children, adolescents and young adults.

**Why do ADHD individuals experience academic problems?**

The research reviewed so far supports the notion that ADHD individuals experience academic problems. However, are these academic problems the result of factors directly related to ADHD (symptoms, underlying processes) or are they the result of factors that are indirectly related to ADHD? ADHD is a highly co-morbid disorder – i.e. individuals with ADHD are likely to experience many other associated problems and have other diagnoses. These other diagnoses can include CD (Biederman et al. 1991).

Because of the close association between ADHD and CD, there has been a body of research investigating the outcomes of individuals with a co-morbid ADHD + CD diagnosis. This research promotes the idea of a double dissociation whereby ADHD + CD individuals experience both future academic and offending problems; however, it is their ADHD behaviours that predict only future academic problems, and their CD behaviours that predict future criminal behaviour. Frick and colleagues (1991) investigated children with a diagnosis of ADHD and CD and found that CD was only related to academic problems because of its close ties with ADHD; ADHD was the significant predictor of academic performance. After controlling for co-morbidity rates between ADHD and CD, Farrington and colleagues (1990) found that childhood CD was a strong significant predictor of later criminal offending, whereas childhood ADHD was only weakly related.

Fergusson and colleagues (1993) looked at the relationship between ADHD and CD behaviours at ages 6, 8 and 10, and later academic performance and juvenile offending at age 13. They found that early CD behaviours were a precursor for future juvenile offending, but were not linked to later school performance, when the correlation between CD and attention deficit behaviours was controlled for. They also found that early attention deficit behaviours were related to future school performance, but not to juvenile offending problems (again, when the correlation between attention deficit behaviours and CD behaviours was taken into account). These results were also found when the sample was tested at 17 and 18 years of age (Fergusson et al. 1997). Rapport and colleagues (1999) support Fergusson et al.’s work; they found strong links between ADHD and later scholastic achievement, and only found links between CD and scholastic achievement by virtue of CD’s correlation with ADHD. Targeting symptoms of severe behaviour disorders (ODD, CD) will not likely bring about an improvement in an ADHD child’s academic performance (DuPaul et al. 2004).

The ADHD/CD literature suggests that the ADHD individual’s academic struggle cannot be put down to associated conduct problems. However, could IQ be the root of the academic disadvantage? Research has shown that negative associations exist between ADHD and intelligence (McGee et al. 1992; Sonuga-Barke et al. 1994), and – although the link between IQ and achievement is an age-old debate – evidence suggests that psychometric intelligence predicts future achievement (Watkins et al. 2007). However, studies that demonstrate the link between ADHD and academic underachievement have controlled for intelligence (Diamantopoulou et al. 2007), or matched experimental and control groups for IQ (Barry et al. 2002), suggesting that ADHD individuals perform academically at a lower level than would be predicted by their IQ. While ADHD individuals have been shown to score lower than controls on IQ tests, this may not be the primary cause of their impaired academic performance. These results mirror finding from children with ADHD and intellectual disability who show the same reduction in their level of attainment as predicted by IQ as seen in children of normal ability (Simonoff et al. 2007).

**Cognitive deficits and academic performance**

A DSM-IV diagnosis of ADHD focuses on the behavioural problems of inattention, hyperactivity and impulsivity, but does not explain the cognitive impairments that are commonly experienced by ADHD individuals, which has drawn criticism in some quarters (Barkley 1997). The cognitive deficits – or executive function (EF) deficits – experienced by ADHD individuals include response inhibition (Barkley 1997) and working memory (Tannock 1998). Indeed, Barkley (1997) suggests that while poor response inhibition is the core deficit in ADHD, it subsequently gives rise to other EF deficiencies, such as cognitive flexibility, planning and fluency.

Research into the relationship between ADHD and academic performance has studied the role played by EFs. Biederman and colleagues (2004) found that children with ADHD and poor executive functioning performed worse on tests of academic achievement than children with ADHD and adequate executive functioning. Interestingly, Biederman and colleagues (2004) showed that impaired executive functioning in controls was unrelated to academic achievement, suggesting an interaction...
between ADHD, executive functioning and academic performance. Diamantopoulou and colleagues (2007) found that ADHD symptoms and poor executive functioning independently predicted poor school performance; however, an interaction was only evident when ADHD was broken down into its subtypes: high levels of inattention along with deficits in executive functioning predicted higher levels of special educational needs.

Barry and colleagues (2002) attempted to explain academic impairment in ADHD by examining whether the relationship between ADHD and academic performance could be attributed to problem behaviours associated with the core symptoms of ADHD (i.e. the child does not pay attention in class, does not complete work, etc.), or to the child’s cognitive impairments that could negatively impact on learning. Thirty-three ADHD-diagnosed children and 33 controls completed a battery of EF tasks, and were rated for ADHD symptom severity. Results showed that ADHD behaviours were a stronger predictor of academic performance than EF, and even when controlling for executive function, symptom severity significantly predicted academic achievement. However, the ADHD group did not exhibit significant EF deficits, and interaction effects of ADHD and EF were not studied.

While some research into the reasons behind the relationship between ADHD and academic performance has studied the role of EFs, it should be noted that EF deficits are not common to all ADHD children (Sonuga-Barke 2002). The dual-pathway model of ADHD (Sonuga-Barke 2002) suggests that two distinct, but parallel pathways underpin ADHD. The first pathway accounts for individuals whose ADHD symptoms are the manifestation of impaired EF. The second pathway accounts for individuals whose ADHD symptoms are the functional expression of an underlying motivational style, characterized by aversion to delay, where the individual expresses fundamental alterations in reward mechanisms, typically choosing small, immediate rewards over larger, delayed rewards. Thorell (2007) examined the effect of the two arms of the dual-pathway model on early academic skills in kindergarten children. First, it was found that delay aversion was only related to symptoms of hyperactivity/impulsivity, and EF deficits were only related with symptoms of inattention. Symptoms of inattention were correlated with academic skills, but symptoms of hyperactivity/impulsivity were not. Also delay aversion was not linked with early academic skills, but there were significant correlations between EFs and mathematics and language skills; EFs were shown to mediate the relationship between inattention and early academic skills.

Thorell (2007) tentatively suggests that ADHD children who have EF deficits could be more likely to experience academic difficulties than those who are delay averse. However, this study was carried out in a pre-school sample, therefore to make more concrete assumptions of this type; research with older cases needs to be done.

The implication of EFs in the research reviewed above suggests that deficits in executive functioning could be at the heart of ADHD-related academic underperformance. This, taken with the consistent finding of the significant role played by inattentive symptoms in the ADHD-academic performance relationship, suggests a possible inattention–EF impairment pathway to academic problems in ADHD individuals.

**Academic intervention**

The significant, negative link between ADHD and academic performance has been demonstrated in this review. While findings in the literature are mixed, a picture is beginning to be painted of a link between inattentive symptoms and academic performance, which is being underpinned by EF deficits. This could have implications for the treatment of ADHD. In ADHD individuals, academic performance does not seem to be related to co-morbid conduct problems, or the disruptive hyperactive/impulsive symptoms. While a teacher may be more aware of the disruptive nature of externalizing behaviours, it is not these problems that should be targeted when considering improvements in academic performance (DuPaul et al. 2004). Academic interventions for ADHD individuals should focus on EF deficits (such as working memory, planning and response inhibition) and inattentive symptoms. Recent research has found that training ADHD children’s working memory skills improved response inhibition, reasoning and parent-rated inattentive symptoms (Klingberg et al. 2005).

The most common ADHD treatments include stimulant medication and behavioural interventions, which are used to target (and improve) off-task and disruptive behaviour (Swanson et al. 1995; Chronis et al. 2005). However, the impact of these approaches on academic performance is smaller and less studied (DuPaul & Eckert 1997; Raggi & Chronis 2006). In a review, Raggi and Chronis (2006) discussed several academic interventions that have received research attention and demonstrate academic benefit to children and adolescents with ADHD.

**Peer and parent tutoring**

Being placed in large classes, with a lack of one-on-one instruction are conditions likely to increase ADHD individuals’
academic difficulties. Peer tutoring is a strategy whereby an ADHD individual is paired with a peer tutor to work on a certain academic activity, with the peer tutor providing one-on-one instruction and assistance at the ADHD individual’s own pace. Research has shown that peer tutoring improves classroom behaviour and academic performance (DuPaul et al. 1998). Research into peer tutoring has also been extended to parent tutors (Hook & DuPaul 1999). Parents were asked to tutor their ADHD child on oral reading tasks, with the procedure involving one-on-one instruction, feedback and active responding. It was found that reading performance increased at home and at school (Hook & DuPaul 1999). While the research into peer tutoring in ADHD is sparse, the results so far are encouraging.

Task/instructional modifications
This involves manipulating tasks and instructions to meet the needs of the ADHD individual. Manipulations include reducing task length, dividing tasks into sub-units, giving explicit instructions, and modifying the delivery or modality of instruction according to the pupil’s learning style (Raggi & Chronis 2006). Unfortunately research into most task and instructional modifications has focused on single cases, thus external validity comes into question; however, results so far have been promising (Raggi & Chronis 2006). Studies evaluating Computer Assisted Instruction (CAI) have demonstrated improvements in mathematics performance in both special education settings and general education classrooms (Ota & DuPaul 2002; Mautone et al. 2005).

Classroom functional assessment procedures
This involves developing an intervention that is specific to the child, based on the identification and manipulation of environmental variables that initiate, maintain and/or increase the child’s problematic behaviour in a particular setting (Ervin et al. 1998). This approach has been used to increase on-task behaviour and reduce disruptive behaviour in ADHD individuals, but as of yet has not been studied in terms of academic productivity and accuracy (Raggi & Chronis 2006).

Self-monitoring
This involves the individual setting goals for classwork completion and accuracy, monitoring these goals and administering rewards upon successful completion. Research suggests that these strategies help to improve the academic performance of ADHD individuals (particularly older children and adolescents), especially in combination with stimulant medication (Raggi & Chronis 2006).

Strategy training
This involves teaching children a specific skill so they can implement it in an academic situation, to improve their performance (Evans et al. 1995). Although this method has received little research attention, Raggi and Chronis (2006) suggest that it could be a useful tool for ADHD individuals, where children and adolescents learn useful skills to improve academic performance, while taking responsibility off parents and teachers. Some support for strategy training has come from Kaufmann and Nuerk (2008) who found that ADHD children performed significantly worse than non-ADHD peers on basic number processing tasks (such as comparing the magnitude of two numbers), but there were no differences between the groups on explicitly trained simple and complex calculation skills.

Homework-focused interventions
Aside from ability, time spent on homework is the best predictor of student grades and achievement (Cooper et al. 1998). As children and adolescents with ADHD experience problems with planning, prioritizing, filtering out distractions, focusing on individual tasks, forgetfulness and lack of organization, it is likely that homework will suffer. Therefore teaching parents homework strategies based around these problems seems beneficial to ADHD individuals (Raggi & Chronis 2006).

Parent tutoring and homework interventions could be a useful tool in boosting the academic abilities of children with ADHD; however, there is research to suggest that in some cases these parent-based strategies should not be the only method employed. A significant minority of children with ADHD will have a parent with ADHD or presenting with high ADHD symptoms (Faraone & Biederman 1997). Sonuga-Barke and colleagues (2002) found that high levels of maternal ADHD reduced the effectiveness of parent training interventions for pre-school ADHD. Perhaps when deciding on appropriate academic interventions for Children with ADHD, their parents’ level of ADHD symptoms should be taken into account, in order to develop the most effective treatment programme – the effectiveness of a parent-based intervention may be influenced by parental ADHD symptoms.

The dual-pathway model of ADHD (Sonuga-Barke 2002) could be used to design strategies to improve ADHD individuals’ in-class focus, thus improving their academic performance.
For example, delay-averse ADHD individuals could be given distractor objects – such as Blu-Tak or a stressball – to fidget with during class, thus distracting them from the passing of time and subsequently reducing their delay aversion. In a review of non-pharmacological interventions for pre-school ADHD, Sonuga-Barke and colleagues (2006) promote the need to compensate for poor executive functioning in ADHD children by teaching parents to communicate using short clear messages. This strategy could also be utilized in the classroom, with teachers communicating in this suggested manner, thus enabling more efficient information processing, and subsequently an improved understanding of work on behalf of the student.

Another approach to addressing the academic performance of ADHD individuals could be altering teachers’ attitudes towards ADHD behaviours and treatments. In a review, Sherman and colleagues (2008) suggest that teachers’ patience, knowledge of intervention techniques, ability to collaborate with interdisciplinary teams, use of gestures when communicating with students and positive attitude towards ADHD children are key factors in the academic success of ADHD pupils. Stressing these points to teachers could generate a more positive classroom environment, which could prove valuable to both ADHD and non-ADHD individuals.

Changes could also be made to the examination (assessment) environment to ensure students ADHD behaviours do not impact on exam performance. Raggi and Chronis (2006) suggest that tasks should be reduced in length and divided into subunits. As such, perhaps ADHD individuals could be assessed in smaller units, where examinations are shorter, thus not allowing symptoms of inattention, hyperactivity and impulsivity to become too much of a concern in the examination setting. Flexible examination environments could also be introduced where pupils with high levels of ADHD symptoms are permitted to leave and re-enter the examination room (under supervision) whenever they feel their attention is waning. Reducing exam length is a strategy that would fall in line with the dual-pathway model of ADHD (Sonuga-Barke 2002): when faced with a long examination, delay averse ADHD individuals will most likely elicit certain behaviours to distract themselves from the passing of time; however, these behaviours will most likely stop the individual from working and could be distracting to other pupils. A shorter examination length would be a much more attractive prospect for the ADHD individual, thus increasing the likelihood of full focus on the examination. Alternatively, to boost the focus of ADHD individuals in long examinations, the in-class delay aversion strategy proposed above (the use of distractor objects) could also be utilized in this setting.

Conclusion

Attention deficit hyperactivity disorder is associated with academic underachievement across the developmental spectrum, from pre-schoolers to adults. Of the features of ADHD, it is inattentive symptoms and EF deficits that are associated with academic problems, while hyperactivity/impulsivity and co-morbid conduct problems are not. Building on Thorell’s (2007) pre-school findings future research should focus on the neuropsychological underpinnings of the relationship between ADHD and academic performance across the ADHD developmental spectrum, to examine the roles of cognitive dysregulation and motivational style. This will enable professionals to gain a broader understanding of what explains academic disadvantage in ADHD, in order to develop effective study strategies and school-based interventions for ADHD individuals. A greater understanding of older individuals with ADHD is also needed in order to develop academic interventions for those at high school, post-16 institutions and university.

Key messages

- ADHD symptoms impact on academic attainment across the lifespan from school readiness to performance at university.
- Deficits in executive functioning appear be at the heart of ADHD-related academic underperformance.
- A wealth of possible classroom-based interventions are available to help and support children with ADHD in the classroom.

References


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