

Université de Montréal

The predictive role of parenting practices and family functioning on the core symptoms of ADHD

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Mémoire présenté à la Faculté des arts et sciences
En vue de l'obtention du grade de maîtrise
(M.Sc.) en psychoéducation
Option mémoire et stage

Août 2015

Faculté des études supérieures

Ce mémoire intitulé:

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Résumé

Résumé

Cette étude vise à examiner la relation entre les pratiques parentales utilisées durant la période de l'enfance et les dimensions principales du trouble déficitaire de l'attention avec hyperactivité (TDAH) à l'adolescence, soit l'inattention, l'hyperactivité et l'impulsivité. Les pratiques spécifiques parentales (engagement, pratiques parentales appropriée, supervision, punitions corporelles, discipline appropriée, discipline sévère et incohérente, discipline verbale positive, félicitations et récompenses, et les attentes claires) et les aspects du fonctionnement familial (communication, résolution de problèmes, rôles dans la famille, sensibilité affective, engagement affectif, contrôle comportemental) ont été examinés par rapport à l'inattention et d'hyperactivité. Trente-six enfants de 6 à 9 ans et leurs parents ont participé à une étude longitudinale de 5 ans. Il y a un manque d'études longitudinales dans ce domaine et cette étude vise à combler cette lacune. Les résultats ne montrent pas de résultats significatifs dans la relation entre les pratiques parentales utilisées dans l'enfance et les symptômes principaux de l'hyperactivité et l'inattention à l'adolescence. Les études futures devraient se concentrer sur la relation entre la psychopathologie parentale et les principaux symptômes du TDAH de l'enfance à l'adolescence, ainsi que l'impact des pratiques parentales sur ces principaux symptômes.

Mots clés : TDAH, pratiques parentales, comportement de l'enfant, comportement de l'adolescent, hyperactivité, inattention, fonctionnement familial

Abstract

This study aims to examine the relationship between parenting practices used in childhood on one hand and the core symptoms of Attention deficit hyperactivity disorder (ADHD) in adolescence on the other hand. Specific parenting practices (involvement, positive parenting, monitoring/supervision, corporal punishment, appropriate discipline, harsh and inconsistent discipline, positive verbal discipline, praise and incentives and clear expectations) and aspects of family functioning were examined (communication, problem solving, roles, affective responsiveness, affective involvement, behavioural control and general functioning) in relation to inattention and hyperactivity. The sample consisted of 36 participants involved in a 5 year study from childhood (6 to 9 years old) to adolescence (11 to 14 years old). The results do not show significant results in the relationship between parenting practices used in childhood and the core symptoms of hyperactivity and inattention in adolescence. There is a lack of longitudinal studies in this area and this study attempts to fill in this gap. However despite a lack of significant results, past research suggests an important relationship between parental psychopathology, which has been linked with ineffective parenting practices and the persistence of ADHD from childhood to adolescence. Future studies should focus on the relationship between parental psychopathology and the core symptoms of ADHD from childhood to adolescence, as well as the impact of parenting practices on these core symptoms.

Key words: ADHD, parenting practices, child behaviour, adolescent behaviour, hyperactivity, inattention, family functioning

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List of Abbreviations

ADHD	Attention Deficit Hyperactivity Disorder
APQ	Alabama Parenting Questionnaire
CD	Conduct Disorder
FAD	Family Assessment Device
ODD	Oppositional Defiant Disorder
N/A	Not available
PPI	Parenting Practices Inventory
SD	Standard deviation

Acknowledgements

It has taken five years for me to reach this point, and without the support and encouragement of those around me, I would not have been able to accomplish this goal.

First, I would like to thank my thesis director, Dr. Sylvie Normandeau. There are no words for the appreciation that I have for your patience, your support, your help, your time and all that I have learned from you. Thank you for your guidance, you have made me a better writer and a more critical thinker.

Next, I would like to thank my mother. Your strength, guidance, support and encouragement have made me the person I am today. You have supported me every step of the way and without you I could not have accomplished this.

I would like to thank my father, despite him no longer being here, his words have always followed me. He wanted me to strive to be the best that I could be; I hope that he is proud of me.

To all of my friends and family that have encouraged me, supported me and understood when I had deadlines to meet, I thank you.

Theoretical Context

Attention deficit hyperactivity disorder (ADHD), a disorder which includes impulsivity, inattention, and hyperactivity is one of the most prevalent childhood disorders. The childhood prevalence of ADHD has been researched and estimated to be between 3 and 7% (Antshel & Barkley, 2009). A study by Bernadi, Faraone, Cortese, Kerridge, Pallanti and Blanco (2012) shows a lifetime prevalence of ADHD as 2.5%, thus indicating that ADHD can have an impact on an individual from childhood to adulthood.

ADHD has three dimensions; inattention and hyperactivity and impulsivity (Burke, Loeber, & Lahey, 2001). The inattention dimension is related to difficulty staying on task, listening, completing instructions, staying organized etc. The hyperactivity dimension is related to fidgeting, leaving one's seat at an inappropriate time, excessively talking, difficulty waiting for one's turn etc. (American Psychiatric Association, 2013). The impulsivity dimension is related to blurting out answers, interrupting others, intruding in other people's conversations etc. According to the DSM-V the three subtypes of ADHD are the predominantly inattentive subtype, predominantly hyperactive-impulsive subtype, and the combined subtype of ADHD (American Psychiatric Association, 2013). One of the reasons that ADHD can be so difficult for both children and their families is that up to 80% of children have a co-morbid disorder (Mash & Wolfe, 2005). It has been found that 50 % of individuals with ADHD have co-morbidity with Conduct Disorder (CD) or Oppositional Defiance Disorder (ODD) (Connor, Steeber & McBurnett, 2010).

ADHD is a neurological disorder linked to a frontostriatal abnormality in the right hemisphere of the brain (Rubia & Smith, 2001). This abnormality can interfere with attentional, inhibitory and executive functioning (Rubia & Smith, 2001). Other research has also indicated that children with ADHD have deficits in executive functioning that can cause dysfunction in everyday life (Cao, Chan, Qian & Wang, 2010). In a study by Karunalas and Smith (2011) it was found that children with ADHD performed more poorly than children without ADHD on working memory tasks, as well as on response inhibition tasks. Early childhood represents a time when many children come across new, challenging social and academic experiences and these deficits in executive functioning may become more apparent. In addition genetic factors play a role in the transmission of ADHD, according to a study by Levy, Hay, McStephen, Wood and Waldman (1997), ADHD has a very high rate of heritability in

comparison to other disorders. It is evident that since this disorder is neurologically based, that environmental factors, though not causes themselves can help shape the evolution of the disorder.

Environmental factors may influence ADHD, an important factor being the role of parenting of children and adolescents with ADHD (Johnston & Mash, 2001). Since ADHD may lead to maladaptive behaviour it is important to be able to identify factors that can exacerbate negative behaviors or reduce them. Parenting practices are an important environmental factor, and can be defined as the actions parents take which influence child development (Locke & Prinz, 2002). Ineffective parenting practices used with children with ADHD and parental psychopathology have the greatest impact on the persistence of behaviors and symptoms related to ADHD (Biederman, Petty, Clarke, Lomedico, & Faroane, 2011; Burke, Pardini & Loeber, 2008; Chronis, Pehlam, Baumann, Kipp, Lahey, Williams, Jones, & Rathouz, 2007). Ineffective parenting practices have been significantly linked to diminished social skills, aggression, child impulsivity and elevated symptoms of ADHD (Harold, Leve, Barrett, Elam, Neiderhiser, Natsuaki, Shaw, Reiss, & Thapar, 2013; Hinshaw, 2002; Kaiser, McBurnett & Pfiffner, 2011; Walter, Cheong, Molina, Pelham, Wymbs, Belendiuk, & Pederson,c2012)

Presently, there is a lack of longitudinal research on the relationship between parenting practices and ADHD related behaviours from childhood through adolescence (Johnston & Mash, 2001). It is important to identify parenting practices that can help improve or exacerbate ADHD related behaviours in order to better help children in their current and future functioning. The main aim of this study is to fill in some of the gaps in the existing literature on parenting practices as predictors of core symptoms of ADHD in children and adolescents.

Attention Deficit Hyperactivity Disorder Across the Lifespan

Three of the main dimensions of ADHD are inattention, hyperactivity and impulsivity. Hyperactivity and impulsivity are combined in the DSM-V. According to the DSM-V (American Psychiatric Association, 2013), inattention symptoms include the following: 1) individual frequently has difficulty maintaining attention in play activities or tasks (i.e.: reading), 2) individual frequently has difficulty organizing tasks and activities (i.e.: does not meet deadlines), 3) individual frequently makes “careless” mistakes or fails to pay attention to details in work, school work or other activities (i.e.: inaccurate work), 4) individual frequently appears not to be listening when someone speaks to him/her

directly (i.e. : mind appears to be elsewhere), 5) individual frequently does not complete instructions until the end (lack of follow-through) and does not complete chores, responsibilities at work or school work (i.e.: loses focus quickly), 6) individual frequently loses things that are needed for activities or tasks (i.e.: keys), 7) individual is frequently forgetful with regards to everyday activities (i.e.: doing chores), 8) individual is frequently distracted by unrelated stimuli (i.e.: thoughts that are off topic), and 9) individual is frequently reluctant or avoidant of responsibilities requiring continuous mental efforts (i.e.: homework) (American Psychiatric Association, 2013). Six out of the nine symptoms of inattention symptoms must be minimally observed (for at least six months) for youth under 17 years of age. For individuals 17 years of age or older, only a minimum of five symptoms are required (American Psychiatric Association, 2013).

Hyperactivity/impulsivity includes the following symptoms according to the diagnostic criteria of the DSM-V: 1) individual frequently leaves chair in circumstances which expect one to be seated (i.e.: leaves seat in classroom), 2) individual frequently moves in seat, knocks with hands or fidgets, 3) individual frequently blurts out information before a question has been completely asked (i.e.: finishes other peoples sentences), 4) individual frequently acts “ as if driven by a motor” (i.e.: not comfortable staying still for a prolonged frame of time, such as in a restaurant), 5) individual frequently talks excessively, 6) individual frequently intrudes or interrupts others (i.e.: enters conversations unrelated to him/her), 7) individual frequently has difficulty waiting for his/her turn, 8) individual is frequently unable to partake in activities during free time quietly, and 9) individual frequently climbs or runs in inappropriate situations. The latter may display itself as feeling restless in adults and adolescents (American Psychiatric Association, 2013). Six out of the nine symptoms of hyperactive impulsive symptoms must be minimally present (for at least 6 months) for youth under 17 years of age. For people 17 years of age or older, only a minimum of five symptoms are required (American Psychiatric Association, 2013).

The predominantly hyperactive-impulsive subtype, as well as the combined subtype affects more than 80% of children and adolescents with ADHD (Dumas, 2002). The predominantly inattentive subtype affects about 20% of children and adolescents with ADHD, and is most evident in adolescence. ADHD is diagnosed most frequently in boys as opposed to girls and children and adolescents receiving treatment for ADHD are largely boys (Dumas, 2002). In children 6 to 12 years old, the ratio of diagnosis for boys and girls is 3 to 1 (Mash & Wolfe, 2005).

Co-morbid Disorders. ADHD is related to a high co-morbidity with other disorders (Yang, Jong & Tsai, 2007). One of the reasons that ADHD can be so difficult for both children and their families is that up to 80% of children have a co-morbid disorder (Mash & Wolfe, 2005). It has been found that 50 % of individuals with ADHD have co-morbidity with CD or ODD (Connor, Steeber & McBurnett, 2010). Additionally both CD and ODD have been found to be associated with certain risk factors related to parenting such as parental psychopathology, lack of parental monitoring and family processes that are considered to be coercive (Connor, Steeber & McBurnett, 2010). As mentioned, roughly 50% of children with ADHD are diagnosed with Oppositional Defiant Disorder (ODD) usually boys and 30 to 50% of ADHD children eventually meet the criteria for Conduct Disorder (CD) (Mash & Wolfe, 2005). In addition 25 % of children diagnosed with ADHD experience anxiety, though this anxiety tends to decrease in adolescence (Mash & Wolfe, 2005). Depression can also be found in 20% to 30% of children with ADHD, which can continue into adulthood (Mash & Wolfe, 2005). In a study by Gau, Ni, Shang, Soong, Wu, Lin and Chiu (2010) it was found that in comparison to children and adolescents without ADHD, individuals with ADHD had elevated risks for Conduct Disorder (rate of 21.7%), Oppositional Defiant Disorder (rate of 57.3%), mood disorders (rate of 4.1%), tic disorder (rate of 7.1%), sleep disorders and nicotine use. In fact one study indicates a 17 times greater risk for ODD and CD in individuals with ADHD in comparison to controls without the disorder (Smalley, McGough, Moilanen, Loo, Taanila, Ebeling, Hurtig, Kaakinen, Humphrey, McCracken, Varilo, Yang, Nelson, Peltonen, & Jarvelin, 2007). In a study by Bernardi, Faroene, Cortese, Kerridge, Pallanti, Wang and Blanco (2012) it was found that with the exception of abusing alcohol, all psychiatric disorders were significantly related with ADHD. It was found that 94.98% of adult participants had, at the minimum, one psychiatric disorder, in comparison to 64.54% of adults without ADHD. The high co-morbidity of ADHD with other disorders, and the disruptive mechanism these disorders can have on someone throughout their lifespan, underlines the importance of the need to identify factors which reduce ADHD related behaviors. In reducing or having ADHD symptoms remit, some of these overlapping disorders might be reduced as well.

Manifestations of ADHD Across the Lifespan. Past research suggests that ADHD has different manifestations at different life stages, the three main stages being childhood, adolescence and adulthood. Symptoms of hyperactivity/impulsivity usually begin to display themselves first, in early childhood, followed a few years later by inattention symptoms (Barkley, Du Paul & McMurray., 1990).

In childhood, ADHD behaviours can manifest themselves in the inattention dimension as children being easily distracted, having difficulty maintaining attention during tasks, and losing things (Burke, Loeber & Lahey, 2001). The hyperactivity-impulsivity dimension is linked to behaviours such as excessive talking, fidgeting, and engaging in activities that are dangerous without taking into consideration the consequences of such behaviour.

In adolescence, unlike in childhood, behaviours linked to the hyperactivity-impulsivity dimension usually display themselves as feelings of restlessness, and less noticeable motor behaviours during activities that are sedentary (Wender, 1995). Adolescents with ADHD may have difficulty concentrating and persisting in their school work (i.e.: inattention) or display poor classroom behaviours such as becoming too excited and joking around (hyperactivity- impulsivity) (Wender, 1995). Research also indicates that adolescents with persisting ADHD tend to have attention related symptoms which are considered to be more “dreamy” type symptoms (such as being forgetful, difficulty with task organization, difficulty following instructions and losing items) (Hurtig, Ebeling, Taanila, Miettunen, Smalley, McGough, Loo, Jarvelin & Moilanen, 2007). Adolescents tend to have a decrease in symptoms related to hyperactivity, while symptoms such as a lack of sustained effort, poor organizational skills as well as time management skills stand out more (Barkley, 2004). In terms of subtypes of ADHD, research indicates that in adolescence the inattentive subtype of ADHD is most common (Hurtig, Ebeling, Taanila, Miettunen, Smalley, McGough, Loo, Jarvelin & Moilanen ,2007). Adolescents with the combined subtype of ADHD have significantly higher levels of disruptive disorders than adolescents with other subtypes (Hurtig et al., 2007).

The study by Hurtig et al. (2007) provides a significant amount of information to existing literature because it examines the possibility of children remitting from their ADHD symptoms in adolescence, as well as the possibility of changing subtype from childhood to adolescence. Hurtig et al. (2007) examined ADHD subtypes and symptoms in both adolescence and childhood. The study consisted of 163 participants from an original sample of 457 adolescents, with an ADHD diagnosis in either childhood or adolescence. Participants were aged 16 to 18 years old and their childhood diagnosis was based on retrospective recall and the DSM-IV criteria. Firstly, the study showed that a diagnosis of ADHD is more prevalent in childhood than adolescence. Also, it demonstrated that the most common subtypes are the combined subtype of ADHD in childhood, the inattentive subtype in adolescence. Results suggest that in both childhood and adolescence the hyperactive-impulsive subtype

is the least prevailing type. Adolescents with the combined subtype of ADHD had significantly higher levels of disruptive disorders than adolescents with other subtypes. In this study, across subtypes, children's symptoms either persisted or remitted in adolescence and the children with the hyperactive-impulsive subtype remitted more often than the other subtypes.

Children with the combined diagnosis tended to meet criteria for only the inattentive subtype in adolescence. Of the 148 participants with a definite ADHD diagnosis in childhood, 29% (n= 58) of participants remitted while 61% (n=20) persisted to adolescence. 9% of participants with an ADHD diagnosis in adolescence did not have a diagnosis in childhood (n=15) and therefore developed the disorder in adolescence. 43% (n=63) of adolescents were still a part of the same subtype of ADHD group as when they were a child, whereas 18% (n=27) adolescents were a part of a different subtype group than in childhood (4 went from the hyper-active impulsive to the combined subtype, 1 went from the inattentive to combined subtype, 2 went from the combined to the hyperactive-impulsive subtype and 20 went from the combined to inattentive subtype). Interestingly, 69% of participants with the childhood hyperactive-impulsive subtype remitted in adolescence, 35% of the inattentive subtype remitted and 30% of the combined subtype remitted in adolescence. This suggests that the highest level of ADHD remittance is for the hyperactive-impulsive subtype of ADHD.

Research also confirms that ADHD can persist into adulthood. According to a study by Bernardi et al. (2012) there is a lifetime prevalence of ADHD of 2.5%. Past research found that five symptoms best differentiate adults with ADHD from adults without the disorder: trouble stopping activities when appropriate, impulsive decision making, difficulty planning ahead, difficulty persevering through tasks that he/she is not interested in and tendency towards daydreaming when concentration is required (Antshel & Barkley, 2009). According to longitudinal data the three areas that are most functionally impaired in adulthood due to ADHD are educational difficulties, responsibilities in the home and occupational areas (Antshel & Barkley, 2009). Research indicates that individuals with ADHD are at an increased risk of having life long difficulties with careless financial behavior, gambling and reckless driving. Furthermore individuals with ADHD tend to leave a job without a plan of action and to experience a lot of quick changes related to career or personal goals (Bernardi et al., 2012).

The lifetime persistence of ADHD, suggests that ADHD can be viewed as a chronic disorder that requires treatment from childhood, through adolescence and possibly adulthood (Turgay, Goodman, Asherson, Lasser, Babcock, Pucci & Barkley, 2012). Identifying factors which contribute to the increase or decrease in symptoms of ADHD can benefit the daily and lifelong management of this disorder. One of the key contributing factors is parenting practices, which has been examined in relation to ADHD, yet there is little information on the contribution of these parenting practices on the developmental trajectory of ADHD symptoms from childhood to adolescence.

Parenting Children with ADHD

The Role of Parenting Practices. Parents are the first agents of socialisation in the life of their child and therefore hold considerable influence in his/her life. Parents engage in different parenting practices to rear their children. It is difficult to point to one specific definition of parenting practices, however according to Darling and Steinberg (1993), parenting practices can be defined as techniques that have “a direct effect on the development of specific child behaviours ... and characteristics” (Darling & Steinberg, 1993, p. 493). Parenting practices can be defined as the actions parents take (e.g. hugging) which influence child development (Locke & Prinz, 2002). Two main constructs in parenting are nurturance and discipline. Discipline is related to harsh parenting practices, as well as clear expectations and reinforcement of prosocial behaviours (Locke & Prinz, 2002). Discipline has been considered a way of obtaining precise positive outcomes in children while nurturance is related to providing a positive environment for the child-parent relationship (Locke & Prinz, 2002). Nurturance is related to the way in which emotions are expressed such as communicating acceptance, hugging and verbal communication of love (Locke & Prinz, 2002).

In the current study, certain parenting practices will be examined: positive parenting, involvement, parental monitoring/supervision, inconsistent discipline, harsh parenting practices and clear expectations (Shelton, Frick & Wootton, 1996; Webster-Stratton, 1998). Positive parenting practices can be defined as parenting practices which include sensitivity, positive affect, a lack of detachment and cognitive stimulation (Azad, Blacher, & Marcoulides, 2014). In addition, positive parenting practices are often associated with warmth. Parental involvement can be defined as an interest and active participation in a child or adolescent’s activities (Berg-Nielson, Vikan & Dahl, 2003). Parental monitoring or supervision can be defined as a “set of correlated parenting behaviours involving attention to and tracking of the child's whereabouts, activities, and adaptations” (Dishion &

McMahon, 1998). Inconsistent discipline can be defined as discipline that incorporates a lack of following through on a consequence or a consequence that does not match the inappropriate behaviour (Shelton, Frick & Wootton, 1996). Harsh parenting practices, often referred to as negative parenting practices, can be defined as parenting practices that lack warmth, displays of anger and yelling as well as actions which intensify parent-child conflicts and physical punishment (Norlin, Axberg & Broberg, 2014). Finally, clear expectations can be defined as parents establishing clear rules for their child in terms of acceptable behaviour (e.i. clear expectations about bed time) (Dumas, Arriaga, Begle, & Longoria, 2011).

The most recent research on parenting points to bi-directional theories, defined as theories in which parents and children simultaneously impact one another at any point in time. These theories attempt to establish the direction by which child and parent behaviour is changed (Lee, Zhou, Eisenberg & Wang, 2013)

Bidirectional Theory. Earlier developmental theories have often pointed to a unidirectional relationship between parenting and child behaviour. It was thought that values, roles and attitudes were transmitted from the older generation to the new one (Kuczynski, Marshall & Schell., 1997) In this unidirectional model, parents play a main role in this transmission process from one generation to the next (Kuczynski, Marshall & Schell, 1997). In contrast however, developmental theories of today point to bi-directional models (Kuczynski et al., 1997). Transactional and bidirectional models suggest that both child and parent play an important role in the transmission of values, roles and attitudes to one another (Kuczynski et al., 1997).

In the bidirectional “working model” process, internalization continues to change and develop throughout one’s life span (Kuczynski et al., 1997). Internalization is a “recursive process” (Kuczynski et al., 1997, p.28) whereby both children and parents create “personal working models” (Kuczynski et al., 1997 p.28) which encompasses attitudes, values and beliefs necessary for the interpretation of interactions, in turn needed to adapt to their own family as well as the community at large (Kuczynski et al., 1997). Externalization refers to the behaviour exhibited by parent and child. Externalization and internalization demonstrate an individual’s processing of beliefs, values and cultural context (Kuczynski et al., 1997). These values, attitudes, motives and beliefs are internalized or externalized by the individual through the way in which contexts are interpreted, chosen, forgotten or rejected

(Kuczynski et al. ,1997). When child and parent interact, their individual values, beliefs, attitudes and motives mutually influence each other (Kuczynski et al. ,1997). In order for this to occur, both child and parent behaviour is filtered through their cognitive strategies, and is displayed through social behaviours (Kuczynski et al., 1997). These social behaviours mutually influence both child and parent.

The parent-child interaction encompasses four main characteristics: mutual shaping, conflict, cooperation and observational learning (Kuczynski et al. ,1997). Mutual shaping refers to the process whereby throughout time, feedback from a child's reaction to parents, as well as feedback from parent's reactions to a child's, progressively and unnoticeably shape both child and parent behaviour. This shaping occurs in a fashion which is not predicted by either individual's working model (Kuczynski et al. ,1997). Conflict occurs when parental demands and their messages are opposed, negotiated and changed by children (Kuczynski et al.,1997). Cooperation, another important piece of the parent-child interaction, refers to a child's receptivity and support of parent goals and a parent's receptivity and support of child goals and ideas (Kuczynski et al. ,1997). Observational learning refers to the process by which children pay attention to the parents approach in interacting with others and not just the message content of parents. This suggest that parent's actions might not always match with the lessons they are trying to teach their children, children might receive mixed messages (Kuczynski et al., 1997).

According to Sameroff (2009), "Everyone in the universe is affecting another or being affected by another" (Sameroff, 2009, p.3). The transactional model, which encompasses many of the same tenets of the bi-directional model, considers that these continuous interactions take place between an individual and an ever changing context. The transactional model places emphasis on the plasticity of the environment as well as the participation of the individual in his/her own progression (Sameroff, 2009). The changing context, refers to the individual's life stage (developmental phase) and its interaction with the environment (Sameroff, 2009). According to the transactional model, both the children and parents carry with them unique characteristics to each interaction with one another. Children and parents bring with them, their temperament, personality, cognitive strategies and other facets of their individuality, and this can be referred at as " intraindividual consistency"(Sameroff, 2009, p.141). These unique characteristics can be changed from each interaction and therefore both children and parents will go into their next interaction as changed individuals (Sameroff, 2009). This

model states, like the bi-directional model, that children have an impact on their parents and parents have an impact on their children (Sameroff, 2009).

Most recent theories on the parent-child relationship and interactions, point to a bi-directional influence, which encompasses not only the child and parent, but the environment and culture as well. The child and parent mutually impact one another, within an ever changing cultural and environmental context that influences each individual as well as their interactions. The bi-directional and transactional models must be taken into consideration when examining parenting practices, as this bi-directional relationship conveys important insights into the mechanisms of the child-parent interaction and how parenting practices are influenced by not only the child but the surrounding environmental context.

Parenting a Child with ADHD. Parents are powerful role models in the life of a child. Children learn many life skills from their parents which include and are not limited to behaviour in society and appropriate (or inappropriate) interactions in relationships. Both parents and children mutually learn from one another and shape each others values, beliefs and behaviour. The following pages will examine the relationship between specific parenting practices such as inconsistent monitoring, supervision/monitoring, positive verbal discipline, clear expectations as well as family functioning and child and adolescent ADHD behaviour.

Several studies have noted the use of less effective parenting strategies in families with children with ADHD or other child disorder. Mothers with children at risk of ADHD, ODD and CD at age 4 were more likely to use time outs or reprimands instead of rewarding appropriate behaviours (Cunningham & Boyle, 2002). In middle childhood, studies have indicated a relationship between parenting practices and child behaviour. In a study by Kaiser, McBurnett and Pfiffner (2011), severity of ADHD and negative or positive parenting were examined in relation to the social functioning 143 children with and without ADHD, aged 5 to 11 years old. Severity of ADHD and parenting practices (less positive parenting, less involvement, more corporal punishment, less monitoring, more inconsistent discipline) and the coercive parent-child relationship were significantly related to aggression and diminished social skills in children with ADHD. Decreased levels of negative parenting and increased levels of positive parenting were associated with better social skills in children with ADHD.

The impact of ADHD is also apparent when examining family functioning. Parents who have preschoolers diagnosed with ADHD tend to report elevated levels of family dysfunction in comparison to parents of children without ADHD (DuPaul, McGoey, Eckert & VanBrackle., 2001). Parents with children with ADHD reported decreased social support, decreased family support, more stress, and a diminished quality of life in comparison to controls. Findings from a study by Hinshaw (2002) suggest that authoritarian parenting is linked with childhood ADHD. Furthermore, a study by Lange, Sheerin, Carr, Dooley, Barton, Marshall, Mulligan, Lawlor, Belton and Doyle (2005) corroborates Hinshaw's findings, in their study parents of children with ADHD reported using increased levels of authoritarian parenting in comparison to the control group (Lange, Sheerin, Carr, Dooley, Barton, Marshall, Mulligan, Lawlor, Belton & Doyle, 2005). Authoritarian parenting encompasses high levels of demandingness and low levels of responsiveness (Baumrind, 1991). This type of parenting can be related to harsher parenting practices.

Kaplan, Crawford, Fisher and Dewey (1998) found that in families with a child with ADHD, family dysfunction occurred more than in families with a child with a reading disability and more than in families with a child without ADHD or a reading disability. Four factors were strongly related to family functioning in families with a child with ADHD. These were being unable to confide in one another, negative feelings in the family, not getting along, and a lack of expressing emotions to one another (Kaplan, Crawford, Fisher & Dewey, 1998). This is consistent with the Lange et al. (2005) study; in which findings demonstrate that parents of children with ADHD, in comparison to controls without the disorder, have psychosocial difficulties which are significant in both personal and family functioning. ADHD in children can therefore act as a stressor which impacts a parent's ability to use appropriate parenting, leading to more ineffective parenting practices (Johnston & Mash, 2001).

In a study by Harold, Leve, Barrett, Elam, Neiderhiser, Natsuaki, Shaw, Reiss and Thapar (2013), two groups were compared, children adopted at birth and their mothers (both biological and adoptive mothers) and children adopted at conception (mothers who used IVF treatments using an egg or embryo that was not genetically related to them). It was found that ADHD symptoms in biological mothers were significantly associated with impulsivity in children, which was found to be significantly related to hostility in adoptive mothers of adopted at birth children. In addition maternal hostility in adoptive mothers was found to be associated with ADHD symptoms in children in both the adopted at conception and adopted at birth children. This hostility predicted higher levels of ADHD symptoms in

children at age 6. Hostility is related to items such as the frequency that a parent gets angry at his/her child, as well as frequency of arguments when there is a disagreement (Harold et al., 2013). This corroborates research literature which links ADHD-related behaviour problems with ineffective parenting practices (Johnston, 1996; Psychogiou, Daley, Thompson & Sonuga-Barke, 2007). In a study by McLaughlin and Harrison (2006), it was found that a decreased sense of competence in parents, as well as more severe behaviour in children with ADHD were significantly related to less effective parenting practices (McLaughlin & Harrison, 2006). In terms of core symptoms of ADHD, it was found in a study by Ellis and Nigg (2009) that parental inconsistent discipline was significantly associated with a childhood ADHD diagnosis.

ADHD often persists into adolescence (Hurtig, Ebeling, Taanila, Miettunen, Smalley, McGough, Loo, Jarvelin & Moilanen, 2007). Walter, Cheong, Molina, Pelham, Wymbs, Belendiuk and Pederson (2012) found that adolescents with ADHD reported significantly less parental consistency and less parental knowledge of their child's whereabouts, which can be related to supervision and monitoring, less parental support and increased parent-adolescent conflict in comparison to adolescents without ADHD.

These studies show an evident interplay between specific parenting behaviours and an increase in ADHD symptoms and maladaptive child behaviours as well as family dysfunction. As mentioned earlier, there is a high co-morbidity of ADHD with other disorders (Yang, Jong, Hsu & Tsai, 2007). There can be a bi-directional effect working here as a parent's specific parenting practices may be in reaction to the stress of raising a child with both ADHD and possibly another behavioural disorder (such as Conduct Disorder (CD) or Oppositional Defiance Disorder (ODD)). This stress can lead to the use of more ineffective parenting practices. In a study by Edwards, Barkley, Laneri, Fletcher and Metevia (2001), adolescents with both ADHD and ODD were contrasted with adolescents in a community sample. Both adolescents with ADHD and ODD and their parents reported significantly more problems with adolescent-parent conflict, more communication considered to be negative, more aggressive strategies used during conflict by adolescents and fathers as well as a higher intensity of anger in both adolescents and fathers in comparison to families with adolescents without a diagnosis (Edwards, Barkley, Laneri, Fletcher and Metevia, 2001). It is evident that ADHD with co-morbid disorders leads to more difficulties for both children and their parents, especially in terms of parent-child conflict, parent-child communication and parental monitoring.

Overall it is evident that ineffective parenting practices have been significantly linked to diminished social skills, aggression, child impulsivity and elevated symptoms of ADHD (Kaiser, McBurnett & Pfiffner, 2011; Harold et al., 2013; Walter et al., 2012). In terms of the development of ADHD characteristics, many protective and risk factors, which include both the family environment and biological factors, play an important role. These factors interact and have an influence on the development of ADHD characteristics (Johnston & Mash, 2001). Different factors may carry a different weight in the development of ADHD symptoms, there can be two extremes of the spectrum in which a child has a strong biological disposition towards the disorder, which leaves less room for a family environment contribution or other factors. However at the other extreme there can be a child who lives in high risk family circumstances which can drive the development of ADHD characteristics despite being mixed with a decreased child predisposition to the disorder (Johnston & Mash, 2001). A child may have a low predisposition to ADHD, but in an unresponsive or chaotic environment, behaviours related to impulsivity, hyperactivity and inattention may be exacerbated (Johnston & Mash, 2001). Sensitive and responsive parenting behaviours can create the base for the development of self regulation skills in children (Johnston & Mash, 2001). Protective factors can assist in self regulation development in a child (Johnston & Mash, 2001). This self-regulation can decrease ADHD symptoms or terminate them in children with predisposition (biological) to ADHD (Johnston & Mash, 2001). The importance therefore of family environment and parenting behaviours is evident the development of ADHD symptoms.

Longitudinal Studies on the Relationship between Parenting Practices and ADHD Related Behaviours and Symptoms in Children and Adolescents

While there is a large body of correlation research linking parenting practices and ADHD, little longitudinal information exists regarding parenting practices and their influence on the developmental trajectory of ADHD from childhood to adolescence. Harvey, Metcalfe, Herbert and Fanton (2011), conducted a 4 year study of ADHD. They found an association between increased negative affect in mothers, decreased maternal warmth, increased paternal laxness as well as higher levels of both paternal and maternal depression when a child with hyperactivity symptoms was 3 years old and had an ADHD diagnosis at age 7.

Parental psychopathology has been linked with inappropriate parenting practices (Belsky, 1984). Chronis, Pehlam, Baumann, Kipp, Lahey, Williams, Jones and Rathouz (2007) corroborate these findings. In their study, 108 children who met the criteria for ADHD at 4 to 7 years old were evaluated in terms of their parents parenting practices and psychopathology. Children were followed for 8 years, annually. It was found that maternal depression was associated with an increase in conduct problems over time while observed praise and positive affect were found to be linked with less conduct problems over time in children with a diagnosis of ADHD (Chronis, Pehlam, Baumann, Kipp, Lahey, Williams, Jones & Rathouz, 2007).

Burke, Pardini and Loeber (2008) investigated the relationship between parenting practices and symptoms in 177 boys with disruptive disorders (CD, ODD and ADHD), aged 7 to 12 years. They were followed until the age of 17. They examined the following parenting practices: involvement, communication, supervision, harsh punishment and timid discipline. Overall, it was found that parenting behaviours were not predictive of ADHD symptoms from childhood to adolescence. In contrast however, it was found that ODD was significantly associated with positive involvement by parents, poor communication, timid discipline and poor supervision. In terms of CD, poor communication was found to be predictive of this disorder. Since this study focused on core symptom criteria for ADHD, their results suggest that parenting practices do not have an influence on the core symptoms of ADHD but are predictive of symptoms of both ODD and CD.

Biederman, Petty, Clarke, Lomedico and Faraone, (2011) looked at predictors related to the persistence of ADHD, in 110 boys with ADHD and 105 boys without the disorder. Boys were aged 6 to 17 years, and were followed for 11 years. It was found that 78% of individuals had ADHD which either fully or partially persisted 11 years later. They found that individuals with persistent ADHD had higher levels of ADHD related impairment at baseline than those that remitted (Biederman, Petty, Clarke, Lomedico & Faraone ,2011). In addition, individuals with persistent ADHD had more exposure to parent psychopathology (maternal psychopathology) than those without ADHD. This suggests that parental psychopathology plays a role in the persistence of ADHD, and as mentioned earlier parental psychopathology has been linked with ineffective parenting practices (Belsky, 1984).

Anderson, Hinshaw and Simmel (1994) examined the relationship between interaction style of mothers as well as parental psychopathology on the development of ADHD or related externalizing

behaviour in children. They compared 49 boys with ADHD and 37 boys without the disorder. They were assessed at baseline and 2 months later. They found that mothers negative interactions acted as predictors of stealing and non compliance 2 months later. When compared with mothers of children without ADHD, it was found that mothers of children with ADHD are more negative and directive while their children are more negative and less compliant 2 months later. Parenting a child with ADHD is a challenge due to problematic behaviours that arise in relation to ADHD, such as less compliance and more negative behaviours; this seems to impact parenting practices by mothers being more negative and directive towards their children.

Studies on the impact of behaviour parent training programs also demonstrate the effect of parenting practices on ADHD symptoms. Some studies show that after parents participate in parent intervention programs they report an improvement in problematic behaviours, such as inattentive and hyperactivity related behaviours as well as oppositional and externalizing behaviours (Ogg & Carlson, 2009; Webster-Stratton, Reid & Beauchaine, 2013) Other studies do not report any such improvement (Tarver, Daley & Sayal, 2014; Van Den Hoofdakker, Van Der Veen-Mulders, Systema, Emmelkamp, Minderaa & Naura, 2007). This research indicates that improving parenting practices through behaviour training programs has mixed evidence in their impact on problematic behaviours in children with ADHD over time. More studies show a positive impact of parent training programs on child ADHD related behaviour while less demonstrate an improvement on core ADHD symptoms(Tarver, Daley & Sayal, 2014).

Overall it is evident that decreased maternal warmth, negative maternal affect and parental psychopathology are linked with an ADHD diagnosis in middle childhood when hyperactivity is present in early childhood. Maternal depression has been associated with an increase in conduct problems over time in children with ADHD, and maternal psychopathology has been found to be a predictor of persistent ADHD from childhood to adolescence. Positive maternal affect and observed praise have been associated with less conduct problems over time in children with ADHD. In addition research also indicates that more studies demonstrate a positive impact of parent training programs on child ADHD related behaviour while fewer studies show an improvement on core ADHD symptoms.

According to Johnston and Mash (2001), most existing studies are correlational and do not provide additional knowledge on how ADHD develops over long periods of time in the family milieu

and beyond. Therefore, lack of longitudinal research is the main grounds for the importance of this study in the advancement of knowledge on the relationship between parenting practices and the symptoms of ADHD.

Synthesis of the Problem and Research Questions

ADHD is a disorder which can impact an individual and his/her quality of life from childhood through adulthood. Past research indicates that parenting practices have an impact on child development and behaviour; parents are powerful role models in the lives of their children. It seems that the use of ineffective parenting practices in children with ADHD and parental psychopathology has the greatest impact on the persistence of behaviours and symptoms related to ADHD (Biederman et al., 2011; Burke et al., 2008; Chronis et al., 2007) A more optimal environment, which includes sensitive and responsive parenting, for a child with a biological predisposition to the disorder can increase self-regulation in a child, thus decreasing ADHD symptoms associated with deficits in self-regulation (Johnston & Mash, 2001).

Two types of studies are included in the literature on the relationship between parenting practices and child behaviour, cross-sectional and longitudinal. Cross-sectional research indicates that in early childhood, mothers of children at risk for ADHD are more likely to use time outs or reprimands instead of positively reinforcing appropriate behaviors. In middle childhood studies suggest that ineffective parenting practices are significantly related to diminished social skills, aggression and child impulsivity. Inconsistent discipline is significantly associated with a childhood ADHD diagnosis. Children with ADHD tend to live in families with higher levels of dysfunction. Rearing a child with behaviour difficulties can elicit inappropriate parenting strategies. ADHD co-morbidity with other disorders has been significantly linked with parental psychopathology (which can be related to ineffective parenting practices), a lack of parental monitoring, coercive family processes, negative parental affect and higher levels of child-parent conflict.

Longitudinal research on the relationship between parenting practices and the development of ADHD indicates that decreased maternal warmth, negative maternal affect and increased parental psychopathology are linked with an ADHD diagnosis in middle childhood when hyperactivity is

present in early childhood. Maternal depression has been associated with an increase in conduct problems over time in children with ADHD, and maternal psychopathology has been found to be a predictor of persistent ADHD from childhood to adolescence. Positive maternal affect and observed praise have been associated with less conduct problems over time in children with ADHD. In addition research also indicates that more studies demonstrate a positive impact of parent training programs on child ADHD related behaviour while fewer studies show an improvement on core ADHD symptoms.

The objective of this study is to examine the relationship between parenting practices or family functioning in childhood, and symptoms of ADHD in adolescence 5 years after the initial assessment in childhood. Two questions are formulated?

- 1) Which parenting practices or family functioning characteristics in childhood are predictors of core symptoms of ADHD, 5 years later in adolescence?
- 2) Which parenting practices or family functioning characteristics in childhood are predictors of change in core symptoms of hyperactivity-impulsivity and inattention from childhood to adolescence?

Methodology

Participants

The 36 participants (31 boys, 5 girls) were between 6 and 9 years of age at Time 1 ($M=8.01$, $SD = 1.04$) and were aged 11 to 14 years old at Time 2 ($M= 12.5$ years, $SD = 1.4$). In terms of ADHD subtype, 25% ($n=9$) of the participants have the predominantly inattentive subtype, 8.3% ($n=3$) of participants have the predominantly hyperactive-impulsive subtype while the majority, 66.7% ($n=24$) have the combined subtype at Time 1. In terms of co-morbidity, 44.4% ($n=16$) of the children have a co-morbid disorder, with 38.9% ($n=14$) having “aggressiveness” and 5.6% ($n=2$) having “anxiety” at Time 1. In 91.7% ($n=33$) of cases, the parent respondent was the mother (mean age = 37.31 years old) whereas in 8.3% ($n=3$) of cases the respondent was the father (mean age= 39.12 years old). In 75% ($n=27$) of cases the family was a biological two parent family while in 13.9% ($n=5$) participants were in a single parent family. In 11.1% ($n=4$) of cases the family was a reconstructed family with the

child's mother. At time 1, 16.3% of families had an income lower than \$59 999(n=6). In 8.3% of cases family income was between \$25 000 and \$ 44 999 (n=3). 13.9% had an income between \$55 000 and \$64 999 (n=5) and 13.9% had an income between \$65 000 and \$85 000 (n=5). Finally 47.2% (n=17) of families had a family income of over \$85 000.

The participants agreed to participate in the follow up study 5 years after their original participation in The Incredible Years intervention study. The families were each referred to the Incredible Years (Webster-Stratton, 1998) research project by a professional in the health, education or social service domain due to their child's ADHD. In order to ensure that the child was eligible to participate in the study, certain inclusion and exclusion criteria had to be respected. The inclusion criteria for the study were the following: a) the child has a diagnosis of Attention Deficit/ Hyperactivity Disorder (according to DSM-IVR criteria and verified by a psychiatric evaluation), b) the child responds to methylphenidate and follows a pharmacological treatment using this medication (Ritalin or Concerta), c) the child is between 6 and 9 years 11 months of age inclusively at Time 1, d) the parents and the child can speak and read French. The exclusion criteria for admission into the research study were the following: a) the child presents with an intellectual delay ($IQ \leq 79$) b) the child presents with a language disorder or severe learning and / or specific disorder, verified in the clinical evaluation, c) the child has a neurological disease, d) the child was born premature (< 35 weeks), and e) the child presents with multiple tics, Tourette's Syndrome or obsessive compulsive disorder.

The original sample was composed of 110 parents with a child that has Attention Deficit Hyperactivity Disorder (ADHD). The original sample was randomly assigned to three groups: a) Training program for parenting skills, b) Telephone Support, and c) Control Group. .

Five years later (follow-up) 57 families were eligible to participate in the study and 36 accepted to participate. There was therefore an attrition of 21 families for the following reasons: 13 could not be reached (change of address), 8 refused (2 were not interested, 3 did not have time and in 3 of the cases the adolescent did not want to participate in the follow up study). After 5 years there were a total of 36 participants from the original sample, 14 participants from the Parent-training group, 13 participants for the Telephone support group and 9 participants from the Control group. Considering that 36 out of 44 families that were reached accepted to participate in the follow-up study, there was an overall acceptance rate of 81.8%.

Diagnostic Evaluation Procedure at the Time of Recruitment

The diagnostic evaluation took place in the research team's laboratory. During this meeting, the parents completed a diagnostic interview (DISC-IV) as well as the Conner's while the children

responded to the WISC-III. The psychiatrist affiliated with the research team met with each family in the study. During these meetings, a workbook containing the other questionnaires from the study was given to the parents. During a home visit, the research assistant collected the workbooks which contained the completed parent questionnaires. The parent who completed the questionnaires was the parent who spent the most time with his/her child; therefore it was up to the parents to decide which one would respond to the questionnaires. All of the parents solicited completed all of the questionnaires.

Diagnostic Instruments

Evaluation of ADHD and Child Behaviour:

DISC-IV (1997): The DISC-IV consists of a diagnostic interview that allows for a comprehensive range of diagnoses for children and adolescents aged 6 to 17 years old (Shaffer, Fisher, Lucas, Dulcan & Schwab, 2000).

Conners Parent Rating Scale (long version) (translated version) (1997): The Conners is an 80-item questionnaire used to assess ADHD and behavioral problems associated with youth aged 3 to 17 years old. It uses a 4 point likert scale ranging from “not true at all” to “very much true”. This questionnaire has the following subscales: oppositional ($\alpha = 0.89$), cognitive/inattention problems ($\alpha = 0.88$), hyperactivity ($\alpha = 0.90$), anxiety/shyness ($\alpha = 0.79$), perfectionism ($\alpha = 0.68$), social problems ($\alpha = 0.82$), psychomatic ($\alpha = 0.73$) and the last three with alphas ranging from 0.88 to 0.96. Conners global index, ADHD Conners Index (used to identify children and adolescent who are at risk for an AD/HD diagnosis) and DSM-IV scale total score (corresponds directly to the diagnostic criteria of the DSM-IV for ADHD) (Conners, 1997).

Weschler Intelligence Scale for Children (WISC, 3rd ed; Weschler, 1991). The five following subtests were administered: information, similarities, vocabulary and letter-number sequencing, and block design. According to Sattler (1992), these subtests allow for a good approximation of one’s general IQ.

Measurement Instruments in Current Study

Child Behaviour

Conners Parent Rating Scale (long version) (translated version) (1997): Specifically the two measures that will be used to test our hypothesis are the DSM-IV: inattentive subscale ($\alpha = 0.89$) and

the DSM-IV: Hyperactive- Impulsive subscale ($\alpha = 0.90$) as these are the most pertinent in relation to ADHD symptoms measured in this study. Each of these subscales has 9 items.

Parenting Practices

Alabama Parenting Questionnaire (APQ) (parent version) (Shelton, Frick & Wootton, 1996) : This questionnaire is used to assess parenting practices in 5 different parenting constructs : parent involvement (i.e.. “ You have a friendly talk with your child.”) ($\alpha = 0.71$), positive practices (i.e. “You reward or give something extra to your child for obeying you or behaving well. “) ($\alpha = 0.77$), poor monitoring/supervision (i.e. “Your child is out with friends you do not know.”) ($\alpha = 0.87$), inconsistent discipline (i.e. “You threaten to punish your child and then do not actually punish him/her.”) ($\alpha = 0.71$), corporal punishment (i.e. “You spank your child with your hand when he/she has done something wrong.”) ($\alpha = 0.82$) (Shelton, Frick & Wootton, 1996). This questionnaire consists of 42 items and is scored on a 5 point likert scale: never (1), almost never (2), sometimes (3), often (4), always (5). The more the parent reports using a parenting practice, the higher the score with the exception of poor monitoring/ supervision, in which an elevated score indicates better supervision practices.

Parenting Practices Inventory (PPI): The PPI is a questionnaire which was “revised from the Oregon Social Learning Center questionnaire for parents of older children,” (Webster-Stratton, 1998; Webster-Stratton, Reid & Beauchaine, 2012) and is used to evaluate the manner in which a caregiver or parent disciplines a child. This questionnaire is comprised of seven subscales: appropriate discipline (i.e.. “If your child hits another child, how likely is it that you would discipline your child in the following ways: Give him/her a time out.”) ($\alpha = 0.82$), harsh and inconsistent discipline (i.e. “If your child hits another child how likely is it that you would discipline your child in the following ways: raise your voice”) ($\alpha = 0.80$), positive verbal discipline (i.e.. “If your child hits another child, how likely is it that you would discipline your child in the following ways: discuss the problem with your child or ask questions?”)($\alpha = 0.75$), (monitoring (i.e. “What percentage of the time do you know where your child is when s/he is away from your direct supervision?”) ($\alpha = 0.54$), praise and incentives (i.e. How often do you: Praise or compliment your child when he/she behaves well or does a good job) ($\alpha = 0.67$), physical punishment (i.e. “If your child hit another child, how likely is it that you would discipline your child in the following ways: Give your child a spanking.) ($\alpha = 0.76$), and clear expectations (i.e. “How much do you agree with the following statement: I have made clear rules or expectations for my child about not fighting, stealing, lying etc.) ($\alpha = 0.66$) (Webster-Stratton, 1998). The PPI is made up of four

different scales for rating items, two seven point likert scales, one five point likert scales and scale used to measure percentages. The seven point likert scales range from “Never” to “Always” and “ Not at all likely” to “ Extremely likely”. The five point likert scales range from “Strongly agree” to “Strongly disagree” and from “none or almost none” of time to “All or almost all” of the time.

Family Functioning

Family Assessment Device (FAD) (Epstein, Baldwin & Bishop, 1983) The FAD is based on the McMaster Model of Family Functioning (Epstein, Baldwin & Bishop, 1983) and is used to assess different dimensions of family functioning. This instrument is comprised of 7 scales and 45 statements: General functioning (ex. “In times of crisis we can turn to each other for support” ($\alpha = 0.72$), problem solving (ex. “We try to think of different ways to solve problems.”) ($\alpha = 0.74$), affective responsiveness (ex. “We are reluctant to show our affection for each other”) ($\alpha = 0.83$), affective involvement (ex. “If someone is in trouble, the others become too involved.”) ($\alpha = 0.78$), behaviour control (ex. “You can easily get away with breaking the rules.”) ($\alpha = 0.72$), roles (ex. “We discuss who is to do household jobs.”), and communication (ex. “You can’t tell how a person is feeling from what they are saying”) ($\alpha = 0.75$). This instrument has 45 items measured on a likert scale with the following response choices: 1 (strongly agree), 2 (agree), 3 (disagree) and 4 (strongly disagree). Scoring is done by adding the answers for each scale and then dividing by the number of items (for each scale). The more elevated the score, the worse the level of family functioning.

Sociodemographic characteristic

Two indicators of sociodemographic characteristics were measured for each family: (a) family income ranging from \$0 to \$85000 and more, and (b) family composition which includes two parent family, single parent family and reconstituted family.

Results

Preliminary Analyses

The objective of this study is to examine the relationship between parenting practices or family functioning in childhood and symptoms of ADHD in adolescence 5 years later.

Table 1 presents the means and standard deviations of the variables in the study for both Time 1 (childhood) and Time 2 (adolescence). The sample is composed of children who have an above cut-off score (t-score of above 60 is considered mildly atypical), of hyperactivity ($M=62.83$) and a close to cut-

off score for inattention ($M= 59.83$) at Time 1 as reported by their parents. These children also have an above cut-off score of hyperactivity ($M=67.94$) and a close to cut-off score of inattention ($M= 59.83$) at Time 2. At Time 1, parents reported an average being often involved with their child and often using positive parenting practices, On average parents were found to use inconsistent discipline, “almost never” and poor monitoring and supervision and corporal punishment,” almost never” and in certain cases “ never”. At Time 2, during adolescence, parents reported being involved often with their child and often using positive parenting practices. On average these parents report “almost never” using poor monitoring and supervision ($M = 1.47$, $SD = 0.41$), inconsistent discipline ($M = 2.37$) and “almost never “or “never” using corporal punishment ($M = 1.22$).

In terms of the Parenting Practices Inventory, at Time 1 parents report using monitoring all or almost all of the time. They report that it is extremely likely that they will use positive verbal discipline and that they will often use praise and incentives. On average, parents “neither agree or disagree” or “disagree” that clear expectations were set for their children ($M=3.70$) while harsh and inconsistent discipline was “slightly likely” to “somewhat likely” to be used ($M=2.61$) and physical punishment was “not at all likely” to be used ($M=1.12$). Results for the PPI are not available at Time 2. In terms of the Family Assessment Device, parents reported on average, family general functioning that can be perceived as “stressed” at Time 1 and at Time 2. On average however family problem solving at Time 1 ($M=1.93$) and Time 2 ($M=1.84$), communication at Time 1 ($M=1.76$) and Time 2 ($M=1.82$), roles at Time 1 ($M= 1.78$) and Time 2 (2.14), affective responsiveness at Time 1 ($M=1.60$) and Time 2 ($M=1.66$), affective involvement at Time 1 ($M=1.77$) and Time 2 ($M= 1.93$) and behaviour control at Time 1 ($M= 1.50$) and Time 2 ($M=1.93$), are not considered to be problematic. On the FAD Device, the higher the score, the more problematic the level of family functioning.

Table 1

Means and Standard Deviation of measures of child behaviour (Conners), parenting practices (APQ and PPI) and Family Functioning (FAD) at Time 1 and Time 2.

VARIABLES	<u>Time 1</u>		<u>Time 2</u>	
	Mean	(SD)	Mean	(SD)
Child behaviour, parenting practices and family functioning				
Conners Parent DSM IV: Hyperactivity-impulsivity	62.83	(12.93)	67.94	(16.58)
Conners Parent DSM-IV: Inattention	59.11	(11.17)	59.83	(9.42)
APQ Involvement	4.14	(0.40)	3.92	(0.42)
APQ Positive Parenting	4.47	(0.40)	4.12	(0.55)
APQ Poor Monitoring/Supervision	1.29	(0.38)	1.46	(0.40)
APQ Inconsistent Discipline	2.11	(0.55)	2.39	(0.65)
APQ Corporal Punishment	1.28	(0.43)	1.19	(0.34)
PPI Appropriate Discipline	4.99	(0.75)	N/A	N/A
PPI Harsh and Inconsistent Discipline	2.61	(0.64)	N/A	N/A
PPI Positive Verbal Discipline	5.58	(0.77)	N/A	N/A
PPI Monitoring	5.68	(0.84)	N/A	N/A
PPI Praise and Incentives	4.92	(0.62)	N/A	N/A
PPI Physical Punishment	1.12	(0.19)	N/A	N/A
PPI Clear Expectations	3.70	(0.47)	N/A	N/A
FAD General Functioning	1.74	(0.38)	1.76	(0.42)
FAD Problem Solving	1.93	(0.40)	1.84	(0.37)
FAD Communication	1.76	(0.41)	1.82	(0.44)
FAD Roles	1.78	(0.41)	2.14	(0.35)
FAD Affective Responsiveness	1.60	(0.46)	1.66	(0.43)
FAD Affective Involvement	1.77	(0.45)	1.93	(0.46)
FAD Behaviour Control	1.50	(0.34)	1.49	(0.40)

Note : SD : Standard deviation; APQ : Alabama Parenting Questionnaire; PPI : Parenting Practices Inventory; FAD; Family

Assessment Device; N/A : Not Available

Analyses

Which measures of parenting practices or family functioning at Time 1 are predictors of a child's core symptoms of inattention or hyperactivity-impulsivity at follow-up, 5 years later at Time 2? In order to answer this question, it was important to first understand the relationship for inattention at time 1 and 2 and for hyperactivity-impulsivity at time 1 and time 2. Bivariate correlations were conducted between inattention at time 1 and inattention at 2, ($r=0.066$, $p<0, 05$) as well as between hyperactivity and impulsivity at time 1 and time 2 ($r=0.354$, $p <0, 05$). This suggests a significant relationship between each of the core symptoms of hyperactivity-impulsivity from time 1 to time 2. In order to further answer this question, partial correlations were performed in order to understand the relationship between each parenting practice at Time 1 and the two measures of child behaviour (hyperactivity-impulsivity and inattention) at Time 2, while controlling for child behaviour at Time 1 (hyperactivity-impulsivity and inattention). None of the correlations between parenting practices or family functioning and child behaviour were found to be significant (see Table 2).

Table 2

Partial correlations between parenting practices (APQ and PPI) or family functioning (FAD) at time 1 and child behaviour at time 2(Conners).

VARIABLES	Hyperactivity-impulsivity Time 2		Inattention-Time 2	
	Correlation	P.value (2 tailed)	Correlation	P.value (2 tailed)
Parenting Practices and Family Functioning at Time 1				
APQ Involvement	-0.02	0.91	-0.01	0.95
APQ Positive Parenting	0.10	0.56	0.11	0.52
APQ Poor Monitoring/Supervision	-0.02	0.91	-0.03	0.87
APQ Inconsistent Discipline	-0.12	0.50	-0.09	-0.61
APQ Corporal Punishment	-0.31	0.07	-0.31	0.07
PPI Appropriate Discipline	0.04	0.81	0.05	0.79
PPI Harsh and Inconsistent Discipline	-0.19	0.28	-0.19	0.28
PPI Positive Verbal Discipline	-0.01	0.97	0.004	0.98
PPI Monitoring	-0.17	0.32	-0.18	0.31
PPI Praise and Incentives	-0.07	0.71	-0.04	0.80
PPI Physical Punishment	-0.09	0.63	-0.07	0.68
PPI Clear Expectations	0.22	0.20	0.26	0.14
FAD General functioning	-0.004	0.98	-0.01	0.98
FAD Problem Solving	-0.06	0.72	-0.06	0.75
FAD Communication	-0.15	0.41	-0.14	0.42
FAD Roles	-0.10	0.58	-0.09	0.60
FAD Affective Responsiveness	-0.10	0.57	-0.10	0.59
FAD Affective Involvement	0.03	0.85	0.04	0.83
FAD Behaviour Control	0.01	0.97	0.01	0.97

Note : SD : Standard deviation; APQ : Alabama Parenting Questionnaire; PPI : Parenting Practices Inventory; FAD : Family Assessment Device

Which measures of parenting practices or family functioning at Time 1 are predictors of changes in hyperactivity-impulsivity and inattention from Time 1 to Time 2? In order to answer this question a change variable was created to determine whether there had been a decline, maintenance or increase in either hyperactivity-impulsivity or inattention. The change variable was created by taking child behaviour at Time 2 and subtracting child behaviour at Time 1 (ex. Hyperactivity-impulsivity Time 2- Hyperactivity-impulsivity Time 1= Hyperactivity-impulsivity change variable). Bivariate correlations were performed to determine the significance of the relationship between parenting practices or family functioning at Time 1 and the change variable for Hyperactivity-impulsivity and Inattention. A significant correlation was found between clear expectations and the difference in inattention from time 1 to time 2 ($r= 0.42, p<0, 05$) as well as clear expectations and the difference in hyperactivity-impulsivity from Time 1 to Time 2 ($r= 0.38, p<0, 05$). Clear expectations at Time 1 are significantly associated with an increase in inattention from Time 1 to Time 2, as well as an increase in hyperactivity-impulsivity from Time 1 to Time 2. Correlations between the other parenting practices or family functioning and the two change variables were not found to be significant.

Table 3

Bivariate correlations between parenting practices or family functioning at time 1 and change in child behaviour on hyperactivity-impulsivity and inattention scales from time 1 to time 2

VARIABLES	Change in Hyperactivity-impulsivity		Change in Inattention	
	Pearson Correlation	Significance (2 tailed)	Pearson Correlation	Significance (2 tailed)
Parenting Practices scales- Time 1				
APQ Involvement	-0.11	0.52	0.09	0.60
APQ Positive Parenting	0.07	0.67	0.20	0.24
APQ Poor Monitoring/Supervision	0.03	0.88	-0.10	0.55
APQ Inconsistent Discipline	-0.05	0.80	-0.11	0.52
APQ Corporal Punishment	0.08	0.65	-0.11	0.54
PPI Appropriate Discipline	-0.05	0.78	0.09	0.60
PPI Harsh and Inconsistent Discipline	-0.02	0.92	-0.13	0.45
PPI Positive Verbal Discipline	0.09	0.59	0.12	0.50
PPI Monitoring	-0.22	0.17	-0.15	0.40
PPI Praise and Incentives	0.05	0.76	0.26	0.12
PPI Physical Punishment	0.26	0.12	0.10	0.57
PPI Clear Expectations	0.38*	0.02*	0.42*	0.01*
FAD General Functioning	-0.01	0.97	-0.02	0.90
FAD Problem Solving	0.11	0.51	0.05	0.80
FAD Communication	-0.09	0.59	-0.05	0.76
FAD Roles	-0.05	0.76	-0.01	0.96
FAD Affective Responsiveness	-0.07	0.71	-0.01	0.98
FAD Affective Involvement	0.03	0.89	0.08	0.63
FAD Behaviour Control	-0.10	0.59	-0.004	0.98

* p<0.05 **p <0.01

Note : SD : Standard deviation; APQ : Alabama Parenting Questionnaire; PPI : Parenting Practices Inventory; FAD : Family Assessment Device

Concomitant change over time in children's hyperactivity and inattention were considered. Four groups were created in order to take into consideration that a child has symptoms of both inattention and hyperactivity-impulsivity at the same time, and these symptoms can differ (i.e. a child can have higher levels of inattention and lower levels of hyperactivity-impulsivity). The four groups were created on the basis of improvement /stability or deterioration of the hyperactivity-impulsivity or inattention scales. In order to create these four groups, the change variables were looked at in terms of whether both change variables were positive (indicating an increase in both inattention and hyperactivity-impulsivity), negative (indicating a decline in both hyperactivity-impulsivity and inattention) or whether one was positive and one was negative (indicating a decline in one of the scales, either hyperactivity-impulsivity or inattention and an increase in the other). Four groups were created that were based on whether inattention and hyperactivity-impulsivity increased, remained the same or decreased: group 1: decrease or maintenance in hyperactivity-impulsivity and inattention (n= 9); group 2 (n=7): decline or maintenance of inattention and increase in hyperactivity-impulsivity, group 3; decrease or maintenance of hyperactivity-impulsivity and increase in inattention (n=4); and 4) group 4: increase in both hyperactivity-impulsivity and inattention (n=16).

Table 4

Distribution of children into categories of change in hyperactivity-impulsivity and inattention

	Decrease or maintenance of hyperactivity-impulsivity	Increase in hyperactivity-impulsivity
Decrease or maintenance of inattention	9	7
Increase in inattention	4	16

Table 5 presents the means and standard deviations of the different parenting practices and family functioning measures for each group. ANOVA analyses comparing these four groups on each measure of parenting practices or family functioning at Time 1 were conducted (presented in Table 6). None of the one way ANOVA analyses were found to be significant. However the relationship between the groups and clear expectations came the closest to being significant ($F(3, 32) = 2.72, p=0.06$).

Table 5

Means and standard deviations of parenting practices (APQ and PPI) and family functioning (FAD) at time 1 for each group of children.

VARIABLES	<u>Group 1</u>		<u>Group 2</u>		<u>Group 3</u>		<u>Group 4</u>	
	(n=9)		(n=7)		(n=4)		(n=16)	
	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>
APQ Involvement	4.12	(0.31)	4.11	(0.41)	4.33	(0.38)	4.11	(0.47)
APQ Positive Parenting	4.54	(0.46)	4.48	(0.47)	4.50	(0.41)	4.43	(0.35)
APQ Poor Monitoring/Supervision	1.37	(0.21)	1.20	(0.49)	1.13	(0.05)	1.33	(0.44)
APQ Inconsistent Discipline	2.20	(0.67)	2.26	(0.66)	1.62	(0.25)	2.13	(0.46)
APQ Corporal Punishment	1.22	(0.29)	1.57	(0.74)	1.00	(0.00)	1.25	(0.31)
PPI Appropriate Discipline	4.90	(0.58)	4.72	(0.97)	5.52	(0.56)	5.03	(0.76)
PPI Harsh and Inconsistent Discipline	2.63	(0.66)	2.93	(0.65)	2.13	(0.55)	2.58	(0.62)
PPI Positive Verbal Discipline	5.50	(0.64)	5.60	(1.06)	5.86	(0.60)	5.54	(0.79)
PPI Monitoring	5.79	(1.05)	5.77	(0.65)	5.83	(0.64)	5.54	(0.88)
PPI Praise and Incentives	4.87	(0.68)	4.75	(0.80)	5.18	(0.29)	4.96	(0.58)
PPI Physical Punishment	1.07	(0.15)	1.17	(0.25)	1.04	(0.08)	1.14	(0.20)
PPI Clear Expectations	3.39	(0.24)	3.60	(0.35)	3.92	(0.22)	3.86	(0.57)
FAD General Functioning	1.68	(0.31)	1.82	(0.36)	1.85	(0.58)	1.71	(0.39)
FAD Problem Solving	1.91	(0.31)	1.94	(0.29)	1.92	(0.62)	1.94	(0.45)
FAD Communication	1.70	(0.22)	1.85	(0.38)	1.89	(0.64)	1.73	(0.47)
FAD Roles	1.70	(0.22)	1.85	(0.38)	1.89	(0.64)	1.77	(0.46)
FAD Affective Responsiveness	1.56	(0.42)	1.50	(0.28)	1.58	(0.35)	1.67	(0.57)
FAD Affective Involvement	1.70	(0.28)	1.72	(0.38)	1.82	(0.50)	1.81	(0.56)
FAD Behaviour Control	1.51	(0.33)	1.43	(0.41)	1.44	(0.33)	1.52	(0.34)

Note: APQ: Alabama Parenting Questionnaire; PPI: Parenting Practices Inventory; FAD; Family Assessment Device. Group 1: Decrease or maintenance in hyperactivity-impulsivity and inattention; Group 2: decline or maintenance of inattention and increase in hyperactivity-impulsivity; Group 3: decrease or maintenance of hyperactivity-impulsivity and increase in inattention; Group 4: increase in both hyperactivity-impulsivity and inattention.

Table 6

One-way ANOVA between groups (1, 2 3, 4) and parenting practices or family functioning at Time 1

Parenting practice or family functioning at Time 1	<i>Between Group Sum of Squares</i>	<i>df</i>	<i>Within Group Sum of Squares</i>	<i>df</i>	<i>F</i>	<i>p</i>
APQ Involvement	0.16	3	5.58	32	0.31	0.82
APQ Positive Parenting	0.07	3	5.40	32	0.15	0.93
APQ Poor Monitoring/Supervision	0.24	3	4.63	31	0.54	0.66
APQ Inconsistent Discipline	1.19	3	9.08	31	1.35	0.28
APQ Corporal Punishment	0.95	3	5.38	32	1.89	0.15
PPI Appropriate Discipline	1.73	3	17.88	32	1.03	0.39
PPI Harsh and Inconsistent Discipline	1.66	3	12.78	32	1.38	0.27
PPI Positive Verbal Discipline	0.40	3	20.61	32	0.21	0.89
PPI Monitoring	0.57	3	24.29	32	0.25	0.86
PPI Praise and Incentives	0.53	3	12.81	32	0.44	0.73
PPI Physical Punishment	0.06	3	1.20	32	0.55	0.65
PPI Clear Expectations	1.57	3	6.14	32	2.72	0.06
FAD General Functioning	0.14	3	4.83	32	0.30	0.825
FAD Problem Solving	0.01	3	5.48	32	0.01	1.00
FAD Communication	0.16	3	5.64	31	0.30	0.83
FAD Roles	0.13	3	5.58	31	0.25	0.86
FAD Affective Responsiveness	0.15	3	6.98	31	0.22	0.88
FAD Affective Involvement	0.10	3	7.00	32	0.15	0.93
FAD Behaviour Control	0.05	3	3.80	31	0.14	0.94

Note. APQ : Alabama Parenting Questionnaire; PPI : Parenting Practices Inventory; FAD; Family Assessment Device; df : degree of freedom

In order to further investigate the changes in inattention and hyperactivity, the four groups of children were grouped into two extreme groups: group 1: increase in both hyperactivity-impulsivity and inattention with a change range greater than 5 (n=10), and group 2: decrease or maintenance in both hyperactivity-impulsivity and inattention with a change range greater than 5 (n=6). Table 7 presents the means and standard deviations of these two groups.

Table 7

Means and standard deviations of the correlations between parenting practices and family functioning at Time 1 and the change in child behaviour in groups 1 and 2.

VARIABLES	<u>Group 1</u>		<u>Group 2</u>	
	<i>(n=10)</i>		<i>(n=6)</i>	
Parenting Practices and Family Functioning At Time 1	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>
APQ Involvement	4.06	(0.50)	4.13	(0.31)
APQ Positive Parenting	4.38	(0.30)	4.39	(0.50)
APQ Poor Monitoring/Supervision	1.41	(0.50)	1.36	(0.23)
APQ Inconsistent Discipline	2.1	(0.45)	2.3	(0.64)
APQ Corporal Punishment	1.20	(0.28)	1.22	(0.27)
PPI Appropriate Discipline	5.07	(0.81)	4.90	(0.67)
PPI Harsh and Inconsistent Discipline	2.48	(0.65)	2.78	(0.53)
PPI Positive Verbal Discipline	5.42	(0.93)	5.44	(0.76)
PPI Monitoring	5.61	(1.00)	6.08	(1.00)
PPI Praise and Incentives	4.86	(0.64)	4.80	(0.85)
PPI Physical Punishment	1.12	(0.21)	1.06	(0.14)
PPI Clear Expectations	4.00	(0.57)	3.39	(0.20)
FAD General Functioning	1.74	(0.40)	1.67	(0.32)
FAD Problem Solving	1.98	(0.39)	1.83	(0.33)
FAD Communication	1.78	(0.50)	1.70	(0.19)
FAD Roles	1.84	(0.48)	1.70	(0.19)
FAD Affective Responsiveness	1.75	(0.60)	1.61	(0.44)
FAD Affective Involvement	1.89	(0.57)	1.65	(0.25)
FAD Behaviour Control	1.59	(0.36)	1.55	(0.28)

Note. APQ : Alabama Parenting Questionnaire; PPI : Parenting Practices Inventory; FAD; Family Assessment Device. Group 1: increase in both hyperactivity-impulsivity and inattention with a change range of greater than 5; Group 2: decrease or maintenance in both hyperactivity-impulsivity and inattention with a change range of greater than 5.

T-tests for between group comparisons between the two extreme categories of child groups with each measure of parenting practices or family functioning at Time 1 were conducted (presented in Table 8). None of the T-Test results were found to be significant with the exception of the relationship between the extreme groups and clear expectations ($t = 2.49$, $df = 14$, $p < .05$, 95% CI for mean difference 0.09 to 1.14). Parents who set clear expectations at Time 1 have adolescents with increased inattention and hyperactivity-impulsivity at Time 2.

Table 8

Independent T-tests between groups (1, 2) and parenting practices or family functioning at time 1.

Parenting practice or family functioning at Time 1	t	df	Sig. (2 tailed)	95% CI for Mean Difference
APQ Involvement	-0.32	14	0.76	-0.57, 0.42
APQ Positive Parenting	-0.28	14	0.98	-0.43, 0.42
APQ Poor Monitoring/Supervision	-0.21	13	0.84	-0.46, 0.56
APQ Inconsistent Discipline	-0.71	13	0.49	-0.81, 0.41
APQ Corporal Punishment	-0.16	14	0.88	-0.33, 0.29
PPI Appropriate Discipline	0.42	14	0.68	-0.68, 1.01
PPI Harsh and Inconsistent Discipline	-0.94	14	0.36	-0.98, 0.38
PPI Positive Verbal Discipline	-0.59	14	0.95	-0.99, 0.94
PPI Monitoring	-0.92	14	0.37	-1.58, 0.63
PPI Praise and Incentives	0.14	14	0.89	-0.75, 0.85
PPI Physical Punishment	0.64	14	0.54	-0.14, 0.26
PPI Clear Expectations	2.49	14	0.03*	0.09, 1.14
FAD General Functioning	0.39	14	0.71	-0.34, 0.49
FAD Problem Solving	0.79	14	0.44	-0.26, 0.56
FAD Communication	0.33	14	0.74	-0.39, -0.53
FAD Roles	0.64	14	0.53	-0.31, 0.58
FAD Affective Responsiveness	0.49	14	0.63	-0.47, 0.75
FAD Affective Involvement	0.97	14	0.35	-0.29, 0.77
FAD Behaviour Control	0.25	14	0.81	-0.33, 0.42

* $p < 0.05$

Note : SD : Standard deviation; APQ : Alabama Parenting Questionnaire; PPI : Parenting Practices Inventory; FAD; Family Assessment Device

Discussion

The main goal of the present study was to examine the relationship between parenting practices or family functioning in childhood, and core symptoms (inattention and hyperactivity-impulsivity symptoms) of ADHD in adolescence 5 years after the initial assessment in childhood.

No significant relationship was found between any particular parenting practice and inattention or hyperactivity symptoms. This result corroborates past longitudinal research, which suggests that parenting practices used in childhood do not have an impact on the core symptoms of ADHD in adolescence (Burke, Pardini & Loeber, 2008). The study by Burke et al. (2008) is the only longitudinal research which examines the relationship between parenting practices and core symptoms of ADHD from childhood to adolescence. According to their findings, parenting practices such as involvement, communication, harsh punishment and timid discipline were not found to be predictive of ADHD symptoms from childhood to adolescence.

Longitudinal research on the relationship between parenting practices and child behaviour suggests that improvement in children with ADHD has been shown with related behaviours, such as externalizing problems, stealing and non-compliance, and not necessarily with core ADHD symptoms themselves (Anderson, Hinshaw & Simmel, 1994; Chronis, Pehalm, Baumann, Kipp, Lahey, Williams, Jones & Rathouz., 2007). Other longitudinal studies showed ineffective parenting practices in early childhood were predictive of an ADHD diagnosis later in childhood (Harvey, Metcalfe, Herbert & Fanton, 2011). Indeed most longitudinal studies suggest that parenting practices are predictors of related behaviour and ADHD core symptoms in childhood but not in adolescence.

According to a meta-analysis by Tarver, Daley and Sayal (2014), evidence indicates that parent training programs are minimally effective on the core symptoms of ADHD, however, behaviour training programs can be beneficial due to positive outcomes related to a decrease in oppositional behaviour in children with ADHD, as well as an improvement in parent-child relationships. Their review encourages professionals to treat parenting practices as risk/protective factors, rather than a way to improve the core symptoms of ADHD. Research from cross-sectional studies suggest that parents of children with ADHD tend to adopt more ineffective parenting strategies, which can be a result of raising a child with more challenging behaviour rather than the fact the child has ADHD. (DuPaul,

McGoey, Eckert & VanBrakle, 2001; Kaplan, Crawford, Fisher & Dewey, 1998). Many inattention symptoms tend to be covert, and therefore not as obvious to parents as symptoms hyperactivity in children, in addition children with co-morbid disorders tend to display more difficult behaviour. Parenting a child with ADHD is a challenge due to problematic behaviours that arise such as less compliance and more negative behaviours (Anderson et al., 1994).

It may be that age is an important factor when it comes to parenting practices and ADHD symptoms. Symptoms of hyperactivity are more obvious in children and tend to decrease in adolescence (Barkley, 2004). Longitudinal studies which take place solely in childhood for all evaluation time points may be more susceptible to observe hyperactivity-impulsivity related behaviours in comparison to longitudinal studies with a final evaluation point in adolescence.

Previous research, along with the current finding, shows that parenting practices may play less of a central role with ADHD symptoms during the adolescent years. A significant relationship was identified between clear expectations from childhood to adolescence and an increase in hyperactivity and inattention in adolescence, which does not line with previous research. It would be expected that setting clear expectations, an appropriate parenting practice, would be associated with improvement in behaviour in children with ADHD. Past research suggests that appropriate parenting practices are associated with better social skills in children with ADHD (Kaiser, McBurnett & Pfiffner, 2011), while ineffective parenting practices are associated with more externalizing behaviours in children with ADHD (McLaughlin & Harrison, 2006). However considering that this is the only significant result from all of the analyses conducted, this finding may be an anomaly.

Parenting practices may have less of an impact on core symptoms of ADHD in the present study due to the low co-morbidity rate in our sample (40%). In general, the co-morbidity rate for ADHD with other disorders can be as high as 80%, with 50% of children with ADHD having co morbid ODD and CD (Connor, Steeber & McBurnett, 2010; Mash & Wolfe, 2005). Children in this study may have less related behaviour issues due to a lower co-morbidity rate with other disorders. The lack of co-morbid disorders may not be a fair representation of children with ADHD in the clinical population. Past research suggests that co-morbid disorders are associated with more challenging child behaviour, which may lead to less effective parenting practices (Edwards, Barkley, Laneri, Fletcher & Metevia., 2001). Thus, less challenging child behaviour may make it easier to parent more effectively.

The time gap from initial assessment to final assessment may have also played a role in our findings. The time gap was 5 years, and perhaps a shorter assessment period would lead to more significant results. A one year assessment period, for example, would have measured child behaviour at two different points in childhood, from a developmental standpoint; symptoms related to hyperactivity may not have decreased. Hyperactivity tends to decrease from childhood to adolescence (Barkley, 2004). Other studies in which the time gap was smaller, 2 months for example, led to finding significant results in the relationship between negative mother-child interactions, as an aspect of ineffective parenting and negative child behaviour such as non-compliance (Anderson, Hinshaw & Simmel, 1994). Both time points in their study were during childhood, and not adolescence.

A major strength of this study is the fact that it is longitudinal and simultaneously investigates the relationship between parenting practices and the core symptoms of ADHD from childhood to adolescence. There is lack of longitudinal research on parenting practices and the core symptoms of ADHD from childhood to adolescence (Johnston & Mash, 2001). While there is some existing research that is longitudinal, the majority of these studies tend to focus on behaviours related to ADHD such as conduct problems, oppositional behaviour and non-compliance rather than the core symptoms of ADHD. In addition there is hardly any existing longitudinal research on the relationship between parenting practices and ADHD symptoms in adolescence.

A main limitation of this study is the small sample size of 36 participants. It is possible that due to the small sample size, significant results did not emerge despite being present. In addition if the sample size had been larger, we could have integrated the intervention groups into the analysis for more information. The respondent for child behaviour, parenting practices and family functioning is the parent. It may have been helpful to include the adolescent's perception of their own behaviour, as well as teacher reported behaviour of adolescent behaviour. This would allow for a better understanding of adolescent behaviour across multiple settings such as; the home environment, in school and in the adolescents other daily activities outside of these two main settings (i.e. spending time with friends at the park). Adolescents with ADHD tend to have symptoms of inattention that are less noticeable than symptoms of hyperactivity. Their symptoms are "dreamy" in nature and encompass difficulty following instructions, being forgetful and losing items (Hurtig et al., 2007). Adolescents might have the best insight into their inattention symptoms since these symptoms are not easily observed by others. This

insight would allow for a more accurate depiction of adolescents ADHD symptoms and would offer a richer database to measure the relationship between parenting practices and ADHD symptoms in adolescence.

Parents may underreport child behaviour issues in an effort to appear as though they no longer require services and parents may not have an accurate perception of their child's behaviour in the school environment. Children and adolescents spend a significant amount of their time each week in the classroom environment and the child's teacher is the best resource in understanding how an adolescents ADHD symptoms manifest in the classroom.

Another limitation of the study is the fact the sample is composed of families who are functioning relatively well and are not using many inappropriate parenting practices. Also the lack of information which exists on whether adolescents are taking medication for their ADHD is a limitation, as this would be interesting to explore, without medication their symptoms might appear more severe. In addition the lack of information on the relationship between parenting practices and family and functioning in this study and the changes in inattention and hyperactivity-impulsivity over time is a limitation and in the future can be explored.

The current study examined parenting practices but did not examine parental psychopathology. Existing longitudinal research found a significant relationship between parental psychopathology and the persistence of ADHD from childhood to adolescence and young adulthood (Biederman, Petty, Clarke, Lomedico & Faraone, 2011). Parental psychopathology has been significantly associated with ineffective parenting practices (Belsky, 1984). Future studies could focus on the relationship between parental psychopathology and the core symptoms of ADHD from childhood to adolescence.

A more in depth look at the transactional relationship between parenting practices or family functioning and the maintenance of the core symptoms of ADHD can be pursued in a future study. This would allow for an investigation as to whether the maintenance of these core symptoms of inattention and hyperactivity-impulsivity over time are accompanied by a deterioration in family functioning or appropriate parenting practices. This would allow for more in depth knowledge in an area lacking longitudinal research that can be of help to many children, adolescents and families.

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