The relationship between parental divorce and the psychological well-being of children with AD/HD: differences in subtypes, age, gender and comorbidity

Leila Heckel
University of Wollongong


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The Relationship between Parental Divorce and the Psychological Well-being of Children with AD/HD: Differences in Subtypes, Age, Gender and Comorbidity

A thesis submitted in partial fulfilment of the requirements for the award of the degree

DOCTOR OF PHILOSOPHY

from

UNIVERSITY OF WOLLONGONG

by

Leila D. Heckel
Dipl. Soz.Paed. (FH)

School of Psychology

2007
I, Leila D. Heckel, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Psychology, University of Wollongong, is wholly my work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

______________________________
Leila D. Heckel

27 August 2007
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<thead>
<tr>
<th>Abbreviation</th>
<th>Term</th>
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<tbody>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>AD/HD</td>
<td>Attention-Deficit/Hyperactivity Disorder</td>
</tr>
<tr>
<td>AOC</td>
<td>Age of Onset Criterion</td>
</tr>
<tr>
<td>APA</td>
<td>American Psychiatric Association</td>
</tr>
<tr>
<td>CBCL</td>
<td>Child Behaviour Checklist</td>
</tr>
<tr>
<td>CD</td>
<td>Conduct Disorder</td>
</tr>
<tr>
<td>CF</td>
<td>Cystic Fibrosis</td>
</tr>
<tr>
<td>CNS</td>
<td>Central Nervous System</td>
</tr>
<tr>
<td>CPT</td>
<td>Continuous Performance Task</td>
</tr>
<tr>
<td>CT</td>
<td>Computerised Tomography</td>
</tr>
<tr>
<td>D</td>
<td>Divorced</td>
</tr>
<tr>
<td>DAT</td>
<td>Dopamine Transporter Gene</td>
</tr>
<tr>
<td>DAYS</td>
<td>Depression and Anxiety in Youth Scale</td>
</tr>
<tr>
<td>DBC</td>
<td>Developmental Behaviour Checklist</td>
</tr>
<tr>
<td>DRD</td>
<td>Dopamine Receptor Gene</td>
</tr>
<tr>
<td>DSM</td>
<td>Diagnostic and Statistical Manual of Mental Disorders</td>
</tr>
<tr>
<td>DZ</td>
<td>Dizygotic</td>
</tr>
<tr>
<td>EEG</td>
<td>Electroencephalography</td>
</tr>
<tr>
<td>FPF</td>
<td>Family and Parental Functioning</td>
</tr>
<tr>
<td>GAD</td>
<td>Generalized Anxiety Disorder</td>
</tr>
<tr>
<td>GAPADOL</td>
<td>Gapadol Reading Comprehension Test</td>
</tr>
<tr>
<td>ICD</td>
<td>International Classification of Diseases</td>
</tr>
<tr>
<td>IQ</td>
<td>Intelligence Quotient</td>
</tr>
<tr>
<td>LBW</td>
<td>Low Birth Weight</td>
</tr>
<tr>
<td>LD</td>
<td>Learning Disabilities</td>
</tr>
<tr>
<td>MBD</td>
<td>Minimal Brain Damage</td>
</tr>
<tr>
<td>MDD</td>
<td>Major Depressive Disorder</td>
</tr>
<tr>
<td>MRI</td>
<td>Magnetic Resonance Imaging</td>
</tr>
<tr>
<td>MZ</td>
<td>Monozygotic</td>
</tr>
<tr>
<td>ND</td>
<td>Non-Divorced</td>
</tr>
<tr>
<td>NSW</td>
<td>New South Wales</td>
</tr>
<tr>
<td>OAD</td>
<td>Overanxious Disorder</td>
</tr>
<tr>
<td>OCD</td>
<td>Obsessive Compulsive Disorder</td>
</tr>
<tr>
<td>ODD</td>
<td>Oppositional Defiant Disorder</td>
</tr>
<tr>
<td>PA</td>
<td>Phonetic Awareness</td>
</tr>
<tr>
<td>PET</td>
<td>Position Emission Tomography</td>
</tr>
<tr>
<td>PP</td>
<td>Phonological Processing</td>
</tr>
<tr>
<td>PTSD</td>
<td>Post Traumatic Stress Disorder</td>
</tr>
<tr>
<td>RD</td>
<td>Reading Disabilities</td>
</tr>
<tr>
<td>ROCF</td>
<td>Rey-Osterreith Complex Figure</td>
</tr>
<tr>
<td>SAD</td>
<td>Separation Anxiety Disorder</td>
</tr>
<tr>
<td>SAST</td>
<td>South Australian Spelling Test</td>
</tr>
<tr>
<td>SES</td>
<td>Socio-Economic Status</td>
</tr>
<tr>
<td>SNAP</td>
<td>Synaptosomal Associated Protein</td>
</tr>
<tr>
<td>TORCH</td>
<td>Test Of Reading Comprehension</td>
</tr>
<tr>
<td>UADD</td>
<td>Undifferentiated Attention Deficit Disorder</td>
</tr>
<tr>
<td>WCST</td>
<td>Wisconsin Card Sorting Test</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WRAT</td>
<td>Wide Range Achievement Test</td>
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</table>
ABSTRACT

It is generally accepted that Attention-Deficit/Hyperactivity Disorder (AD/HD) results from a dysfunction of the central nervous system, which has led to a commonly-held belief that environmental factors play little role in the behavioural problems of these children. However, this perspective has been poorly investigated. This thesis examined the relationship between parental divorce and the psychological well-being of children with AD/HD. Subjects were aged 6 to 18 years and were diagnosed with either the inattentive or combined subtype of the disorder. Firstly, the relationship between parental divorce and the symptom profile of children with AD/HD was investigated. Differences in children’s behaviour between (a) divorced and non-divorced families, (b) single-parent households and step-families, and (c) single-divorced and multiple-divorced parents, were examined. A possible relationship between the quality of family relationships and children’s symptom profile was investigated. Subtype, age, and gender differences were evaluated in terms of symptom severity and comorbid conditions. Secondly, parents’ perceptions of the impact of their children’s behaviour on marital status and family/parental functioning were examined. The major results were that (a) parental divorce was associated with greater symptom severity, more externalizing/internalizing behaviours, and poorer social functioning, but less with academic underachievement, (b) children living in step-families presented with greater impairment than those in single-parent households, (c) differences in psychological well-being between children with AD/HD of single- and multiple-divorced parents were minor, (d) poor relationships with family members correlated with children’s overall behaviour, (e) parental divorce was related to adjustment differences in AD/HD subtypes, age, and gender, and (f) the correlation between behaviour problems of children with AD/HD and marital/family dysfunction was weak. It may be concluded that parental divorce was associated with the psychological well being in children with AD/HD, and there is some suggestion to view AD/HD as a bio-psychosocial disorder.
OVERVIEW

This thesis aimed to investigate the relationship between parental divorce and the psychological well-being of children with AD/HD, as this has not been investigated widely in previous research. The relationship of divorce and children’s symptom profile was examined through differences in symptom severity, externalizing/internalizing behaviour, academic and social functioning between divorced and non-divorced families. This aim was achieved through comparison of these measures in children from divorced and non-divorced families, single-parent households and step-families, single divorced and multiple divorced parents, as well as through the examination of the association of these measures with the quality of relationships among AD/HD family members. As part of this investigation, differences in the correlates of different AD/HD subtypes, and age and gender were examined. In the final study, parents’ perception of the impact of their child's behaviour on marital and family functioning was evaluated.

The first four chapter of this thesis provide comprehensive literature reviews on Attention-Deficit/Hyperactivity Disorder (Chapter 1), Comorbidity (Chapter 2), Divorce (Chapter 3), and Chronic Conditions in Childhood (Chapter 4).

Study 1 (Chapter 5) investigated the relationship of divorce with the symptom profiles of children with AD/HD with comorbid CD/ODD and LD. All subjects (N=1000) were between ages 6 and 18 years, and were diagnosed with either the inattentive or combined subtype of AD/HD. Of these, 213 children came from divorced and 787 from intact families. Results showed that children of the inattentive subtype with comorbid LD were less frequent in divorced families, whereas children of the combined subtype with comorbid CD/ODD were more prevalent in the divorced group. Overall, there was a linear trend with increasing number of divorces with increasing age of children, especially with those of the combined subtype of AD/HD. Children in the older age group (13-15 years) with comorbid CD/ODD were overrepresented in the divorced
group. Boys with comorbid CD/ODD were found to be more common in the divorced group. The general results suggested an association between parental divorce and children’s externalizing behaviour but not with their academic performance.

Study 2A (Chapter 6) extended the investigation of the group differences found in Study 1 by examining symptom severity, externalizing/internalizing behaviour, academic and social functioning in children with AD/HD between divorced and non-divorced families. 479 children were included in this study; with all subjects between the ages of 6 and 18 years, diagnosed with either the inattentive or combined subtype of AD/HD. Significantly higher levels of hyperactivity, impulsivity and inattention, internalizing/externalizing behaviour, and lower levels of academic and social functioning were found in children from divorced families compared to those from intact families. Differences in subtype, age, and gender indicated greater impairment in children from divorced families, particularly in the inattentive subtype, younger children, and in girls. These results suggested that parental divorce was associated with impairment in all domains of functioning in children with AD/HD.

Study 2B (Chapter 7) extended the findings investigated in Study 2A by examining family-type correlates in children of divorced parents. This aim was achieved by evaluating differences between children of (a) single-parent households and step-families, and (b) single and multiple divorces. Further, an association between the quality of relationships with family members after divorce and remarriage and children’s psychological well-being was assessed. 86 children with AD/HD from divorced families were included in this study, with all subjects between the ages of 6 and 18 years. Children living in step-families presented with greater maladjustment relative to those from single-parent households. Group differences between children who experienced single or multiple transitions of their parents were minor, and poor relationships with family members correlated with deficient overall functioning in children with AD/HD. These results suggest that remarriage does not re-establish the same family situation that symbolizes stable two-parent households. Multiple divorces are relatively unrelated
to behavioural problems in children with AD/HD, and poor relationships among family members after divorce and remarriage are associated with adjustment problems in children with this disorder.

Study 3 (Chapter 8) investigated the perceptions of parents of children diagnosed with AD/HD regarding the impact of their child’s behaviour on marital and family functioning. In this study, all subjects were diagnosed with either the inattentive or combined subtype of AD/HD and were aged between 6 and 18 years. 105 children from non-divorced families and 18 children from divorced homes were included in this study. The aim of Study 3 was to examine whether non-divorced parents of children with AD/HD differed from divorced parents in terms of family and parental functioning. No significant differences between the two groups were found. There was a weak relationship between children’s AD/HD related symptoms and family/parental functioning in the non-divorced group. Overall, non-divorced parents presented with greater family difficulties and poorer parental functioning before than after their child was diagnosed with AD/HD. These results suggest that children’s contribution to family adversity and marital instability is minor, and some existing problems among families and spouses can be compensated through effective treatment of the disorder.

An overall summary of the results obtained in the thesis, and suggestions for future research, are provided in Chapter 9. It is concluded that parental divorce correlates with poor psychological well-being in children with AD/HD, and the association between environmental factors and AD/HD needs to be explored on a longitudinal basis in future research.
Attention-Deficit/Hyperactivity Disorder (AD/HD) has become one of the most common neurobehavioural disorders of childhood. The diagnostic criteria for AD/HD are set out in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) by the American Psychiatric Association (APA, 1994). AD/HD is a two dimensional disorder characterized by two axes (inattentive and hyperactive-impulsive), which allows the classification of three different subtypes: the Predominantly Inattentive Type, the Predominantly Hyperactive-Impulsive Type, and the Combined Type. Throughout this chapter and the remainder of this thesis, the currently valid term AD/HD will be used. For the literature review, terms from previous editions of the DSM will be used accordingly.

1.1 History of AD/HD

1.1.1. The Moral Deficit Syndrome

In 1902 George Still described in a number of lectures 20 children presenting with symptoms of passionateness, spitefulness or cruelty, lawlessness, jealousy, shamelessness and inattention, which is considered to be the first account of AD/HD. Still described this phenomenon as a lack of ‘moral control’ which was characterized by “(1) defect of cognitive relation to environment; (2) defect of moral consciousness; and (3) defect of inhibitory volition” (p. 1011). He suggested a possible association between this morbid condition and intellectual disorders, but did not rule out a possible manifestation by children of normal intelligence. Still was the first to suggest that the symptoms of the disorder are different from the behaviour of normal children, and he also indicated age-appropriate criteria for diagnosis. In addition, Still reported a higher proportion of males than females with this behaviour (3:1), and that in most cases these symptoms appeared before 8 years of age. He considered the disorder to be
uncommon, and demonstrated an alteration of symptoms during adolescence and some persistence into adulthood. Still proposed a biological predisposition to these characteristics and suggested either a hereditary or pre- or post-natal injury as the possible cause of these behaviours. Still also hypothesized a relationship between the behavioural and attentional deficits, and implied common neurological deficiencies. Still further suggested a decreased threshold of inhibition in responding to stimuli, and a possible disconnection of cortical areas.

1.1.2 The Post Encephalitic Disorder

Interest in AD/HD in North America arose after the outbreak of an encephalitis epidemic in 1917-1918. The children who survived this brain infection continued to suffer significant behavioural and cognitive sequelae, showing a change in personality by becoming hyperactive, distractible, irritable, unruly, destructive and antisocial (Cantwell, 1981; Kessler, 1980; Stewart, 1970). Symptoms of oppositional and defiant behaviour, conduct problems, insomnia, affective disorders, sexual precocity, and delinquency were also found by others (Ebaugh, 1923; Hohman, 1922; Strecker & Ebaugh, 1924; Stryker, 1925). At this time AD/HD was clearly regarded as a ‘post encephalitic disorder’, resulting from central nervous system (CNS) damage, with a relatively pessimistic view of prognosis. However, Bender (1942) treated such children in the period between 1934 and 1940, and reported successful treatment strategies using simple behaviour modification programs and increased supervision. The effectiveness of these approaches was also supported by Bond and Appel (1931).

1.1.3 The Brain-stem Syndrome and the Restless Syndrome

In the 1930s and 40s most children who were hospitalised in psychiatric institutions due to their disruptive, disobedient, anti-social and restless behaviour were
viewed to have suffered from different types of brain damage, caused by pre- or perinatal trauma or encephalitis. In accordance with the theory of a brain damage syndrome, researchers at this time studied further possible causes of brain injury in children characterized with those behavioural deficits. Schilder (1931) and Shirley (1938) proposed an association between behavioural and cognitive impairments with birth trauma, and suggested that the frontal, temporal and parietal lobes played an important role in the regulation of impulses. Blau (1936) suggested a relationship between head injuries and hyperkinetic, anti-social and delinquent behaviour. Blau also found that the intelligence of these children was in the normal range. These findings were supported by Werner and Strauss (1941), who compared mentally ill children with and without brain injury. Results indicated that those children with a brain injury performed more poorly on tests of visual and tactual perception and motor performance, than did children without a brain injury. Other researchers, such as Levin (1938), investigated a relationship between epilepsy and restlessness, suggesting that excessive restless behaviour is subject to psychological disturbances and not mental defects. Byers and Lord (1943) examined the mental development in children following lead poisoning and discovered intellectual and emotional difficulties, including short attention span, impulsive and cruel behaviour in each of their subjects. Further, Meyer and Byers (1952) studied the impact of infections, such as measles encephalitis on children’s behaviour, and found impaired learning abilities and aggressive and impulsive behaviour patterns in their children. During this era new terms such as ‘Brain-Stem Syndrome’ (Kahn & Cohen, 1934) and ‘Restless Syndrome’ (Levin, 1938) were introduced to describe the disorder which is now known as AD/HD. Investigators such as Childers (1935) questioned the notion of neurological deficits in children with behavioural and attentional deficits, failing to find a correlation between hyperactive behaviour and endocrine disturbances, but indicated instead a possible relation with social and family-environmental factors.
1.1.4 The Hyperkinetic Impulse Disorder

In the 1950s studies were undertaken to investigate neurological mechanisms in the aetiology of hyperactivity. Laufer, Denhoff, and Solomons (1957) suggested an abnormal function of the diencephalon as a possible cause of this disorder, influenced by a dysfunctional CNS. Knobel, Wolman, and Mason (1959) underlined an imbalance between cortical and subcortical areas, where poor filtering of stimulation in the subcortical areas led to an excess of stimulation in the cortex. Furthermore, studies evaluated a relationship between the frontal lobe and behaviour problems, as well as the influence of different cortical areas in behavioural traits, suggesting a complex interaction of defective functions, irritations, and inhibitory releases (Brock, 1948; Dusser de Barenne, & McCulloch, 1941; Fulton, 1951; Penfield & Rasmussen, 1950). With these findings, a new expression was developed and the ‘Hyperkinetic Impulse Disorder’ was born, with hyperactivity as its most prominent feature, followed by short attention span, poor concentration and schoolwork. The behaviour syndrome was still regarded to be caused by some kind of brain damage, and its tendency to disappear in adult life was understood as subject to maturation of the brain (Knobel, Wolman, & Mason, 1959; Laufer & Denhoff, 1957).

1.1.5 The Hyperkinetic Reaction of Childhood Disorder

The concept of ‘Minimal Brain Damage’ (MBD), suggested by Strauss and Lehtinen (1947), was introduced due to critical reviews that began questioning the role of brain damage in this disorder. The disorder was found to be characterized by behavioural, attentional, and cognitive deficits usually accompanied by learning problems, such as dyslexia and language disorder (Birch, 1964; Burks, 1960; Herbert, 1964; Ounsted, 1955; Rutter, Graham, & Birch, 1966). At the time, symptoms were based on observable deficits rather than on a non-observable mechanism in the brain.
Chess (1960) examined 36 children diagnosed with ‘physiologic hyperactivity’ and found destructive, very impulsive and oppositional defiant behaviour, as well as poor schoolwork and learning difficulties associated with hyperactivity. A new concept of a ‘hyperactive child syndrome’ was developed and manifested in the DSM-II (APA, 1968) as the ‘Hyperkinetic Reaction of Childhood Disorder’. The disorder was described as a single disorder with no subtypes, characterized by symptoms of overactivity, restlessness, distractibility and short attention span, with hyperactivity as the defining feature. The syndrome was now viewed as a behavioural syndrome, resulting from organic pathology or some biological problem, rather than solely from environmental factors. However, there was still a discrepancy in the view of hyperactivity existing between North America and Europe, particularly Great Britain (Taylor, 1988). In North America, hyperactivity was regarded as a behavioural syndrome characterized by abnormal levels of activity, and seen as a common disorder of childhood, with no necessary association with brain pathology. In contrast, Great Britain viewed hyperactivity as a relatively uncommon state of excessive activity, associated with brain damage such as epilepsy, retardation, infections or trauma.

After its conceptualization in the DSM-II (APA, 1968), hyperactivity has undergone further research in respect to its aetiology. Neuroanatomical and neurophysiological studies suggested underarousal or brain under-reactivity and neurotransmitter deficiencies (Beninger, 1989; Steward, 1970; Wender, 1971), together with neurological immaturity (Kinsbourne, 1973), as possible causes, as well as a wide range of environmental factors. Other researchers investigated a possible familial transmission of the disorder. In their early study, Morrison and Stewart (1971) interviewed the legal parents of 35 adopted hyperactive children, their biological parents, and control parents. Results indicated that the biological relatives reported a significantly higher prevalence of hyperactive child syndrome, hysteria, and alcoholism compared to the adopting parents and the control group. The authors therefore
proposed a genetic hypothesis of transmission and rejected the idea of environmental factors as the sole cause of the disorder.

1.1.6  Attention Deficit Disorder (ADD) with/without Hyperactivity

Following the DSM-II (APA, 1968), critical debate among investigators began as to whether deficits in sustained attention, and impulsivity or hyperactivity, are the defining features of the disorder. Douglas (1972) reported that hyperactive children showed greater impairments in vigilance, sustained attention and impulsive control, and these deficiencies were accompanied by high levels of restlessness. Douglas therefore suggested hyperactivity be relegated to an equivalent or even secondary role in the definition of the disorder. Further research by Douglas and Peters (1979) and Douglas (1980, 1983) demonstrated impairments in the following categories: (1) investment, organization, sustained attention; (2) inhibition of impulsive responding; (3) modulation of arousal levels; and (4) a strong tendency to seek immediate reinforcement. These findings led to a relabelling of the disorder in the DSM-III (APA, 1980) and the term ‘Attention Deficit Disorder with or without hyperactivity’ was coined, with inattention and impulsivity as its core defining features, and with two subtypes based on the presence (ADD/H) or absence (ADD) of hyperactivity. Diagnostic criteria comprised (1) a more specific symptom list, categorized in factors of inattention, impulsivity and hyperactivity; (2) guidelines for age of onset and duration of symptoms; and (3) exclusion of other psychiatric conditions, such as schizophrenia, affective disorder or mental retardation (APA, 1980). Thus, to warrant a diagnosis, individuals had to present with three of five signs of inattention, three of six of impulsivity, and two of five signs of hyperactivity.

After the DSM-III was introduced, studies were initiated to examine the validity and utility of this new conceptualisation by differentiating children with ADD from those with ADD/H in terms of symptom presentation and adjustment (Edelbrock, Costello, &
Kessler, 1984; Lahey, Schaughency, Frame, & Strauss; 1985; Prior, Sanson, Freethy, & Geffen, 1985). As the presence of an attention deficit was central for diagnosis, problems in focusing, maintaining and sustaining attention over time, impulsivity, distractibility, disorganisation, and the need for external supervision and control were described as important aspects (APA, 1980). While Douglas and Peters (1979) provided support for deficits in sustained attention, such as the ability to attend over an extended period of time in laboratory tasks, Prior et al. (1985) questioned these findings in terms of the duration of tasks applied by Douglas and Peters. Most of the tasks lasted between 10 and 15 minutes, while some ran for 3 to 5 minutes only. However, the usual task length criterion for vigilance studies is closer to 30 minutes (Mackworth, 1970). Prior et al. (1985) therefore used tasks lasting 25-30 minutes, and found only minimal deficits in sustained attention. Several other reports of investigators were in line with these findings, failing to find sustained attention deficits among hyperactive children (Hiscock, Kinsborune, Caplan, & Swanson, 1979; Loiselle, Stamm, Maitinsky, & Whipple, 1980). Thus, the assertion in the DSM-III of attention deficits as the main feature in ADD/H did not find experimental support.

Carlson's (1986) findings that children with ADD were more daydreaming, sluggish, drowsy, hypoactive, apathetic, and learning disabled, but showed less symptoms of aggression, conduct problems, and were less rejected by their peers than those diagnosed with ADD/H, were not published in time to find consideration in the revision of the DSM-III. Due to this dissimilarity of behaviour patterns, Carlson suggested that the two subtypes should be regarded as distinct disorders and not as similar subtypes of a single disorder. In contrast, Maurer and Stewart (1980) and Rubinstein and Braun (1984) failed to find differences between the two groups, suggesting that ADD should not be considered as an adequately specified category. Due to their negative results the latter authors questioned whether the measurements would accurately assess the characteristics of ADD or ADD/H, and whether they are useful in allocating children to the correct categories. Nonetheless, there was not much
of a time span available for researchers to find sufficient evidence to support the 2-
dimension model, as work on the DSM-III-R (APA, 1987) was already underway. Thus,
the lack of clinical ADD diagnoses suggested that there was little need for this
category, and also the indication that ADD and ADD/H are unlikely to be subtypes of a
single disorder led to changes in the diagnostic system.

1.1.7 Attention Deficit Hyperactivity Disorder and Undifferentiated Attention
Deficit Disorder

When the DSM-III-R (APA, 1987) was introduced, the disorder was termed
“Attention Deficit Hyperactivity Disorder” (ADHD). The diagnostic criteria comprised a
single behaviour checklist with 14 items, which were not categorized under a distinct
domain. However, factor analysis of the items suggested that they formed two
behavioural dimensions, with inattentive-restless and impulsive-hyperactive, being
relatively separate (Bauermeister, Alegria, Bird, Rubio-Stipec, & Canino, 1992; Lahey,
Loeber, Frick, Quay, & Grimm, 1992). For a diagnosis of ADHD, a cut-off score of at
least eight out of 14 behaviours was determined. Norms for rating the severity of
symptoms were also set, ranging from mild and moderate to severe. The presence of
affective disorders no longer excluded the diagnosis of ADHD, and the subtyping of
ADD was removed. ADD with hyperactivity became ADHD, whereas ADD without
hyperactivity was no longer recognized as a subtype of ADD and became a category of
minimal definition, called ‘Undifferentiated Attention Deficit Disorder’ (UADD), featuring
inattention. The APA committee called for more research to improve its utility as a
diagnostic category (APA, 1987), and to indicate whether children with ADD had similar
or different types of attentional deficits compared to those with ADD/H, as different
kinds of attention would make ADD a separate childhood psychiatric disorder (Barkley,
1990). While the committee placed the DSM-III-R in abeyance until more research was
available to guide its definition, further investigations followed in an attempt to improve
diagnostic criteria for ADHD, and to make clear which of the two conceptualisations, the DSM-III or its revision, was more precise (Douglas, 1988; Draeger, Prior, & Sanson, 1986; Prior & Sanson, 1986; Sergeant, 1988; Sergeant & Van der Meere, 1989). Barkley (1990) shed light on major limitations of the DSM-III revision. He criticized the form of two behavioural dimensions and suggested that these symptoms should be presented in separate lists, with each having its own cut-off score. In addition, as the wording of the items did not apply to different developmental periods (from preschool to young adulthood), more explicit examples were demanded.

1.1.8 Attention-Deficit/Hyperactivity Disorder (AD/HD)

Research was undertaken in the 1990s (Lahey et al., 1990; Newcorn et al., 1994) in order to identify the weaknesses of both the DSM-III and DSM-III-R diagnostic systems, and to develop more appropriate criteria to define this disorder. Thus, ADHD changed from a uni-dimensional into a two-dimensional disorder (inattentive and hyperactive/impulsive) in the DSM-IV (APA, 1994), which allowed the diagnosis of three different subtypes: Predominantly Inattentive Subtype, Predominantly Hyperactive-Impulsive Subtype, and Combined Subtype. A diagnosis of AD/HD is currently based on the presence of 6 or more symptoms from either one predominant subtype or from both in a combination. Each symptom must have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level. Some symptoms must be displayed in multiple domains (e.g., the home and school setting) and need to occur before age seven (APA, 1994). Interestingly, the predominantly hyperactive-impulsive subtype was not recognized as an ADD subtype in any previous version of the DSM. Further research was conducted in order to examine the validity of this new conceptualization. Morgan, Hynd, Riccio, and Hall (1996), and Carney (2003), supported the multidimensional conceptualization of AD/HD by demonstrating a close relationship between ADD without hyperactivity
(DSM-III) and the predominantly inattentive subtype (DSM-IV), and between ADD/H (DSM-III) and the combined subtype (DSM-IV). In contrast, no association was found between subtypes in the DSM-III revision and the DSM-IV. These findings are in accord with those of others (Lahey et al., 1998), suggesting that the criteria set in the fourth edition of the DSM for the three subtypes of AD/HD are valid in identifying children with AD/HD who tend to display functional impairment in multiple domains, even after controlling for other comorbid conditions. Moreover, Wolraich, Hannah, Pinnock, Baumgaertel, and Brown (1996) suggested that DSM-IV criteria are likely to lead to a higher rate of prevalence of AD/HD. Results showed a 57% increase in the number of children who met criteria of DSM-IV subtypes compared with DSM-III-R. However, DSM-IV has not been without criticism. Sangare (2000) has pointed to a lack of compensations regarding age or gender, as symptoms are known to present differently in older and younger children, and between boys and girls. In addition, Barkley (2002) continued listing existing problems of DSM-IV criteria identified by research, e.g. age of onset, duration requirement of 6 months, attention differences between the subtypes, or differential diagnoses, and stressed the importance for clinicians to be aware of these limitations.

"Never view these guidelines as cast in stone; they are merely suggestions for how clinicians can identify a child as AD/HD at this time." (Barkley, 1995, p.119).

In addition to the DSM-IV criteria of AD/HD, a second conceptualisation of hyperactivity is presented by the World Health Organization (WHO) in the International Statistical Classification of Diseases (ICD), mostly used throughout Europe. Its latest revision, the ICD-10 (WHO, 1993) describes a single disorder named ‘Hyperkinetic Disorder’ which is generally similar to the DSM-IV AD/HD. However, some differences exist between these two conceptualisations. A diagnosis made under the criteria of the ICD-10 requires symptoms in all domains of inattention, hyperactivity and impulsivity (WHO, 1993) whereas the DSM-IV concept stipulates only the presence of symptoms
in one domain (APA, 1994). Hence, use of the concept of AD/HD leads to a higher prevalence, and may lead to overmedication, whereas use of the diagnostic criteria for hyperkinesis results in fewer cases and may cause underdiagnosis, but suggests moderate use of medication (Foreman, Foreman, Prendergast, & Minty, 2001). Tripp, Luk, Schaughency, and Singh (1999) investigated to what extent ICD-10 hyperkinetic disorder and DSM-IV AD/HD would identify the same cases, by comparing both groups in respect of neurodevelopmental, academic and cognitive functioning, and the presence of conduct problems. Results indicated increased symptom severity in the AD/HD combined group, but few differences in all domains of functioning. However, the groups did not differ in rates of conduct problems. Besides an existing overlap between these two conceptualisations, the DSM-IV criteria identified a broader group of children than did the ICD-10 system.

Studies conducted in this thesis were based on the DSM-IV criteria for AD/HD and therefore the ICD-10 concept will not be mentioned further.

1.2 Primary Symptoms of AD/HD

1.2.1 Theoretical Assumptions Underlying Cognitive Deficits in AD/HD

In an attempt to define cognitive deficits in children with AD/HD, different conceptual models have been used, suggesting several domains of impairments including attention, inhibition, state regulation, delay aversion, and executive functions (Douglas, 2005). In the search for a core deficit, Barkley (1997) argues that it is the deficit of behavioural inhibition in AD/HD that would cause impairment on executive functions, including working memory, internalizing of speech, reconstitution (analysis and synthesis), and self-regulation of affect-motivation-arousal. Those executive functions would then in turn create impairment on the motor control–fluency–syntax,
which is responsible for the programming and prompt execution of complex, fine motor
sequences. Finally, all these deficiencies account for the poor sustained attention,
displayed by children with AD/HD. Douglas (2005) stresses that impaired functions in
attention and inhibition can have a negative impact on strategic or organizational
abilities. Most AD/HD children are aware of what they have to do but show problems in
accomplishing that. Therefore, it is important to understand the difference between 'not
knowing' and 'not doing' to avoid ascribing difficulties in performance to 'higher order'
executive problems, when they are actually the result of deficits in attention or control
inhibition.

Hence, AD/HD currently can be regarded as a disorder involving
neuropsychological systems (executive functions) and the behavioural inhibition
system. Further, its core symptoms of inattention and impulsivity/hyperactivity can lead
to behavioural difficulties, poor academic performance, and impairment in social
functioning (Barkley, 1997).

1.2.2 Inattention

Attention difficulties can occur in many different forms. According to the DSM-IV
(APA, 1994) individuals diagnosed with the predominantly inattentive subtype of
AD/HD have the inability to sustain attention; they are often easily distracted and
forgetful. Activities or tasks are often changed prior to completion, and instructions are
not followed through. They have problems in organization and often lose items
necessary to carry out tasks and activities. Frequently they fail to pay attention to
details and do not seem to listen. The problems of inattention in the predominantly
inattentive subtype and the combined subtype of AD/HD are currently viewed as
qualitatively identical attention deficits, with the subtypes differing only in the presence
of hyperactive-impulsive symptoms. However, some investigators (Barkley, 1997;
Mirsky, 1987; Sergeant & Van der Meere, 1989) argue against this notion and believe
in the existence of different forms of inattention among these two AD/HD subtypes. These authors suggest that children of the inattentive subtype are rather impaired in speed of information processing and focused or selective attention, whereas those of the combined subtype present with problems in sustaining attention and distractibility.

The literature contains different models of how to explain attention deficits in AD/HD. The Hybrid Neuropsychological Model of Executive Functions by Barkley (1997) hypothesis that deficits in behavioural inhibition contribute to impaired performance in four domains of executive functioning, affecting the ability to sustain attention. Tsal, Shalev, and Mevorach (2005) reject this model of deficits in executive attention solely defining AD/HD, and suggest a combination of four different domains involved in attentional deficits (Four-Faced Model). Thus, children with AD/HD would have impairments in selective attention, executive attention, sustained attention, and orienting attention. In their study, the following tests were applied to measure deficits in all four domains: Conjunctive Visual Search Task (selective attention); Stroop-like Task (executive attention); Vigilance Task similar to the Continuous Performance Test (sustained attention); and the Cost-benefit Technique (orienting of attention). Most AD/HD children were impaired in the function of sustained attention and more than 50% had deficits in all other domains. In addition, when comparing the two common subtypes of AD/HD (inattentive vs. combined), the authors did not find differences in attentional deficits, implying that the two subtypes would have the same attention problems, regardless of symptoms of hyperactivity/impulsivity co-occurring in the combined type. However, these results are contradictory to those of Barkley, DuPaul, and McMurray (1990).

Barkley (1997) suggests two forms of sustained attention (persistence), and distinguishes between contingency-shaped persistence and self-regulated/goal directed persistence. The former type refers to direct situational based interventions such as reinforcement related to the task, whereas the other type is clearly related to executive functions which are responsible for self-regulation and motor control. The
latter would not require prompt reward in order to carry out the task or activity as the persistence is rather controlled by internal behaviour structures, and thus the motivation to stay on task is primarily self-regulated. Barkley (1997) argues that it is this self-dependent form of sustained attention that would be delayed in children with the combined type of AD/HD, and that this should be qualitatively distinct from the type of inattention seen in children with the predominantly inattentive subtype of AD/HD.

Posner and Peterson (1990) define attention deficits by describing three networks which are related to different anatomical regions: the vigilance network (sustained attention); the visual orienting network (selective attention); and the executive attention network (conflict solving). Based on the visual orienting network, Shalev and Tsal (2003) investigated deficits in selective attention in children with attention problems. Their small group of participants were impaired in selective attention and also in their ability to selectively focus attention when performing the Flanker Task and the Visual Search Task, but displayed no impairment on the Feature Search Task.

In terms of distractibility, scientists such as Barkley (1995) have argued that these children have a lower level of CNS arousal and therefore need more stimulation to keep their brain functioning at a normal level than do individuals without AD/HD. However, Sykes, Douglas, Weiss, and Minde (1971) had proposed that distractibility may not be apparent for the majority of children with AD/HD. In their study, 40 hyperactive children and 19 normal controls were distracted with visual and auditory stimuli while concentrating on the Continuous Performance Task (CPT). Findings suggested that the performance of neither group was negatively affected by the particular distracting stimuli used (intermittent white noise). Rosenthal and Allen (1980) confirmed this study, but suggested that different strength of distracters and a higher significance of stimuli for the participants would lead to more distractibility in children with AD/HD compared to normal children.
These studies clearly highlight the diversity and the magnitude of attentional problems in children with AD/HD. There is the assumption of the presence of different forms of inattention in the predominantly inattentive and the combined subtypes of the disorder. Therefore, some investigators strongly suggest conceptualizing the predominantly inattentive subtype as a distinct and valid childhood disorder, and not as a subtype of AD/HD (Barkley, 1990, 2002; Barkley, DuPaul, & McMurray, 1990).

1.2.3 Hyperactivity/Impulsivity

For the definition of hyperactivity, descriptions such as fidgeting with hands or feet, squirming in chairs, leaving seats, wandering or climbing about, kicking feet back and forth while seated or excessive talking are being used (APA, 1994). In general, overactive children show more restless behaviour than normals, both at home and at school. Barkley (1976) found that hyperactive children were moving about a room nearly 8 times as often, that their arm motions were more than twice and their leg movements nearly four times higher than those of controls and that they were more than three times as restless while watching a short movie and more than four times as fidgety and wriggly during psychological tests than controls. In addition, Porrino et al. (1983) demonstrated clearly in their study that children with AD/HD are more active than others. Wearing a special mechanical device, monitoring all activities and movements carried out during the day over a period of 7 days, boys with AD/HD were significantly more active than the control group, including during sleep. However, measures of symptoms of hyperactivity are not regarded as being as reliable as those of attentional problems. Research suggests that hyperactive children are not more likely to show overactive behaviour than others in all situations. Barkley (1981) argues that it is more the restrictiveness of the environment and the amount of concentration required to be assigned to a task which leads to differences in activity levels in hyperactive children compared to normals. Döpfner, Schürmann, and Lehmkuhl (2000)
found that children with AD/HD compared to control subjects, showed lower rates of activity in unfamiliar than they did in familiar situations, when they spent time with a single person, or when they were devoted to a favourite activity, even if it required a higher level of attention.

Impulsivity in children with AD/HD is defined as a low capacity to control impulses and inhibit behaviour (Barkley, 1995). Symptoms of impulsivity are often shown in forms of blurting out answers before a person has completed the question, and interrupting others while having a conversation. They have trouble in waiting for their turn which also makes them restless, frustrated and aggressive (APA, 1994). This behaviour, characterized by insufficient self-control and low frustration tolerance is often viewed by others as disrespectful, bad-mannered, and impolite. Consequently, relationship problems are inevitable and individuals with AD/HD experience more negative feedback by adults and peers (Weiss & Trokenberg-Hechtman, 1993). In addition, the impulsivity of those with AD/HD is often represented by taking greater risks without considering the consequences beforehand. Thus, children and teenagers with AD/HD are more likely to run the risk of having serious accidents, drinking alcohol, smoking cigarettes or taking illegal drugs (Barkley, 1995).

1.3 Epidemiology of AD/HD

1.3.1 Challenges in the Estimate of Prevalence Rates

AD/HD represents the most common neurodevelopmental disorder of childhood, comprising 50% of child and adolescent clinical referrals in psychiatry (Cantwell, 1996). Changes in diagnostic criteria within the DSM (APA, 1980, 1987, 1994) have contributed to variations in estimates for AD/HD. Also, as a result of the use of different diagnostic criteria (DSM-IV vs. ICD-10), prevalence rates for the
disorder vary widely. Estimated prevalence rates may also vary in regard to racial and ethnic groups, social background, and rural/urban population. AD/HD is regarded as a developmental disorder with symptoms changing with increasing age. Therefore, Barkley (1997) demands an age-normed symptom list with the requirement of different numbers of symptoms for diagnosis. Thus, a diagnosis for older children and adults could be made based on fewer symptoms than younger children. This dilemma of conceptualizing and defining AD/HD for different age groups may also lead to variations when estimating prevalence of AD/HD. The use of different approaches to identify the disorder produces not only differences in prevalence but may also contribute to an increase of prescriptions in stimulant medication for children with AD/HD (Rowland, Lesesne, & Abramowitz, 2002). Thus, the question has occurred whether the disorder is diagnosed appropriately and accurately. These problems involved in diagnosing AD/HD in a reliable manner make it difficult to interpret reported prevalence rates.

1.3.2 Global Prevalence of AD/HD

According to the DSM-IV, prevalence of AD/HD is approximately 3-5% among school-age children (APA, 1994). However, the literature does not always correspond with this figure. Baumgärtel, Wolraich, and Dietrich (1995) compared prevalence rates of AD/HD using DSM-IV, DSM-III-R and DSM-III criteria. While rates of DSM-III and DSM-III-R did not differ significantly, an increase in prevalence by 64% was found when changing criteria from DSM-III (9.6%) to DSM-IV (17.8%). Wolraich, Hannah, Pinnock, Baumgaertel, and Brown (1996) reported an increase of AD/HD diagnoses by 57% from DSM-III-R (7.3%) to DSM-IV (11.4%). These findings indicate that changes in diagnostic criteria led to higher prevalence rates, which was largely due to the introduction of the new subtypes in the DSM-IV, resulting in more AD/HD predominantly inattentive cases and less AD/HD predominantly hyperactive-impulsive
cases in these samples. In addition, rates identified using DSM-IV criteria are somewhat higher than those stated by the American Psychiatric Association (APA, 1994).

Community-based studies conducted in North and South America evaluating the occurrence of AD/HD in school-age children indicated different rates of prevalence among various countries (Montiel-Nava, Pena, & Montiel-Barbero, 2003; Rowland et al., 2001; Vasconcelos et al., 2003). Based on DSM-IV criteria, the use of parents and teachers as informant sources, and the application of various standardized assessment tools, they reported prevalence rates ranging from 10% to 17%. However, studies investigating the prevalence of AD/HD in Europe reported somewhat lower rates (2% to 4%) (Gallucci et al., 1993; Landgren, Petersons, Kjellman, & Gillberg, 1996).

Breton, Bergeron, Valla, Berthiaume, and Gaudet (1999) evaluated informant parallelism when estimating prevalence of mental health disorders in Quebec, Canada based on DSM-III-R criteria. Results indicated a twofold higher rate of AD/HD diagnoses in boys aged 9 to 11 years as rated by teachers (13.2%) compared to parents (7.3%). This study further identified more AD/HD diagnoses in children aged 6 to 8 years than in adolescents. Similar results were found in community prevalence surveys by others (Bird, Gould, Yager, Staghezza, & Canino, 1989; Offord et al., 1987).

1.3.3 Prevalence of AD/HD Subtypes

In clinic based samples, the combined subtype of AD/HD has consistently been reported to be the most prevalent among the three subtypes, followed by the predominantly inattentive subtype and by relatively few diagnoses of the predominantly hyperactive/impulsive subtype (Faraone, Biederman, Weber, & Russel, 1998; Lahey et al., 1994; McBurnett et al., 1996; Paternite, Loney, & Roberts, 1996). Within these studies ratios from 2:1 to 3:1 for the combined and inattentive subtypes have been
estimated; however, others have found relatively equal prevalence rates for these two subtypes (Eiraldi, Power, & Nezu, 1997; Morgan, Hynd, Riccio, & Hall, 1996).

In population based samples, the inattentive subtype has been reported to be the most prevalent of the three subtypes (Baumgaertel, Wolraich, & Dietrich, 1995; Gaub & Carlson, 1997; Graetz, Sawyer, Hazell, Arney, & Baghurst, 2001; Wolraich, Hannah, Baumgaertel, & Feurer, 1998), followed by the combined subtype and the predominantly hyperactive/impulsive subtype. Results from these studies indicated rates ranging from 4.5% to 8.8% for the predominantly inattentive subtype, 1.7% to 2.5% for the predominantly hyperactive/impulsive subtype, and 1.9% to 4.7% for the combined subtype of AD/HD. In contrast, Gadow et al. (2000) reported a 8.5% prevalence for the hyperactive/impulsive subtype, and lower rates for the inattentive and the combined subtypes (7.2%, 4.2%, respectively).

In summary, the predominantly inattentive subtype of AD/HD appears to occur more frequently in the community, the combined subtype exceeds or equals its prevalence in clinic populations, and the hyperactive/impulsive subtype is less frequently diagnosed in both, referred and non-referred samples. The higher occurrence of children with the combined subtype in clinical trials is not surprising as those children are more likely to be referred for treatment as a result of impairment in multiple domains of functioning (Faraone et al., 1998; Gaub & Carlson, 1997).

1.4 Aetiology of AD/HD

The clinical diagnosis of AD/HD is primarily based on subjective reports of the child’s behaviour from parents and teachers, however, systematic methods to reliably diagnose the disorder have been developed, such as rating scales and clinical diagnostic interviews (Jensen, Martin, & Cantwell, 1997; Jensen et al., 1995; Piacentini et al., 1993). Further, the childhood symptoms acknowledged by these methods are
risk factors for a variety of negative outcomes in adulthood (Taylor, Chadwick, Heptinstall, & Danckaerts, 1996). The current belief among researchers is that the next critical stage is the explanation of the aetiology and pathophysiology of AD/HD, investigated through behavioural and laboratory tests, including neuroanatomy, neurochemistry, molecular biology, family, twin, and adoption studies (Swanson, Castellanos, Murias, LaHoste, & Kennedy, 1998).

1.4.1 Neuroanatomy of AD/HD

1.4.1.1 The Frontal Lobe Hypothesis

The similarity of deficits observed in individuals suffering from prefrontal injury, and those found in children with AD/HD, has encouraged researchers to investigate a possible relationship between frontal lobe deficits and the symptoms of AD/HD. So far, neuroanatomical findings clearly indicate deficits in the prefrontal cortex and related subcortical systems in AD/HD (Bradley & Golden, 2001; Hynd et al., 1993; Luria, 1962, 1973; Spencer, Biederman, Wilens, & Faraone, 2002). There are implications of a right hemispheric dysfunction, showing differences in prefrontal, caudate and parietal areas in children with AD/HD (Levy, Barr, & Sunohara, 1998; Swanson, Castellanos, Murias, LaHoste, & Kennedy, 1998). Further, brain areas such as the orbital-frontal region, which is linked through pathways with the caudate nucleus (includes the striatum), and structures in the midbrain known as the limbic system, are found to be responsible for the deficits of individuals with AD/HD in sustained attention, inhibition and controlled behaviour, emotions and motivation as well as distractibility, and problems of working memory, planning and judgement (Barkley, 1995, 1997; Faraone & Doyle, 2001; Neuhaus, 2001; Spencer, Biederman, Wilens, & Faraone, 2002).
1.4.1.2 Cortical, Subcortical Structures and Connective Pathways

The majority of structural imaging studies in AD/HD research, using either Computerised Tomography (CT) or Magnetic Resonance Imaging (MRI) technologies have found an overall smaller volume of the cerebellum and brain structures such as the genu and splenium regions of the corpus callosum, that connects the right and the left frontal areas, and the basal ganglia and its specific segments, including the caudate nucleus, the head of the caudate nucleus, the putamen, and the global pallidus (Aylward et al., 1996; Baumgardner et al., 1996; Castellanos et al., 1996; Filipek et al., 1997; Kates et al., 2002), thus providing support for the hypothesis of dysfunctional right-sided prefrontal-striatal systems in AD/HD. In contrast, while Semrud-Clikeman et al. (1994) replicated findings of a volumetric reduction in the splenium, the authors failed to reveal significant differences in the genu region. Furthermore, Hynd et al. (1991, 1993) found differences in patterns of asymmetry of the head of the caudate nucleus, with normal children having a left-larger-than-right pattern of asymmetry (L>R), whereas children with AD/HD had the reverse pattern of asymmetry (L<R). This was due to a significantly smaller head of the left caudate nucleus in children with AD/HD. The authors also hypothesized that the smaller left caudate in children with AD/HD may be associated with a right-sided bias in dopamine, which possibly correlates with increased motor activity. Similar results were obtained by some investigators in more recent studies (Baumgardner et al., 1996; Filipek et al., 1997) but not by others (Castellanos, Giedd, Eckberg, & Marsh, 1998; Pineda et al., 2002). Despite the contradictory results, the literature provides some support for the involvement of the frontal lobe in the aetiology of AD/HD.
1.4.2 The Hypoarousal Model of AD/HD

Besides the existing support from structural MRI studies for the involvement of the prefrontal cortex in the aetiology of AD/HD, functional brain imaging studies have been carried out to investigate prefrontal abnormalities in individuals with AD/HD. It has been argued that attentional and behavioural problems identified in AD/HD result from cortical underarousal (Lou, Henriksen, & Bruhn, 1984; Niedemeyer & Naidu, 1997) and therefore neurophysiological studies have aimed to find support for a hypoarousal model of AD/HD by assessing cerebral blood flow, glucose metabolism, and brain wave activities in the frontal lobes.

1.4.2.1 Cerebral Hypoperfusion and the Role of Glucose Metabolism

The first study conducted in this area was by Lou, Henriksen, and Bruhn (1984), who examined regional cerebral blood flow in 13 children with dysphasia and/or AD/HD using xenon 133 inhalation and emission computer tomography. Results suggested decreased blood flow (hypoperfusion) in the white matter of the frontal lobes in 11 subjects with AD/HD, and hypoperfusion in the caudate nucleus region in 7 AD/HD cases. The administration of methylphenidate resulted in an increase of blood flow in the frontal regions, including basal ganglia and mesencephalon. Further, a decreased perfusion was observed in the motor cortex and the primary sensory cortex, leading to reduced motor activity and less distractibility. The authors concluded that these structures are inhibited in their functions and emphasized the role of medication in brain areas of dysregulated blood flow. More recent studies have added further support to the hypoperfusion hypothesis (Lou, Henriksen, & Bruhn, 1990; Lou, Henriksen, Bruhn, Borner, & Nielsen, 1989).

Zametkin et al. (1990) investigated differences in cerebral glucose metabolism by comparing 25 adults diagnosed with AD/HD in childhood with 50 adults without the
disorder, using the position emission tomography scan (PET). To measure cerebral glucose metabolism, the authors injected radioactive glucose into their probands’ bloodstreams while they completed an auditory continuous performance test. Results suggested reduced brain activity in 30 of 60 specific brain regions with a significantly lower cerebral glucose metabolism in adults with AD/HD compared to controls. The largest reductions were observed in areas such as the motor cortex and the superior prefrontal cortex, structures known to be involved in the regulation of motor activity and attention. Further confirmation of these findings was provided by others (Ernst et al., 1994; Zametkin et al., 1993).

1.4.2.2 Electroencephalography (EEG) Studies

Electroencephalography studies have been carried out to explore the model of hypoarousal in AD/HD. Early studies reported an increase in slow-wave activity in children with AD/HD compared to normal controls, primarily in the theta band (Capute, Niedermeyer, & Richardson, 1968; Satterfield, Cantwell, Lesser, & Podosin, 1972; Satterfield, Lesser, Saul, & Cantwell, 1973). These findings are in accord with more recent findings reporting increased theta activities in children with AD/HD, predominantly in the frontal lobe (Clarke, Barry, McCarthy, & Selikowitz, 1998; Clarke et al. 2003; Janzen, Graap, Stephanson, Marshall, & Fitzsimmons, 1995). Mann, Lubar, Zimmerman, Miller, and Muenchen (1992) studied EEG differences in inattentive boys and normal controls and reported increased theta activity in frontal and central brain regions during cognitive task performance, and also decreased beta activity in posterior and temporal regions when sustained attention was required. Similar results were found by Lazzerio et al. (1998) but not by others (Chabot & Serfontein, 1996). Clarke et al. (2003) found increased absolute and relative beta in the frontal regions of some children diagnosed with AD/HD combined subtype and suggested that these children with elevated beta activity are probably not hypoaroused
as previously hypothesised, and concluded that excessive beta may be associated with symptoms of impulsivity and/or hyperactivity only. Moreover, differences in activities of alpha and delta bands have continuously been reported in the literature. In their early study Matousek, Rasmussen, and Gilberg (1984) analyzed EEG frequencies in children with minimal brain dysfunction and found increased relative delta activity in the posterior region associated with the disorder. While the majority of studies confirmed these findings in children with AD/HD (Clarke, Barry, McCarthy, & Selikowitz, 1998, 2002, 2003; Clarke et al., 2003) others did not (Kuperman, Johnson, Arndt, Lingren, & Wolraich, 1996). Further, decreased alpha activities have most frequently been observed in the posterior regions of individuals with AD/HD (Callaway, Halliday, & Naylor, 1983; Dykman, Holcomb, Oglesby, & Ackerman, 1982; Mann et al., 1992). In addition, Clarke, Barry, McCarthy, & Selikowitz (2002) suggested decreased alpha activity to be partially associated with increased delta. In contrast, an increased alpha activity has been found by others (White, Hutchens, & Lubar, 2005).

In summary, while findings from studies using EEG measures have been somewhat inconsistent most investigators have found support for the hypoarousal hypothesis in AD/HD, showing an association between cognitive and behavioral functioning during task performance and increased slow wave activity in the posterior regions and elevated delta and theta, as well as decreased alpha and beta activities in the prefrontal cortex.

1.4.3 Neurochemistry and Molecular Biology of AD/HD

1.4.3.1 The Dopamine Theory

Additional neurological factors that have been evaluated as aetiological variables are the neurotransmitter systems. Since the 1970s, the biochemical theory of AD/HD has been based on a catecholamine hypothesis, which implies deficiencies of
the dopamine neurotransmitter system in cortical and subcortical brain regions resulting in behavioural inhibition and cognitive deficits (Castellanos, 1997; DuPaul & Stoner, 1994; Pliszka, McCracken, & Maas, 1996; Swanson, Castellanos, Murias, LaHoste, & Kennedy, 1998). It has been argued that the behavioural disturbances of AD/HD may be the result of an imbalance of the dopaminergic systems in the prefrontal cortex, where brain dopamine utilization is reduced (Jones & Hess, 2003; Levy, Barr, & Sunohara, 1998; Russell, Allie, & Wiggins, 2000).

Castellanos (1997) refined the dopamine theory and assumed that a) presynaptic effects prevail in D2-rich subcortical regions, where presynaptic receptors are abundant, leading to a reduced production of synaptic dopamine, and b) postsynaptic effects predominate in D4-rich cortical regions, where presynaptic receptors are lacking, causing an increased production of synaptic dopamine. These dysfunctions in the dopaminergic system presumably result in both an underactivity in cortical regions, which causes cognitive deficits, and an overactivity in subcortical regions, which leads to motor excesses (Castellanos, 1997). However, despite some refinements of the catecholamine theory, to date its status remains unclear.

1.4.3.2 The Relationship Between Dopamine Genes and AD/HD

Pharmacological studies strongly support the involvement of neurotransmitter systems, particularly the dopaminergic system, as stimulant intervention has been proven to be effective in reducing AD/HD symptoms in about 70% to 80% of cases (Smalley et al., 1998; Swanson, Castellanos, Murias, LaHoste, & Kennedy, 1998). Based on findings implying the effectiveness of stimulant medication in the treatment of this disorder, molecular genetic studies examined a possible relationship between AD/HD and several genes involved in dopamine regulations.

Recent studies reported a possible link between AD/HD and two specific genes, the dopamine transporter gene (DAT1) on chromosome 5 (Gill, Daly, Heron, Hawl, &
Fitzgerald, 1997; Giros et al., 1992; Vandenbergh et al., 1992), and the dopamine 4 receptor gene (DRD4) on chromosome 11, which has been found to have some alleles that are sensitive to dopamine, leading to a deficit in the output of dopamine receptive neurons (Grady, Moyzis, & Swanson, 2005; Grady et al., 2005; LaHoste et al., 1996; Swanson et al., 1998).

Molecular genetic findings raise the questions of how these genes combine to increase the risk for AD/HD, as no single gene has been found to be sufficient to cause a disorder (Comings et al., 1991; Levy, Barr, & Sunohara, 1998), and whether different genes contribute to certain aspects of the AD/HD phenotype (Stevenson et al., 2005). Most studies have found the DRD4 polymorphisms to best account for AD/HD (Stevenson et al., 2005). Crosbie (2005) investigated relationships between three candidate genes, specific behavioural traits, and potential cognitive endophenotypes. Findings suggested an association between the 4-repeat allele of the DRD4 and lower scores of inattention and better control inhibition; further, higher ratings of inattention and hyperactivity-impulsivity, but not inhibitory control, were linked with a risk haplotype of the DAT1, and the SNAP-25 (haplotype relative risk analysis compares the genotype of an affected individual with those of their biological parents). The author therefore suggested that inhibitory control can be regarded as a genetically informative endophenotype for AD/HD. Moreover, some researchers have proposed an association between the 7-repeat allele of the DRD4 and the combined subtype of AD/HD (LaHoste et al., 1996), as well as higher levels of both inattention and conduct disorder symptoms (Rowe et al., 2001). In contrast, other researchers have failed to find a relationship between the 7-repeat allele and the deficits characterizing AD/HD (Swanson et al., 2000; Todd et al., 2001).

In summary, there are suggestions in the literature that there are many genes involved in the aetiology of AD/HD, each with a small effect. However, some may have a larger effect in certain aspects of this disorder. Even though the pathway between genes and behaviour is complex and indirect, transmission disequilibrium test analysis
provide some evidence that genes of the prefrontal brain dopaminergic system play a
greater role in cognitive and emotional functions compared to motor activities in
individuals diagnosed with AD/HD. While the mode of inheritance of this entity is
complex, haplotype relative risk analysis support the hypothesis of genetic
transmission of the disorder. However, larger samples and collaborative efforts will be
needed in future research to fully understand the genetic structural design of AD/HD.

1.4.4 Heritability of AD/HD

In addition to molecular genetic studies, research has focused on the
contribution of genetic inheritance in the development of AD/HD, involving family, twin,
and adoption studies. Results are convincing across all three areas of investigation,
demonstrating that genetic factors play a role in the aetiology of this disorder for a
considerable proportion of children.

Many investigations have been carried out to investigate the possibility of
genetic susceptibility to AD/HD through family studies. Biederman et al. (1992)
examined 140 children with AD/HD, 120 normal controls, and their 822 first-degree
relatives, using structured diagnostic interviews for diagnosis. Findings indicated a
statistically greater risk for AD/HD among relatives of children with AD/HD compared
with relatives of normal controls (16% to 3% respectively). Further support for a familial
transmission of AD/HD has been provided by other researchers (Biederman, Faraone,
Keenan, Knee, & Tsuang, 1990; Faraone, et al., 1992; Faraone, Biederman, &
Milberger, 1994; Faraone et al., 2000; Samuel et al., 1999; Stadler et al., 2006). While
the majority of family studies confirm the hypothesis of a familial transmission of
AD/HD, very few investigators do not (Reeves, Werry, Elkind, & Zametkin, 1987).

Faraone and Doyle (2001) stated that twin studies are based on the assumption
that, when brought up together, identical (monozygotic [MZ]) and fraternal (dizygotic
[DZ]) twins share the same quantity of environmental influences but differ in their
genetic similarity. Further, while MZ twins share all of their genetic material, DZ twins, are similar to ordinary siblings and share no more than 50% of their genes. Therefore, it has been argued that MZ twin pairs are more likely to have the same disorder than DZ twin pairs (Faraone & Tsuang, 2002; Faraone, Tsuang, & Tsuang, 1999; Plomin, DeFries, & McClearn, 1998). Several twin studies investigated the genetic influence on the hyperactive/impulsive and inattentive symptom dimensions. Gillis, Gilger, Pennington, and DeFries (1992) examined 37 MZ twins and 37 DZ twin pairs where one twin had been diagnosed with AD/HD, using a basic regression model for analysis. Findings indicated that 79% of MZ and 32% of DZ twins were concordant for AD/HD, suggesting that symptoms of attention and hyperactivity/impulsivity are highly heritable. While these findings were criticized by researchers because of the small sample size, other studies using larger twin samples have produced similar results (Hudziak, 2001; Martin, Levy, Pieka, & Hay, 2006; Sherman, Iacono, & McGue; 1997; Stevenson, 1992).

Adoption studies also implicate a genetic component in the aetiology of AD/HD. Differing from twin studies, where parents may transmit the risk of developing a disorder to their biological children via both biologic and environmental pathways, in adoption studies adoptive parents can only confer a risk through an environmental path (Faraone & Doyle, 2001). Therefore, genetic and environmental causes of familial transmission in AD/HD can be unravelled by examining both adoptive as well as biological parents of children diagnosed with this disorder. An adoption study undertaken by Sprich, Biederman, Crawford, Mundy, and Faraone (2000) examined rates of AD/HD in first-degree adoptive relatives of 25 adopted children with AD/HD and compared them with those of first-degree biological relatives of 101 non-adopted children with AD/HD and 50 non-adopted children without AD/HD. Results strongly supported a genetic heritability for AD/HD, with 18% of the biological parents of non-adopted children with AD/HD having the disorder, compared to 6% of adoptive parents of children with AD/HD, and 3% of biological parents of normal control children. Similar
results were found by others (Buckminster-Sprich, 1996; Morrison & Stewart, 1973). These studies support the hypothesis that biological rather than adoptive relationships are accountable for the transmission of AD/HD. However, as none of these studies examined the adoptive and biological parents of the same children, this conclusion is unconfirmed.

1.4.5 Environmental Factors

Although there is strong evidence in the literature for the high heritability of AD/HD, family, twin, adoption studies and molecular genetic analyses have shown that environmental factors do play a role in the development of AD/HD. However, neither solely biological, nor exclusively psychosocial, environmental risk factors account for the existence of this disorder (Faraone & Doyle, 2001).

1.4.5.1 Biological Factors

Milberger, Biederman, Faraone, Chen, and Jones (1996) investigated the role of maternal smoking during pregnancy in the aetiology of the disorder, and suggested nicotine to be a risk factor for AD/HD. Findings suggested that 22% of children with AD/HD had mothers who were smoking a pack of cigarettes per day for a period of at least three months during pregnancy, compared to 8% of mothers of normal control children. These findings support the notion that maternal smoking during pregnancy increases the risk of having a child who develops AD/HD. Other studies found that the exposure to lead may contribute to some cases of AD/HD (Fergusson, Fergusson, Horwood, & Kinzett, 1988; Thomson et al., 1989). However, the relationship between environmental lead and AD/HD must be seen with caution as these studies did not use clinical criteria to diagnose AD/HD in their subjects. Some investigators have drawn attention to the impact of low birth weight (LBW) in AD/HD (Breslau et al., 1996; Mick,
Biederman, Prince, Fischer, & Faraone, 2002; Szatmari, Saigal, Rosenbaum, & Campbell, 1993), and others have hypothesised that fatty acids, especially omega-3 and omega-6, may play an important role in brain development and function, thus influencing the occurrence of psychiatric and neurological disorders (Richardson, 2006). However, studies undertaken to test the fatty acid hypothesis in relation to AD/HD have produced mixed results (Hamazaki & Hirayama, 2004; Hiraqama, Hamazaki, & Terasawa, 2004; Stevens et al., 2003; Voigt et al., 2001).

1.4.5.2 Psychosocial Factors

There is consistency in the literature about the existence of a relationship between AD/HD and family adversity (Cohen, Adler, Kaplan, Pelcovitz, & Mandel, 2002; Counts, Nigg, Stawicki, Rappley, & Von Eye, 2005; Murphy & Barkley, 1996). Barkley, Fischer, Edelbrock, and Smallish (1990) examined adolescent outcomes of hyperactive children in an 8-year follow up study. A significantly higher rate of separation and divorce was found among mothers of hyperactive children relative to mothers of normal controls. Lower rates of family intactness among families of children with AD/HD have also been reported by others (Biederman et al., 1998; Brown & Pacini, 1989). Hinshaw (2002) investigated background characteristics of 140 preadolescent girls with AD/HD and 88 comparison girls. Findings indicated that girls of both AD/HD subtypes (inattentive and combined) had rates of adoption greater than 20%, which was almost six times higher than the rate found in the comparison group. While this study included planned adoptions shortly after birth, and late adoptions following several foster placements, the latter tend to represent the greatest risk for impairment (Simmel, Brooks, Barth, & Hinshaw, 2001).

The most profound indicators of adversity found are exposure to marital discord and parental psychopathology (Cantwell, 1996; Gelfand & Teti, 1990; Hetherington, Cox, & Cox, 1982; Mash & Johnston, 1983; Offord et al., 1992; Taylor & Warner-
Biederman et al. (1995) assessed the impact of parental psychopathology and exposure to parental conflict on AD/HD-related psychopathology and dysfunction in 140 children with AD/HD and 120 control subjects. Analysis showed significant associations between both indicators of adversity and psychosocial functioning in the clinical group compared to control subjects. The authors therefore concluded that adverse family-environment variables play an important role in the aetiology of AD/HD. Poor parenting, marital disharmony, family dysfunction, and a conflict-ridden parent-child relationship have previously been reported as common risk factors for attention problems or hyperactivity in children (Brandon, 1971; Burt, Krueger, McGue, & Iacono, 2003; Tallmadge & Barkley, 1983; Taylor & Warner-Rogers, 2005; Warner-Rogers, Taylor, Taylor, & Sandberg, 2000; Young, Heptinstall, Sonuga-Barke, Chadwick, & Taylor, 2005), and for the development of internalizing and externalizing problems in children with AD/HD (Drabick, Gadow, & Sprafkin, 2006; Hurtig et al., in press)

Graetz, Sawyer, Hazell, Arney, and Baghurst (2001) studied subtype differences in children aged 6 to 17 years and found that the problems associated with the combined subtype of AD/HD were related to greater disruption of family activities and greater limitations on the amount of time parents had for their own personal needs, compared with the problems displayed by children of the inattentive or hyperactive-impulsive subtypes. They called for longitudinal studies to clarify the link between social adversity and AD/HD, and highlighted the need for interventions to reduce adversity in families of children with disruptive disorders. Finally, Hurtig et al. (in press) examined the occurrence of comorbid conditions, such as CD/ODD, substance abuse and mild depression in adolescents with AD/HD, and found that compared with the AD/HD only group, those in the comorbid group lived more often in non-intact families, suggesting that family environments may contribute to the development of comorbid conditions in adolescents with AD/HD. Biederman et al. (1995) found that family conflict and low family cohesion was related to the occurrence of internalizing/externalizing
behaviour problems and poor social functioning in children with AD/HD, but unrelated to learning disabilities. Finally, Hurtig, Taanila, Ebeling, Miettungen, and Moilanen (2005) reported that adolescents with AD/HD from non-intact families presented with more attention and behavioural problems compared to adolescents from intact homes.

In summary, although the importance of psychosocial adversity has been recognized in the literature as an important correlate in the development of AD/HD, it is still unclear whether these factors are influenced by AD/HD-symptom related behaviour or, in contrast, whether they act as modifiers in the course of the illness and contribute to maladjustment and dysfunctions in children with AD/HD. Findings so far support both reciprocal and transactional models, reflecting the impact of child’s behaviour on parents as well as parents’ effects on the child (Johnston & Mash, 2001).

1.5 Differences in AD/HD Subtypes

When the DSM-III criteria changed to DSM-IV, AD/HD became a two axis disorder with three different subtypes, where symptoms of inattention are separated from those of hyperactivity/impulsivity. However, since then there has been concern among researchers whether the predominantly inattentive subtype of AD/HD should best be considered as an AD/HD subtype, or a separate disorder (Barkley, 1990, 1997; Mirsky, 1987; Sergeant & Van der Meere, 1989). Beside the common characteristics of inappropriate levels of inattention and overactivity/impulsivity, diagnosis of AD/HD indicates differences between children related to treatment response, family backgrounds, developmental courses and psychiatric symptoms (Barkley et al., 1990). Therefore, many studies have been conducted to distinguish the AD/HD subtypes from each other. However, the predominantly hyperactive/impulsive subtype is a new diagnostic subtype in the DSM-IV conceptualization of AD/HD and has hitherto
received little investigative attention, and is not related to previous subtypes from earlier versions of the DSM (Newcorn et al., 1989).

1.5.1 Age Effects on AD/HD Subtypes

Children’s age has been reported to correlate with the various subtypes of AD/HD. It has been argued that children with the combined subtype would have a significantly earlier age of onset of AD/HD symptoms than those of the predominantly inattentive subtype. For instance, in their clinically referred sample, Faraone et al. (1998) found the youngest to be diagnosed with the hyperactive-impulsive subtype, intermediate in age were those of the combined subtype, and inattentive children were the oldest at interview and at time of initial referral for treatment. These findings are in accord with other clinic bases studies reporting children of the inattentive subtype to be older in age than those diagnosed with the hyperactive-impulsive or combined subtype (Casey, Rourke, & DelDotto, 1996; Eiraldi, Power, & Nezu, 1997; Nolan, Volpe, Gadow, & Sprafkin, 1999). The same age patterns in AD/HD subtypes were reported in non-referred samples (Gadow et al., 2000; Graetz et al., 2001). However, these findings were not supported by Morgan et al. (1996) who did not find differences in age between the various subtypes in their clinic sample, nor did others in non-referred populations (Carlson, Lahey, & Neeper, 1986; Gaub & Carlson, 1997; Todd et al., 2002).

Most of the studies examining age effects among AD/HD subtypes did not differentiate between age of onset, referral or interview, however the ones that did have suggested main effects in age of referral rather than in age of onset. The majority of children have been found to show patterns of hyperactivity/impulsivity at preschool age, whereas problems of attention develop later at school age. When comparing the inattentive and combined subtypes of AD/HD, symptoms of inattention were found to have a later onset in the latter (Applegate et al., 1997). If this distinction is valid, it can
be concluded that the differences in attention disturbances between these two subtypes will remain even if hyperactivity-impulsivity symptoms in the combined subtype diminish with increasing age of children. This means that children of the combined subtype do not actually change subtypes, as they will continue to manifest their type of inattention (distractibility and lack of persistence), and still be qualitatively different from those with the predominantly inattentive subtype (Barkley, 1997).

1.5.2 Comorbidity in AD/HD Subtypes

A great deal of research has been carried out to investigate differences in the prevalence of comorbid conditions among AD/HD subtypes. There is overall agreement that inattentive children present with fewer behavioural problems (Barkley, DuPaul, & McMurray, 1990; Gaub & Carlson, 1996; Graetz et al., 2001), but are more daydreaming, shy, socially withdrawn, disorganized, less active, and in need of more supervision than hyperactive/impulsive children (Hinshaw, 2002; Lahey, Schaugency, Strauss, & Frame, 1984; Stanford & Hynd, 1994). In contrast, hyperactive/impulsive children were found to show less internalizing problems, but more disruptive and impulsive behaviour (Hinshaw, 2002; Morgan, Hynd, Riccio, & Hall, 1996; Stanford & Hynd, 1994). Gadow et al. (2000) found children of the predominantly hyperactive/impulsive and combined subtype to present with more oppositional and aggressive behaviour than those of the predominantly inattentive subtype.

In clinic as in population based samples, the combined subtype of AD/HD consistently has been associated with externalizing disorders, such as Conduct Disorder (CD) and Oppositional Defiant Disorder (ODD) (Barkley, DuPaul, & McMurray, 1990; Eiraldi, Power, & Nezu, 1997; Faraone, Biederman, Weber, & Russell, 1998; Goodyear & Hynd, 1992; Nolan, Volpe, Gadow, & Sprafkin, 1999). However, findings are inconsistent in regard to internalizing disorders such as comorbid anxiety and depression. Some clinic based studies found higher ratings on various anxiety and
depression scales for children with the combined subtype than for those of the inattentive subtype (Hinshaw, 2002; Nolan et al., 1999). Similar results were found by Gaub and Carlson (1996) and Wolraich et al. (1996) in their non-referred samples. In contrast, others were unable to find differences between the two subtypes for these conditions (Eiraldi et al., 1997; Gadow et al., 2000; Morgan et al., 1996; Power, Costigan, Eiraldi, & Leff, 2004), and some reported higher rates of mood or anxiety disorders for the inattentive subtype (Biederman, Newcorn, & Sprich, 1991; Faraone et al., 1998; Lahey, Schaughency, Hynd, Carlson, & Nieves, 1987). It has been speculated that some of these apparent discrepancies between studies in terms of internalizing disorders may be a result of changes in diagnostic criteria (Eiraldi et al., 1997). Alternatively, there are implications that referral patterns may be responsible for the ambiguous relationship between internalizing problems and AD/HD subtypes. For instance, there is a tendency of higher rates of anxiety and depression in inattentive children among the clinic population compared to non-referred samples, suggesting that these conditions may contribute to higher referral rates.

1.5.3 Academic and Cognitive Achievement in AD/HD Subtypes

The literature has continuously demonstrated a relationship between academic underperformance and AD/HD (Carlson, Lahey, & Neeper, 1986; Lahey, Schaughency, Strauss, & Frame, 1984). However, studies conducted to find differences in academic achievement and cognitive functioning among the AD/HD subtypes have yielded somewhat mixed results. While some clinic based studies failed to find significant differences regarding scholastic achievements, suggesting that all subtypes are equally impaired (Barkley, DuPaul, & McMurray, 1990; Casey, Rourke, & DelDotto, 1996; Faraone, Biederman, Weber, & Russell, 1998; Morgan, Hynd, Riccio, & Hall, 1996), others reported greater impairment in math achievement for children of the inattentive subtype compared with those of the combined subtype (Hynd et al., 1991; Marshall,

Various studies examining non-referred children with AD/HD found inattentive children to present with lower academic achievement than hyperactive/impulsive children (Gadow et al., 2000). Wolraich, Hannah, Pinnock, Baumgaertel, and Brown (1996) reported that poor academic performance was most commonly found among children of the inattentive subtype than in those of the hyperactive/impulsive or combined subtype of AD/HD. While these results correspond with the findings of Gadow et al. (2000), some investigators have reported greater impairment in schoolwork, including lower test scores on reading, spelling and math for the combined subtype than for the hyperactive/impulsive or inattentive subtypes (Graetz, Sawyer, Hazell, Arney, & Baghurst, 2001; Todd et al., 2002). Others found inattentive children to present with poorer arithmetic skills than children of the combined subtype; but failed to find differences between these subtypes in regard to reading or spelling achievement (Carlson, Lahey, & Neeper, 1986; Marshall, Schafer, O'Donnell, Elliott, & Handwerk, 1999). When examining cognitive performance in respect to IQ measures, some investigators found that hyperactive/impulsive children obtained significantly lower Full Scale IQ scores than did inattentive children (Carlson et al., 1986). In contrast, others reported that the inattentive subtype was more impaired on both performance and Full Scale IQ than the combined subtype (Marshall et al., 1999).

There are several explanations for these controversial findings in the literature. Carlson, Shin, and Booth (1999) argue that most of the measures used to examine academic and cognitive achievement, such as the Wide Range Achievement Test (WRAT) or the WRAT-revision (R), lack in sensitivity and may therefore not be suitable to adequately identify differences in scholastic achievement. Casey, Rourke, and
DelDotto (1996) point to a discrepancy among researchers in defining learning disabilities. The inconsistent use of criteria, such as the inclusion or exclusion of incorporated basic processing deficiencies, in the definition of learning impairment in children with AD/HD may partly be responsible for the ambiguous results reported in the literature. Further, different types of behavioural and emotional problems identified among the subtypes may interact with attention deficits and in turn contribute to dissimilar achievement scores (Carlson et al., 1986).

1.5.4 Social Functioning in AD/HD Subtypes

Social deficits in children with AD/HD have been found in clinic referred and population based studies (Gaub & Carlson, 1997; Graetz et al., 2001; King & Young, 1982), suggesting that children of all subtypes are less popular than their peers, and those of the combined subtype are more actively rejected. Gadow et al. (2000) reported a greater lack of social skills in children of the inattentive subtype, while higher scores on the CBCL social problems scale were obtained for the hyperactive-impulsive and the combined subtypes. Further, all subtypes received elevated scores on the CBCL withdrawn scale. Gaub and Carlson (1997) studied behavioral characteristics of AD/HD subtypes and found children of all subtypes were significantly impaired in various domains of functioning. However, the combined subtype was associated with the most severe pattern of maladjustment. Findings indicated that inattentive children received lower Peer Dislike ratings and higher Peer Like scores, than did children of the hyperactive/impulsive and combined subtypes. In accord with these findings are those by Graetz et al. (2001) who reported lower psychosocial quality of life for all AD/HD subtypes. However, the authors found children with the combined subtype to be more severely impaired in both peer-related activities and social functioning, and suggested that these difficulties in adjustment may be associated with emotional and behavioural problems commonly found among this subtype. Consistent with these
findings, Wheeler and Carlson (1994) argued that the social deficits displayed by children with the inattentive and combined subtypes of AD/HD, may differ in nature and severity. The authors hypothesised that deficits in social performance may be attributable to children of both subtypes, whereas difficulties in social knowledge would only apply to children of the predominantly inattentive subtype. A study conducted by Maedgen and Carlson (2002) explored this hypothesis but did not consistently support it. Impairments in the social status of children with AD/HD were found for the combined subtype, who were rated as less popular than controls; in addition, self-reports indicated deficits in both social knowledge and social performance and these were related to aggressive and emotionally dysregulated behaviour patterns. In contrast, children with the inattentive subtype presented with less social knowledge and with greater passivity in regard to social interactions with peers, and this was associated with internalizing problems. The authors concluded that the social problems related to behavioural and emotional disturbances in children of the combined subtype resulted in active rejection by peers, and social deficits of the inattentive subtype associated with withdrawal and social passivity caused decreased peer acceptance.

1.6 Developmental Course of AD/HD and Differences in Age

AD/HD is currently viewed as a chronic disorder found in boys and girls (Barkley, 1998). A great deal of research has been done to study AD/HD in childhood. However, aspects such as its developmental course, clinical presentation, assessment and treatment of the disorder in adolescence and adulthood remain unclear (Gingerich, Turnock, Litfin, & Rosén, 1998; Hill & Schoener, 1996; Shaffer, 1994). According to Willoughby (2003) there are two different types of investigations necessary to show evidence of its chronicity: a) developmental outcome studies, and b) developmental course studies, including diagnostic retention and symptom trajectory studies.
Additionally, further evidence can be achieved by studying the age of onset criterion of AD/HD.

1.6.1 Developmental Outcome Studies

Barkley, Fischer, Edelbrock, and Smallish (1990) investigated adolescent outcomes in an 8-year prospective follow up study of 123 clinically referred children with AD/HD and 66 normal controls aged between 4 and 12 years, and found substantially higher rates of antisocial behaviour, conduct problems, substance use and poorer academic performance in the clinical than in the control group. Similarly, in their 4-year longitudinal study of 6 to 17 years old individuals with AD/HD, Biederman et al. (1998) reported higher rates of substance use disorders, more scholastic problems (repeated grades), and more conflict-ridden relationships with parents in their subjects with AD/HD than in normal controls. Another study by Young, Heptinstall, Sonuga-Barke, Chadwick, and Taylor (2005), examined adolescent outcome in a longitudinal epidemiological design, and found hyperactive girls to present with more difficulties at school, poor relationships with peers, and higher rates of state anxiety. However, findings of this study were solely based on self-reports of adolescent girls, and did not include parents’ or teachers’ perspectives as a source of information, which might have biased results. Further, higher rates of internalizing problems in adolescents with AD/HD were found by Bedriye et al. (2004). However, their subjects were screened cross-sectionally and included only a small number of hyperactive girls. Finally, the literature also provides support for a chronic course in regard to neuropsychological functioning in individuals with AD/HD. Seidman, Biederman, Faraone, Weber, and Ouellette (1997) reported neuropsychological impairment in their clinically-referred sample for both their younger participants and for adolescents with AD/HD, and therefore did not support the hypothesis that children would overcome the executive functioning deficits found on the WCST, the Stroop test, and the ROCF in the
transition from childhood into adolescence. Similar findings of persistence of AD/HD into adolescence have been reported in recent years (Happe, Booth, Charlton, & Hughes, 2006; Seidman et al., 2005; Seidman, Biederman, & Faraone, 2005).

These studies provide evidence that AD/HD is not a maturational disorder as such and show that children with this disorder continue to present with a variety of cognitive and behavioural difficulties in later life. Research appears to be compelling that adolescents and young adults with AD/HD present with symptomatology similar to children with the same condition. However, developmental outcome studies alone do not provide sufficient evidence to support the view of AD/HD as a chronic disorder. While there is evidence that childhood AD/HD is associated with negative developmental outcomes, it is unclear whether AD/HD symptoms as such are accountable for this association. This raises the question of what factors are responsible for outcome differences in adolescents and young adults, as some children improve over time and some continue to manifest maladjustment. Therefore, studies have been conducted to investigate whether late negative outcomes are attributable to factors such as socio-economic status, low IQ, family dysfunction, learning difficulties or problems in conduct. Taylor et al. (1996) followed up school-aged boys with AD/HD and found that insufficient parental warmth and high levels of parental hostility correlated with negative outcome, especially conduct problems, in adolescence and young adulthood. However, Hechtman, Weiss, Perlman, and Amsel (1984) argued that not a specific factor but a combination of different contributing factors would be associated with different negative outcomes in later life. The authors found that a combination of SES, IQ, symptoms of hyperactivity, and parenting style were the best predictors for later academic outcome, while emotional maladjustment in young adults was predicted by family psychopathology, low frustration tolerance and emotional instability during childhood.

In summary, developmental outcome studies provide some evidence for the common belief of AD/HD being a chronic disorder. However, without reservations, this
type of investigation is based on the assumption that children with AD/HD are at increased risk for negative developmental outcomes in adolescence and young adulthood. However, in order to characterize AD/HD as a chronic condition, it is necessary to prove that AD/HD symptomatology and symptom-related impairments continue to exist in adolescents and young adults. Therefore, developmental course studies are needed to address this issue.

1.6.2 Developmental Course Studies

Willoughby (2003) describes two strategies of developmental course studies: diagnostic retention studies and symptom trajectory studies. Diagnostic retention studies include the diagnosis of AD/HD in children at one point in time, followed by further assessments to determine whether individuals continue to meet diagnostic criteria. Symptom trajectory studies include pre and post investigations to examine the number of AD/HD symptoms displayed by individuals at subsequent evaluations.

1.6.2.1 Diagnostic Retention Studies

A comprehensive 4-year longitudinal diagnostic retention study to investigate developmental change in clinically referred boys with AD/HD was carried out by Hart, Lahey, Loeber, Applegate, and Frick (1995). Findings indicated that 77.4 % of boys who were diagnosed with AD/HD at ages 7 to 12 years still met diagnostic criteria for this disorder when they were 10 to 15 years old. Equally high rates were found in a 4-year follow-up study by Biederman et al. (1996). According to their findings, 85% of children who met diagnostic criteria for AD/HD in childhood continued to have the disorder in adolescence. However, these studies were limited in several ways. Firstly, only boys with AD/HD were included and therefore findings cannot be generalized to the female population as girls with AD/HD may display different developmental
courses. Secondly, only clinically referred children were used who are generally known to exhibit more severe symptoms and other disruptive behaviour problems than non-referred children and may therefore present with more stable symptomatology over time. Hence, the high rates found in these studies might have been distorted by referrals and are not representative for the general population. Retention rates in community samples were investigated by Barkley et al. (1990), who found that over 80% of their sample continued to meet diagnostic criteria for AD/HD in adolescence. However others, such as Taylor, Chadwick, Heptinstall, and Danckaerts (1996) and McGee et al. (1990), reported substantially lower rates in their non-referred population (40% and 50% respectively). The high rate of diagnostic retention of AD/HD found by Barkley et al. (1990) is possibly attributable to the rigid selection of subjects used in their study and is not necessarily representative of the general population of AD/HD.

Generally, both clinic and community-based retention studies assume that the diagnostic criteria used to identify AD/HD can be applied to all individuals irrespective of their developmental age, and Biederman, Mick, and Faraone (2000) stated that issues in regard to diagnostic retention would be subject to how retention is defined. In addition to the definition problem, Willoughby (2003) points to further constraints involved when examining rates of retention in individuals with AD/HD. Firstly, the diagnostic criteria were originally set up only for boys in middle childhood, secondly the criteria established to diagnose AD/HD are subject to frequent revisions; and thirdly, there is a lack of specific cut-offs for diagnosis of AD/HD among adolescents and adults. Given these limitations, diagnostic retention studies alone seem to be insufficient to demonstrate the developmental course of AD/HD, and therefore symptom trajectory studies with repeated measures of AD/HD symptoms during the transition from childhood to adolescence may be additionally useful in explaining developmental changes over time (Willoughby, 2003).
1.6.2.2 Symptom Trajectory Studies

A 4-year longitudinal symptom trajectory study was carried out by Hart et al. in 1995. They reported a decline of hyperactive-impulsive symptoms with increasing age of their subjects, but symptoms of inattention declined during the first two years of reassessment and then remained rather stable across repeated measurements. Mick, Faraone, and Biederman (2004) found similar results, with inattention being more persistent during transition into adolescence and early adulthood than symptoms of hyperactivity/impulsivity. Other studies are in line with these findings, reporting different patterns of symptom decline as a function of age for symptoms of hyperactivity/impulsivity and inattention, in both the clinical and general population (Gomez, Harvey, Quick, Scharer, & Harris, 1999; Nolan, Volpe, Gadow, & Sprafkin, 1999).

Despite the overall agreement of a symptom decline with increasing age of individuals with AD/HD, there is uncertainty whether the decrease is attributable to the natural history of the disorder or the inadequacy of the diagnostic criteria. Faraone, Biederman, and Mick (2006) argue that the DSM does not provide a sufficient symptom list that meets developmental changes in adolescence or young adulthood. That is, some of the items are valid for children but may not be relevant for adolescents or young adults. For example, the DSM-IV symptom “often leaves seat in classroom or in other situations in which remaining seated is expected” (APA, 1994, p. 92) may apply to school-age children but not necessarily to young adults. It might be difficult for young children to remain seated; however during adolescence the process of socialization and the maturity of the brain leads to a greater ability to inhibit impulses. Further, compared to school age children, adolescents or young adults are not always asked to sit down for a long period of time and therefore there are fewer chances for them to display this symptom (Faraone, Biederman, & Mick, 2006). Thus, the current diagnostic criteria may be responsible for an under-identification of AD/HD in adolescents and
young adults, which highlights the importance of more norm-appropriate criteria in the diagnosis of AD/HD in adolescence and adulthood.

1.6.2.3 Age of Onset Studies

Despite the evidence of a general decline in AD/HD symptomatology with increasing age, provided by symptom trajectory studies, there is also some support of an increase in symptoms of hyperactivity/impulsivity and inattention as a function of age shown by age of onset studies. These studies evaluated the efficacy of the age of onset criterion, stated in the DSM-IV (APA, 1994), where some of the items on the symptom list have to be displayed before age of 7 years in order to validate a diagnosis of AD/HD. Researchers such as Barkley and Biederman (1997) argue against the age of onset criterion (AOC), as it may reject diagnosis in adolescents and adults who experience AD/HD-related impairments, and they therefore demand a broader concept with more empirical validity. The authors support the view of AD/HD being a disorder that has its onset in childhood, but criticize the requirement of a precise AOC in order to meet diagnostic criteria, especially as there are few other childhood disorders that require such a strict AOC.

Age of onset studies so far have found only a small number of adolescents showing delayed onset of elevated levels of AD/HD symptoms. Willoughby, Curran, Costello, and Angold (2000) found that 26% of adolescents with the inattentive subtype reported the first occurrence of their symptoms after age 7. This also applied to youth with the combined subtype, however to a much smaller degree (13%). Further, the authors found no differences when comparing the early onset with the late onset inattentive group in regard to comorbidity, psychosocial impairment or influence on parental functioning. Direct comparison of the early onset and late onset combined group indicated that youth with an early onset of AD/HD symptoms were at greater risk for comorbid CD, ODD, depression and that it impacted more negatively on their
parents’ functioning than those in the late onset group. A study undertaken by Cuffe et al. (2001) identified a nearly 50% increase in the prevalence of AD/HD among adolescence in their community-based sample, if the age of onset criterion wasn’t taken into account when diagnosing the disorder. Therefore, the authors suggested that future research should include adolescents and young adults who do not meet the age-of-onset criterion for AD/HD, and also stressed the importance of treatment needs for those individuals. Further, Applegate et al. (1997) found, in their clinical sample, that nearly all adolescents who were diagnosed with the hyperactive-impulsive subtype of AD/HD also met the age of onset criterion, whereas 18% of those who met criteria for the combined subtype, and 43% of the inattentive subtype, did not show impairment before age 7 years. Further, 75% of youth who did not meet the age of onset criterion presented with scholastic difficulties, and that applied to any subtype. Therefore, the authors suggested that the DSM-IV age of onset requirement would limit the identification of adolescents with AD/HD and existing academic problems. They also recommended to distinguish the inattentive subtype in the DSM-IV from the other two subtypes, due to the differences found between them in regard to the age of onset of symptoms and impairment. Finally, they queried the focus in the DSM-IV on the age of onset of impairment, rather than symptoms, when assessing adolescents for AD/HD.

In summary, findings from age of onset studies suggest an increase, instead of decrease of AD/HD symptomatology in youth, during the transition from childhood into adolescence, though findings only apply to a small number of teenagers. Therefore, the current age of onset criterion might under-identify adolescents with a late onset of attention problems, and also those youth with a delayed onset of symptoms related to the combined subtype of AD/HD. Additionally, AD/HD related impairments might lead to a mis-diagnosis of a different disorder that comprises of similar symptoms for youths and young adults. Hence, the current age of onset criterion seems to be a hindrance in the diagnosis of AD/HD in adolescence and young adulthood, however, the literature
provides some support that AD/HD can be viewed as a developmental disorder that persists in young individuals and has a symptom onset in childhood.

1.7 Sex Differences in AD/HD

1.7.1 Gender Distributions

AD/HD is most frequently observed among boys (APA, 1994). The literature indicates a male to female sex ratio ranging from 2:1 to 10:1, with higher rates found among the clinic-referred population compared to community samples (Biederman et al., 2002; Gingerich, Turnock, Litfin, & Rosen, 1998; Stevenson & Williams, 2000). In the field of childhood psychopathology, clinic-referred samples are not representative of the affected population in general (Costello, 1990). The lower ratio found among community samples implies that a higher proportion of boys than girls with AD/HD presents for clinical assessment. Neuhaus (2000) holds the view that this phenomenon is due to the fact that girls present with less striking and remarkable behaviour patterns than boys, and are therefore less likely to be referred to a clinic for examination. Gaub and Carlson (1997) support this notion, and suggest higher rates of conduct disorder or other disruptive behaviour in AD/HD boys than in girls, result in higher referral rates for boys. When looking into gender distributions in the various subtypes of AD/HD, differences were found in both referred and non-referred samples, with girls being diagnosed more often with the inattentive type than boys (Eiraldi et al., 1997; Graetz et al., 2001; Hartung et al., 2002; Maedgen & Carlson, 2000). Other investigators found boys overrepresented in all subtypes (Gadow et al., 2000; Gaub & Carlson, 1996; Schmitz et al., 2002; Todd et al., 2002).
1.7.2 Sex Differences in the General Population

Tamm and Gaub (1997) examined sex differences in children with disruptive behaviour disorders and found that, of those diagnosed by teacher ratings with the combined subtype of AD/HD, boys showed higher ratings of aggression and were more impaired in their symptom severity than girls. Similar results were found by others (Gomez, Harvey, Quick, Scharer, & Harris, 1999). While Disney, Elkins, McGue, and Iacono (1999) failed to find gender differences in their sample, there was some suggestion that girls with AD/HD would be at higher risk for substance abuse than boys. Levy, Hay, Bennett, and McStephen (2004) studied gender differences in AD/HD subtypes. Results indicated that boys were more frequently diagnosed with Conduct Disorder (CD) and Opposition Defiant Disorder (ODD), whereas Separation Anxiety Disorder (SAD) was more common in girls. Further SAD was higher in girls with the inattentive subtype, and Generalized Anxiety Disorder (GAD) was more often found in girls with the combined subtype of AD/HD. Prout (2000) examined neuropsychological differences in children with AD/HD and reported that boys and girls were more similar than different on response inhibition and processing speed, but females had weaker visuospatial skills than males. Willcutt and Pennington (2000) investigated differences in gender and subtype in regard to reading disabilities (RD). While no association between the inattentive subtype and RD was found for both girls and boys, RD was significantly more common in boys than girls of the hyperactive/impulsive subtype of AD/HD. The ADORE study group (Novik et al., 2006) examined the influence of gender on AD/HD in Europe and while no differences among boys and girls were found in respect to comorbid psychiatric conditions and physical health problems, a significantly higher occurrence of emotional symptoms, more pro-social behaviour and a greater likelihood of being a victim of bullying were observed for girls than boys. Despite the empirical support for the existence of gender differences in the non-referred population, there are studies which did not find significant variations among boys and girls.
1.7.3 Sex Differences in the Clinic Population

Lumley, McNeil, Herschell, and Bahl (2002) examined gender differences in disruptive behaviour disorders among 149 children referred to an outpatient clinic. While there was no significant variation in the prevalence of AD/HD boys and girls, more males than females were diagnosed with 2 or 3 comorbid disruptive behaviour disorders. In their sample of 127 clinic-referred children, Hartung et al. (2002) found boys and girls more similar than different regarding internalizing symptoms as well as cognitive and academic performances. Nonetheless, according to teacher reports, boys showed higher levels of inattention, hyperactivity and impulsivity than girls. Similarly, Gabel, Schmitz, and Fulker (1996) failed to find differences in hyperactive boys and girls in regard to internalizing and externalizing behaviour.

In contrast to findings suggesting that boys and girls with AD/HD are more similar than different, Biederman et al. (2002) found that girls had fewer comorbid diagnoses of learning disabilities, disruptive behaviour disorders, and major depression than boys. Additionally, AD/HD girls had fewer problems in school and displayed more leisure interests than boys. On the other hand, girls were more intellectually impaired, showed more symptoms of inattention, received more comorbid diagnosis of panic disorder, and were at higher risk for substance use disorder than boys. Nonetheless, AD/HD girls received less medical or psychological treatment than did AD/HD boys. Newcorn et al. (2001) found AD/HD girls less impulsive than AD/HD boys. In addition they discovered that their female subjects with comorbid anxiety had lower levels of impulsivity than those girls without this condition, implying a different effect of comorbidity on AD/HD core symptoms in girls and boys. Sharp et al. (1999) generally did not find gender differences in their clinic-referred AD/HD sample in respect to
comorbidity. Psychiatric diagnoses and childhood AD/HD in their biological parents was equally represented, regardless of children’s sex. Nevertheless, girls were more reading impaired, showed more attention problems and had a higher proportion of siblings diagnosed with AD/HD than boys.

Overall, there are only a small number of studies examining gender differences in the prevalence of AD/HD, showing the issue is being neglected in the literature. Despite the general problem of identifying AD/HD in girls, the majority of studies provide evidence for the existence of gender differences in both population and clinical samples in terms of AD/HD symptomatology, internalizing/externalizing behaviour, and academic/cognitive functioning.

1.8 Summary

AD/HD has undergone considerable change in its conceptualisation and has now become a two dimensional disorder with three subtypes. AD/HD is one of the most common developmental disorders of childhood with an estimated prevalence ranging from 3-5%. Evidence to view AD/HD as a chronic disorder has been provided by developmental outcome together with developmental course studies, such as diagnostic retention, symptom trajectory and age of onset studies. Studies conducted into the subtypes of AD/HD have found differences other than hyperactivity between the predominantly inattentive and hyperactive/impulsive subtypes, and therefore suggested that the two subtypes should not be considered as subtypes of the same disorder. Further, it has been argued to whether the inattention found in the inattentive and combined subtypes of the disorder is the same, and if so, that the former should be regarded as a separate disorder. Although, there are problems with the identification of AD/HD in girls; research suggest the existence of sex differences in areas of behavioural symptomatology and academic/intellectual performances.
Recent research has focused on studying the aetiology of AD/HD. Studies conducted implied that the disorder is highly heritable and may be associated with neurobiological deficits in the cortical and subcortical regions that control attention and motor behaviour. However, a definitive mode of inheritance has not been established. The majority of family, twin, and adoption studies confirm the hypothesis of a familial transmission of AD/HD. However, the role of social-environmental factors in the development of AD/HD has received little investigative attention. While there is support in the literature about the existence of a relationship between AD/HD and family adversity it is uncertain whether family instability acts as a modifier in the course of the illness and contributes to maladjustment and dysfunctions in children with AD/HD. Therefore, the aim of this thesis is to extend the existing aetiological knowledge of AD/HD by evaluating the relationship between AD/HD and parental divorce. This will be done by examining both, possible effects of divorce on the psychological well-being of children with AD/HD in general; and on comorbidity, subtypes, age and gender in particular; and by investigating the effects of behavioural problems in these children on family functioning and marital status.

Within the following chapters of this thesis the literature into comorbidity in AD/HD will be reviewed. This will be done by discussing the most commonly comorbid conditions seen in children with AD/HD, including internalizing/externalizing disorders and learning disabilities. The occurrence of these co-occurring conditions will be investigated in this thesis when examining the relationship between parental divorce and the psychological well-being in children with AD/HD. Further, the divorce literature will be studied to allow an insight into the negative effects of parental divorce or separation on the psychological well-being in children and adolescents. Finally, other chronic childhood conditions will be discussed to identify a possible relationship between parental divorce and children who suffer from a severe chronic illness.
CHAPTER 2: COMORBIDITY
2.1 Introduction

In addition to the problems of inattention, impulsivity and hyperactivity, children with AD/HD are frequently diagnosed with other comorbid conditions. Conduct Disorder (CD) and Oppositional Defiant Disorder (ODD) are considered to be the most common comorbid diagnoses (August, Realmuto, MacDonald, Nugent, & Crosby, 1996; Loney & Milich, 1982; Souza, Serra, Mattos, & Franco, 2001); followed by affective disorders, such as Depression and Dysthymic Disorder (Bagwell, Molina, Kashdan, Pelham, & Hoza, 2006; Biederman, Faraone, Keenan, & Tsuang 1991; Blackman, Ostrander, & Herman, 2005; Byun et al., 2006; Souza et al., 2001). A high co-occurrence of anxiety disorders, including Generalized Anxiety Disorder (GAD), Separation Anxiety Disorder (SAD), Social Phobia and Specific Phobia have been found in children with AD/HD (Pliszka, 1992; Souza, Serra et al., 2001; Vance et al., 2002; Vance & Luk, 1998); and Learning Disabilities (LD) have been reported to frequently co-occur in individuals diagnosed with AD/HD (Decker, McIntosh, Kelly, Nicholls, & Dean, 2001; Kube, Petersen, & Palmer, 2002; Mc Cann & Roy-Byrne, 2000; Semrud-Clikeman et al., 1992).

Furthermore, the literature states that as many as two thirds of elementary school-age children, who have been referred for clinical evaluation for AD/HD, present with at least one additional psychiatric disorder (Nottelmann & Jensen, 1995). Essau, Groen, Conradt, Turbanisch, and Petermann (1999) reported a prevalence rate of 69.8% for at least one other psychiatric diagnosis, and more than one third (37.1%) presented with two comorbid disorders. Further, 51% of the children with AD/HD examined by Biederman et al. (1992) met criteria for one additional comorbid condition, whereas among adults, 77% were found to have at least one other psychiatric disorder. Souza et al. (2001) stated that 57% of their sample could have at least two diagnoses other than AD/HD.
2.2 Externalizing Disorders: Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD)

2.2.1 Diagnostic Criteria for ODD and CD

Disorders of conduct in children characterize a variety of disruptive behaviours, ranging from mild symptoms such as yelling or temper tantrums to more severe symptomatology including stealing, aggression or physical harm (McMahon & Wells, 1989). It has been argued in the literature that individuals who display anti-social conduct would not represent a homogeneous group and are distinguishable in regard to their behaviour (Hinshaw, Lahey, & Hart, 1993; Lahey, Loeber, Quay, Frick, & Grimm, 1992; Moffitt, 1993). Thus, there have been a number of approaches to classify and subtype children with disordered behaviour, and the DSM-IV (APA, 1994) describes two diagnostic categories that comprise disruptive behaviour: Oppositional Defiant Disorder and Conduct Disorder.

2.2.1.1 Diagnostic Criteria for ODD

The DSM-IV (APA, 1994) describes ODD as a childhood disorder consisting of oppositional behaviour towards family members and authority figures, displayed in form of disobedience, provocation, and negativity. Children with ODD often lose their temper and blame others for their own mistakes or misbehaviour. They repeatedly argue with adults or peers, refuse to comply with requests and disobey to rules of adults and authorities. Children with ODD often become angry and show resentful, spiteful or mean patterns of behaviour. A diagnosis of ODD can be made if an individual displays for a duration of at least six months a minimum of four symptoms out of a list of eight. These behaviours must have been presented more often than they usually occur in
children of comparable age and level of development. The presence of oppositional and defiant behaviour must lead to significant impairment in domains of social, academic, and occupational functioning. Further, if criteria for CD or Antisocial Personality Disorder are met, or the individual is over age of 18, a diagnosis of Oppositional Defiant Disorder cannot be made. However, if ODD co-occurs with AD/HD, a diagnosis for both conditions is required. The DSM-IV (APA, 1994) indicates a higher occurrence of ODD among boys than girls, and an onset of symptoms before the age of eight years and not later than early adolescence (APA, 1994).

2.2.1.2 Diagnostic Criteria for CD

The DSM-IV (APA, 1994) describes the disorder as a repetitive and persistent pattern of behaviour with the violation of basic rights of others or age-appropriate societal norms or rules. Typical conduct problems include aggression to people and animals, destruction of property, deceitfulness or theft, and the serious violations of rules. For a diagnosis of CD, individuals have to present at least three behaviour patterns out of a symptom list of 15 items, which must have been displayed in the past 12 months, and with a minimum of one being present during the past six months. Further, the behaviour shown by individuals must lead to significant impairments in regard to their social, academic or occupational performance. Finally, the DSM-IV indicates that a diagnosis of CD in individuals older than 18 years of age can only be made in the absence of Antisocial Personality Disorder. Conduct Disorder is categorized into three subtypes based on age of onset. The Childhood-Onset-Type describes individuals who display at least one criterion attributable to CD prior to the age of 10 years, whereas the Adolescence-Onset-Type describes individuals who did not exhibit any criterion characteristics prior to age 10 years. Further, if the age of onset of CD is unknown, the subtype Unspecified Onset is used. The DSM-IV also
provides criteria for the severity of the disorder, being mild, moderate, or severe; and indicates a higher occurrence of this condition among boys than girls (APA, 1994).

Subtyping CD based on the age of onset became necessary as studies have found complex developmental trends regarding certain forms and levels of aggression in individuals during childhood and adolescence (Lahey et al., 1998; Loeber & Hay, 1997; Loeber & Farrington, 1998). Further, with the use of the number of symptoms and their intensity, the DSM-IV provides better guidelines in assessing the severity of the disorder in clinical settings. However, the age of onset has been criticized by researchers for several reasons. Firstly, the age of onset criterion is solely based on one measurement, the absence or presence of a symptom before age 10 years (Loeber & Stouthamer-Loeber, 1998). Secondly, the ability of informants to recall the age of onset of symptoms is not reliable (Angold, Erkanli, Costello, & Rutter, 1996). Thirdly, evidence for the use of the new subtypes were found in research findings for boys (Lahey et al., 1998; Moffitt, 1993; Robins, Tipp, & McEvoy, 1991; Tolan & Thomas, 1995), but it lacks in empirical and prognostic support for girls (Hartung & Widiger, 1998; Loeber, Burke, Lahey, Winters, & Zera, 2000; Widiger, 1998).

2.2.2 Diagnostic Categories and Associated Prevalence Rates for CD/ODD

There is a verifiable overlap among these conditions as about 90% of children classified as having CD also meet criteria for ODD (Lahey et al., 1994) and of those diagnosed with ODD, 32% show symptoms of CD (Biederman et al., 1996). However, estimated prevalence rates for CD and ODD vary widely. These differences are largely due to changes in diagnostic criteria, the nature of the population studied, and the use of different sources of information to measure disruptive behaviour in children and adolescents.
Lahey et al. (1990) compared prevalence rates in the general population using DSM-III and DSM-III-R diagnostic criteria. Findings indicated that DSM-III-R ODD was 25.5% and CD 44.3% less prevalent compared to their DSM III counterparts. Breton et al. (1999) investigated the prevalence of DSM-III-R mental health disorders in Quebec using a sample of 2400 children, aged 6 to 14 years. In respect to different informants (parents, teachers, adolescents) rates ranged from 0.7% to 5.8% for ODD, and 0.2% to 2.3% for CD. Studies conducted to measure prevalence rates based on DSM-IV criteria have found a somewhat higher occurrence for disruptive disorders. Ersan, Dogan, Dogan, and Sumer (2004) reported a prevalence of 11.5% for ODD in a Turkish sample of 1425 children, 6 to 15 years old, and an even higher rate of 20% was found by Simmel, Brooks, Barth, and Hinshaw (2001) in a non-clinical sample of 808 adopted children and youth, aged 4-18 years. Further, in their national comorbidity survey replication, Nock, Kazdin, Hiripi, and Kessler (2006) identified 9.5% of individuals in their sample (N = 3199) meeting diagnostic criteria for CD. A similar rate was found by Stahl and Clarizio (1999).

### 2.2.3 ODD Versus CD – A Continuum of a Single Disorder?

Loeber (1988) and Loeber, Keenan, Lahey, Green, and Thomas (1993) suggested a developmental course from ODD to CD with increasing age. Therefore, ODD is regarded as an antecedent to CD as many children with ODD later develop CD (Loeber, Burke, Lahey, Winters, & Zera, 2000; Spivack, Marcus, & Swift, 1986). Further, CD is regarded as a precursor to Antisocial Personality Disorder (APD) (Frick, 1998; Loeber, et al., 2000; Loeber, Lahey, & Thomas, 1991). Loeber, Green, and Lahey (2001) found that among 7 to 12 year old boys with CD, 69% already exhibited 3 or even more symptoms of APD. In addition, an early onset of CD in children is often associated with preceding symptoms of ODD (Lahey, Loeber, Quay, Frick, & Grimm, 1997; Loeber, Lahey, & Thomas, 1991). Finally, it has been argued that ODD
represents a milder form of CD, and that both disorders are related to the same risk factors and forms of impairment (Achenbach, 1993; Lahey, Loeber, Frick, Quay, & Grimm, 1992; Loeber, Green, Kennan, & Lahey, 1995).

Despite this overlap, these two conditions are regarded as separate disorders. Firstly, many young individuals with ODD never develop CD. Biederman et al. (1996) identified two subtypes of ODD, one that is precursory to CD and another that does not proceed into CD with increasing age, suggesting that not all children with ODD will consequently develop CD. Additional empirical support that not all individuals diagnosed with ODD will go on to meet criteria for CD, has been provided by others (Loeber, Keenan, Lahey, Green, & Thomas, 1993; Russo, Loeber, Lahey, & Keenan, 1994). Secondly, a late onset of CD in adolescence seems to be independent of ODD, consequently not all individuals who receive a diagnosis of CD in adolescence have experienced ODD in the past (Lahey, Loeber, Quay, Frick, & Grimm, 1992; Lahey et al., 1997). Thirdly, symptoms of ODD are regarded to be less severe than those of CD (Loeber, Lahey, & Thomas, 1991). Therefore, regardless of their similarities, these conditions have to be seen as two distinct disorders and the implementation of a differential diagnosis for these disruptive behaviours is essential.

2.2.4 AD/HD and CD/ODD – Diagnostic Correlates and Associated Prevalence Rates

Disruptive behaviour disorders such as CD and ODD are considered to be the most common co-occurring conditions in individuals diagnosed with AD/HD (August, Realmuto, MacDonald, Nugent, & Crosby, 1996; Souza, Serra, Mattos, & Franco, 2001). Therefore, besides their AD/HD symptomatology children’s behaviour is often accompanied by oppositional, defiant and hostile patterns of conduct. The highest rates of comorbidity were found in a study carried out in Puerto Rico by Bird, Gould, and Staghezza (1993) with 93% of children diagnosed with DSM-III attention deficit disorder
had comorbid CD or ODD. Relatively high rates were also reported by Offord, Boyle, and Racine (1989) who identified 42.7% of a group of hyperactive children who met DSM-III criteria for CD. Further, August et al. (1996), using DSM-III-R criteria, obtained rates of comorbidity of 12% for CD and 32% for ODD among children diagnosed with AD/HD. Biederman et al. (1996) found 65% of their children with AD/HD being comorbid with ODD and 22% with CD. The frequency of comorbid conditions among children with AD/HD based on DSM-IV criteria ranges from 26% to 40% for CD (Possa, Spanemberg, & Guardiola, 2005; Rohde et al., 1999) and from 14% to 52% for ODD (Byun et al., 2006; Ersan, Dogan, Dogan, & Sumer, 2004; Possa et al., 2005; Rohde et al., 1999).

These relatively high variations in prevalence rates of comorbid CD and ODD in the AD/HD population is mainly the result of changes in diagnostic criteria and differences in the approach to diagnosis. While some investigators support a categorical approach were psychiatric diseases are identified by a set of discrete diagnostic criteria, others favour the dimensional approach, were psychopathologic symptoms are defined as significant variation from normal behaviour (Biederman, Faraone, & Lapey, 1992). As mentioned above (chapter 2.2.2), differences in prevalence rates may also result from variations in sample and informant source.

2.2.5 AD/HD Versus CD/ODD – Homogenous Disorders?

Despite the fact that AD/HD often co-occurs with CD and ODD, there is a considerable debate among researcher as to whether these conditions are similar disorders or distinct entities. There is empirical support that many children with AD/HD do not meet criteria for CD or ODD, and aggressive or oppositional individuals do not necessarily receive a diagnosis of AD/HD. However, as prevalence rates show, these conditions do occur together in a substantial number of youths (Reeves, Werry, Elkind, & Zametkin, 1987; Szatmari, Boyle, & Offord, 1989). The literature implies that AD/HD
can be seen as a predictor of future development of ODD (Biederman, Munier, & Knee, 1987; Loeber & Dishion, 1983), and there is evidence that AD/HD acts as a precursor of CD (Gittelman-Klein, Mannuzza, Shenker, & Bongarua, 1985). In addition, an early rather than a late onset of CD was found to be associated with a diagnosis of AD/HD (Farrington, Loeber, & van Kammen, 1990). This finding is important as an early onset of conduct problems is associated with persistence of symptoms into adolescence and adulthood (Loeber, 1982; Loeber, Green, Keenan, & Lahey, 1995). Therefore it is essential to find out more about factors related to early and late onset of CD and how these three disorders affect each other. There are two central positions regarding the relationship of AD/HD and disruptive behavioural disorders: some researchers view AD/HD and CD/ODD as indistinguishable, while others believe that they are partially or completely independent (Biederman, Newcorn, & Sprich, 1991).

Proponents of the "indistinguishable" position demonstrate similarities between children with AD/HD and those with CD/ODD. Several studies found no differences among hyperactive children with and without comorbid disruptive disorders on measures of cognitive tasks (Oosterlaan, Logan, & Sergeant, 1998; Schachar & Tannock, 1995). Oosterlaan and Sergeant (1998) found equal deficiencies in response inhibition on the stop task among children with AD/HD and those diagnosed with CD. Further, neuroanatomical studies showed that similar brain regions, such as the frontal lobe, are involved in the aetiology of these disorders (Bradley & Golden, 2001; Golden, Jackson, Peterson-Rohne, & Gontkovsky, 1996; Raine, Stoddard, Bihtle, & Buchsbaum, 1998; Spencer, Biederman, Wilens, & Faraone, 2002). Studies of neurochemistry demonstrated an overlap of the neurotransmitter serotonin in the cause of AD/HD and CD/ODD (Comings et al., 2000; Moffitt et al. 1998; Unis et al., 1997).

Support for the "independent" position has been derived from twin and family genetic studies. Dick, Viken, Kaprio, Pulkkinen, and Rose (2005) investigated genetic and environmental influences on AD/HD, ODD and CD in a Finnish twins sample and suggested a shared genetic influence among these disorders. However, all three
profiles were influenced to a certain degree by unique genetic factors, and the authors failed to find significant shared environmental effects. An adoption study carried out by Cadoret and Stewart (1991) supported the role of genetic factors in AD/HD, suggesting that adoptive children with AD/HD had a history of criminality and delinquency in their biological parents. In contrast, aggression was related to family environmental factors and psychiatric problems in adoptive parents. Family studies have found a somewhat stronger association between childhood CD/ODD than AD/HD and parental antisocial behaviour, alcohol dependency (August, Stewart, & Holmes, 1983; Biederman, Faraone, Keenan, Knee, & Tsuang, 1990; Stewart, DeBlois, & Cummings, 1980), and other family environmental factors such as low socioeconomic status, poor parenting, or family conflict (August, Realmuto, MacDonald, Nugent, & Crosby, 1996; Barkley, Fischer, Edelbrock, & Smallish, 1991; Lahey et al. 1988).

In summary, the bulk of research indicates that AD/HD and CD/ODD are at least partially independent entities. While there is evidence of a strong genetic component in the aetiology of AD/HD; CD and ODD are considered as having their origin in lower socioeconomic status and greater family dysfunction, justifying a separate classification of these conditions. However, AD/HD may be biased by environmental factors and poor psychosocial conditions, and on the other hand, a genetic contribution in the cause and course of ODD or CD cannot completely be ruled out. Although the risk factors for these conditions may be distinct, in some cases they can interact with each other and lead to deterioration.
2.3 Internalizing Disorders: Anxiety Disorders and Depression

2.3.1 Diagnostic Criteria for Anxiety Disorders

There is considerable confusion about the definition and meaning of anxiety in the literature, as several terms to describe the phenomenon are used, such as “fear”, “clinical fear”, “avoidance behaviour”, “avoidance reaction”, “anxiety”, “anxiety state”, or “phobia” (Barrios & O’Dell, 1989). However, overall, the foundation of these terms is based on the concept of fear. Fear can be defined through three types of reactions towards a feared stimulus: a) motor reactions, such as avoidance or escape; b) subjective reactions, such as reports of discomfort or distress; c) physiological reactions, such as increased heart rate, sweating or fast breathing (Marks, 1969; Morris & Kratochwill, 1983). In accordance with empirical research on childhood anxiety, the American Psychiatric Association (APA, 1994) in their fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) established diagnostic categories for both, anxiety disorders that were solely found to occur in children or adolescents and those appearing throughout the lifespan. However, only those conditions with an onset in childhood/adolescence and most commonly found in individuals with AD/HD will be discussed in this chapter.

2.3.1.1 Separation Anxiety Disorder (SAD)

Within the DSM-IV (APA, 1994), Separation Anxiety Disorder (SAD) is characterized by an unrealistic and excessive fear of separation from an attachment figure (mostly parents), from home or familiar surroundings, and by the avoidance of situations involving separation. When separation occurs, children usually present with physical complaints, such as stomach aches, headaches, nausea or vomiting.
However, cardiovascular symptoms, e.g. feelings of dizziness, faintness or palpitations are more common among adolescents than children. After separation, young individuals often have morbid fears that an accident or illness could occur to their parents or themselves, and they will never be reunited with their relatives. For a diagnosis of SAD, an individual has to exhibit at least three symptoms out of a list of eight, and the disturbance has to be present for at least four weeks. SAD has an onset before age 18 years but can have an onset as early as preschool age. The condition should not be due to a Pervasive Developmental Disorder, Schizophrenia or other psychotic disorders. The disturbance has to cause clinically significant distress or impairment in academic, social or other domains of functioning (APA, 1994).

2.3.1.2 Social Phobia

A diagnosis of Social Phobia can be made if an individual displays a persistent and irrational fear of one or more social or performance situations in which the person is confronted with possible examination by others, which in turn causes fear of acting in a way that may result in humiliation or embarrassment (APA, 1994). Typical examples are speaking or performing in public, the use of public lavatories, eating in public, or writing in front of others. The exposure to such feared situations provokes anxiety and individuals develop a strong desire to avoid such situations. The disturbance must cause significant distress and impairment in domains of social, academic, or occupational functioning, and must be present in individuals under 18 years for at least 6 months. The phobic person has to be aware that the fear experienced is excessive or unreasonable in nature; however, this feature may be absent in children. Social Phobia cannot be diagnosed if the fear or avoidance is due to physiological effects of a substance, a general medical condition, or another mental disorder. In the presence of a general medical condition or another mental disorder, the fear must be unrelated to it.
The DSM-IV also specifies a generalized subtype if the fears include most social situations.

2.3.1.3 Specific Phobia

The DSM-IV (APA, 1994) characterizes Specific Phobia, previously Simple Phobia (APA, 1986) as a persistent and irrational fear of an object or situation (e.g. heights, animals, flying, exposure to blood). The phobic person recognizes that the fear is unreasonable or excessive; however, this feature may not be present in children. The exposure to the phobic stimulus leads to an immediate anxiety response, resulting in the avoidance of phobic situations and objects. The disturbance interferes significantly with an individual's daily routine, academic, social, and occupational functioning; and there is marked distress about the occurrence of the phobia. In individuals under 18 years of age, the fear must be present for at least six months. When an individual suddenly experiences a phobic situation or object, symptoms of anxiety and fear may be very similar to those of a Panic Attack or another anxiety disorder; however, the fear or phobic avoidance associated with the specific stimulus must not be due to another mental disorder. Within the DSM-IV, the previous term Simple Phobia was changed to Specific Phobia (APA, 1994), and had undergone further subtyping. There are five subtypes to specify a certain type of Phobia: Animal Type, Natural Environment Type (e.g. heights, storms, water), Blood-Injection-Injury Type, Situational Type (e.g. airplanes, elevators, enclosed places), and Other Type (e.g. fear of choking, vomiting, fear of loud sounds or costumed persons). Impairment might be minor as long as phobic objects are rare or can be easily avoided. However, if this is not possible, an individual's life may become considerably affected. Age of onset for Simple Phobia varies, but animal phobias almost always begin in childhood. While most phobias with an onset in childhood remit without treatment, those that continue into adulthood rarely disappear without treatment.
2.3.1.4 Generalized Anxiety Disorder (GAD)

According to the DSM-IV (APA, 1994), an individual has to display an excessive anxiety and worry about a number of events or activities to validate a diagnoses of Generalized Anxiety Disorder (GAD). Further, the disturbance must be present for the past six month and be associated with at least three symptoms (only one in children) out of a list of six, with at least some symptoms present for more days than not. An individual has to find it difficult to control the worry and the anxiety or physical symptoms must cause significant distress or impairment in social, occupational or other important domains. The disturbance is not due to the direct physiological effects of a substance or a general medial condition, does not occur exclusively during a Mood, Psychotic, or Pervasive Developmental Disorder, and is not restricted to features of an Axis I disorder.

2.3.2 Diagnostic Criteria for Depression

Research on childhood depression began to emerge in the early 1970s. Prior to that, depression was considered to exist only in adults, and was not regarded as a clinical disorder in childhood (Kazdin, 1989). This was mainly due to the psychoanalytic view that depression resulted from aggression directed to oneself (Rochlin, 1965), from conflict that produces guilt (Beres, 1966), and from low self-esteem caused by an incongruence between the real and ideal self (Rie, 1966). These beliefs postulated that depression depends on a well-developed superego, which was assumed not to be established until adolescence, and therefore the existence of depression in childhood was negated. Investigations in the early 70s acknowledged that depression can be present in children and was defined as “masked depression” or “depressive equivalents”, implying that childhood depression would result secondarily from other problem behaviours, such as temper tantrums, hyperactivity, delinquency, somatic
complaints, phobias, separation anxiety, and underachievement (Cytryn & McKnew, 1972, 1974; Glaser 1968; Kovacs & Beck, 1977; Malmquist, 1977). Despite the revolutionary idea that depression can exist in children and the importance of a different manifestation compared to depression in adulthood, the definition of a masked disorder involved problems in operationalisation, as to whether a specific symptom would or would not represent a sign of depression (Kazdin, 1989). Others argued that depressive equivalents should not be regarded as a clinical disorder as they are subject to developmental stages, which occur over the course of childhood and diminish over time (Lapouse, 1966; Lefkowitz, 1980; Werry & Quay, 1971). The notion that the expression of masked symptoms may vary as a function of age in children encouraged empirical research to further investigate the developmental course of these symptoms. Numerous investigations followed to study affective disorders in children and adolescents, and evidence was provided that depressive disorders do occur during childhood and adolescence (Carlson & Strober, 1978; Costello, 1989; Kovacs & Beck, 1977; McGee, Feehan, Williams, & Anderson, 1992; Poznanski & Zrull, 1970, Rutter, Schaffer, & Shepherd, 1975; Weinberg, Rutman, Sullivan, Penick, & Dietz, 1973). Thereafter, diagnostic criteria for affective disorders based on presenting symptoms and descriptive features of other disorders have been established and revised in the development of the DSM (APA, 1980, 1986, 1994)

In this chapter only those conditions which are most commonly found in children and adolescents with AD/HD will be discussed.

2.3.2.1 Major Depressive Episode and Major Depressive Disorder (MDD)

A Major Depressive Episode is diagnosed if an individual displays at least five items out of a symptom list of nine. These symptoms have to be present for 2 weeks and must represent a change from previous functioning. At least one of these nine symptoms had to be either a) depressed mood or b) loss of interest or pleasure. The
symptoms should not meet diagnostic criteria for a mixed episode and must cause significant distress or impaired social, occupational functioning. The symptoms are not attributable to the physiological effects of substance abuse or a general medical condition.

The DSM-IV (APA, 1994) provides diagnostic criteria for two types of Major Depressive Disorder (MDD). While the presence of a single Major Depressive Episode is necessary to meet diagnostic criteria for MDD-Single Episode, to warrant a diagnosis of MDD-Recurrent, at least two separate Major Depressive Episodes have to be present. There must be an interval of at least two months between these episodes in which criteria for a Major Depressive Episode are not met. The DSM-IV further lists criteria that apply to both types of MDD. A diagnosis of MDD can only be made in the absence of a manic, mixed or hypomanic episode, and the Major Depressive Episode is unrelated to Schizoaffective Disorder and is not superimposed by another Psychotic Disorder. If full diagnostic criteria for a Major Depressive Episode is met, specifiers need to be use to describe its clinical status. However, if the criteria for a Major Depressive Episode are not fully met, the clinical status of the Major Depressive Disorder has to be specified (APA, 1994).

2.3.2.2. Dysthymic Disorder

A diagnosis of Dysthymic Disorder can be made if a person does not fully meet criteria for a Major Depressive Episode, due to insufficient severity and duration of a chronic disturbance of mood. According to the DSM-IV (APA, 1994), Dysthymic Disorder is diagnosed if an individual displays depressed mood for most of the day, for more days than not, and for a duration of at least two years (at least one year for children and adolescents). While depressed, an individual has to exhibit at least two symptoms out of an item list of six. During the two-year period, the person has never been without these symptoms and depressed mood for more than two months at a
time. The disturbance causes significant distress or impairment in domains of social, occupational or other areas of functioning. Dysthymic Disorder is diagnosed in the absence of a manic, mixed, or hypomanic episode, and when criteria for Cyclothymic Disorder are not met. The disturbance must not occur during the course of a chronic Psychotic Disorder and is not due to physiological effects of a substance or a general medical condition. Dysthymic Disorder can have an early onset if the symptoms develop before the age of 21, and a late onset if at age 21 or afterwards, and can further be specified by atypical features.

2.3.3 Diagnostic Categories and Associated Prevalence Rates for Anxiety Disorders and Depression

There is a dilemma in estimating prevalence rates for anxiety and depression which is mainly due to the nature of the symptoms displayed by individuals. These internalizing conditions, compared to AD/HD and disruptive behaviour disorders, consist of predominantly covert behaviour patterns, which are more difficult to observe and measure with methodological instruments (Pliszka, 1998, 2000). Many children who report themselves as being anxious are not described as such by their parents, suggesting that parents may be oblivious of their child’s symptoms (McGee et al., 1990; Pliszka, 1992). Moreover, a major problem with the use of various rating scales for anxiety and depression is that these conditions share common symptoms, which for example the Child Behaviour Checklist taps by identifying a single syndrome called anxious/depressed. Consequently these assessment instruments are lacking in differentiating symptoms specifically for anxiety and depression, which is necessary in terms of diagnoses, as the DSM-IV (APA, 1994) categorizes anxiety and depression into two separate entities for both adults and children. Therefore, the use of shared symptoms on rating scales to assess anxiety and depression is questionable (Brady & Kendall, 1992). Given these issues, together with the use of single/multiple informants,
different diagnostic instruments, sample source (referred, non-referred), study design (longitudinal, cross-sectional), and the changes in diagnostic criteria throughout the DSM, it is not surprising that the literature contains highly discrepant prevalence rates for internalizing disorders found in children and adolescents.

Based on DSM-III criteria, Costello et al. (1988) and Costello (1989) studied the prevalence of childhood psychiatric disorders in 7 to 11 year old children from primary care paediatric clinics, using data retrieved from parent or child self-reports. Results indicate a prevalence of 21.7% for anxiety disorders and 2.5% for depressive disorders. The most commonly-found conditions included Simple Phobia (9.2%), Overanxious Disorder (4.6%) and Separation Anxiety Disorder (4.1%). While Major Depressive Episodes (3.1%) and Dysthymia (1.1%) were less common, the authors found the highest rates of comorbidity among adolescents diagnosed with depressive disorders. Almost two-thirds of those presented with a coexisting disorder.

Breton et al. (1999) examined informant parallelism regarding the prevalence of mental health disorders, based on the Quebec Child Mental Health Survey. The sample consisted of 2,400 children, 6 to 14 years old, and data were derived from children and their parents. Rates varied consistently according to informant source. While parents reported higher prevalence for Simple Phobia (parents: 11.5%, children: 4.9%) and Overanxious/Generalized Anxiety Disorder (parents: 3.8%, children: 3.1%), and lower rates for Separation Anxiety Disorder (parents: 1.6%, children: 2.6%), children reported higher rates for depressive disorders than did their parents (parents: 1.7%, children: 3.4%).

In their longitudinal community based sample (N = 1,420), Costello, Mustillo, Erkanli, Keeler, and Angold (2003) assessed annually 9-13 year old schoolchildren until they reached age 16 years, to examine prevalence and development of psychiatric disorders in childhood and adolescence. While the occurrence of any anxiety disorder was highest in 9-10 year olds (4.6%) and dropped to 1.6% by the age of 16; the prevalence of any depressive disorder increased from 0.5% to 3.1% over that time.
In contrast, McGee, Feehan, Williams, and Anderson (1992) reported an increase of anxiety disorders in children between ages 11 and 15 years (6.5% to 11.3%), and suggested a rise in worries and fears over time. However, in line are their findings that the prevalence of Major Depressive Episode increased as a function of age (0.5% to 2.5%), and while Depression at age 11 was found to be more common among boys, by age 15 higher rates were observed among adolescent girls. However, Dysthymia did not appear to increase significantly over time, suggesting that there is less empirical support for a construct of Major Depressive Episode in childhood. This is consistent with other findings implying that Dysthymia occurs more frequently during childhood, whereas Depression is more commonly observed among adolescents or adults (West, Sweeting, Der, Barton, & Lucas, 2003).

2.3.4. The Relationship of Anxiety and Depression - Differences and Similarities

Despite the consistency in the literature about the existence of anxiety and depressive disorders in children and adolescence, there is a substantial debate on whether these conditions represent a single broad disorder or multiple narrow disorders, as they frequently co-occur and are seldom found to exist in their pure form (Ollendick, Shortt, & Sander, 2005; Seligman & Ollendick, 1998). In clinical populations, any anxiety disorder is found to be highly comorbid with another anxiety disorder (Caron & Rutter, 1991; Kendal, Brady, & Verduin, 2001), and children and adolescents diagnosed with an anxiety disorder frequently exhibit high rates of depression. Comorbidity rates in children with anxiety and comorbid depression range from 15% to 20%, whereas rates for children with depression and comorbid anxiety range from 25% to 50%, suggesting that it is more common for depressed children to display anxious symptoms than for anxious children to exhibit depression (Ollendick, Shortt, & Sander, 2005). However, others have not found a coexistence of anxiety and...
affective disorders in the same individual (Hershberg, Carlson, Cantwell, & Strober, 1982).

Regarding this overlap of anxiety and depressive disorders, investigations aimed to explain the relationship of these conditions. The literature shows that these entities can be distinguished in regard to descriptive and developmental factors, but also provides support for a temporal relationship between anxiety and depression. Stavvakaki, Vargo, Boodoosingh, and Roberts (1987) studied anxious and depressed children and found that those with depression were older and had been hospitalized more frequently than anxious children. Similar results were found by Hershberg et al. (1982). However, these studies only examined children who had either disorder, but did not include a sample who presented with both conditions. Other studies have shown that children with overlapping anxiety and depression were older than children diagnosed with an anxiety disorder alone (Strauss, Last, Hersen, & Kazdin, 1988; Strauss, Lease, Last, & Francis, 1988). Further, Kovacs et al. (1994, 1989) studied depressed children and found that those with comorbid anxiety had an earlier onset of symptoms of depression, compared to children without a co-diagnosis of anxiety. The authors also found that the anxiety disorder was present prior to the onset of depression, suggesting that anxious children may become depressed as adolescents, a significant finding which has been supported by others (Angold, Costello, & Workman, 1998; McGee, Feehan, Williams, & Anderson, 1992; Strauss et al., 1988).

Silberg, Rutter, and Eaves (2001) studied the role of genetic and environmental factors in the association between depression and Overanxious Disorder (OAD), Simple Phobia, and Separation Anxiety Disorder (SAD) in 8-13 year and 14-17 year old girls. Findings suggest that the genetic risk to depression in girls older than 14 years was associated with earlier symptoms of OAD and Simple Phobia, and the shared environmental risk to depression in middle to late adolescence was related to persistent symptoms of SAD and concurrent OAD. Finally, shared environmental factors specific to depression in early adolescence were found to influence the risk to
SAD before age 14 and Simple Phobia after age 14. These results demonstrate distinct aetiological patterns for these conditions and suggest different developmental pathways to depression in girls after age 14. A longitudinal twin study conducted by Boomsma, Koopmans, and Dolan (1997) examined anxiety, neuroticism and depression in adolescents and young adults, and suggested shared genetic factors in the existence of these conditions. Further evidence for a heritable genetic risk for both disorders has been provided by others (Eley & Stevenson, 1999; Thapar & McGuffin, 1995; Weissman et al., 1987).

In summary, on the basis of empirical research, there is a meaningful relationship between anxiety and depressive disorders in children and adolescents. The literature suggests a temporal relationship between these two conditions, with an earlier onset of anxious than depressive symptoms in individuals, suggesting that anxiety can lead to depression. Similarities between the two disorders can be drawn from family-genetic and twin studies, providing evidence of shared genetic and environmental factors. Despite the similarities found among these entities there is evidence that the two conditions are separate disorders and are distinguishable from each other.

2.3.5 AD/HD and Anxiety/Depression – Diagnostic Correlates and Associated Prevalence Rates

Epidemiological and clinically referred samples have shown high levels of comorbidity between AD/HD and anxiety and affective disorders. The prevalence of AD/HD and comorbid anxiety disorders range from 30% to 40%, suggesting that children with AD/HD are likely to present with one or more comorbid anxiety disorder (Lahey, Schaugency, Hynd, Carlson, & Nieves, 1987; Munir, Biederman, & Knee, 1987; Souza, Serra, Mattos, & Franco, 2001). Further, 15% to 30% of children diagnosed with anxiety disorders are found to meet diagnostic criteria for AD/HD (Byun
et al., 2006; Last, Perrin, Hersen, & Kazdin, 1992; Last, Strauss, & Francis 1987). In addition, AD/HD and mood disorders have been found to occur together in 15% to 75% of cases in both, clinical and epidemiological trials (Biederman, Newcorn, & Sprich, 1991; Byun et al., 2006; Jenson, Burke, & Garfinkel, 1988; Woolston et al., 1989). Staton and Brumback (1981) reported that 75% of hyperactive children in their sample met criteria for depression, and 55% of those with depression met criteria for hyperactivity.

The discrepancies in prevalence rates of comorbidity in children and adolescents with AD/HD and internalizing disorders are primarily due to methodological factors. As described in chapter 2.3.3 differences are attributable to problems regarding the nature of the symptoms displayed, the reliability of different informant sources, the discriminant validity of instruments, the nature of the sample, and the study design used to examine anxiety and depressive disorders in individuals. Therefore, identification criteria, involving multiple assessment methods and informant sources are necessary to increase diagnostic accuracy for internalizing disorders in children and adolescents.

The most common comorbid anxiety disorders found in children with AD/HD are Generalized Anxiety Disorder (GAD), Separation Anxiety Disorder (SAD), Social Phobia and Specific Phobia (Souza, Serra, Mattos, & Franco; 2001; Vance et al., 2002). Suzuki (2005) investigated anxiety disorders among children with AD/HD aged 6 to 11 years in Osaka, Japan using the Japanese version of the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (KSADS - PL-J). Results suggest a 30% comorbidity rate for Specific Phobia, 10% for Generalized Anxiety Disorder, and 5% for Separation Anxiety Disorder. Souza et al. (2001) examined comorbid conditions in 34 children and adolescents diagnosed with AD/HD, aged 6 to 16 years. Anxiety disorders, including GAD, SAD, Social and Specific Phobia were seen in approximately 35% of the sample. Moreover, other anxiety disorders have been found to co-occur with AD/HD, such as Obsessive
Compulsive Disorder (OCD) and Post Traumatic Stress Disorder (PTSD) (Spencer, Biederman, & Wilens, 1999; Suzuki, 2005). When examining the occurrence of mood disorders in individuals with AD/HD, Blackman, Ostrander, and Herman (2005) evaluated the prevalence of Depression in 7,231 school children, grade 1-4. Findings indicated that the condition co-existed in 9% of their children diagnosed with AD/HD. Similar rates were found by others (Bagwell, Molina, Kashdan, Pelham, & Hoza, 2006; Souza et al., 2001).

2.3.6 The Relationship of AD/HD and Anxiety/Depression – Differences and Similarities

The high levels of comorbid AD/HD and internalizing disorders led to speculation whether some children with an underlying depressive disorder received a misdiagnosis of AD/HD (Brumback, 1988), and whether the presence of anxiety may represent a different AD/HD subtype (Pliszka, 1989). Some investigators hold the view that symptoms of depression found in children with AD/HD may be secondary, resulting from persistent malfunctioning and demoralization related to AD/HD (Weiss & Trokenberg-Hechtman, 1993), while others have concluded that some children may have a primary anxiety disorder that leads to secondary inattentiveness (Pliszka, 1989). Despite these discrepancies, there is agreement among researchers that the co-occurrence of anxious/depressive symptoms and hyperactivity in the same individual may result in poor long-term prognosis, including psychopathology, problems in interpersonal and family functioning (Biederman et al., 1996; Brumback, 1988), and increased mortality (Brent et al., 1988). Thus, studies have been carried out to explain the overlap of comorbid internalizing disorders in AD/HD by investigating differences and similarities among these conditions.
2.3.6.1 Family Genetic Studies

It has been argued in the literature that AD/HD and affective disorders may share common familial vulnerabilities. A family genetic study conducted by Biederman Faraone, Keenan, and Tsuang (1991) indicated that the risk for AD/HD in relatives of children with AD/HD and comorbid Major Depressive Disorder (MDD) did not differ from those with AD/HD alone; neither did the risk for MDD in relatives of children with AD/HD and comorbid MDD from those with AD/HD alone, suggesting AD/HD and MDD may share common familial etiologic factors, and that non-familial environmental influences may be responsible for the presence or absence of comorbidity. Another investigation by Biederman, Faraone, Keenan, Steingard, and Tsuang (1991) showed that the risk for anxiety disorders in relatives of children with AD/HD and comorbid anxiety was significantly higher than in relatives of children with AD/HD alone. The authors further could not ascertain a co-segregation between AD/HD and anxiety disorder within families, meaning that the two disorders occurred in different relatives (i.e., an uncle with AD/HD, cousin with MDD), and concluded that the two disorders may transmit independently in families. Biederman et al. (1992) further studied familial risk factors regarding AD/HD and comorbid anxiety and depression in children with AD/HD and their first-degree biological parents. Results indicated that AD/HD and mood disorders might share common familial vulnerabilities, whereas AD/HD and anxiety disorders are more likely to be transmitted independently in families.

2.3.6.2 Differences in Phenotype and Associated Difficulties

Some recent investigations hypothesised that anxiety may inhibit impulsivity but impact more adversely on attentional tasks (Brown, 2000; Pliszka, Carlson, & Swanson, 1999). Pliszka (1992) examined performance differences on the CPT between children with AD/HD and comorbid overanxious disorder and children
diagnosed with AD/HD only. The comorbid group was found to display less impulsive and hyperactive behaviour and to have longer reaction times than the pure AD/HD group. Further, Manassis, Tannock, and Barbosa (2000) compared 18 children with AD/HD and anxiety to 15 subjects with AD/HD only, 15 patients with anxiety only, and 16 controls. Findings indicated that children with AD/HD and anxiety presented with better response inhibition on a stop task relative to the pure AD/HD group. These findings were supported by Tannock and Schachar (1995) who reported greater impairment of working memory in their AD/HD/anxious subjects relative to AD/HD-only children. In sum, the presence of anxiety in children with AD/HD seems to play a role in the inhibition of impulsive and hyperactive behaviour. However, it also impacts negatively on working memory and other cognitive performances. Further, neither Biederman et al. (1991) nor Tannock (2000) were able to distinguish children with and without anxiety in terms of learning disabilities, but found more social difficulties, more stressful events and more problems during pregnancy related to children with AD/HD and comorbid anxiety. Pliszka (1989) found children with AD/HD and comorbid anxiety to have lower levels of inattention/hyperactivity and to be less likely to meet criteria for CD, compared to children with AD/HD alone. In contrast, Biederman et al. (1991) did not find different rates of CD in children with AD/HD alone and AD/HD with anxiety disorders; and Tannock (2000) found higher rates of CD in their AD/HD/anxious subjects.

An attempt to differentiate hyperactive children from those with affective disorders was made by Biederman et al. (1992), who studied academic and cognitive functioning in children with AD/HD and comorbid depression. Results indicated that the comorbid group experienced more school placements than the AD/HD only group. However, the authors failed to find differences in regard to learning disabilities, repeated grades, need for tutoring or IQ levels between the two groups. Further, Biederman, Mick, & Faraone (1998) postulated that the remission of AD/HD symptoms, symptom severity and other associated features such as academic difficulties are not
related to the persistence or reduction of depression. This assumption highlights independent and distinct courses of AD/HD and depression, and identifies comorbid depression as a distinct entity and not as pure demoralization.

2.3.6.3 Age of Onset Studies

Some investigators studied demographic factors, such as the age of onset of anxiety and depressive symptoms, to differentiate AD/HD comorbid subgroups. Pliszka (1989, 1992) found children with AD/HD and co-existing anxiety were older than those with AD/HD alone. In their prospective follow-up study, Biederman et al. (1996) reported elevated rates of depressive symptoms with increasing age in children with AD/HD, and these findings are in accordance with case reports by Dvoredsky & Stewart (1981). Further support for a later onset of depressive than AD/HD symptoms were provided by others (Biederman, Faraone, Mick, & Lelon, 1995; Kovacs, Akiskal, Gatsonis, & Parrone (1994). In contrast, Bird et al. (1988) found depression more likely to be present in younger individuals with ADD. In summary, the majority of findings reported a later occurrence of anxious and depressive symptoms in individuals with AD/HD, supporting the hypothesis of independent courses of these conditions and their distinctiveness.

2.3.6.4 Family-environmental Risk Factors

Jensen, Shervette, Xenakis, and Richters (1993) examined the role of environmental and psychosocial family risk factors in children with AD/HD and comorbid anxiety/affective disorders. The authors found significantly increased stress levels in children of the comorbid group compared to the AD/HD only group. Mothers of children with AD/HD and anxiety/depression reported considerably more symptoms on the Hopkins Symptom checklist for themselves than did mothers of children with
AD/HD only. Biederman et al. (1995) found family and psychosocial adversity to be related to increased AD/HD core symptoms and the occurrence of comorbid anxiety and depression in children with AD/HD, suggesting that psychosocial and environmental factors would lead to more AD/HD severity and internalizing comorbidity. Biederman, Faraone, Keenan, Steingard, and Tsuang (1991) found higher rates of parental divorce and separation among families of children with AD/HD and comorbid anxiety (59%), relative to those with AD/HD alone (27%).

2.3.6.5 Summary

The literature reviewed shows that if not recognized and attended to, AD/HD and comorbid internalizing disorders may lead to morbidity, impairment and poor long-term prognosis, including an increased risk for suicide. While AD/HD and depression may share common familial vulnerabilities, anxiety disorders seem to be transmitted independently and may simply co-occur with AD/HD. Affective and anxious symptoms appear to have an onset later than AD/HD, and while comorbid anxiety has been reported to be associated with less hyperactivity/impulsivity in children with AD/HD, the persistence or absence of comorbid depression did not seem to impact on the severity of AD/HD symptoms or other related features. Family environmental factors have been found to contribute to internalizing problems in children with AD/HD. Overall; the literature provides evidence that anxiety and effective disorders are distinct entities. However, considering the prominent overlap between AD/HD and internalizing conditions, there is a need for clinicians to assess covert emotional problems in individuals with AD/HD rather than focusing on overt disruptive behaviour exclusively, as this may have important implications in regard to treatment and long-term prognosis for children and adolescents with AD/HD and co-occurring internalizing problems.
2.4 Learning Disabilities (LD)

2.4.1 Diagnostic Criteria for Learning Disabilities

There is a considerable debate among researchers to how Learning Disabilities (LD) should be defined, as the given definition has an impact on identification, treatment, and research. Several definitions of LD exist; however, the most utilized definition is that of the National Joint Committee on Learning Disabilities (Hammill, 1990): "Learning disabilities is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the life span" (NJCLD, 1987, p.1).

The DSM-IV (APA, 1994) provides diagnostic criteria for disorders involving specific academic skill, such as reading disorder, mathematics disorder, and disorder of written expression. The category "not otherwise specified" applies to disorders in learning that do not meet criteria for any specific learning disorder. The diagnostic criteria for each of the specific skill disorders require that given the chronological age, measured intelligence, and age-appropriate education, an individual’s actual achievement must be substantially below his/her expected achievement as determined by standardized ability tests. The disturbance also has to interfere with academic achievement or daily activities that require specific learning skills.

There are several definitional issues involved in the establishment of diagnostic criteria for LD. Firstly, there is a lack of acknowledgement in the current definition that learning disabilities strongly depend upon our expectations of children (Smith, 1985). Therefore, variations in requirements make it difficult to formulate a definition that is operationally specific and applicable worldwide (Ysseldyke & Algozzine, 1983).
Secondly, the current definition does not acknowledge individual differences within groups of learning-disabled children, nor does it take into account the importance of psychosocial, motivational and environmental factors on academic underachievement (Keogh, 1982). However, there is empirical support for the position that individuals differ in their severity of learning problems, cognitive deficits and coping skills (Taylor, 1989). Thus, further attempts to establish homogeneous subgroups of children with LD are necessary to advance assessment procedures, treatment and future research (Blashfield, 1993). Finally, a major problem consists in the use of IQ and achievement discrepancy criteria. While IQ test scores are useful in predicting cognitive power and difficulties, they are not necessarily effective in assessing learning aptitude, and it is further possible that the deficits that account for the learning problem may contribute to low IQ test scores (Taylor, 1988).

2.4.2 Diagnostic Categories and Associated Prevalence Rates for LD

Given the aforementioned deficiencies in the definition of LD it is not surprising that the literature contains highly discrepant prevalence rates for these conditions. The incidence of LD in the general population varies between 2% and 5% (Interagency Committee on Learning Disabilities, 1987) and 2% and 10% (APA, 1994). Shaywitz, Shaywitz, Fletcher, and Escobar (1990) found a 17.5% prevalence of Reading Disabilities (RD) in a sample of 445 non-referred children, and significantly higher rates have been reported among the clinical population (46.3%) (Shaywitz, Shaywitz, & Fletcher, 1992).

However, regardless of the nature of the sample studied, there is a lack of consistency regarding the methods used to assess LD, resulting in variations of prevalence rates (Shaywitz, Fletcher, & Shaywitz, 1994). The most common approaches used to assess learning disabilities are IQ and ability-achievement discrepancies that means an individual’s specific academic skill, determined by
standardized test are significantly lower than his/her scores on intelligence tests (Stuebing et al., 2002). Therefore, the classification of a learning disability depends on the researcher’s concept as to whether a child must be 1.5 or 2.0 standard deviations below a score as predicted by IQ (Pliszka, 2000, 1998). Overall, the validity of IQ and ability-achievement discrepancies for the classification of LD has consistently been found to be relatively weak (Speece & Shekitka, 2002; Stuebing et al., 2002).

Semrud-Clikeman et al. (1992) attempted to determine rates of LD among clinically-referred children more accurately, using three different methods: reading and arithmetic achievement scores $\geq 10$ (method 1), $\geq 20$ (method 2), $< 85$ and $\geq 15$ (method 3) standard score points below full-scale IQ. Results for reading disability indicated, highest rates for method 1 (43%), method 2 produced a rate of 10%, and lowest rates for method 3 (3%). Similarly, for arithmetic disability highest rates were achieved for method 1 (53%); however, equal rates were found for methods 2 and 3 (33%). These results indicate an over-identification of LD through the use of a relatively-liberal definition (method 1), which represents the most commonly-used method in the literature, and modest rates in the use of more stringent criteria. Findings therefore suggest the use of a reading and arithmetic standard score of at least 20 points below full-scale IQ as a guide for clinicians as such a discrepancy may require further testing.

2.4.3 AD/HD and LD – Diagnostic Correlates and Associated Prevalence Rates

Learning Disabilities are regarded as the second most common comorbid condition found in individuals with AD/HD (Shaywitz et al., 1994). Consequently, individuals with AD/HD frequently experience poor academic achievement resulting from deficits in reading, spelling, and maths (Decker, McIntosh, Kelly, Nicholls, & Dean, 2001; Kube, Petersen, & Palmer, 2002; Marshall, Hynd, Handwerk, & Hall, 1997; Tirosh & Cohen, 1998). Studies have constantly reported a scholastic underperformance in children with AD/HD compared to controls, and this lack of
educational attainment was indicated by poorer grades in academic subjects, more placements in special classes, and a somewhat higher demand for tutoring (Barkley, 1995; Edelbrock, Costello, & Kessler, 1984; Faraone et al., 1993; Lahey, Schaughency, Strauss, & Frame, 1984; Silver, 1981).

With regard to methodological inconsistencies in terms of classifications and measurements used to define LD, prevalence rates for AD/HD with comorbid LD have been found to vary widely. An overlap ranging from as low as 10% to as high as 92% has been reported in the literature between AD/HD and LD (August & Holmes, 1984; Halperin, Gittelman, Klein, & Rudel, 1984; McGee, Williams, & Silva, 1984; Silver, 1981). In contrast, the occurrence of AD/HD in learning-disabled children was found to range from 15% to 80% (Gillis, Gilger, Pennington, & DeFries, 1992; Lambert & Sandoval, 1980; Safer & Allen, 1976; Shaywitz, Fletcher, & Shaywitz, 1995). Shaywitz et al. (1994) examined the relationship between inattention and RD in school children from grade 1 through grade 9. Findings indicated that inattention in children with RD was relatively low in grade 1 (12%) and showed a modest increase in grade 9 (24%). In contrast, RD in children with inattention was relatively common already in grade 1 (31%) and occurred even more frequently in grade 9 (over 50%).

### 2.4.4 The Relationship of AD/HD and LD – Differences and Similarities

Despite the overall agreement among researchers that AD/HD and LD frequently co-occur, there is confusion over the differentiation of these two entities. This ambiguity is the result of empirical findings suggesting an overlap of academic and attention problems in both conditions, the existence of AD/HD and LD within the same child, and the heterogeneity of Learning Disabilities (Shaywitz, et al., 1995; Tannock & Brown, 2000). It has been suggested that attention problems influence behaviour and impact negatively on academic performances (Decker et al., 2001), and therefore some investigators have argued that AD/HD may be the major cause of LD (Gaddes &
Edgell, 1994). However, this notion did not find support by the National Conference of Learning Disabilities (1988). There are two hypotheses in the explanation for comorbidity between LD and AD/HD. The aetiology hypothesis proposes that the existence of the two disorders are attributable to the same aetiological influences, which implies that individuals with LD and AD/HD would display the deficits associated with both LD and AD/HD alone (Willcutt et al., 2001). The phenocopy hypothesis suggests that LD and AD/HD co-exist because the primary disorder causes only the symptoms of the second disorder but not its underlying deficits (Pennington, Groisser, & Welsh, 1993). This means that LD may only produce behavioural problems of AD/HD, without causing the cognitive or brain deficits attributable to AD/HD, or vice versa. For example, an individual’s inattentive or hyperactive behaviour could be caused by the frustration experienced through reading difficulties, or a child may have reading problems as a result of attentional difficulties.

Consequently, research has been conducted to test these hypotheses with the aim of distinguishing AD/HD from LD (DuPaul & Stoner, 1994; Semrud-Clikeman et al., 1992) by investigating neuropsychological and distinctive aetiological factors for both conditions.

2.4.4.1 Neuropsychological Studies

Neuropsychological findings suggest that the deficits of Executive Functioning (EF), particularly the problems of inhibition, are characteristics of AD/HD (Oosterlaan, Logan, & Sergeant, 1998; Pennington & Ozonoff, 1996; Schachar, Tannock, & Logan, 1996; Willcutt et al., 2001), whereas deficits in Phonological Processing (PP), Phonetic Awareness (PA) and verbal working memory are predominantly found in subjects with learning disorders (Shaywitz et al., 1995; Wagner & Torgesen, 1987; Willcutt et al., 2001). Further, LD has been found to be strongly associated with selective attention problems, whereas attention problems in AD/HD are believed to be more global (Felton
& Woods, 1989). Difficulties in rote memory or learning by repetition have only been found in children with AD/HD, but not in those diagnosed with LD (Felton & Woods, 1989). Moreover, Freibergs and Douglas (1969) postulated that reinforcement improved the performance of children with AD/HD but impacted only slightly on those with LD. However, AD/HD and Learning Disabilities, especially Reading Disorders (RD), may share some commonalities. Associations between both disorders have been reported in the literature in respect of deficits in speed of information processing, naming speed, motor skills, and time perception (Carte, Nigg, & Hinshaw, 1996; Fawcett & Nicolson, 1994; Nicolson & Fawcett, 1994; Nigg, Hinshaw, Carte, & Treuting, 1998).

Pennington, Groisser, and Welsh (1993) investigated cognitive deficits, such as PP and EF in AD/HD and RD. Results showed significant impairment in PP but not in EF in the RD only and the RD+AD/HD group compared to both the AD/HD only and the control group. In contrast, the AD/HD only group presented with greater impairment in EF relative to all other groups. The similarity found between the RD only and the comorbid group suggested that primary RD may have caused the phenotypic manifestation of AD/HD in the comorbid group without EF deficits which are typically characteristic of AD/HD, thus providing support for the phenocopy hypothesis. These findings were partially confirmed by others (Shaywitz et al., 1995). In contrast, the vast majority of studies did not support the phenocopy hypothesis (Nigg, 1999; Reader, Harris, Schuerholz, & Denckla). Willcutt et al. (2001) reported that individuals with RD and AD/HD exhibited both executive function deficits related to AD/HD, and phonological processing deficits associated with RD, and therefore provided strong evidence against the phenocopy hypothesis.
2.4.4.2 Twin and Family Genetic Studies

Twin and family genetic studies provide evidence that AD/HD and LD are generally distinct and genetically independent, even though the possibility of a small aetiological linkage between these conditions may still exist (Faraone et al., 1993; Gillis, Gilger, Pennington, & DeFries, 1992). A twin study conducted by Willcutt, Pennington, and DeFries (2000) showed that RD was associated more with AD/HD symptoms of inattention than hyperactivity/impulsivity. While a significant heritability of 95% between RD and symptoms of inattention was found, only 21% of the overlap between RD and hyperactivity/impulsivity was attributable to common genes. Gillis-Light, Pennington, Gilger, and DeFries (1995) assessed the genetic aetiology of comorbid reading disability and AD/HD in 61 identical and 43 same-sex fraternal twin pairs. Results indicated that 45% of reading deficits were attributable to genetic factors that also influenced attention difficulties. Moreover, heritable variation accounted for 70% of the covariance between reading and hyperactivity measures. Based on these findings, the authors suggested a partial heritable influence for comorbid reading difficulties and AD/HD. Similar results were found by Stevenson, Pennington, Gilger, DeFries, and Gillis (1993), who studied a possible common aetiology of spelling deficits and hyperactivity in two independent samples of twin pairs (Colorado, London). 69% and 84% (respectively) of the covariance between spelling difficulties and hyperactivity was explained by genetic influences. Further support for a common genetic aetiology for reading achievements and AD/HD was provided by others (Trzesniewski, Moffitt, Caspi, Taylor, & Maughan, 2006).

Faraone et al. (1993) postulated an alternative explanation for AD/HD and LD comorbidity with the non-random mating hypothesis. The authors evaluated Learning Disabilities in 140 children with AD/HD and in 120 normal controls, and assessed their 822 first-degree relatives. Results indicated that both disorders were transmitted independently in families and that spouses of those with AD/HD had significantly higher
rates of LD than spouses of those without AD/HD, suggesting that this co-occurrence might be the result of a higher rate of non-random mating between individuals with AD/HD and LD. However, this hypothesis was not supported by others (Friedman, Chhabildas, Budhiraja, Willcutt, & Pennington, 2003).

2.4.4.3 Summary

Despite some similarities in the literature between comorbid AD/HD and LD, the two conditions are regarded as two distinct disorders. While AD/HD is characterized by behavioural dysfunction, such as impulsivity, hyperactivity and inattentiveness, and clinically diagnosed by the presence of symptoms, learning disabilities are distinguished by cognitive deficits, based on language, reading, writing, spelling and arithmetic problems, measured with standardized achievement and intelligence tests. However, it is still unclear whether academic underachievement or school failure in children with AD/HD is attributable to symptoms of inattention and hyperactivity/impulsivity, to cognitive deficits of LD, a combination of both AD/HD and LD factors, or a result of social disadvantage, demoralization and a subsequent decline in motivation (Campbell & Werry, 1986). Many children with AD/HD achieve adequately at school, and not all individuals with LD have problems with inattention or hyperactivity/impulsivity, suggesting that the two conditions may be independent in their existence, but can overlap in some individuals (Interagency Committee on Learning Disabilities, 1987). Therefore, future research has to be aware of the high significance regarding attributional factors, the need for a precise and accurate determination of comorbid learning disabilities in children with AD/HD, and the requirement of different intervention approaches.
2.5 Conclusion

The literature demonstrates the heterogeneity of AD/HD and indicates the co-occurrence of internalizing and externalizing disorders, as well as Learning Disabilities in childhood, adolescence and young adulthood. There is evidence that comorbidity can lead to high rates of morbidity and disability including poor long-term outcomes, and may cause problems in differential diagnosis and treatment efficacy. Research further suggests that AD/HD subtyping might be able to be based on patterns of comorbid disorders and that these subgroups of individuals with AD/HD may have different risk factors, clinical course, neurobiology, and treatment responses. Data from family-genetic studies propose that AD/HD and CD/ODD should be considered as a distinct subtype that responds well to stimulant medication but has a relatively poor long-term prognosis. The disruptive behaviour observed in children with AD/HD may be linked to distinct genetic risk factors. While AD/HD and Depression may share common familial vulnerabilities, anxiety disorders and Learning Disabilities seem to be independently transmitted and may rather co-occur with AD/HD.

In summary, to guarantee an adequate assessment and management of AD/HD clinicians have to take into account not only the symptoms associated with AD/HD but also accompanying impairments of other disorders. However, comorbidity complicates the diagnostic process as symptoms of other disorders may not always fully meet diagnostic criteria for this specific disorder. Further, clinicians must be aware that parents or teachers may under-report symptoms of internalizing disorders in children with AD/HD, as they are better able to identify disruptive behavioural problems. Comorbid conditions may require different treatment approaches than AD/HD and AD/HD symptoms and their responses to treatment may be influenced by the severity of comorbid disorders. In addition, developmental aspects should be taken into account when assessing and supervising externalizing and internalizing disorders in children.
with AD/HD. Many children first meet criteria for ODD and then develop CD. Symptoms of anxiety and depression have been found to have an onset later than AD/HD, and comorbid anxiety has been reported to be associated with less hyperactivity/impulsivity in children with AD/HD. Academic and learning problems of children with AD/HD have been proposed to persist into adolescence and are associated with chronic underachievement and school failure.

In the next chapter the literature on divorce will be summarised and discussed. The occurrence of internalizing/externalizing conditions as well as social and academic problems in children after parental divorce or separation will also be reviewed.
CHAPTER 3: DIVORCE
3.1 Introduction

The traditional nuclear family has been considered to be the most desirable family type for many years, in terms of providing good mental health and well-being for all family members (Amato, 1987). However, this view has changed as rates of divorce and parental separation have increased in the past decades. Research estimates that almost half of all marriages in Australia will end in divorce (Australian Institute of Family Studies, 1993; Bumpass & Raley, 1995; Data digest, 2000).

Consequently, there are increasing numbers of step-families, as the majority of divorced individuals that remarry have children (Nicholson, Fergusson, & Horwood, 1999). Research suggests that about one third of children will experience the divorce and remarriage of their custodial parent during childhood or adolescence (Bumpass & Rindfuss, 1979; Glick, 1989). According to the Australian Bureau of Statistics (ABS, 2005) 68% of all marriages registered in 2005 were first marriages and 32% were remarriages. Further, men are more likely than women to remarry or cohabit with another partner within 8 years after divorce (men 71%, women 52%; ABS, 1994). Finally, second marriages are apparently less stable than first marriages (Hetherington, 2005), as research suggests that about 37% of remarriages end in divorce, compared to 30% of first marriages (Sweet & Bumpass, 1987). Furstenberg and Spanier (1984) argued that this phenomenon may be attributable to the fact that, due to their previous experiences, unhappy remarried couples would more easily consider divorce as an option than remaining in an unsatisfied marriage, whereas first married couples tend to be more reluctant to divorce.

As a result of the higher rate of break-downs of step-families, many children will undergo multiple family transitions. Bumpass (1984) reported that about half of the children who experienced a divorce and remarriage, will be confronted with another split-up of the new family. Further, Fergusson, Horwood, and Shannon (1984) found in
their New Zealand cohort that almost one fifth of children had experienced three or more household changes by age nine.

Although divorce and remarriage have become more prevalent and socially accepted in western societies (Thornton & Young-DeMarco, 2001), children from intact families differ considerably from those of divorced or remarried parents (Amato, 2001). There is evidence in the literature that children of divorced parents present with a wide range of internalizing and externalizing behaviours, with poor academic performances and social maladjustment, compared to children from intact families (Brown, 2004; Cheng, Dunn, O'Connor, & Golding, 2006; Forman & Davies, 2003; Harold, Shelton, Goeke-Morey, & Cummings, 2004). Further, there is empirical evidence that adjustment problems in children of divorced parents vary as a function of age and gender, with boys being more negatively affected than girls, and younger children presenting with greater levels of maladjustment than adolescents, particularly in single-parent homes (Amato, 2001; Davies & Lindsay, 2004; Harold & Conger, 1997; Hetherington, Cox, & Cox, 1982; Huurre, Junkkari, & Aro, 2006; Kinard & Reinherz, 1986; Vander Valk, Spruijt, DeGoede, Maas, & Meeus, 2005).

It is important to note that divorce should not be seen as a single, static event, but as a process that often begins a substantial time before separation takes place. The consequences associated with parental break-up are linked with factors that precede, accompany, and follow the event of separation (Pryor & Trinder, 2004). This is demonstrated by research findings reporting elevated levels of distress and adjustment problems in children before parental separation (Cherlin et al., 1991; Elliott & Richards, 1991; Harold, Fincham, Osborne, & Conger, 1997; Shaw, Winslow, & Flanagan, 1999). Further, the risk of negative outcomes in children has been found to be higher if parents stay together for the sake of the children or need a considerable amount of time before they decide to separate (Furstenberg & Kiernan, 2001; Pryor, 1999). However, studies on family type show that divorce and remarriage play an important role in the development of social, behavioural, and academic problems in
children (Hetherington, Stanley-Hagen, & Anderson, 1989; Jeynes, 1999; Marks, 2006). It has been argued that children living in step-families are generally not better off than those living with a single-parent (Amato, 2005). Research investigating the impact of multiple divorces points to greater adjustment problems in children who experienced repeated transitions, compared to those who had only undergone one divorce or separation of their biological parents (Dunn, Deater-Deckard, Pickering, & O’Connor, 1998).

3.2 Divorce Trends and Australian Demographic Statistics

3.2.1 Global Trends in Divorce and Marriage

Family life has been changing tremendously across almost all Western industrialized societies, reflecting a significant reduction in marital stability during the past decades (Cherlin, 1992; White, 1990). Therefore, the likelihood of divorce has increased progressively from 7% in 1880 to a current rate of almost 50% in nearly all Western countries (Martin & Bumpass, 1989). This development has been accompanied by decreasing marriage and fertility rates (DeVaus & Wolcott, 1997; Martin & Bumpass, 1989). Lester (1996) investigated trends in divorce and marriage in 27 nations around the world during the period of 1950 to 1985. An increase in the divorce rate was found in 25 of the 27 nations, and this trend was associated with a declining marriage rate in 22 nations. In addition, all countries showed a decrease in birth rates during this period. Findings also suggested that those nations with a higher divorce rate in 1950 presented with steeper increases in the following 35 years; the same applied to birth rates, but not to marriage rates. The author concluded that high divorce rates would lead to more acceptance in the population and therefore become more common in societies. Schelling (1978) proposed that an individual’s behaviour
would depend on how many other people behave the same way. Thus, it seems that the occurrence of an activity may increase and become self-sustaining once its frequency has passed a certain level, and perhaps this is the case with modern divorce rates in Western societies.

3.2.2 Divorce in Australia: A Demographic Analysis

While divorce in Australia was practically non-existent at the beginning of the 20th century, 32% of Australian marriages were estimated to end in divorce by the end of the 20th century (ABS, 2000). Table 3.1 and the figures 3.1 - 3.5 show the trend in number of divorces and marriages, the crude divorce rates, as well as the number of children involved in divorce over the last decades. According to the Australian Bureau of Statistics (ABS, 2005), there were 52,399 divorces granted in Australia in 2005, signifying an increase of 5.4% in divorces compared to the number granted 10 years ago (49,712), and a 31.6% increase on the number granted in 1985 (39,830). Consequently, over the last two decades, approximately 50,000 children in Australia have experienced a family break-down each year. The Australian crude divorce rate (the number of divorces per 1,000 population) was 2.6 in 2005. However, there has been a decreasing trend in the crude divorce rate since 2001, when it was 2.9. Further, there were also 109,323 marriages registered in Australia in 2005, indicating that the divorce rate was half the marriage rate. The crude marriage rate (per 1,000 per population) has been in decline during the past 20 years. While it was estimated at 7.3 in 1985 and 6.1 in 1995, figures for 2005 show a somewhat lower rate of 5.4.

Table 3.1 Australia: Number of divorces, marriages, and children involved in divorce

Please see print copy for Table 3.1

Source: Australian Bureau of Statistics, 2005, *the number of children involved in divorce was not available in 1995, therefore, the figure from year 1993 was used to present comparable data.*
would depend on how many other people behave the same way. Thus, it seems that the occurrence of an activity may increase and become self-sustaining once its frequency has passed a certain level, and perhaps this is the case with modern divorce rates in Western societies.

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<table>
<thead>
<tr>
<th>Year</th>
<th>Divorces granted</th>
<th>Registered marriages</th>
<th>Children involved in divorce (&lt;18 yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>30,050</td>
<td>115,463</td>
<td>46,803</td>
</tr>
<tr>
<td>1995</td>
<td>40,712</td>
<td>109,369</td>
<td>48,107*</td>
</tr>
<tr>
<td>2001</td>
<td>55,320</td>
<td>103,730</td>
<td>52,398</td>
</tr>
<tr>
<td>2003</td>
<td>55,149</td>
<td>106,400</td>
<td>49,850</td>
</tr>
<tr>
<td>2005</td>
<td>52,269</td>
<td>130,523</td>
<td>48,850</td>
</tr>
</tbody>
</table>

Source: Australian Bureau of Statistics, 2005. "The number of children involved in divorce was not available in 1990, therefore, the figure from year 1993 was used to present comparable data."
While these demographic trends in divorce describe family processes in the Australian society, they do not provide information about social and psychological correlates of marital dissolutions. However, it is important to investigate causal factors associated with divorce in order to identify those families who are at risk, and to incorporate them as target groups in prevention campaigns (Hewitt, Baxter, & Western, 2005).
3.3 Theoretical Assumptions Underlying Divorce and Separation

One of the major obstacles of measuring the outcomes of divorce in children is that divorce is not an event that exists in isolation, but has been recognized as a process or a series of processes. Therefore, the assessment of various developmental stages related to parental divorce or separation is a challenging task for researchers. As separation is not a single event but connected with the prior relationship history, it has been proven difficult to disentangle cause and effect of marital dissolution (Pryor & Trinder, 2004).

So far, research on the effects of divorce is based on two major assumptions, the causal hypothesis and the selection hypothesis (D’Onofrio et al., 2005). While the theory of direct causation considers higher rates of psychological and behavioural problems in children of divorced parents to be the consequences of marital dissolution, the selection hypothesis refers to differences in divorced and non-divorced parents, and that these differences would be responsible for marital break-down and later adjustment difficulties in children (Emery, Waldron, Kitzmann, & Aaron, 1999). By reviewing the literature, Amato (2000) found evidence for both the causation as well as for the selection effects related to parental divorce and separation.

3.3.1 Social Correlates of Marital Break-down

Social correlates of parental divorce include temporal, life-course, attitudinal and economic factors (Hewitt, Baxter, & Western, 2005). Temporal factors comprise changes in attitudes regarding marriage and divorce, changes to divorce law, and an increased involvement of women in the workforce (Bracher, Santow, Morgan, & Trussell, 1993; Heaton, 1991). Life-course factors include; a) race and ethnicity (DeVaus, Qu, & Weston, 2003; Tzeng & Mare, 1995), b) socio-economic status of
parents (Bumpass, Martin, & Sweet, 1991; Wolfinger, 1999), c) parental divorce, as research suggests that children who experienced the divorce of their parents are more likely to undergo marital dissolution themselves in adulthood (Amato, 1996; Teachman, 2002; Wolfinger, 1999), d) age at marriage, as individuals who marry when they are younger than 25 years are at increased risk of divorce (ABS, 2000), e) cohabitation prior to marriage (DeMaris & Rao, 1992; DeVaus et al., 2003; Sarantakos, 1994), and f) pre-marital childbirth and pregnancy (Bracher, Santow, Morgan, & Trussell, 1993; Waite & Lillard, 1991). The most common attitudinal factors related to marital breakdown are religion and attitudes towards work and gender roles in the family. Individuals with a stronger religious affiliation showed greater commitment to marriage (Bumpass, Martin, & Sweet, 1991; Lillard, Brien, & Waite, 1995), and people with rather traditional beliefs about family gender roles were found to be in more stable marriages (Greenstein, 1995; Heaton & Blake, 1999). Finally, the literature suggests economic factors related to marital dissolution. In almost all Western societies women’s socio-economic status has improved during the past decades, resulting in greater economic independence and more confidence in surviving financially in case of divorce (Booth, Johnson, White, & Edwards, 1984; Cherlin, 1992; Rank, 1987).

### 3.3.2 Psychological Correlates of Marital Break-down

Parental psychopathology and personality characteristics of parents have frequently been identified as risk factors for marital disruption and marriage instability. There is some evidence in the literature that elevated levels of depression, especially in women, are associated with marital disharmony, marital dissolution and even multiple family break-ups (Capaldi & Patterson, 1991; Gotlib & Whiffen, 1989; Johnson & Jacob, 1997; O’Connor, Hawkins, Dunn, Thorpe, & Golding, 1998; O’Connor & Insabella, 1999). Others reported poor marital interactions including poor communication, negative affect, tension, hostility, and non-responsiveness in the
presence of a depressed partner (Cicchetti & Toth, 1998; Gotlib & Hooley, 1988; McLeod & Eckberg, 1993), and these disruptive interactions are associated with poor marital quality, instability and adverse effects on their children’s psychological well-being (Cicchetti & Toth, 1998). Although there is empirical evidence that the quality of marital relationships is associated with the occurrence of parental depression, it is unclear whether marital discord can be seen as a possible cause, consequence, or a correlate of depressive symptomatology in parents (Hetherington, 1999). Some investigators suggest that differences in psychological well-being of divorced and married individuals would be more due to the effects of divorce than to pre-existing psychological conditions (Menaghan, 1985), and others found that a substantial minority of divorcees presented with psychological disturbances prior to divorce, whereas others developed psychological problems afterwards (Kitson, Benson-Babri, & Roach, 1985).

Further, divorce-prone individuals have been found to present with unregulated behaviour, aggression, alcoholism, depression, psychosomatic problems, and insensitivity regarding interpersonal relationships, and these factors correlated with subsequent divorce and separation (Amato, 1993; Forgatch, Patterson, & Ray, 1995; Kiecolt-Glaser et al., 1987; McGue & Lykken, 1992). J. Block, J.H. Block, and Gjerde (1988) reported that mothers in families who eventually experienced divorce described themselves as malicious, restless, agitated, unsocial, self-centered, timid, and disobedient. In addition, mothers also described their husbands before the divorce in rather negative terms, with displaying ambitious, unloving, disobedient, unsupportive, critical, talkative, dominating and stubborn behaviours. Therefore, it seems that some parents are relatively vulnerable in their relationships, and this may be associated with the likelihood of separation and divorce, especially among those couples with psychological dysfunctions and problematic personality.
3.4 The Relationship of Family Conflict and Divorce with Children’s Well-being: Divorce as a Process

Divorce, as well as remarriage, have to be viewed as parts of a complex chain of transitions and family reformations, rather than static events that exist in isolation. Thus, risk factors associated with children’s psychological well-being may change within the process of separation and correlate with a variety of adverse outcomes in offspring after divorce. Parental dissolution includes a multitude of life changes, such as a reduction in family resources, change in residence, the establishment of new roles and responsibilities, reorganization of routines, and the acceptance of new family members (Anderson, Lindner, & Bennion, 1992; Funder & Kinsella, 1991; Hetherington, Bridges, & Insabella, 1998; Peterson & Zill, 1986). However, divorce not only consists of stressful events experienced by adults and children, but also offers an opportunity to escape from conflict and to establish new, satisfying relationships (Hetherington, 2005).

3.4.1 Before the Divorce: Exposure to Marital Conflict

The literature suggests that approximately 50% of children living with unhappily married parents experience high interparental conflict, including verbal arguments, and in some cases even physical violence between parents (Hetherington, 2005). There is growing evidence that children who are exposed to marital discord are likely to become extremely distressed, and display hostile and aggressive behaviour towards others (J.H. Block, J. Block, & Gjerde, 1986). In addition, research findings point to a number of adjustment problems in children and adolescents experiencing regular parental conflict, such as anxiety, depression, and conduct disorders (Davies & Cummings, 1994; Davies & Lindsay, 2004; Harold & Conger, 1997; Harold, Fincham, Osborne, &
Conger, 1997; Najman et al., 1997; Shaw, Winslow, & Fannagan, 1999). Thus, conflict-ridden homes are not beneficial to children’s development and psychological well-being, and some researchers suggest that, in the long run, those children would fare better if their parents separated or divorced (Amato, Loomis, & Booth, 1995; Hetherington, Cox, & Cox, 1982). Amato and Keith (1991), for instance, found that children exposed to high-conflict in intact families showed lower levels of psychological adjustment and self-esteem than did those from divorced families. Nonetheless, divorce represents a highly unsettling life event that may correlate with adjustment problems in all family members. Thus, Kiernan (1990) and Funder and Kinsella (1991) underline the importance of focusing on pre-divorce effects on children’s development, as well as on post-divorce effects and consequences.

Besides parental conflict, there is a growing body of research suggesting that temperamental and personality characteristics of children play an important role in coping with stressors caused by marital discord (Hetherington, 2005). Temperamentally difficult children have been found to be less adjustable to change and more vulnerable to disadvantages and hardship than children with an easy temperament (Hetherington, 1989, 2005; Rutter, 1980). In addition, other child characteristics, such as intelligence, independence, internal locus of control, and self-esteem, are also related to a child’s capability to cope with stressful events (Garmezy, 1983; Werner, 1987). Interestingly, Block et al. (1986) suggested that children with personality and behaviour difficulties may not just be more vulnerable to the effects of parental divorce but also more likely to have parents who end up in divorce or separation. Thus, behaviour problems in children may aggravate marital difficulties and contribute to divorce.
3.4.2 Short and Long-term Effects of Divorce

Parental separation is associated with significant high levels of risk, as children of divorce are almost twice as likely to experience adjustment problems compared to children from intact families (Pryor & Trinder, 2004). Many empirical studies investigating the consequences of divorce are based on Bowlby’s (1969) Attachment Theory, which postulates that the loss of an attachment figure would result in an instinctive anxiety response. Thus, physical separation from a parent caused by divorce would lead to acute levels of stress in most children. Bowlby describes a three-stage process, which is characterized by acute upset at first, followed by apathy-depression, and then by a loss of interest in the parent.

In addition, there is empirical evidence that the adaptation of children to parental divorce may vary as a function of age. In general, the literature suggests that children of all ages present with an increase in problem behaviours and disturbed relationships after the divorce (Amato, 2001). Younger and cognitively immature children are found to display greater signs of distress after parental separation, possibly because they may not understand why their parents divorced and might even feel guilty and responsible for the break-up. In contrast, older children and adolescents may be somewhat better able to identify the reasons of their parents’ divorce, and are more capable of resolving loyalty conflicts (Hetherington, 1989; Hetherington, Stanley-Hagen, & Anderson, 1989; Wallerstein & Kelly, 1980). Further, Cheng, Dunn, O’Connor, and Golding (2006) postulate that adolescents are not only more cognitively skilled but also present with greater social competence. Therefore, older children become more involved with external family members or friends, and engaged in non-family activities, which in turn provides them with additional resources to cope with their parents’ divorce. Younger children, however, often do not have access to those support systems, and are therefore more dependent on experiences and help within the family.
Thus, children’s adjustment in the divorce process depends on factors such as the child’s age at divorce or the timing of divorce (Spigelman, Spigelman, & Englesson, 1994). Kalter and Rembar (1981) discussed three possible perspectives: (1) the cumulative-effect hypothesis, which postulates that the younger the child at the time of divorce, the more adverse are its consequences; (2) the critical-stage hypothesis, which assumes that the occurrence of divorce during different developmental stages of a child would be related to different constellations of emotional and behavioural problems; (3) the recency hypothesis, which perceives divorce as a trauma for children from which they can recover in time.

Lansford et al. (2006) found that parental separation during elementary school was associated with internalizing and externalizing problems, whereas later divorce correlated with poorer academic achievements. Spigelman et al. (1994) found lower levels of anxiety, aggression and distress in subjects who were older than six years when their parents divorced. These results are in contrast to previous findings by Wallerstein (1985), who found that feelings of sadness and anger existed mostly in those children who were older at the time when their parents split up.

Generally, the literature suggests that divorce effects are most evident shortly after divorce (Frost & Pakiz, 1990; Hetherington, Cox, & Cox, 1982; Hetherington & Stanley-Hagan, 1999; Sun & Li, 2002). Research findings so far have revealed that in the first three years following divorce, children display more oppositional, delinquent and aggressive behaviours, are more demanding, attention seeking, distractible, and present with less self-control than those from intact families (Amato, 2001; Amato & Keith, 1991; Cheng et al., 2006; Emery, Waldron, Kitzmann, & Aaron, 1999; Hetherington et al., 1982; Spruijt, DeGoede, & VanderValk, 2001). Others reported more emotional problems, such as depression (Hetherington, 2005; VanderValk, Spruijt, DeGoede, Meeus, & Maas, 2004), poorer academic performances (Hetherington, 2005), higher risks for substance use (Flewelling & Bauman, 1990; Jeynes, 2001), as well as more problematic relationships, including social problems.
and lower social competence (Camara & Resnick, 1988; Hetherington et al., 1982; Liu et al., 2000; Peterson & Zill, 1986).

Despite the occurrence of functional impairments experienced by children immediately after divorce, there is empirical evidence that these emotional and behavioural disturbances will diminish in the vast majority of children over time (Hetherington & Stanley-Hagan, 1999; Pryor & Trinder, 2004). Sim and Vuchinich (1996) suggest that maturation plays an important role in dealing with stressful life events, such as parental divorce or separation, as with increasing age coping resources in adolescents improve. Chase-Landsdale, Cherlin, and Kiernan (1995) refer to the experience of positive events or relationships that may mediate and promote a healthy development for children after parental separation. Therefore, many children show a remarkable long-term resilience in terms of adjustment to their new life circumstances (Hetherington, 2005).

Despite a substantial recovery in many children and the diminishing of behavioural problems, a small proportion will continue to display adjustment difficulties into late adolescence and young adulthood (Chase-Landsdale et al., 1995; Sun & Li, 2002). VanderValk, Spruijt, DeGoede, Maas, and Meeus (2005) found that adolescents and young adults presented with increased internalizing and externalizing symptoms even several years after their parents’ divorce. Hetherington (2005) reported higher levels of delinquency and substance use, and a stronger engagement with antisocial peers. Lower educational attainment, with higher rates of school drop-outs, were found in post-divorced adolescents by others (Hetherington, 2005; Wolfinger, 1999; Wolfinger, Kowaleski-Jones, & Smith, 2003). Further, studying medium and long-term outcomes for children after divorce, Pryor and Trinder (2004) found that in adolescence these children were more likely to leave school early, to enter partnerships and become parents when still very young. Moreover, in adulthood those people would have lower socioeconomic attainment, more alcohol and substance abuse, higher risks for suicide and depression, and a greater likelihood to dissolve their own marriages. While
Ruschena, Prior, Sanson, and Smart (2005) did not find any differences regarding academic outcomes and social functioning in adolescents from divorced and intact families, they noted more adaptive as well as maladaptive behaviours, especially in adolescent girls.

### 3.4.3 Gender Differences

There is inconsistency in the literature as to whether children’s adjustment to parental divorce varies as a function of gender. While there is empirical evidence that parental divorce or separation is more enduring for boys than for girls (Hetherington et al., 1982; Porter & O’Leary, 1980; Rutter, 1987), others found only minimal or no gender differences (Amato & Keith, 1991; Jonsson, Njardvik, Olafsdottir, & Gretarsson, 2000; Rogers, Power, & Hope, 1997). Further, it has been speculated that boys, relative to girls, present with higher levels of impulsive and aggressive behaviour, even prior to divorce (Block et al., 1986; Hetherington et al., 1982). In general, boys are found to exhibit more conduct behaviour problems and greater deficits in social adjustment, whereas internalizing problems, such as depression, anxiety, and withdrawal are more frequently observed among girls (Amato & Keith, 1991; Cheng et al., 2006; Dunn et al., 1998; VanderValk, Spruijt, DeGoede, Maas, & Meeus, 2005).

Amato (2005) suggests that the stronger correlation between divorce and social maladjustment in boys may be due to the loss of the same-gender parent, as children usually reside with their mother after separation. The author further points out that boys may have a less supportive environment and a more conflict-ridden relationship with their custodial mother, as they are likely to resemble their fathers.

Huurre, Junkkari, and Aro (2006) examined long-term psychological effects of parental divorce in a 16-year follow-up study from adolescence to adulthood, and found higher rates of depression, interpersonal problems, and psychosomatic complaints among female subjects compared to male subjects. Similarly, Lindner, Stanley-Hagan,
and Cavanaugh-Brown (1992) reported more symptoms of depression, fewer behavioral and emotional problems, less social adjustment problems, and greater scholastic competency in girls than in boys of divorced parents. Hetherington et al. (1982) reported that boys from high-conflict divorced families had a less functional mother-son relationship, were more socially isolated at school, verbally aggressive, and more immature compared to boys from nuclear families, and to girls from divorced parents. Kinard and Reinherz (1986) investigated the relationship of marital disruption with children’s academic achievement and reported higher overall school performance and a greater productivity for girls than for boys. The authors further concluded that elevated levels of stress and anxiety in custodial mothers may trigger anxiety in their children, which in turn may correlate with their academic achievements.

Despite the bulk of research providing evidence for the existence of gender difference among children of divorced families, the literature also contains many studies that did not support this notion. Thus, Sun (2001) did not reveal gender differences in regard to post-disruption effects; neither did the author find variations among boys and girls before parental separation, with both exhibiting more academic, psychological, and behavioral problems compared to their peers from intact families. Furthermore, in their longitudinal study, Ruschena, Prior, Sanson, and Smart (2005) did not find any gender differences regarding social skills and academic functioning when examining adolescent adjustment after family transitions. Finally, Amato’s meta analysis (2001) compared boys and girls adjustment after divorce across five domains, and found that boys and girls only differed in the domain of externalizing behaviour, with boys presenting with more conduct problems than girls.

3.4.4 Divorce, Remarriage, and the Role of Multiple Transitions

Family reorganizations associated with divorce have become increasingly common experiences for both parents and children. Thus, a substantial number of
children spend an average of 5 years of their childhood in single-parent homes (Bumpass, 1984; Hofferth, 1985). While children live only temporarily in single-parent households (Cherlin, 1992; Hetherington & Jodl, 1994), this family type can be regarded as a transitory phase which ends for a majority of parents in remarriage, as about 70% of women and 80% of men remarry (Bumpass, 1984; Glick, 1989; Hetherington et al., 1982). Therefore, children continue to experience family changes after parental divorce while they grow older. Remarriage does not guarantee a stable home, as research suggests that a higher proportion of remarriages than first marriages will end in divorce (Cherlin, 1992; Furstenberg & Spanier, 1984; Goetting, 1982; Sweet & Bumpass, 1987). In addition, there is empirical evidence for the existence of third and higher order marriages, suggesting that some children will experience multiple divorces of their custodial parent (Belsky, Lerner, & Spanier, 1984; Bloom, Hodges, Kern, & McFadding, 1985; Dunn et al., 1998), with each successive marriage contributing to a decrease in family stability (Walker, Rogers, & Messinger, 1977). Both divorce and remarriage represent a complex chain of alterations that impact on various aspects of a child’s adjustment and psychological well-being (Hetherington et al., 1982). Therefore, a great deal of research has been carried out to investigate childhood outcomes in different family settings, and a remarkable variability within various groups has been identified (Amato, 1994; Amato & Keith, 1991).

3.4.4.1 Intact Families Versus Divorced/Remarried Families

Many authors have acknowledged that children in single-parent families and step-families are more likely to present with higher levels of social and emotional problems, more internalizing and externalizing behaviour, as well as with lower educational attainment, compared to those growing up in nuclear families (Allison & Furstenberg, 1989; Dawson, 1991; Ferri, 1984; Hetherington et al., 1982; Hetherington & Jodl, 1994; Zill, 1994; Zimiles & Lee, 1991). Dunn et al. (1998) investigated
adjustment and prosocial behaviour in 4-year old children and their older siblings, in various family types. The authors found higher levels of hyperactivity, more peer problems and conduct disorder in children growing up in single-parent households and step-families than in those from intact homes. Further, while the 4-year olds from divorced and remarried parents presented with more emotional problems, the older siblings (mean age 7 years) were found to show less prosocial behaviour, compared to their counterparts from non-divorced families. Similarly, Lindner, Stanley-Hagan, and Cavanaugh-Brown (1992) found that children from non-divorced families were more socially competent, had fewer behaviour problems, and achieved better academically than those living with single or remarried mothers. In addition, in their meta analysis, Amato and Keith (1991) compared 92 studies to investigate the impact of parental divorce on children’s well-being. Findings suggest that children living in step-families compared with those in intact two-parent homes exhibited more conduct problems, greater psychological and social maladjustment, and lower scholastic performances. Further, Jeynes (1999) examined the relationship of remarriage following divorce with scholastic performance in children, and suggested an academic disadvantage for those from reconstituted and single-parent families compared to those from intact homes. These findings have found support by Sandefur, McLanahan, and Wojtkiewitz, (1992), who reported less high school graduations in adolescents from divorced and remarried families than in those from intact homes; and by Kinard and Reinherz (1986), who found lower scores on language performance and total academic performance in children living with single divorced mothers compared with those from nuclear families.

3.4.4.2 Single-parent Households Versus Step-families

Overall, when compared with nuclear families, the literature postulates similar negative outcomes in children from single-parent households and step-families, suggesting that remarriage does not re-establish the same family situation that
symbolizes stable two-parent households. However, there is some controversy among researchers about whether remarriage of the custodial parent and living within a step-family would be associated with greater functional impairment in children than residing in a single-parent household. For instance, Hetherington, Cox, and Cox (1985) found that children presented with more problem behaviours after 2 years of remarriage compared with those living with their single custodial mother. This is in accordance with Amato and Keith (1991), who reported more psychological adjustment problems and more conduct difficulties in children from step-families than in those from divorce single-parent households. Further, Lindner et al. (1992), using a multi-respondent study design (custodial mother, observer, teacher), reported higher levels of total behaviour problems in children from remarried mothers, and more anti-social and shy-withdrawn behaviour as well as more cognitive impairment in those living with their single mother. By studying the relationship of various family types with student achievement, Marks (2006) reported weaker academic performances in children from reconstituted families compared with their counterparts from single-parent households. Similar results were found by others (Jeynes, 1999). However, in contrast to these findings, there is evidence in the literature that children from step-families and single-parent homes are more similar than different. Pryor and Trinder (2004) suggested that children in lone-parent and step-family homes would face similar risks for poor outcome. Further, Zill (1988) reported that children from single-parent households displayed as many problem behaviours as did those from step-families. Funder and Kinsella (1991) supported this notion, finding no significant differences in terms of psychological deficits among children of the two family types.

3.4.4.3 Age and Gender Differences

The literature provides evidence that children’s adjustment to parental divorce and remarriage varies qualitatively according to children’s age. Due to their better
developed cognitive and social skills, older children in single-parent families have been found to adjust better to the new family situation than their younger counterparts (Hetherington, 1989; Wallerstein & Kelly, 1980). In contrast, studies examining age differences in terms of remarriage reported somewhat different results. Individuals in early adolescence seem to have the greatest difficulty in adjusting to the entering of new family members, whereas younger children appear to be better able to cope with the presence of a step-family (Hetherington, 1989; Hetherington, Cox, & Cox, 1982). A greater risk for delinquency (Pagani, Tremblay, Vitaro, Kerr, & McDuff, 1998) and higher rates of academic problems, sexual misconduct and other delinquent activities (Hetherington & Stanley-Hagan, 1999) have been found among individuals in early adolescence from step-parent homes.

A number of studies have provided evidence that the presence of a step-parent increased the well-being of boys, but had no effect or decreased the well-being of girls (Chapman, 1977; Hetherington et al., 1985; Santrock, 1972; Santrock, Warshak, Lindbergh, & Meadows, 1982). In line with these results are the findings by Peterson and Zill (1986), and Fergusson, Dimond, and Horwood (1986), who found higher rates of conduct problems in girls living in step-families compared to those from single-parent homes, and suggested that boys in reconstituted families would fare better than those in one-parent households. Zaslow (1989) examined gender differences in the response to parental divorce and remarriage and found more externalizing problems in boys and increased levels of internalizing behaviour patterns in both boys and girls living in single-parent households. When remarriage occurred, girls compared to boys were found to present with higher levels of both types of problem behaviour. Conversely, Baumrind (1989) indicated that, in contrast to her findings with younger children, adolescent girls residing with their custodial mother after divorce exhibited more externalizing behaviour patterns than did adolescent boys.

Overall, results suggest that some children can benefit from the custodial parent’s remarriage, especially young boys, as the addition of a step-father may
compensate for the loss of the biological father, whereas adolescents might fare better in single-parent homes. However, it is important to note that the vast majority of older children in step-families become normal teenagers, who may experience initial adjustment problems but are unlikely to exhibit any long-term antisocial behaviour problems (Cabrera, Tamisk-LeMonda, Bradley, Hofferth, & Lamb, 2000; Rohner, 2000).

3.4.4.4 Multiple Transitions

As noted previously, there is confirmation that remarriages following divorce are less stable than first marriages, and therefore are more likely to end in divorce (Cherlin, 1992; Furstenberg & Spanier, 1984; Goetting, 1982; Sweet & Bumpass, 1987). This means that about 50% of children who have undergone a divorce and remarriage of their custodial parent will experience another break-down of the new family (Bumpass, 1984). Consequently, along with the risks identified for children growing up in divorced single-parent homes or step-families, there is empirical support that multiple transitions place children at even higher risk for adjustment problems than either of these two family types (Pryor & Trinder, 2004). For instance, Dunn et al. (1998) studied the relationship of repeated transitions and children’s adjustment outcome in 7-8 year olds, and discovered that the number of transitions was associated with elevated levels of hyperactivity, conduct and emotional difficulties, peer problems and less prosocial behaviour. Dunn et al. (1998) also postulated that the behaviour problems found in their subjects were not attributable to maternal personality characteristics or child rearing practices. Similarly, higher levels of offending behaviour and disruptive conduct were found in children who experienced multiple family changes (Fergusson, Horwood, & Lynskey, 1992; Kurdek, Fine, & Sinclair, 1995). In addition, Brody, Neubaum, and Forehand (1988) examined the relationship of serial marriages as an accumulation of adverse life experiences with children’s well-being, and suggested more behaviour
problems, stronger suicide tendencies, higher rates of depression, a poorer parent-child relationship, as well as stronger feelings of helplessness and incompetence in children who had undergone serial marriages of their custodial parent compared to those who only experienced a single family break-down. Finally, the literature provides support that multiple transitions may correlate with children’s educational attainment. Cockett and Tripp (1994), for instance, found children to present with more school problems and lower grades if they had experienced more than two transitions. Furthermore, Aquilino (1996) and Wu and Martinson (1993) reported that those children who had undergone more than two family changes were less likely to enter tertiary education, but were found to join the workforce and having children early.

In summary, findings in the literature are consistent that, in addition to divorce and remarriage, multiple family interruptions may put children at increased risk for behavioural, emotional and relational problems, as well as for scholastic difficulties and lower educational grades. This conclusion is verified by the finding that children who remain in stable single-parent homes after parental break-up appear to perform satisfactorily compared to those who experience remarriage and multiple divorces (Ferri, 1976).

3.5 The Quality of Children’s Relationships with Family Members of Divorced/Remarried Parents: A Correlate of Post-Divorce Adjustment

3.5.1 Single-parent Households

While parental divorce has been found to correlates with adjustment problems in children, there is also evidence in the literature that parents, especially mothers, would present with psychological malfunctioning after divorce (Hetherington et al.,
In almost 90% of cases the mother obtains custody of any children, resulting in practical as well as emotional difficulties (Derdeyn, 1976; Hetherington, Stanley-Hagen, & Anderson, 1989). Single custodial parents frequently become overwhelmed by responsibilities, financial hardship, and their own emotional reactions to divorce (Belle, 1990; Demo & Acock, 1996; Kiecold-Glaser et al., 1987). Thus, during the first year following divorce custodial parents have been found to present with marked emotional instability, including euphoric states and optimism alternating with symptoms of depression, anxiety and loneliness, resulting in changes in self-concept, self-esteem, and in a poor parent-child relationship (Brown, 2000; Dunn et al., 1998; Hetherington et al., 1989; McLanahan & Sandefur, 1994). Therefore, the occurrence of low levels of well-being in parents following divorce may correlate with the quality of parenting and the sensitivity towards children’s adjustment problems (Carlson & Corcoran, 2001; McLanahan & Sandefur, 1994).

There is empirical support that the parenting style of single custodial mothers often becomes inconsistent, non-supportive, uncommunicative or disciplinary, resulting in a decline in controlling and monitoring children’s behaviour effectively (Hetherington, 1991, Hetherington et al., 1982; Hetherington et al., 1989). However, fathers who obtain custody of their children after divorce have also been found to present with parenting difficulties. The literature reports emotional problems, including feelings of resentment and anger, but also anxiety, worry and confusion about their capability to parent their children (Hetherington & Stanley-Hagan, 1986). Custodial fathers are more lenient and tolerant, before becoming more restrictive and limiting (Hetherington et al., 1982). While the literature suggests that fathers who obtain custody are more capable in controlling or disciplining their children, and experience less parenting stress compared to custodial mothers, they also communicate less openly and show limited competency in monitoring their children, with the latter being associated with more delinquent behaviour in adolescence (Hetherington, 2005). However, studies have reported an improvement in parenting skills for both parents over time. By two years,
better family adjustment and fewer difficulties with their children have been found for custodial fathers than for custodial mothers (Furstenberg, 1988). This phenomenon is assumed to be associated with less financial worries, more social support for custodial fathers, and a greater likelihood of receiving custody for school-aged children and adolescents (Hetherington et al., 1989). This finding is in accord with results presented by Peterson and Zill (1986), who found that only 60% of children living with the custodial mother reported a positive relationship, compared to 69% residing with the custodial father.

Further, the post-divorce relationship of children with their custodial parent can differ as a function of gender and age. Hetherington (2005) and Hetherington et al. (1989) investigated parent-child relations, and found the relationship between divorced mothers and their sons to be characterized by mutual coercive interactions, including increased non-compliance, anger outbursts, as well as high levels of demandingness and dependency, whereas daughters seemed to display problematic behaviour only in the first year following divorce, and then adjusted rather quickly by forming a positive and close relationship with their custodial mother. Similar results for single-parent families were found by J. Block, J.H. Block, and Gjerde (1988), reporting a somewhat less harmonious mother-son relationship, whereas the mother-daughter relationship was characterized by warmth, intimacy, and described as even sisterly. Baldwin and Skinner (1989) described the mother-child relationship as a vicious circle in which the child’s internalizing, externalizing and demanding behaviours, and the custodial mother’s ineffective parenting methods, exacerbate each other’s problems and make everyone’s life unpleasant.

In general, the entry into adolescence, a developmental stage which is generally accompanied by confronting and rebellious behaviour towards parents, involves many challenges for children. They need to become more independent, they have to develop autonomy, and establish their own identity. During this period, adolescents need the support of their parents in order to develop according to age-
appropriate norms. However, poor parenting practices, and a conflictual relationship with the custodial parent after divorce, may interfere with a positive development during adolescence. Earlier studies found a somewhat better parent-child relationship for adolescents who lived with the same-sex parent (Camara & Resnick, 1988). Others reported a better quality of relationships for both adolescent boys and girls if they resided with the custodial mother than with the father (Maccoby, Buchanan, Mnookin, & Dornbusch, 1993). Particularly, preadolescent girls were found to form a close, loyal, confiding and supportive relationship with their custodial mother. However, during adolescence this bond seems to weaken, as maturing daughters tend to become more argumentative and oppositional towards their mothers (Hetherington, 2005).

3.5.2 Step-families

Divorce and remarriage entail changes in family organization, roles and relationships. While the result of a divorce lies in the loss of the non-custodial parent, remarriage involves the entry of additional family members, the step-parent and, in some cases, step-siblings. The majority of investigations focused on step-father/step-children relationships, as step-families are most commonly made up of a custodial mother and a step-father (Hines, 1997). When entering a step-family, children who used to live with their single custodial parent are challenged with the formation of constructive relationships with the new family members, and also with the re-establishment of relations with their custodial parent and biological siblings. So far, the literature only reports a temporary disruptive parent-child relationship, with elevated levels of conflict and negativity immediately after remarriage, and the development of a constructive relationship with time (Hetherington, 1992). However, a few studies reported some differences between the relationships of non-divorced, and remarried mothers two years after remarriage, with their children, with remarried mothers being less effective in controlling and monitoring their children (Bray, 1988; Hetherington,
1989, Pink & Wampler, 1985). Furthermore, Vuchinich, Vuchinich, Hetherington, and Clingempeel (1991) found children to be less responsive to their remarried mother compared to children in intact families, and this behaviour was observed more among boys than girls, which may be a continuation after divorce of pre-existing mother-son difficulties.

The pattern between the step-parent and the step-child is, however, quite different. There is considerable confusion and ambivalence among family members about how to establish a successful relationship between these two parties (Hetherington, 1992). The literature suggests that, as a result of this uncertainty, step-parents present with a lack of cohesiveness, communication, parental discipline, control and monitoring, and less engagement with the step-child (Brand, Clingempeel, & Bowen-Woodward, 1988; Bray, 1988; Furstenberg, 1987; Hetherington, 1988, 1989). When comparing step-fathers with biological fathers, Vuchinich et al. (1991) found that, in the first two years of remarriage, step-fathers attempt to develop a positive relationship with their step-children by displaying far more positive and responsive, and less negative and directive behaviour, symbolizing the role of a sociable and polite stranger. However, after initial attempts to establish a positive relationship and to improve the new family unit, step-parents are found to become increasingly disengaged from their step-children. This is particularly so for step-fathers, as step-mothers are generally more involved in child care (Hetherington, 1988, 1989). Moreover, the disengagement and withdrawal behaviour by the step-parent may be a result of persistent resentment and confrontation displayed by some step-children (Anderson, Greene, Hetherington, & Clingempeel, 1999; Hetherington, 1992; Kurdek & Fine, 1993). In general, step-mothers, compared to step-fathers, were found to have a more marked problematic relationship with their step-children (Clingempeel, Brand, & Ievoli, 1984; Furstenberg, 1987; MacDonald & DeMaris, 1996). Research suggests that, particularly during adolescence, step-sons and step-daughters present with more
coercive, less warm and responsive behaviour towards their step-mothers compared to step-fathers (Anderson et al., 1999; Bray & Berger, 1993; Hetherington, 1993).

In addition, when comparing children’s views of step-parents, Clingempeel et al. (1984) reported that those living with step-mothers viewed their relationship as more stressful and less supportive than those living with step-fathers. There are two possible explanations for this phenomenon; first, custodial fathers may expect step-mothers to take over the role of their divorced partner as a caretaker and disciplinarian (Fine, Voydanoff, & Donnelly, 1993; Thomson, McLanahan, & Curtin, 1992; Whitsett & Land, 1992); second, non-custodial mothers are found to maintain contact with their children more frequently than do non-custodial fathers, therefore step-mothers are more likely to get involved in competitive relationships, resulting in loyalty conflicts in children (Hetherington & Jodl, 1994).

Generally, both younger boys and girls initially respond negatively to the entry of a step-parent, however this is more enduring and intense for girls. There is empirical support that young step-daughters, compared to step-sons, are less likely to accept the step-father in their family, are more likely to treat him as an intruder who interferes with the child-mother relationship previously established during single-parenthood, and are more likely to display withdrawn, defiant, aggressive, and disruptive behaviour (Brand & Clingempeel, 1987; Hetherington, 1989, 1993). In contrast, young boys seem to have much to gain and little to lose with the entry of a step-father. Findings indicate that the addition of a step-father may compensate for the conflictual mother-son relationship, provide a source of support and companionship, and also may represent a new role model for the step-son (Vuchinich et al., 1991). Further, Hetherington (1993) reported that boys in remarried families, who had a supportive and authoritative step-father, were no different to those where the mother maintained single-parenthood.

Research has indicated that remarriage is particularly hard for adolescents to cope with (Hetherington, 1993). With the introduction of new family members, such as step-siblings, adolescent’s status may change in the sense that an oldest child may
become the middle, or the youngest may become an older child (Hines, 1997). Further, children in early adolescence were reported to find it more difficult to accept a step-parent as a new family member (Hetherington, 1989; Pink & Wampler, 1985). Young adolescents perceive the interventions of their step-fathers as a hindrance in their establishment of increasing autonomy, and especially pre-adolescent girls who are preoccupied with and sensitive to sexuality, which increases during early adolescence, may feel less comfortable with the presence of a non-biological parent (Hetherington, 1989). Adolescent step-daughters and step-fathers may feel insecure and confused about how to express affection, warmth, and care appropriately in their relationship (Strother & Jacobs, 1984; Vuchinich et al., 1991). Moreover, adolescent girls are found to show more withdrawn, sullen, avoidant and non-communicative behaviour towards their (step-)fathers, compared to girls from intact families (Hetherington, 1993). Vuchinich et al. (1991), for instance, reported that adolescent step-daughters spoke 30% less to their step-fathers, compared to girls to their biological fathers in nuclear families.

3.5.3 Sibling Relationships

While the literature provides a great deal of information on parent-child relationships in divorced and remarried families, sibling data is quite limited. However, sibling relationships after parental divorce are unique as they may compensate for interparental conflict and poor relations with the custodial and non-custodial parent (Hetherington, 1992). Further, the parent-child relationship, and also dissimilar treatment of children by divorced parents, has been found to impact on sibling relationships and their adjustment (Daniels, 1987; Dunn, 1983; Hetherington, 1988; Plomin & Daniels, 1987). There are two contrasting theoretical assumptions regarding sibling relationships in divorced and remarried families, one suggesting that siblings will regard each other as rivals, and present with hostile behaviour in their competition for
parental affection and attention. The other hypothesis is that such children, having experienced divorce or remarriage of their custodial parent, will regard relationships with adults as untrustworthy, erratic, and distressing, and will therefore turn to each other for comfort and mutual support (Bank & Kahn, 1982; Ihinger-Tallman, 1987).

Research undertaken so far to study sibling relationships in divorced families suggests that girls of divorced parents are more likely to show supportive and prosocial behaviour towards their siblings compared with boys; however, they are not necessarily less antisocial than boys (Bryant, 1982; Dunn, 1983). Others have found that brothers are less likely to be reciprocally supportive and that sisters are less able to provide emotional assistance for their brothers (Hetherington, 1988; Wallerstein, Corbin, & Lewis, 1988). In general, studies investigating the effects of family structure, such as birth order, gender, and developmental changes, on sibling relationships are somewhat inconsistent. For instance, while some investigators reported higher levels of negative behaviour in both older brothers and older sisters compared to younger siblings (Dunn, 1983), others reported problematic behaviour only in older brothers but not in older sisters (Hetherington, 1988; MacKinnon, 1989). Further, older sisters were more commonly found to teach their younger siblings than were older brothers (Dunn, 1983). In addition, research on gender composition of sibling pairs report less positive relationships among same-sex dyads, particularly those involving boys (Abramovitch, Pepler, & Corter, 1982; Anderson, 1999; Stoneman, Brody, & MacKinnon, 1986). Scarr and Grajek (1982) argued that these family structure variables would not explain differences in siblings sufficiently, and others claimed that these variables described little of the variance in individual differences in terms of adjustment (Daniels, Dunn, Furstenberg, & Plomin, 1985; Rodgers & Rowe, 1985). Therefore, most investigators believe that it is the quality of relationships and interactions among family members, rather than structural variables, that may explain developmental outcome in children of divorce (Furman & Buhrmester, 1985; Hetherington, 1988; MacKinnon, 1989).
In addition, some investigators have examined relationships among biologically-related siblings and step-siblings in remarried families. Generally, there is a wide range of sibling relationships in step-families, and the nature of these relations can be quite ambiguous (Anderson, 1999). Bumpass (1984) suggested that after remarriage two thirds of children will have either a half-sibling or a step-sibling. Furstenberg (1988) reported that 41% of children did not include their step-siblings in their definition of “immediate family” and interestingly, such exclusions were not related to the length of time they had been living in a step-family. Anderson (1999) compared different sibling relationships in remarried families with those of biological siblings from non/step-families. Results indicated that the relationships between step-siblings were less negative and aggressive, and characterized by less rivalry, avoidance and embarrassment of each other, compared with those of full siblings in step-families. These findings are in accord with others who suggested a benign, positive and supportive relationship among step-children (Ganong & Coleman, 1994; Ihinger-Tallman, 1987; White & Reidman, 1992). Further, while Anderson (1999) found no differences in relationships between full siblings living in step-families and those from non-step-families; others reported more intense negative behaviour among biologically-related siblings in step-families (Anderson & Rice, 1992), but also more intense positive behaviour (Hetherington, 1999) compared to those from non-step-families. Further, sibling and step-sibling relationships are more frequently characterized by rivaling, aggressive, and coercive behaviour, and this negativity may act as an additional stressor to children’s well-being, at least in the first two years of remarriage (Hetherington, 1989).

3.5.4 The Impact of Relationships on Children’s Adjustment

Parental separation or divorce may weaken the parent-child relationship, and this in turn may contribute to some of the adjustment problems found in children from
disruptive homes (Peterson & Zill, 1986). From a family systems perspective, the
development of psychopathology in children and adolescents can only be captured by
taking into consideration various interdependent relationships among family members
(Minuchin, 1985). Therefore, the literature suggests a potential link between the quality
of family relationships and children’s adjustment to marital conflict (Cowan, Cowan, &
Schulz, 1996; Hetherington, 1999) and parental marital transitions (Bray, 1999; Bray &
Hetherington & Jodl, 1994).

Some investigators have examined the role of depressive and withdrawn
parenting of single custodial mothers in relation to children’s adjustment, and found that
externalizing as well as internalizing behaviour in children was linked with
depressive/withdrawn parenting (Wood, Repetti, & Roesch, 2004). However, previous
studies reported that aversive parenting did not account for internalizing behaviour in
adolescence associated with divorce (Simons, Lin, Gordon, Conger, & Lorenz, 1999).
Differences in social, emotional and academic adjustment between children from intact
and remarried families were found to be associated with a difficult custodial parent-
child and step-parent/step-child relationship, as well as with high levels of conflict and
rivalry with siblings (Hetherington, 1999). For instance, Jodl, Bridges, Kim, Mitchell, and
Chan (1999) investigated adjustment differences in adolescents from intact and step-
families, and reported more symptoms of depression, more acting-out behaviour and
less social and cognitive competence in adolescents from remarried relative to intact
families. The authors further stated that a hostile and coercive relationship between the
custodial mother and the adolescent was related to higher levels of externalizing
behaviour, lower levels of social responsibility, more sibling negativity and less sibling
positivity. The latter finding is in line with other empirical research suggesting that the
quality of the parent-child relationship corresponds with the quality of sibling
relationships (Brody, Stoneman, & McCoy, 1994; Conger, Conger, & Elder, 1994).
Furthermore, Peterson and Zill (1986) studied the effects of marital disruption and
parent-child relationships on behaviour problems in boys and girls. Findings suggested that girls who had a positive relationship only with their fathers, but not with their custodial mothers, or with neither of their divorced parents, presented with significantly high levels of depressed/withdrawn behaviour, whereas similar boys showed more impulsive/hyperactive and antisocial behaviour, suggesting that girls are more likely to react with overcontrolled-, and boys with undercontrolled-, behaviour. In addition, boys displayed more misbehaviour and received more suspensions from school than did girls. Kim, Hetherington, and Reiss (1999) investigated children’s adjustment in step-families and found that aversive and hostile behaviour displayed by step-fathers led to more externalizing problems in both step-sons and step-daughters, which was further associated with delinquent peer contacts. This corresponds with research findings by Anderson, Lindner, and Bennion (1992), who found negativity expressed by step-fathers to be associated with externalizing behaviour in step-children.

Moreover, Dunn et al. (1998) studied the impact of the quality of children’s relationships with their custodial mother, their mother’s partner, and their siblings. Findings suggest that, independent of a child’s age, a poor mother-child relationship was associated with higher levels of hyperactivity, emotional, conduct, peer, and prosocial problems in children. The authors further stated that the negativity in children’s relations with their mother’s partner and their siblings also contributed to adjustment problems in these children, and this was unrelated to the mother’s negativity. Hetherington (1992) provided evidence that negativity in relations between biologically-related siblings in step-families contributed to more externalizing behaviour in adolescents. Similar results were found by Kim, Hetherington, and Reiss (1999), who reported that negative and hostile behaviour among siblings produced adverse behavioural problems in adolescent girls and boys of step-father families. Anderson, Lindner, and Bennion (1992) added further evidence to these findings, by indicating an association between negativity in sibling relations and more externalizing behaviour patterns in those from remarried families, compared to children from intact homes.
3.6 Summary

As statistics of divorce show, the nuclear family, always perceived as the most common and favourable type of all existing living arrangements, is no longer the norm. The chronic instability of marriages has led to an increased divorce rate in Western countries during past decades. There are risks for children’s well-being associated with parental divorce, as the literature suggests the occurrence of adjustment problems, not only after the break-up, but already prior to separation. It may be possible that children benefit from their parents’ divorce, as they are no longer confronted with parental conflict and discord, and may therefore fare better in a single-parent household. However, the majority of studies indicate functional impairment in children following divorce, including short- and long-term negative outcomes. The literature proposes adjustment problems, not only in children but also in parents, following divorce, resulting in deficient parenting and a relatively poor relationship between the child and the custodial-parent.

Further, remarriage and the diversity of step-family dynamics correlate with children’s psychological well-being. The entry of a step-parent may help improve the family in economic terms; but it is also associated with an increase in adjustment problems in children. In addition, there are individual differences in how children respond to parental separation, with variations among age groups and gender. Adolescence seems to be a difficult time for dealing with marital transitions, as an increasing demand for autonomy may trigger heightened conflict in divorced and remarried families. While boys seem to adjust less satisfactorily in single-parent homes, the entry of a step-parent appears to influence their behaviour in a positive way. Girls generally fare better living with their single custodial mother by forming a close and supportive relationship, and remarriage may produce concern and anxiety that the step-parent may interfere and disrupt this affiliation, and in turn cause conflict
and complications. Finally, the literature clearly implicates the role of chronic instability and multiple transitions as placing children at significantly increased risk for behaviour problems. Thus, the way children react in response to divorce, remarriage or multiple transitions depends highly on the quality of relationships with their family members. The literature highlights the importance not only of a positive parent-child relationship in children’s adjustment to family changes, but also the role of sibling relations. Therefore, in research, it is important to understand the complexity and meanings of family processes, and also the risk factors associated with marital dissolution, so that ways of supporting stability and well-being for all family members can be found.

In this chapter, the literature on divorce was reviewed, including divorce trends, theoretical assumptions underlying divorce, differences in children’s adjustment in relation to family type, and the quality of relationships among family members. In the next chapter, the literature will be reviewed on chronic childhood conditions in regards to family adversity and divorce rates.
CHAPTER 4: CHRONIC CONDITIONS IN CHILDHOOD
4.1 Introduction

The economic impact of chronic childhood illnesses on families has always been a topic of great interest in both research and political decision making, as families with chronically ill children have been found to suffer from economic hardship, resulting from medical and other treatment expenditures (Darling, 1987; Heath, Lintuuran, Rigguto, Tikotlian, & McCarthy, 2006; Newacheck & Taylor, 1992). However, what is equally important is the issue of how family relationships and marital stability are influenced by serious health conditions in children.

There are two theoretical reasons why families with chronically ill children might be expected to have higher divorce rates compared to those with healthy children. Firstly, Friedman, Hechter, and Kanazawa (1994) suggest that the ‘uncertainty reduction principle’ causes individuals to engage in behaviours that are likely to minimize uncertainty about the future. This means that severe and chronic health conditions in children are associated with tremendous stress for parents, which can destabilize their marriage and increase the couple’s uncertainty about the future as well as the probability to seek divorce by the parent who expects to be the non-custodial parent after the break-up. Further, the authors argue that the less severe or persistent the child’s conditions are, the more optimistic about their child’s future and the more engaged in helping their child are the parents. In addition, families of children with less severe health problems would have similar divorce rates to those parents with healthy children. In Contrast however, some investigators have indicated that the severity of a child’s illness is unrelated to the likelihood of parental divorce (Dorner, 1975; Falkman, 1977; Tew, Laurence, Payne, & Rawnsley, 1977).

Secondly, from a social-economic perspective children are perceived as ‘marital-specific capital’, which increases the net gain from marriage and thus improve marital stability (Becker, Landes, & Michaels, 1977; Waite & Lillard, 1991). This implies
that if a child is less able to meet its parents’ expectations (e.g., enjoyment and pride), then the child’s marital-specific capital is less than expected, causing a lower gain from the marriage than anticipated, and a higher risk for divorce. Alternatively, elevated concern in parents about possible negative effects of divorce on their chronically ill child would increase rather than decrease marital stability. Current social norms encourage couples with children to stay together more than childless couples, and these expectations may be even higher especially for those with chronically ill children (Joesch & Smith, 1997).

In addition to these hypotheses, there are some other perspectives suggesting negative outcomes for parents with seriously ill children. A child’s illness or disability may place heavy emotional and financial burden on parents, increase the time spent on child-rearing, and disrupt marital social relationships (Friedrich & Friedrich, 1981; Kazak, Reber, & Carter, 1988). This last may correlate with the quality of interparental relationships, and may result in marital dissolution (Mauldon, 1992). In addition, maternal depression associated with the severity and age of the chronically ill child, and the mother’s limited social network, has been frequently observed among mothers of ill children (Breslau, Staruch, & Mortimer, 1982; Cummings, Bayley, & Rie, 1966; Gayton, Friedman, Tavormina, & Tucker, 1977). This has been further found to negatively affect marital relationships (Fadden, 1989; Stoneman, Brody, & Burke, 1989). Thus, as a result of these factors, maternal depression in association with childhood illness can place unstable families at even greater risk. In contradiction, there is some evidence in the literature that additional medical costs related to special treatment for chronically ill children, would lead to a long-term financial hardship in single parenthood, so that the likely custodial parent refrains from considering divorce or separation as a possible solution (Cherlin, 1977; Joesch & Smith, 1997; Mauldon, 1992). Consequently the parents stay together, despite their marital discontent and dissatisfaction.
4.2 Divorce Rates Among Families of Chronically Ill Children

The literature consistently reports findings in regard to divorce rates among families of children with serious health problems. For instance, some investigators have found high divorce rates among couples with chronically ill children (Finley, Putterbough, Cook, Netley, & Rowe, 1979; Gath, 1977; Lansky, Cairns, Hassanein, Wehr, & Lowman, 1978; Love, 1973; Martin, 1978), whereas others did not find any significant differences in divorce rates between the general population and families with children of poor health (Hauenstein, 1990; Lansky, Cairns, Hassanein, Wehr, & Lowman, 1978; Love, 1973; Martin, 1978). Nonetheless, there is some evidence of higher levels of marital distress, indicated by poor marital satisfaction, and a higher frequency of arguments or differences in opinions between couples (Sabbeth & Leventhal, 1984).

In general, past research has predominantly focused on relatively small samples, and did not investigate longitudinal data, but used cross-sectional study designs, poor outcome measures, and inadequate control groups. An exception are studies by Corman and Kaestner (1992) and Mauldon (1992), who examined the relationship of divorce and children's health status using a large representative sample and multivariate modelling. Both concluded that poor health conditions in children correlated with an increase of the mother's likelihood of divorce. In addition, others have found divorce rates 2 to 3 times higher among couples with children who suffered from congenital heart disease, cerebral palsy, or blindness, compared to those with healthy children. Lower rates of marital dissolution were found in families with children who had migraines, learning disabilities, respiratory allergies, asthma, a permanent deformity or loss of limbs. Furthermore, higher impact scores and divorce rates were observed among families with childhood cancer and spina bifida compared to families of children with diabetes mellitus (Heath, Lintuuran, Rigguto, Tikotlian, & McCarthy,
2006; Martin, 1975). These results are in accordance with Joesch and Smith (1997) who found that mothers of children with a chronic illness had both higher and lower risks of divorce than those of healthier children. The authors therefore argued that the likelihood of divorce among families with chronically ill or disabled children depends upon the type of illness. However others suggested that the frequency of a child’s illness would be the key factor that impacts on the parent’s risk for divorce (Mauldon, 1992).

Consequently I will discuss some of the most severe chronic conditions in childhood, including childhood asthma, childhood cancer, cystic fibrosis and AD/HD, and their relationship with marital dissolution.

4.3 The Relationship Between Family Adversity and Chronic Childhood Conditions

4.3.1 Childhood Asthma

Asthma is one of the most common chronic diseases among children (Woodruff et al., 2004) with 13.4% of Australian children aged 0-14 years diagnosed with asthma in 2001 (ABS, 2001). Children with chronic conditions have been found to experience a considerable added burden of poor health. For instance, Newacheck and Taylor (1992) reported that 28.6% of children with asthma were limited in their usual activities and spent an average of 3 days per year in bed due to their chronic condition. Further, the authors found an annual school absence of approximately 5 days in asthmatic children, which was also attributable to their illness.

In addition, there is evidence that the presence of a child with a chronic condition, especially younger children and those with more frequent symptoms (Wasilewski et al., 1988), is associated with additional stress and disruptions in their
families (Longo & Bond, 1984). Frankel and Wamboldt (1998) studied the impact on family life of 70 children diagnosed with asthma, and suggested that impact levels were associated with the amount of parental emotional stress and social support. Parents who presented with high levels of emotional distress, and low rates of perceived social support, described their child’s condition as disruptive, having a significant influence on family life. As a consequence of these findings, research investigated the impact of stressors on family stability and marriage break-downs. Joesch and Smith (1997) examined the relationship of various childhood conditions and marital dissolution. While lower rates of divorce were found among families with asthmatic or learning disabled children, higher rates were observed for those with children who suffered from genital heart disease or cerebral palsy, compared to families with healthy children. Therefore, the authors concluded, that the risk of parental divorce would depend upon the child’s condition. In addition, Dawson (1991) studied the effects of family structure on children’s physical health. Results indicated a 50% higher risk of asthma in children of divorced parents compared to children from intact families. While the author suggested that the children’s condition was the cause rather than the consequence of marital disruption, results cannot be considered definitive and more research is needed to investigate the relationship between children's health and family type. In contrast, Angel and Lowe-Worobey (1988) studied chronic disorders, including asthma, in children from intact families and single mother homes (most of them previously married). The authors discovered that single mothers reported a higher occurrence of chronic diseases such as asthma for their children than did mothers from intact families. It was suggested that children residing in single-parent homes are more likely to live in poverty and are therefore more frequently exposed to health risks associated with low income, compared to those from intact families.
4.3.2 Childhood Cancer

While childhood cancer is relatively rare compared to cancer in adults, with a global annual incidence ranging from 70 to 160 per million children aged 0-14 years (Stiller, 2004), it has been found to be the second most common cause of death in children, after accidents and injuries (Moon, Rahman, & Bhatia, 1999; Ries et al., 1999). The most frequent diagnostic groups of childhood cancer found worldwide are leukaemia (12%-33%), lymphoma (11%-22%), and tumours of the central nervous system (18%-22%) (Chen et al., 2002; Garcia-Calatayud et al., 2003; Ka et al., 2003; Moon, Rahman, & Bhatia, 1999; Wessels & Hessling, 1997), with the highest rates observed in younger children, males and in the white population (Chen et al., 2002; Moon, Rahman, & Bhatia, 1999). Having a child diagnosed with cancer is associated with various emotional reactions in parents, and this is mostly because cancer is associated with death (Grootenhuis & Last, 1997). There is empirical support that parents of newly diagnosed children with cancer present with higher levels of emotional distress, including anxiety or depression (Dahlquist et al., 1993; Magni, Silvestro, Carli, & DeLeo, 1986; Manne et al., 1995; Overholser & Fritz, 1990), as well as insomnia, somatic and social dysfunctioning (Fife, Norton, & Groom, 1987; Magni, Messina, DeLeo, Mosconi, & Carli, 1983; Sawyer, Antoniou, Toogood, Rice, & Baghurst, 1993). For instance, McCarthy (1975) found that more than one third of 64 mothers of children diagnosed with leukaemia were receiving antidepressants, mild tranquilizers, or sleeping tablets. The author further reported more mothers (33%) than fathers (12%) taking antidepressant and sedative medication. Additionally, Brown et al. (1992) reported psychiatric disorders in 34% of mothers with children who received a diagnosis of cancer. Thus, a child's chronic illness can be correlated with poor psychological well-being in parents, and this may be associated with marital disharmony. Some researchers have reported higher levels of marital distress, particularly after the diagnosis but without resorting to divorce (Brown et al., 1992;
Schuler et al., 1985). Hamovitch (1964) provided evidence of marital problems in at least 10% of couples during the course of their child’s illness and after its death. He did not report any rates of divorce or separation in this group but found some cases were marital dissolution occurred. Further, in their follow-up study of 40 parents three months after their child died of leukaemia, Kaplan, Grobstein, and Smith (1976) reported that 5% had divorced and 18% were separated. In general, these studies utilized only very small samples, a short-term follow-up period, and most did not compare divorce rates with those of a control group or with census data of the general population.

On the other hand, Lansky, Cairns, Hassanein, Wehr, and Lowman (1978) found no differences in levels of marital stress and divorce rates in parents of children with cancer and the general population. However, results also indicated that the illness did not bring couples closer together. Others have reported that most parents perceived their marriage as relatively satisfactory and described their partners as supportive and caring (Barbarin, Hughes, & Chesler, 1985). Oakley and Patterson (1966) carried out a follow-up study of interviews with 15 families where the child had died of cancer at least 11 months ago, and found no divorces or separations in their sample. These findings are in line with those by Stehbens and Lascari (1974), who indicated no parental break-ups in their group, and no adverse affects of children’s chronic illness on marital relationships.

4.3.3 Cystic Fibrosis

Cystic Fibrosis (CF) is predominantly diagnosed in childhood and is a genetically inherited disease that affects approximately 30,000 individuals in the United States (Cystic Fibrosis Foundation, 2003; Davis, Dumm, & Konstan, 1996; Stark, Mackner, Patton, & Acton, 2003). This multifaceted chronic condition affects the secretory glands of major organs in the respiratory, gastrointestinal, and reproductive
system, resulting in pancreatic insufficiency, chronic progressive pulmonary disease, and atypical high electrolyte concentration in sweat (Stark et al., 2003; Farzan & Farzan, 1997; Spirito & Kazak, 2006). The production of thick mucus, the hallmark of this illness, makes the lungs vulnerable to recurrent pulmonary infections, while pancreatic insufficiency causes inadequate digestion and absorption of food (Davis et al., 1996; Farzan & Farzan, 1997; Stark et al., 2003). Some children experience additional complications when they become older, such as CF-related diabetes, osteoporosis (Stark et al., 2003), and liver disease (Cystic Fibrosis Foundation, 2001). However, advances in medical treatment, early diagnosis, and the availability of effective antibiotics have led to an increased life expectancy of approximately 30 years (Cystic Fibrosis Foundation, 2003; Doershuk, 2001; Farzan & Farzan, 1997).

Treatment regimes for children and adolescents suffering from CF, including chest physiotherapy, antibiotics, and nutritional treatment, are important in the management of the disease (Hagopian & Thompson, 1999; Ramsey, Farrell, & Pencharz, 1992; Stark et al., 2003), and adherence is crucial for survival, which places high demands and tremendous stress on patients and their families (Ievers & Drotar, 1996; Spirito & Kazak, 2006). Studies investigating the problem of adherence to treatment suggest that non-adherence is a major cause of conflict between parents and children with CF, especially during adolescence (DiGirolamo, Quittner, Ackerman, & Stevens, 1997; Patterson, Budd, Goetz, & Warwick, 1993; Quittner et al., 2000). In addition, Gayton, Frieman, Tavormina, and Tucker (1977) studied 43 families of children with CF, aged 5 to 18 years, and found decreased family satisfaction and family adjustment in these couples. Further, while the authors reported greater disturbances in personality functioning in fathers than mothers, the latter presented with increased levels of depression, feelings of hopelessness, and futility. However, this study was limited in sample size and did not include a clinical control group for comparison. Quittner et al. (1998) investigated role strain in 33 couples with children diagnosed with CF, and 33 parents with a healthy child. Findings suggest greater
marital role strain, including higher levels of frustration and conflict among couples with children with CF compared to the control group. Not significant, but noteworthy, is their finding that mothers of a chronically ill child reported more symptoms of depression than fathers and couples in the control group, and this was suggested to be partly attributable to elevated levels of parenting stress and more responsibility for medical care in mothers. However, this study only focused on parents with very young children (toddler, kindergarten), and results are therefore not generalizable to other age groups.

In contrast to the aforementioned findings, Walker, Ford, and Donald (1987) did not find any significant differences between mothers of children with CF and those of healthy children in terms of stress levels or feelings of inadequacy as a parent. However, the authors reported that mothers of preschool children and adolescents with CF had higher depression scores than mothers of healthy children in the same age groups. Similarly, McCrae, Cull, Burton, and Dodge (1973) studied 100 mothers of children with CF and found that 42 had sought medical help and underwent anti-depressant therapy. Finally, Begleiter, Burry, and Harris (1976) investigated the prevalence of divorce among 29 parents of children with cystic fibrosis and found a divorce rate of 17%, but highlighted that this finding was not significantly different to the national US divorce rate of 14%. However, the sample in general was very small and the use of the national divorce rate may not represent the rate in the region from which the sample was drawn, as divorce rates vary widely across the nation. Similarly, Venters (1981) studied 100 families of children with CF and found no significant correlation between family adjustment and marital status. However, some relationship was reported by Oppenheimer and Rucker (1980), who found 5 divorced cases in their sample of 37 families, and two of them stated that it was a result of the stress involved caring for their child with CF.
4.3.4 Attention-Deficit/Hyperactivity Disorder

Children diagnosed with AD/HD, especially those of the hyperactive-impulsive or combined subtype of the disorder, present with multiple behaviour problems which may correlate with poor family functioning and disruptive interparental relationships. Battle and Lacey (1972) described mothers of highly active boys as critical, disapproving, unaffectionate, and punitive. However, these parenting behaviours were not associated with high levels of activity in girls. While some investigators hold the view that this type of parenting found in mothers of hyperactive children would be a contributing factor to the child’s symptom profile (Bettelheim, 1973), others strongly disagree and suggest that the mother’s parenting performance would be a reaction to the child’s behaviour and not a cause of it (Bell & Harper, 1977).

The latter view has found empirical support from several investigators. Humphries, Kinsbourne, and Swanson (1978) studied child-parent interactions during a highly structured task under drug and placebo conditions. Findings suggested that while on medication the hyperactive child and the mother displayed more praise and less criticism towards each other, they made fewer errors on the task and the mothers gave fewer directions. This change of intrusive controlling, disapproving, behaviour in mothers, while the child was on stimulants, shows that changes in the child’s behaviour can modify parenting patterns in mothers, and the authors therefore concluded that the mother’s negative parenting style was a response to the child’s disruptive behaviour rather than the cause of it. However, this study was carried out without a comparable control group, and the structured laboratory test may not be applicable to real-life situations. Cunningham and Barkley (1979) compared mother-child interactions of hyperactive boys (off medication) and normal controls in a free play and task setting. Findings suggest that mothers of hyperactive boys displayed more controlling behaviour, gave more commands, were less rewarding, and also more inconsistent in rewarding desired behaviours. The authors concluded that the mother’s over-
controlling behaviour might not just be an initial response to the child’s behavioural difficulties, but also impact on the child’s performance. Similar results were found by Mash and Johnston (1982), who reported more negative, less responsive and approving behaviour in mothers of hyperactive children than in controls. In a subsequent study, Mash and Johnston (1983) reported that parents of hyperactive children were less confident in their parenting knowledge than controls, and especially mothers reported higher levels of stress, more social isolation, self-blame, and depression. Tallmadge and Barkley (1983) examined differences in parenting style among fathers with hyperactive boys and found them, like mothers, to be more directive than fathers of controls. However, the children were more likely to obey their fathers’ than their mothers’ commands.

These emotional problems and elevated levels of stress, together with the negative parenting patterns found in parents of hyperactive children, may further correlate with poor interparental relationships and marital discord. Early studies by Rutter (1971) and McCord and McCord (1959) concluded that externalizing disorders, such as AD/HD, are associated with disruptive marriages. Barkley (1981) further speculated that parents of children diagnosed with AD/HD would experience more marital discord and maternal depression than other clinical groups or non-disabled control subjects. Brown and Pacini (1989) reported higher rates of divorce and separation in their AD/HD group compared to clinical and non-disabled controls. The authors further indicated that divorced or separated parents experienced disturbed interpersonal relationships, including higher levels of conflict and lower family cohesiveness. However, this study included 85 clinically-referred subjects and results might therefore be biased, as the literature suggests higher frequencies of children with more severe symptomatology in the clinical population (Neuhaus, 2000; Gaub & Carlson, 1997). More recent studies have reported similar outcomes. For instance, Cohen, Adler, Kaplan, Pelcovitz, and Mandel (2002) investigated the effects of marital status on psychopathology in adolescents and found higher rates of AD/HD in those
from divorced/separated homes (27%), compared to teenagers from intact families (2%). Further, a workshop held by Hinshaw, Peele, and Danielson (1999), discussing public health issues in AD/HD, examined areas of dysfunction in individuals with AD/HD and their families. The authors concluded that AD/HD would be associated with marital discord and higher divorce rates. Similar results were found by others (Barkley, Fisher, Edelbrock, & Smallish, 1990; Biederman et al., 1991, 1992, 1998, 2002). Counts, Nigg, Stawicki, Rappley, and von Eye (2005) found family adversity, including marital conflict, to be associated with children’s AD/HD symptomatology. The authors further suggest that marital conflict may impact on the child’s behaviour, but also be influenced by the child’s conduct problems. Similarly, Kasen, Cohen, Brook, and Hartmark (1996) suggested that adolescents living in step-families would be four times more at risk for AD/HD than youth from intact homes. Other investigators established a relationship of poor parenting skills, marital disharmony, parental conflict, and disruptive parent-child relationships with hyperactivity and attentional difficulties (Brandon, 1971; Burt, Kruger, McGue, & Iacono, 2003; Cantwell, 1996; Taylor & Warner-Rogers, 2005; Warner-Rogers, Taylor, Taylor, & Sandberg, 2000), as well as with the occurrence of internalizing and externalizing problem behaviour in children with AD/HD (Biederman, Faraone, & Monuteaux, 2002; Biederman et al., 1995; Drabick, Gadow, & Sprafkin, 2006; Hurtig et al., in press; Hurtig, Taanila, Ebeling, Miettungen, Moilanen, 2005). Generally, most of these studies are lacking in sample size, longitudinal study design and diversity of subject selection (e.g. ethnic groups, urban/suburban areas, referred/non-referred, narrow age range, exclusion of girls), which limits generalizability of results to other populations. In summary, research findings indicate an association between marital disruption and behaviour problems in children with AD/HD. However, whether these family adversities can be seen as the consequence or the cause of the child’s conduct needs further clarification.
4.4 Summary

There is little evidence in the literature that rates of divorce and separation are higher among families of children with a chronic illness or disability compared to those of healthy children. However, analyses highlight the importance of children’s health for the stability of families and interparental relationships. The severity and frequency of symptoms may be associated with the amount of emotional distress parents experience when caring for a child with poor health (Mauldon, 1992). Further, the type of illness may also be a key factor in terms of family stability and psychological functioning, as some childhood conditions have been reported to be more related to family dissolution than others (Joesch & Smith, 1997). Therefore, life threatening chronic illnesses such as childhood asthma, cancer, or cystic fibrosis may have a stronger negative impact on family and parental functioning than developmental disorders, such as AD/HD, which do not follow a lethal course. Moreover, chronic conditions in children can cause financial hardship, place tremendous burden on parents’ psychological well-being, and may correlate with disruptive marital relationships.

It has been argued that parents of chronically ill children present with more symptoms of depression, experience more marital distress, more dissatisfaction, and have more arguments and disagreements than other parents. However, in general, the data do not necessarily suggest a tendency of parents to seek divorce when caring for an ill or disabled child (Hauenstein, 1990; Lansky, Cairns, Hassanein, Wehr, & Lowman, 1978; Longo & Bond, 1984; McCubbin, 1989), and studies indicated that the majority of couples reported that their child’s illness had not negatively affected their marital relationship (Barbarin, Hughes, & Chesler, 1985). While the AD/HD literature indicates a relationship between marital disharmony, parental conflict and the symptom
profile of children with AD/HD, it is unclear whether the behaviour problems of these children can be seen as the cause or the consequence of family instability.

Overall, neither the assumption that separation or divorce is directly related to the stress perceived by parents of caring for a child with a chronic and/or life-threatening illness, nor the postulation that marital malfunctioning contributes adversely to the child’s chronic condition can be made. Therefore, further research is necessary to study the relationship between parental/family functioning and chronic childhood conditions as well as to investigate treatment approaches other than pharmaceutical methods in order to provide best treatment for all family members of chronically ill children.

In this chapter, the literature on the relationship of parental divorce and chronic childhood conditions was reviewed. The following study chapters will investigate the relationship between parental divorce and the psychological well-being of children with AD/HD. Differences in children’s behaviour will be examined between divorced and non-divorced families, single-parent households and step-families, as well as single and multiple divorced parents. Further, the quality of relationships between children with AD/HD and their family members will be evaluated. Finally, parental perceptions about the impact of their child’s behaviour on family and parental functioning will be investigated.
CHAPTER 5: STUDY 1. THE RELATIONSHIP BETWEEN 
DIVORCE AND CHILDREN WITH AD/HD AND COMORBID 
CD/ODD and LD¹

¹This study is under review for publication as: Leila D. Heckel, Adam R. Clarke, 
Robert J. Barry, Rory McCarthy, & Mark Selikowitz. The Relationship Between 
Divorce and Children with AD/HD of Different Subtypes and Comorbidity: Results 
from a Clinically Referred Sample. Journal of Divorce and Remarriage.
5.1 Introduction

AD/HD has been recognized as the most common behavioural disorder in childhood, characterised by symptoms of inattention, hyperactivity, and impulsivity (Barkley, 1981). The current Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994) describes AD/HD as a two dimensional disorder with cognitive and behavioural symptoms and defines three subtypes: Predominantly Inattentive, Predominantly Hyperactive-Impulsive, and Combined Type. Prevalence of AD/HD in Australian children is estimated at 11% (Sawyer et al., 2000). Children with AD/HD are frequently diagnosed with other comorbid conditions, such as Conduct Disorder (CD) and Oppositional Defiant Disorder (ODD), which are considered to be the most common comorbid diagnoses (Souza, Serra, Mattos, & Franco, 2001), but Learning Disabilities (LD) are also common among children with AD/HD (McCann & Roy-Byrne, 2000; Semrud-Clikeman et al., 1992). In clinic-based studies the combined subtype has been consistently associated with externalizing disorders (Barkley, DuPaul & McMurray, 1990; Eiraldi, Power, & Nezu, 1997; Faraone, Biederman, Weber, & Russell, 1998; Goodyear & Hynd, 1992; Nolan, Volpe, Gadow, & Sprafkin, 1999), whereas the inattentive subtype has been reported to present with greater impairment in academic achievement (Hynd et al., 1991; Marshall, Hynd, Handwerk, & Hall, 1997). However, a majority of studies failed to find significant differences regarding scholastic achievements, suggesting that both subtypes are equally impaired (Barkley et al., 1990; Casey, Rourke, & DelDotto, 1996; Faraone et al., 1998; Morgan, Hynd, Riccio, & Hall, 1996). While the inattentive subtype of AD/HD is found to be more prevalent in older children, the combined subtype is more common among younger children (Nolan et al., 1999). This is in accordance with research pointing to a steady decline in symptoms of hyperactivity/impulsivity with increasing age of children with AD/HD, whereas symptoms of inattention tend to persist into adolescence and adulthood.
In addition, poorer school performances have been found in older subjects with AD/HD relative to younger children (Barkley et al., 1990; Biederman et al., 1998). Finally, disruptive disorders and poorer school functioning have been more frequently observed among boys than girls (Biederman et al., 2002; Gershon, 2002; Graetz, Sawyer, & Baghurst, 2005).

Recent research has focused on studying the aetiology of AD/HD. Studies have shown that the disorder is highly heritable and may be associated with neurobiological deficits in the cortical and subcortical regions that control attention and motor behaviour (Levy, Hay, McStephen, Wood, & Waldman, 1997; Morrison & Stewart, 1973; Spencer, Biederman, Wilens, & Faraone, 2002). Further, molecular genetic studies have implicated the role of various polymorphisms, and the involvement of several genes in the pathogenesis of AD/HD (Faraone & Doyle, 2001; Mill et al., 2006).

Taylor and Warner-Rogers (2005) suggested that the quality of caregiving could negatively influence attention, impulse control and self-regulation in children with AD/HD. However, to date the aetiology of this disorder is still unclear and research on environmental factors, such as divorce, as a possible risk to the well-being of children with AD/HD, is lacking. Part of the reason for the lack of research is that the bulk of the scientific literature to date attaches little importance to the role of environmental or social factors in the development of AD/HD (Barkley, 1997; Cantwell, 1996). This is primarily due to the commonly held view of AD/HD as a neurodevelopmental disorder, resulting from structural abnormalities in the frontal cortex and in subcortical brain areas, as well as the involvement of various genes as the primary cause of this disorder (Faraone & Doyle, 2001; Morrison & Stewart, 1973). Therefore, environmental factors are regarded as playing only a subordinate role in the cause and course of AD/HD. Authors such as Barkley (1997) argue that only biological and genetic factors play an important part in AD/HD, and therefore rule out the influence of environmental factors. Cantwell (1996) postulates that psychosocial factors are related to the
development of CD and ODD rather than to the core symptoms of AD/HD. This issue needs to be investigated, as a belief about the nature of a disorder has a major impact on treatment, and it is possible that present best practice treatment for AD/HD does not actually focus on all the factors that cause the problem.

The traditional nuclear family has been considered to be the most desirable family type for many years, in terms of providing good mental health and well-being for all family members (Amato, 1987). However, this view has changed as rates of divorce have increased in the last decades. According to the Australian Bureau of Statistics (ABS, 2003), there were 53,145 divorces granted in Australia in 2003, signifying an increase of 10% in divorces compared to 10 years earlier (48,363). There were also 106,400 marriages registered in Australia in 2003, indicating that the divorce rate was half the marriage rate. Thus, over the last two decades, approximately 50,000 children in Australia experienced a family breakdown each year (ABS, 2003).

The impact of divorce on the mental health of children has been well documented. Studies suggest that divorce results in poorer academic achievement and more externalizing behaviour problems in children (Amato, 2001; Cheng, Dunn, O’Connor, & Golding, 2006; Forman & Davies, 2003; Harold, Shelton, Goeke-Morey, & Cummings, 2004; Jeynes, 1999; Lansford et al., 2006). A review of the literature also indicates that children’s maladjustment to parental divorce varies as a function of gender. The effect of divorce seems to be more enduring for boys than for girls, with boys showing more behaviour difficulties than girls prior to the divorce (J.H. Block, J. Block, & Gjerde, 1986); and Harold and Conger (1997) reported externalizing problems only for boys. Kinard and Reinherz (1986) investigated the effects of divorce on children’s academic achievement and reported higher overall school performance and a greater productivity for girls than for boys. However, these outcomes seem to change with increasing age of the children. Age-related differences were found, with adolescent girls presenting with more externalizing problems than adolescent boys (Baumrind, 1989, 1991; Davies & Lindsay, 2004), and Hetherington (2005) found that
the likelihood of achieving a higher educational outcome (e.g. high school, college) was stronger for adolescent boys than girls. However, these findings have not been replicated by others, who did not find significant interactions between age and gender when examining differences in academic outcome (Ruschena, Prior, Sanson, & Smart, 2005; Sun, 2001).

The relationship between parental divorce and the well-being of children with AD/HD has not been widely investigated. Research focused on families of children with AD/HD has so far found that these families have difficulties in interpersonal relationships and somewhat fewer intact marriages (Barkley, Fisher, Edelbrock, & Smallish, 1990; Biederman et al., 1992; Biederman, Faraone, Keenan, Steingard, & Tsuang, 1991; Brown & Pacini, 1989; Cohen, Adler, Kaplan, Pelcovitz, & Mandel, 2002; Kasen, Cohen, Brook, & Hartmark, 1996). However, very few studies investigated a possible relationship between divorce and AD/HD. Some researchers have found that adolescents with AD/HD and comorbid conditions, relative to those with AD/HD alone, were significantly more common in non-intact families, suggesting that family characteristics are associated with the presence of more attention problems, CD, ODD, mild depression and substance abuse in adolescents with AD/HD (Hurtig, Taanila, Ebeling, Miettungen, & Moilanen, 2005; Hurtig et al., in press). Others have found that harsh and inconsistent parenting, as well as low marital satisfaction, and high levels of conflict among family members, correlated with the occurrence of conduct problems in children with AD/HD (Drabick, Gadow, & Sprafkin, 2006). Further, there is evidence in the literature that poor parenting, a chaotic home environment, and marital disharmony are associated with symptoms of inattention and hyperactivity in children (Brandon, 1971; Burt, Krueger, McGue, & Iacono, 2003; Rutter, Cox, Tupling, Berger, & Yule, 1975; Tallmadge & Barkley, 1983; Warner-Rogers, Taylor, Taylor, & Sandberg, 2000; Young, Heptinstall, Sonuga-Barke, Chadwick, & Taylor, 2005); and others have found that family conflict and low family cohesion not only correlated with a higher risk for AD/HD but also with more problem behaviour in domains of
internalizing/externalizing and social functioning in children with AD/HD (Biederman et al., 1995; Biederman, Faraone, & Monuteaux, 2002). However, the majority of these studies were limited in their sample size, included mostly boys with AD/HD, and investigated children within a very narrow age range.

The aim of this study is to extend the existing aetiological knowledge of AD/HD by investigating differences in the occurrence of behavioural problems and learning disabilities among children with AD/HD from divorced and non-divorced families, and to determine whether divorce is associated with the symptom profile of these children. Further, subtype, sex, and age differences will be examined. This study will test the following hypotheses: parental divorce correlates with the occurrence of a) disruptive behaviour, such as CD/ODD, and b) learning disabilities among children with AD/HD; so that children with AD/HD from divorced families are more likely to show externalizing behaviour patterns and academic underachievement, compared to those of intact AD/HD families.

5.2 Method

5.2.1 Subjects

This study utilised file audit data from a paediatric practice in Sydney Australia. For inclusion in this study, all children had a primary diagnosis of AD/HD according to DSM-IV criteria (APA, 1994). The sample consisted of alphabetically consecutive files from the pool of current patients. The complete case files provided information about the child’s diagnosis, the presence of comorbid psychiatric disorders such as LD and CD/ODD, the present family situation (e.g. carers, marital status), and demographic data. The files of 1201 children, aged 6 to 18 years, were initially reviewed. From this sample, two groups were selected: (1) children with AD/HD whose parents were
divorced; and (2) children with AD/HD whose parents were not divorced. For the purposes of this study, divorce was defined as physical separation and/or divorce of the child’s biological parents. We excluded children living with adopted or foster families or other carers (e.g. grandparents) which was not the result of a divorce or separation of their biological parents (e.g. both parents deceased). These files were further reduced to 1000 subjects, as only one sibling within a family was included in the study. Where multiple siblings were found, only data from the first file reviewed was included for analysis. This was done to reduce the possible impact of a single divorce on multiple children, which may have biased results.

### 5.2.2 Procedure

After arrival at the Sydney Developmental Clinic each subject received a comprehensive clinical assessment by both a paediatrician and a psychologist. At first, parents together with their child had a consultation with the developmental paediatrician. For the diagnoses of AD/HD and disruptive behaviour problems such as CD/ODD, children had to meet criteria according to the DSM-IV (APA, 1994). For diagnosis of these conditions the paediatrician conducted semi-structured clinical interviews with all parents, based on DSM-IV criteria, followed by a physical examination of the child. This source of information is stressed by Rowland, Lesesne, and Abramowitz (2002) as one of the most important diagnostic procedures available. Then, each child had to undergo psychometric assessment to evaluate levels of intelligence and cognitive abilities, and to identify educational impairments in reading and spelling. In addition to the clinical assessment diagnoses were aided by school reports and reports from other health professionals. Upon assessing each child all clinical records were reviewed by a member of the research team (LH). Prior to data collection approval of the ethical review board at the University of Wollongong was obtained for this research study.
5.2.3 Measures

In order to identify children’s IQ’s for inclusion criteria, each child had a psychometric assessment consisting of the Stanford-Binet Intelligence Scale (Thorndike, Hagen, & Sattler, 1986) or different age-related versions of the Wechsler Intelligence Scale (Wechsler, 1991). Both tests are considered to be valid and reliable measures of general intelligence in children and have been widely used in the evaluation of AD/HD (Biederman et al., 1995; Saklofske, Schwean, Yackulic, & Quinn, 1994). The Stanford-Binet Intelligence Scale assesses intelligence and cognitive abilities in children and adults. The test is used to determine the presence of a learning disability or a developmental delay, and in measuring intellectual development. This scale tests intelligence across four areas, including verbal reasoning, quantitative reasoning, abstract/visual reasoning, and short-term memory. These areas are covered by 15 subtests: vocabulary, comprehension, verbal absurdities, pattern analysis, matrices, paper folding and cutting, copying, quantitative, number series, equation building, memory for sentences, digits, objects, and bead memory. The Wechsler Intelligence Scale for Children is a test battery for 6 to 17 year olds that measures intellectual abilities. The test consists of two scales, the verbal scale and the performance scale. The verbal scale assesses language expression, comprehension, listening, and the ability to apply these skills to solving problems. The performance scale measures non-verbal problem solving, perceptual organisation, speed, and visual-motor proficiency.

Further, to identify learning disabilities, different standardised age-related reading and spelling tests were administered to each child, including the Neale Analysis of Reading Ability (Neale, 1989), the Woodcock Reading Mastery Test – Revised (Woodcock, 1990), the TORCH (Mossenson, Hill, & Masters, 1987) or GAPADOL (McLeod & Anderson, 1973), and the South Australian Spelling Test (Westwood, 1999). The Neale Analysis of Reading is a standardised reading test that
measures text reading rate, accuracy and comprehension in children aged 6-13 years. The Woodcock Reading Mastery Test – Revised is a commonly used educational achievement test that assesses reading ability in students in grades K-12, undergraduate college students, and adults. This test consists of several subtests including letter identification, word identification, nonsense words, word comprehension, and passage comprehension. The Tests of Reading Comprehension (TORCH) is a reading assessment tool for school children from year 3 to 10 that measures reading comprehension skills. The test consists of twelve reading passages graded in order of difficulty, varying in length from 200 to 900 words, including fiction and non-fiction texts. The GAPADOL reading comprehension test uses a cloze technique where students are asked to provide words which are deleted from a paragraph of the text. The test is designed to discriminate reading ability at high ability and adolescent age levels above a ceiling of 10 years of age. The South Australian Spelling Test is a 70-word oral spelling test which assesses spelling performance across the age range 6 to over 15 years.

5.2.4 Statistical Analysis

At first, an analysis to measure frequencies in the total sample was performed. This identified the number of divorced and non-divorced cases, prevalence rates in each sex and AD/HD subtype, and comorbidities in children with AD/HD. For categorical comparisons, Pearson’s chi-square test was used, with 1 $df$, and all $p$-values were two-tailed. Further, a comparison of the two groups (divorced, non-divorced) was performed to find differences between AD/HD subtypes, age, sex, and other comorbid conditions in subjects.
5.3 Results

5.3.1 Total Group Comparisons

5.3.1.1 Demographic Data

The total sample analysed contained 1,000 children with AD/HD. Of these, 213 (21.3%) came from families where the parents were divorced, and 787 (78.7%) from families where the parents were not divorced. The age of children ranged from 6 to 18 years, with the mean age of all subjects being 10.0 years. A male to female ratio of approximately 3:1 was found, with boys (77.7%) being more prevalent than girls (22.3%). Within this sample, children with the combined (51.0%) or inattentive (49.0%) subtype of AD/HD were nearly equally represented. Further, the combined subtype (58%) was more common in the divorced group than the inattentive subtype (42%). A prevalence rate of approximately 41% was identified for the existence of comorbid psychiatric disorders among subjects with AD/HD. 34.5% of children with AD/HD were diagnosed with LD, and 6.7% with disruptive disorders (CD/ODD).

5.3.1.2 Subtype Differences

Gender differences and the presence of CD/ODD and LD within the subtypes are presented in Table 5.1. Results indicated that boys were significantly more likely to be diagnosed with the combined subtype of AD/HD, whereas girls were more commonly diagnosed with the inattentive subtype ($\chi^2=48.248$, $df=1$, $p<.001$). The presence of LD was significantly elevated in the inattentive subtype of children with AD/HD, but less common in the combined subtype ($\chi^2=25.478$, $df=1$, $p<.001$). In
contrast, CD/ODD was significantly more frequent in our children with the combined subtype of AD/HD than in the inattentive subtype ($X^2=46.035, df=1, p<.001$).

**TABLE 5.1: AD/HD subtype comparisons on comorbidities and gender of children with AD/HD**

<table>
<thead>
<tr>
<th></th>
<th>Total Sample</th>
<th>LD</th>
<th>CD/ODD</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inattentive type</td>
<td>490</td>
<td>49%</td>
<td>207***</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Combined type</td>
<td>510</td>
<td>51%</td>
<td>138</td>
<td>27%</td>
<td>61***</td>
</tr>
<tr>
<td>Total</td>
<td>1000</td>
<td>100%</td>
<td>345</td>
<td>35%</td>
<td>67</td>
</tr>
</tbody>
</table>

Note: LD = Learning Disorder, CD/ODD = Conduct Disorder/Oppositional Defiant Disorder, AD/HD = Attention Deficit Hyperactivity Disorder, ***p<.001

5.3.2 Divorced and Non-Divorced Group Comparisons

5.3.2.1 Differences in Comorbidity

Figure 5.1 shows the comorbidity of our children with AD/HD, comparing divorced and non-divorced families. The presence of CD/ODD in children with AD/HD differed significantly, and this was due to the higher than expected occurrence of CD/ODD in the divorced group ($X^2=10.974, df=1, p<.001$). No significant results were found for learning disabilities.

![Figure 5.1: The presence of LD, CD/ODD in children with AD/HD from divorced (D) and non-divorced (ND) families, *p<.001](image-url)
5.3.2.2 Age Differences

Figure 5.2 shows the incidence of divorce in the families of children with AD/HD as a function of age. A significant age-related difference was found in the parents’ marital status. There was a linear trend with increasing number of divorces with increasing age of children with AD/HD, and a corresponding trend of declining numbers of non-divorces with increasing age of children ($X^2=4.206$, $df=1$, $p<.05$).

![Figure 5.2: Age of children with AD/HD from divorced (D) and non-divorced (ND) families](image)

When investigating differences in the occurrence of comorbid conditions between various age groups, significant results were only found for children in age group 3 (13-15 yrs) (see Figure 5.3). The presence of CD/ODD in children with AD/HD was significantly higher in the divorced group than expected ($X^2=6.140$, $df=1$, $p<.05$). No significant differences were found for LD.
### 5.3.2.3 Subtype Differences

Figures 5.4 and 5.5 present the rates of LD and CD/ODD in children with AD/HD as a function of divorce, separately for the inattentive and combined subtypes of AD/HD. Analysis of the prevalence of CD/ODD among children of the inattentive subtype was inconclusive, due to the small sample size. In children with the inattentive subtype, the presence of LD was significantly lower in the divorced group than expected ($\chi^2=5.590, df=1, p<.01$). In children with the combined subtype of AD/HD, CD/ODD was significantly more prevalent in the divorced group ($\chi^2=4.015, df=1, p<.05$) than expected.
Figures 5.4 and 5.5 show the results for parents’ marital status as a function of age of children with AD/HD for the subtypes separately. With children of the combined subtype, a significant age-related difference was found in the parents’ marital status. There was a linear trend with increasing numbers of divorces with increasing age of children with the combined subtype, and a corresponding trend of declining numbers of non-divorces with increasing age of the children ($X^2=4.006$, $df=1$, $p<.05$). In contrast,
with children of the inattentive subtype, no significant age-related difference was found in the parents’ marital status, but a tendency towards a similar significant linear effect was noted ($X^2=3.213, df=1, p=.07$).

![Figure 5.6](image6.png)  
Figure 5.6: Number of children with AD/HDcom from divorced/non-divorced families as a function of age

![Figure 5.7](image7.png)  
Figure 5.7: Number of children with AD/HDin from divorced (D) non-divorced (ND) families as a function of age

No significant subtype differences were found between the divorced and non-divorced group in the comparison of the two sexes.
5.3.2.4 Gender Differences

Figures 5.8 and 5.9 show the incidence of LD and CD/ODD in children with AD/HD as a function of divorce for the genders separately. Analysis of the prevalence of CD/ODD among girls was inconclusive due to the small sample size. No significant results were found for girls with LD. However, in boys the presence of CD/ODD was significantly higher in the divorced group than expected ($X^2=5.686$, $df=1$, $p<.01$). No significant results were found for boys with LD.

![Figure 5.8](image1)

**Figure 5.8:** The presence of LD, CD/ODD in boys with AD/HD from divorced (D) non-divorced (ND) families, *$p<.01$*

![Figure 5.9](image2)

**Figure 5.9:** The presence of LD in girls with AD/HD from divorced (D) non-divorced (ND) families
5.4 Discussion

This study found that a minority of children with AD/HD, approximately one-fifth, experienced parental divorce. This rate is relatively low compared to reported divorce rates in the general population in Australia, suggesting that half of the marriages will dissolve (Saliba, 2005). There are two possible explanations for this phenomenon. Firstly, it is likely that parents of children with AD/HD are hesitant to seek divorce and stay together because it is in the best interest of the child with such a disorder. Thus, parents may try to avoid any more family disruption which may cause additional distress and impact adversely on the child’s behaviour. Secondly, the national divorce rates have not been established as a function of the children’s age, and it is also possible that the present data simply reflects the average rate of divorce in families with children of this age. However, resolution of this issue is beyond the scope of this study.

The present study investigated the occurrence of comorbid behavioural problems (CD/ODD) and learning disabilities (LD) among children with AD/HD from divorced and non-divorced families. Boys were more common than girls (approx. 3:1) within this clinical group, which is consistent with several other studies (Hartung et al., 2002; Nolan et al., 1999). Within this sample, children with the combined subtype were slightly more common than those with the inattentive subtype of AD/HD. This is in accordance with some clinic-based studies (Morgan et al., 1996) but not with others (Carlson, Shin, & Booth, 1999; Counts, Nigg, Stawicki, Rappley, & Von Eye, 2005; Faraone et al., 1998). Additionally, boys were more frequently diagnosed with the combined than the inattentive subtype (6.5:1), suggesting that boys are more severely impaired than girls, and therefore more likely to be referred for clinical assessment. Comorbid LD in children with AD/HD was more common than comorbid CD/ODD. These findings are in contrast to previous studies (Pliszka, 1998; Souza et al., 2001) in
which CD/ODD were considered to be the most common comorbid diagnoses. There are possible explanations for this phenomenon. Firstly, this may either be the result of a referral bias in the population that this practice draws from or the result of a different bias in the other studies. However, considering that the sample (N=1000) used in this study is significantly larger compared to those of other investigations, it is possible that the present data best reflects average rates of comorbidity in the AD/HD population. Secondly, it may be the result of the use of different methods within the literature to define learning disabilities in children, resulting in variations in the prevalence of reading, spelling, or arithmetic difficulties.

In addition to prevalence rates of AD/HD subtypes, comorbid conditions are important aspects of the validity of diagnostic categories. Our findings that CD/ODD was significantly more prevalent in children diagnosed with the combined subtype are congruent with findings in the literature (Carlson et al., 1999; Faraone et al., 1998; Morgan et al., 1996). LD was significantly more common in the inattentive subtype; this is in contrast to others who have found equal rates of learning disabilities in both subtypes (Barkley et al., 1990; Hinshaw, 2002). Nonetheless, a higher prevalence of reading problems and underachievement in maths for the inattentive subtype has been found in some studies (Marshall et al., 1997; Morgan et al., 1996; Warner-Rogers, Taylor, Taylor, & Sandberg, 2000).

In accord with the literature (Hartung et al., 2002; Newcorn et al., 2001), our study found that a diagnosis of the combined subtype was significantly more common among boys, whereas the inattentive subtype of AD/HD was significantly more diagnosed among girls. However, these results are in contrast to other studies (Morgan et al., 1996; Nolan et al., 1999) which found no differences in boys or girls for the various subtypes. No significant gender differences were found in this study in regard to comorbid CD/ODD and LD. These results are in accordance with previous clinic-based studies which did not find gender differences in children with AD/HD for comorbid conditions (Gaub & Carlson, 1997; Hartung et al., 2002).
The influence of environmental factors on children with AD/HD has generally been disregarded in preference for neurologically based models of the disorder, which have primarily been used as the basis for the use of stimulant medications as a first line of treatment in the USA and Australia (Castellanos et al., 1996; Heilman, Kytja, Voeller, & Nadeau, 1991; Levy, 1991). However, the literature on divorce suggests that children from divorced families present with more behavioural problems and academic underachievement than those of non-divorced families (Block et al., 1986; Harold & Conger, 1997; Kinard & Reinherz, 1986). Therefore this study aimed to investigate the relationship between an environmental factor, parental divorce, and the symptom profile of children with AD/HD.

This study found significant differences in the rates of comorbidities between children from divorced and non-divorced families. Children with AD/HD and comorbid CD/ODD were significantly more common in divorced families. However, no significant differences were found for comorbid LD. There are two possible explanations for these results. Firstly, marital conflict and the family changes related to parental divorce might have a negative impact on the child's behaviour and could lead to more disruptive behaviour patterns in children with AD/HD. A possible relationship between CD or ODD symptoms in children with AD/HD and family adversity has been proposed (Counts et al., 2005; Drabick, Gadow, & Sprafkin, 2006; Hurtig, et al., 2005, in press), and others have suggested that secondary environmental or social factors are associated with ODD in children with AD/HD (Satterfield & Schell, 1984). Further, on the basis of a lack of electrophysiological differences between children with AD/HD, with and without CD/ODD, it has been suggested that social and environmental factors are largely responsible for the behavioural problems in children with AD/HD (Clarke, Barry, McCarthy, & Selikowitz, 2002; Barry, Clarke, McCarthy, & Selikowitz, 2007). The present results, when taken in the context of past research into CD/ODD, would suggest that marital conflict is associated with the symptom profile of children with AD/HD, and that environmental factors should be considered when assessing and
planning treatment regimes for these children. A second possible interpretation is that these children contribute to the breakdown of their parents’ marriage. Considering the fact that children with disruptive behaviour patterns are more difficult to control, which might cause additional stress, conflict, and argument among couples, it is possible that the child’s behaviour may contribute to stress within the marriage. There is some suggestion in the literature that negative parenting may be a response to the child’s disruptive behaviour rather than the cause of it (Bell & Harper, 1977; Humphries, Kinsbourne, & Swanson, 1978; Maniadaki, Sonuga-Barke, Kakouros, & Karaba, 2005). However, this factor needs further investigation.

Significant differences in AD/HD subtypes were found between children from divorced and non-divorced families in this study. Statistical analysis on inattentive children with comorbid CD/ODD was inconclusive due to small cell sizes in this sample. Nonetheless, this study found that children of the inattentive subtype of AD/HD with a comorbid diagnosis of LD were significantly less common in divorced families. In contrast, children of the combined subtype of AD/HD with CD/ODD were significantly more common in divorced families. Again, these findings point to the stronger relation between marital problems and CD/ODD behaviours than academic problems in children with AD/HD. Since the combined subtype of AD/HD is more prone to disruptive behaviour, those children with a co-diagnosis of CD/ODD may experience more problems at home than those with comorbid LD. Counts et al. (2005) found comparable results, indicating that family adversity is related to ODD symptoms in children with the combined subtype of AD/HD.

This study found significant age-related differences among the subtypes between the two groups. There was a linear trend with increasing number of divorces with increasing age of children with the combined subtype, and a corresponding trend of declining numbers of non-divorces with increasing age of these children. In contrast, no significant age-related differences were found for children of the inattentive subtype; however a tendency towards a similar linear effect was noted. Not significant, but
noteworthy, is the fact that we failed to find differences in gender in either subtype when comparing divorced and non-divorced families, leading to the conclusion that, in clinic-based samples, girls and boys may be impaired similarly, and family functioning is not related to behaviour problems in children with AD/HD of either sex.

This study found significant differences in family marital status between children with AD/HD of different ages. There was a linear trend of increasing numbers of divorces with increasing age of children with AD/HD. Further, significant differences were found for the older children (13-15 yr), with a higher occurrence of CD/ODD in the divorced group. However, no significant differences were found for LD. These findings again suggest that parents may wait to divorce until their children get older. Further, divorce is associated with the presence of disruptive disorders in older children with AD/HD, and this result reflects findings in the literature, suggesting a higher occurrence of conduct problems during adolescence in general (Hetherington, 1993) and in teenagers from divorced families in particular (Cooney, Smyer, Hagestad, & Klock, 1986).

Significant differences in gender were found between children with AD/HD from divorced and non-divorced families in this study. Statistical analysis of the presence of comorbid CD/ODD among girls with AD/HD was inconclusive due to the small cell size. However, our results show that boys with AD/HD and comorbid CD/ODD are significantly more likely to live with divorced parents. Further, the fact that boys with AD/HD and comorbid CD/ODD are more common in divorced families while boys and girls with LD are more frequent in non-divorced families suggests once more that disruptive behaviours in children with AD/HD are associated with marital discord more than are academic problems in children with AD/HD. These findings were expected, as previous research suggests a neurological basis for LD, including a central nervous system processing deficiency (Casey et al., 1996; Marshall, et al., 1997), whereas CD/ODD are considered to be behavioural disorders associated with lower socioeconomic status and greater family dysfunctions (Cantwell, 1996; Frick et al.,
Further Trzesniewski, Moffitt, Caspi, Taylor, and Maughan (2006) implicated an overlap between LD and AD/HD due to shared genetic influences but not environmental factors. Finally, others failed to find an association between learning disabilities in children with AD/HD and family conflict (Biederman et al., 1995; Biederman, Faraone, and Monuteaux, 2002). Thus, these results suggest that parental divorce correlates with an increase in disruptive behaviour in children with AD/HD, but seems to be unrelated to learning difficulties.

This study extended the literature regarding a possible relationship between environmental factors and AD/HD. Findings of this study showed that rates of CD/ODD were significantly increased in children with AD/HD from divorced families, with main effects for those of the combined subtype, boys and adolescents, which suggests that divorce is associated with the occurrence of externalizing disorders in these children. However, disruptive behaviours might increase marital discord and thereby increase the divorce rate within these families. This study cannot fully determine whether divorce can be seen as a possible cause or an effect of co-occurring CD/ODD in children with AD/HD, and this needs further investigation. However, it appears that parental divorce may not be associated with learning disabilities in children with AD/HD. This is possibly attributable to the neurological basis of LD, which implies that LD is relatively unaffected by environmental factors.

Findings in this study thus suggest that appropriate interventions in treatment programs may be critical to improve family functioning for children with AD/HD and to minimize parental discord, especially in those families with comorbid CD/ODD.
CHAPTER 6: STUDY 2A. THE RELATIONSHIP BETWEEN DIVORCE AND SYMPTOM SEVERITY, EXTERNALIZING/INTERNALIZING BEHAVIOUR, ACADEMIC AND SOCIAL FUNCTIONING IN CHILDREN WITH AD/HD

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2This study is under review for publication as: Leila Heckel, Adam Clarke, Robert Barry, Rory McCarthy, & Mark Selikowitz. The relationship between divorce and the psychological well-being of children with AD/HD: Differences in age, gender, and subtype. Journal of Child Psychology and Psychiatry.
6.1 Introduction

Study 1 of this thesis investigated differences in the occurrence of externalizing disorders and learning disabilities as well as differences in age, gender and AD/HD subtypes, in children with this disorder from divorced and non-divorced families. Study 1 found that externalizing disorders such as CD/ODD were more common in children with AD/HD living in divorced families relative to intact families. However, no group differences were found for the occurrence of learning disabilities. While children of the inattentive subtype with comorbid LD were more frequently found in non-divorced families, those of the combined subtype with co-occurring CD/ODD were more common in divorced families. Adolescents with comorbid CD/ODD were found to be more prevalent in divorced than in non-divorced families, and there was a trend of increasing divorce rates with increasing age of children with AD/HD. Finally, boys with comorbid CD/ODD were more frequently observed in divorced than in non-divorced families. From these results it was concluded that parental divorce correlated with the occurrence of externalizing disorders in children with AD/HD, particularly in boys, adolescents and children with the combined subtype of the disorder. Further, it was suggested that divorce may not be associated with learning disabilities, which might reflect the neurological basis of learning disabilities.

Both the results of study 1 and the literature confirm the occurrence of externalizing disorders and learning disabilities in children with AD/HD (August, Realmuto, MacDonald, Nugent, & Crosby, 1996; Decker, McIntosh, Kelly, Nicholls, & Dean, 2001; Kube, Petersen, & Palmer, 2002; Souza, Serra, Mattos, & Franco, 2001). However, within the literature various internalizing problems, such as anxiety disorders or depression (Pliszka, 2000; Vance & Luk, 1998), as well as difficulties in regard to social functioning (Hinshaw, 2002; Maedgen & Carlson, 2002) have been found to frequently co-exist with AD/HD. Moreover, a substantial amount of research has been
carried out to investigate these differences in relation to AD/HD subtypes, as well as age and gender among clinically referred children with AD/HD. Studies conducted to investigate subtype differences in terms of emotional maladjustment in children with AD/HD have produced mixed results. While some investigators found comorbid anxiety disorders and depression to be more associated with the combined subtype of AD/HD (Gaub & Carlson 1997; Hinshaw, 2002), others did not find differences between the various subtypes (Power, Costigan, Eiraldi, & Leff, 2004). Further, a study conducted by Maedgen and Carlson (2002) indicated impairments in the social status of children with AD/HD. Children with the combined subtype were less popular than controls, and this was related to their aggressive and emotionally dysregulated behaviour patterns. In contrast, children with the inattentive subtype presented with less social knowledge and with greater passivity in regard to social interactions with peers, and this was associated with internalizing problems. Similar results for children with the inattentive subtype were reported by others (Gadow et al., 2000; Hinshaw, 2002). It has been argued that adolescents would present with more internalizing problems compared to younger children (Bedriye et al., 2002; Kato, Nichols, Kerivan, & Huffman, 2001), and studies have found poorer school performance in older subjects with AD/HD (Barkley et al., 1990; Biederman et al., 1998). Finally, disruptive social relationships with peers, the opposite sex, and family members have been reported in children and adolescents with AD/HD (Cunningham & Barkley, 1979; Mash & Johnston, 1982; Young, Heptinstall, Sonuga-Barke, Chadwick, & Taylor, 2005). The literature on gender differences in clinically referred children indicates similar levels of impairment among boys and girls in regard to internalizing problems and social functioning (Hartung et al., 2002; Lumley, McNeil, Cheryl, Herschell, & Bahl, 2002; Sharp et al., 1999).

Research into the effects of divorce in non-patient samples suggests variations among different age groups and genders in terms of emotional and social adjustment. Amato (2001) proposed that children of all ages would present with an increase in problem behaviours and disturbed relationships after divorce. However, younger and
cognitively immature children were found to display greater signs of distress after parental separation, supposedly because they may not understand why their parents divorced and might even feel guilty and responsible for the breakup. In contrast, older children and adolescents are somewhat better able to identify the reasons of their parents’ divorce, and are more capable of resolving loyalty conflicts (Hetherington, 1989; Hetherington, Stanley-Hagen, & Anderson, 1989; Wallerstein & Kelly, 1980). Further, Cheng, Dunn, O’Connor, and Golding (2006) postulate that adolescents are not only more cognitively skilled but also present with greater social competence.

Further, it has been speculated that boys are more negatively affected than girls even prior to divorce, by displaying higher levels of impulsive and aggressive behaviour (J.H. Block, J. Block, & Gjerde, 1986; Hetherington, Cox, & Cox, 1982). In general, boys are found to present with more conduct behaviours and greater deficits in social adjustment, whereas internalizing problems, such as depression, anxiety, and withdrawal are more common among girls (Amato & Keith, 1991; Cheng et al., 2006; Dunn, Deater-Deckard, Pickering, & O’Connor, 1998; VanderValk, Spruijt, DeGoede, Maas, & Meeus, 2005). Huurre, Junkkari, and Aro (2006) examined long-term psychological effects of parental divorce in a 16-year follow-up study from adolescence to adulthood, and found higher rates of depression, interpersonal problems, and psychosomatic complaints among female compared to male subjects. Similar results were found by others (Lindner, Stanley-Hagan, & Cavanaugh-Brown, 1992). In contrast, other investigators such as Sun (2001) did not find gender differences in regard to post-disruption effects; neither did the author find variations among boys and girls before parental separation, with both exhibiting more psychological and behavioral problems compared to their peers from intact families. These findings are in accordance with other studies (Amato, 2001; Ruschena, Prior, Sanson, & Smart, 2005).

There is growing evidence in the literature that children’s adjustment to parental divorce depends on factors such as the child’s age at divorce or the timing of divorce,
as some researchers found lower levels of anxiety, aggression and distress in those subjects who were older than six years when their parents divorced (Spigelman, Spigelman, & Englesson, 1994). Lansford et al. (2006) found that parental divorce during elementary school was associated with internalizing and externalizing problems in children, whereas later divorce correlated with poorer performance at school. These findings are in contrast to a previous report by Wallerstein (1985), who found that feelings of sadness and anger existed mostly in those children who were older at the time their parents split up.

In Study 1 a first attempt was made to investigate differences in externalizing behaviour and academic difficulties between children with AD/HD of divorced and non-divorced families. While this study was of 1000 subjects, it was limited in that it relied on notes from clinical files, which did not contain accurate diagnoses of internalising problems. The aim of study 2A is to replicate Study 1, and to extend the investigation of differences in the symptom profile between children with AD/HD from divorced and non-divorced families, by examining a wider range of measures including externalizing and internalizing behaviour, as well as social and academic performances, and to further explore age, gender and subtype differences. The study also aimed to determine whether divorce may be associated with symptom severity, not just comorbidities, as this would help to determine whether environmental factors, such as parental divorce, correlate with the presentation of the core features of AD/HD.

6.2 Method

6.2.1 Subjects

Subjects initially consisted of 586 children referred to a paediatric practice for an assessment of AD/HD. These subjects came from urban, suburban, and rural
populations throughout the state of New South Wales, Australia. Subjects’ age ranged from 6 to 18 years (mean age of 10.8 years), and subjects were diagnosed with AD/HD according to the DSM-IV criteria (APA, 1994). This sample was reduced to 479 subjects, as only one sibling within a family was included in the study in an attempt to reduce the possible impact of a single divorce on multiple children, which could have biased results. We excluded children living with adopted/foster families, and those living with other carers not as the result of divorce of their biological parents. Further, children with a full scale IQ score lower than 75 were also excluded from this study. Divorce was defined as either physical separation and/or divorce of the child’s biological parents. This gave final figures of 86 (18%) children with divorced parents and 393 (82%) children with non-divorced parents. The group was split into two age groups to examine age-related differences in the symptom profile. Group 1 included primary school children (grade 1-6, age 6-12) and group 2 consisted of secondary school children (grade 7-12, age 13-18). To investigate differences in regard to the timing of the divorce, we defined two time periods: Period 1 included divorces which happened less than 3 years prior to the initial diagnosis and Period 2 comprised divorces which occurred more than 3 years prior to the initial diagnosis.

6.2.2 Procedure

When the children arrived at the paediatric practice for their initial assessment, the parents were given an assessment package consisting of the Child Behaviour Checklist (Achenbach & Edelbrock, 1983), Conners’ Parent Rating Scale – Revised (Conners, 2000), Depression and Anxiety in Youth Scale (DAYS) (Newcomer, Barenbaum, & Bryant, 1994), Autism Screening Algorithm of the Developmental Behaviour Checklist (DBC) (Einfeld & Tonge, 1992), and a questionnaire to gather information about marital status and family relationships (Appendix 2A). These were completed while the child received a clinical assessment by a paediatrician and a
psychologist. The assessment consisted of a semistructured clinical interview which assessed both physical and psychological aspects of the child’s presentation. Cognitive performance was evaluated using the Stanford-Binet Intelligence Scale (Thorndike, Hagen, & Sattler, 1986) or different age-related versions of the Wechsler Intelligence Scale (Wechsler, 1991). Learning difficulties were assessed using the Neale Analysis of Reading Ability (Neale, 1989), the Woodcock Reading Mastery Test – Revised (Woodcock, 1990), the TORCH (Mossenson, Hill, & Masters, 1987) or GAPADOL (McLeod & Anderson, 1973), and the South Australian Spelling Test (Westwood, 1999). The diagnosis of AD/HD was also aided by school reports and reports from other health professionals. Written consent was obtained from both parents and children, and an information sheet was given to explain the purpose of this study (Appendix 1A). Prior to data collection approval of the ethical review board at the University of Wollongong was obtained for this research study.

6.2.3 Measures

In order to evaluate children’s psychological well-being, which comprised of AD/HD symptom severity, the occurrence of externalizing and internalizing behaviour problems as well as academic and social functioning; several rating scales and test batteries were used. The Conners’ Parent Rating Scale – Revised is an 80 items instrument that helps to assess AD/HD and to evaluate problem behavior in children and adolescents. For the purpose of this study, only 6 of the existing subscales were used, including oppositional, anxious-shy, social problems, DSM-IV: inattentive, DSM-IV: hyperactive-impulsive, and DSM-IV: total. The Child Behavior Checklist is designed for children aged 6 to 18 years to assess behaviour problems and social competence in children. It consists of 118 items related to behaviour problems which are scored on a 3-point scale ranging from not true to often true of the child. This instrument includes a competence scale, syndrome scale, total problem scale, and a DSM-oriented scale,
which are further divided into 20 subscales. For this study 9 subscales were used, including attention problems, rule-breaking behaviour, aggressive behaviour, externalizing problems, anxious/depressed, internalizing problems, social problems, social, and school. The Depression and Anxiety in Youth Scale (DAYS) is a screening tool that measures anxiety, depression, and social maladjustment in children and adolescents ages 6-19. The parent scale contains 28 items and is useful in identifying major depressive disorders and overanxious disorders in children and adolescents. The Developmental Behaviour Checklist (DBC) is a 96-item instrument that assesses behavioural and emotional problems in young people with intellectual disability. For the purpose of this study only the Autism Screening Algorithm of the DBC was used. It consists of 29 items related to emotional and behavioural problems which are scored on a 3-point scale ranging from not true to very true of the child. Detailed information on the tests used to measure cognitive performance and to identify learning disabilities in subjects has been provided in previous subchapters (5.2.3.).

6.2.4 Statistical Analysis

Prior to analysis, all dependent measures were examined to ensure a normal distribution. Chi-square was used to compare groups on descriptive variables and to analyze frequency data. Two-tailed independent \( t \) tests were applied in the comparison of divorced and non-divorced families on measures of symptom severity, internalizing/externalizing problems, and academic and social functioning. Mean T-scores were used for comparisons on the parent-completed CBCL, and the Conners’, mean raw scores on the DAYS, and the DBC. Learning impairment was identified through reading and spelling abilities of subjects by calculating differences between chronological age and age equivalent of most tests, except for the TORCH, where subject presented with learning difficulties if they scored at or below the 22\(^{nd}\) percentile.
6.3 Results

6.3.1 Demographic Data

The full scale IQs of subjects ranged from 75 to 151, with the mean IQ being 100. Age of subjects ranged from 6 to 18, with the mean age being 10.8 years. Mean age of subjects at time of their parent’s first divorce was 5.4 years. A male to female ratio of 2.3:1 was found in the AD/HD sample, with boys (334; 70%) being more prevalent than girls (135; 30%). Within this sample, the inattentive subtype of AD/HD (308; 64%) was more common than the combined subtype (171; 36%), reflecting a ratio of approximately 2:1. Further, the inattentive subtype occurred more frequently in the divorced group than the combined subtype (51, 59%; 35, 41%). Significant gender differences were found within the subtypes, with girls being more frequently diagnosed with the inattentive subtype, and boys more often with the combined subtype, than expected ($\chi^2=24.282$, $df=1$, $p<.001$). Significant gender differences were found within the divorced (D) and non-divorced (ND) groups. Boys were significantly more prevalent in the non-divorced group, and girls more common in the divorced group, than expected ($\chi^2=5.387$, $df=1$, $p<.05$).

6.3.2 AD/HD-related Symptomatology, Externalizing/Internalizing Problems, and Academic and Social Functioning

Descriptive and comparative statistics for differences in children with AD/HD of divorced and non-divorced families in terms of symptom severity, externalizing/internalizing problems, and academic and social functioning are presented in Table 6.1. In regard to the psychometric measures, the number of subjects in each domain of functioning varied as a result of missing parent ratings.
Significant differences were found between the two groups on measures of symptom severity. Children from divorced families had significantly higher mean scores than those from non-divorced families on the Conners’ DSM-IV Inattentive (t=-3.41, p<.001), Hyperactive-Impulsive (t=-3.40, p<.001), and Total item scales (t=-3.99, p<.001), as well as on the CBCL Attention Problems scale (t= -2.18, p<.05). For externalizing problems, children of divorced parents had significantly higher mean scores on the Conners’ Oppositional scale (t=-3.94, p<.001), on the CBCL Rule-Breaking Behaviour scale (t=-3.06, p<.01); the Aggressive Behaviour scale (t=-2.73, p<.01); the Externalizing Problems scale (t=-3.02, p<.01), and on the Autism Screening Algorithm of the DBC (t=-2.92, p<.01), compared to children from non-divorced families. With internalizing problems, children of divorced parents scored significant higher on the CBCL Anxious/Depressed scale (t=-2.03, p<.05), on the DAYS Anxiety scale (t=-2.78, p<.01); and on the DAYS Depression scale (t=-3.06, p<.01) relative to those from intact families. For academic functioning, children from divorced families displayed significantly greater spelling difficulties on the South Australian Spelling Test (t=-2.09, p<.05), than did those from non-divorced families. However, no significant differences were found for reading ability. Significant results in regard to social problems in children with AD/HD were found with children of divorced parents having significantly higher mean scores than those of non-divorced parents on the Social Problems scale of the CBCL (t=-2.09, p<.05) and on the DAYS Social Maladjustment scale (t=-2.75, p<.01).
### Table 6.1: Means, Standard Deviations, and Comparative Statistics of children with AD/HD of divorced/non-divorced families on symptom severity, externalizing/internalizing problems, academic and social functioning

<table>
<thead>
<tr>
<th></th>
<th>Non-Divorced</th>
<th>Divorced</th>
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<tbody>
<tr>
<td><strong>Symptom Severity</strong></td>
<td></td>
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<tr>
<td>Conners’ DSM-Inattentive</td>
<td>386 68.40 11.76</td>
<td>84 73.17 10.81</td>
<td>-3.41***</td>
</tr>
<tr>
<td>Conners’ DSM-Hyp/Impulsive</td>
<td>386 65.59 14.28</td>
<td>84 71.43 14.10</td>
<td>-3.40***</td>
</tr>
<tr>
<td>Conners’ DSM-Total</td>
<td>386 68.83 12.50</td>
<td>84 74.73 11.23</td>
<td>-3.99***</td>
</tr>
<tr>
<td>CBCL: Attention Problems</td>
<td>373 67.65 9.90</td>
<td>80 70.28 9.34</td>
<td>-2.18*</td>
</tr>
<tr>
<td><strong>Externalizing Problems</strong></td>
<td></td>
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<tr>
<td>Conners’ Oppositional</td>
<td>386 61.75 13.75</td>
<td>84 68.30 13.95</td>
<td>-3.94***</td>
</tr>
<tr>
<td>CBCL: Rule-Breaking Beh.</td>
<td>373 58.93 8.70</td>
<td>80 62.19 8.39</td>
<td>-3.06**</td>
</tr>
<tr>
<td>CBCL: Aggressive Behaviour</td>
<td>373 60.66 10.76</td>
<td>80 64.34 11.74</td>
<td>-2.73**</td>
</tr>
<tr>
<td>CBCL: Externalizing Problems</td>
<td>373 58.04 12.14</td>
<td>80 62.51 11.28</td>
<td>-3.02**</td>
</tr>
<tr>
<td>DBC: Autism Screening Alg.</td>
<td>392 11.43 9.27</td>
<td>86 14.69 9.27</td>
<td>-2.92**</td>
</tr>
<tr>
<td><strong>Internalizing Problems</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>CBCL: Anxious-Depressed</td>
<td>373 59.36 9.14</td>
<td>80 61.68 9.68</td>
<td>-2.03*</td>
</tr>
<tr>
<td>DAYS: Anxiety</td>
<td>387 2.38 2.17</td>
<td>85 3.09 2.06</td>
<td>-2.78**</td>
</tr>
<tr>
<td>DAYS: Depression</td>
<td>387 2.10 2.27</td>
<td>85 2.94 2.35</td>
<td>-3.06**</td>
</tr>
<tr>
<td><strong>Academic Functioning</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>SAST: Spelling</td>
<td>383 8.44 23.64</td>
<td>85 14.28 21.85</td>
<td>-2.09*</td>
</tr>
<tr>
<td><strong>Social Functioning</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBCL: Social Problems</td>
<td>373 59.77 8.49</td>
<td>80 61.96 8.50</td>
<td>-2.09*</td>
</tr>
<tr>
<td>DAYS: Social Maladjustment</td>
<td>387 2.56 1.69</td>
<td>85 3.12 1.73</td>
<td>-2.75**</td>
</tr>
</tbody>
</table>

Note: CBCL=Child Behaviour Checklist, DAYS=Depression and Anxiety in Youth Scale, SAST=South Australian Spelling Test. ***p<.001, **p<.01, *p<.05

### 6.3.3 Subtype Differences

Descriptive and comparative statistics for differences in AD/HD subtypes are presented in Table 6.2. When examining children of the inattentive subtype, significant results were found in the domain of AD/HD-related symptomatology. Those with divorced parents had significantly higher mean scores on the Conners’ DSM-IV Inattentive (t=-2.62, p<.01), Hyperactive-Impulsive (t=-2.59, p<.01), and Total item scales (t=-3.13, p<.01) than those with non-divorced parents. For externalizing problems, inattentive children of divorced parents scored significantly higher on the Conners’ Oppositional scale (t=-4.27, p<.001), the CBCL Rule Breaking Behaviour scale (t=-3.28, p<.001); the Aggressive Behaviour scale (t=-2.94, p<.01); the Externalizing Problems scale (t=-2.84, p<.01), and on the Autism Screening Algorithm of the DBC (t=-2.53, p<.05) than did inattentive children from non-divorced families. For internalizing problems, significant results were found for those with divorced parents, who scored significantly higher on the DAYS Anxiety scale (t=-2.76, p<.01); and the DAYS Depression scale (t=-3.14, p<.01); compared to those with non-divorced parents. For social functioning, those from divorced families had significantly higher
mean scores on the CBCL Social Problems scale (t=-2.00, p<.05) and on the DAYS Social Maladjustment scale (t=-2.52, p<.05) than did those from non-divorced families. When examining differences in regard to age of children, significant differences were found. Inattentive children from divorced families were significantly older than those from non-divorced families (mean age ND 10.9 yrs vs. D 11.10 yrs, t=-2.33, p<.05).

Significant results were also found for children with the combined subtype. In the domain of AD/HD related symptomatology, those children living with divorced parents scored significantly higher on the Conners’ DSM-IV Inattentive (t=-2.03, p<.05), Hyperactive-Impulsive (t=-2.18, p<.05), and Total item scales (t=-2.31, p<.05) than did those living with non-divorced parents. When examining differences in regard to age of children with the combined subtype, results were only approaching statistical significance with those from divorced families being older than those from non-divorced families (mean age ND 9.11 yrs vs. D 11.0 yrs, t=-1.90, p=.059).

### TABLE 6.2: Means, Standard Deviations, and Comparative Statistics of children with the inattentive and combined subtype of AD/HD of divorced/non-divorced families on age, symptom severity, externalizing/internalizing problems, academic and social functioning

<table>
<thead>
<tr>
<th></th>
<th>Inattentive Subtype</th>
<th>Combined Subtype</th>
<th></th>
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</thead>
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<td></td>
<td>Non-Divorced</td>
<td>Divorced</td>
<td>Mean</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>128.74</td>
<td>37.81</td>
<td>142.20</td>
</tr>
<tr>
<td><strong>Symptom Severity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conners’ DSM-Inattentive</td>
<td>67.34</td>
<td>12.07</td>
<td>72.16</td>
</tr>
<tr>
<td>Conners’ DSM-Hyp-Imp</td>
<td>60.26</td>
<td>12.62</td>
<td>65.38</td>
</tr>
<tr>
<td>Conners’ DSM-Total</td>
<td>65.61</td>
<td>12.09</td>
<td>71.40</td>
</tr>
<tr>
<td><strong>Externalizing Problems</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conners’ Oppositional</td>
<td>57.61</td>
<td>11.66</td>
<td>65.66</td>
</tr>
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<td>CBCL: Rule-Breaking Beh</td>
<td>55.98</td>
<td>6.93</td>
<td>59.78</td>
</tr>
<tr>
<td>CBCL: Aggressive Beh</td>
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<td>7.97</td>
<td>61.15</td>
</tr>
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<td>CBCL: Extrem Problems</td>
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<td>11.02</td>
<td>59.26</td>
</tr>
<tr>
<td>DBC: Autism Screen Alg</td>
<td>8.77</td>
<td>7.71</td>
<td>11.76</td>
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<td>DAYS: Anxiety</td>
<td>2.15</td>
<td>2.08</td>
<td>3.04</td>
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<tr>
<td>DAYS: Depression</td>
<td>1.84</td>
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<td><strong>Social Functioning</strong></td>
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<tr>
<td>CBCL: Social Problems</td>
<td>58.14</td>
<td>7.56</td>
<td>60.57</td>
</tr>
<tr>
<td>DAYS: Social Maladjust.</td>
<td>2.29</td>
<td>1.61</td>
<td>2.92</td>
</tr>
</tbody>
</table>

**Note:** CBCL=Child Behaviour Checklist, DAYS=Depression and Anxiety in Youth Scale, ***p<.001, **p<.01, *p<.05
6.3.4 Age Differences

Descriptive and comparative statistics for age differences are presented in Table 6.3. Younger children (6-12 yrs) of divorced parents had significantly higher mean scores on measures of symptom severity on the Conners’ DSM-IV Inattentive scale (t=-3.03, p<.01); the Hyperactive-Impulsive scale (t=-2.45, p<.05), the Total item scale (t=-3.18, p<.01), and on the CBCL Attention Problem scale (t=-2.49, p<.05) compared to those from non-divorced families. For externalizing problems, those with divorced parents had significantly higher mean scores on the Conners’ Oppositional scale (t=-2.90, p<.01), the CBCL Rule-Breaking Behaviour scale (t=-2.46, p<.05); the Aggressive Behaviour scale (t=-2.47, p<.05); the Externalizing Problems scale (t=-2.63, p<.01); and on the Autism Screening Algorithm of the DBC (t=-2.02, p<.05) than did those from non-divorced families. For internalizing problems, children of divorced parents had significantly higher mean scores on the CBCL Anxious-Depressed scale (t=-2.30, p<.05), the CBCL Internalizing Problems scale (t=-2.03, p<.05), the DAYS Anxiety scale (t=-2.40, p<.05), and the DAYS Depression scale (t=-2.20, p<.05) than did children from non-divorced families. Significant differences in social functioning were found with children of divorced parents scoring significantly higher on the CBCL Social Problems scale (t=-2.20, p<.05), and the DAYS Social Maladjustment scale (t=-2.57, p<.05) than did children from non-divorced families.

In the older age group (13-18 yrs) children of divorced parents scored significantly higher on the Conners’ DSM-IV Hyperactive-Impulsive scale (t=-2.34, p<.05) than those living in non-divorced families. For externalizing problems, children of divorced parents scored significantly higher on measures of the Conners’ Oppositional scale (t=-2.44, p<.05); and on the Autism Screening Algorithm of the DBC (t=-2.43, p<.05) than did children of non-divorced parents.

When taking the effects of timing of divorce into account, children who experienced their parental divorce less than 3 years ago displayed greater impairment
on the Neale Reading Accuracy \( (t=2.54, p<.05) \) compared to those who experienced their parents’ divorce more than 3 years ago. Social functioning results approached significance, with children who experienced the parental divorce less than 3 years ago being more impaired on measures of the CBCL Activities scale \( (t=-1.94, p=.057) \), compared to children where the parental divorce occurred more than 3 years ago.

### Table 6.3: Means, Standard Deviations, and Comparative Statistics of age differences in children with AD/HD of divorced/non-divorced families on symptom severity, externalizing/internalizing problems, academic and social functioning

<table>
<thead>
<tr>
<th></th>
<th>Age group 1 (6-12 yrs)</th>
<th>Age group 2 (13-18 yrs)</th>
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<tbody>
<tr>
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<td>Non-Divorced</td>
<td>Divorced</td>
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<tr>
<td><strong>Symptom Severity</strong></td>
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<td></td>
</tr>
<tr>
<td>Conners’ DSM-Inattentive</td>
<td>67.23 (11.57)</td>
<td>72.35 (10.95)</td>
</tr>
<tr>
<td>Conners’ DSM-Hyp/Imp</td>
<td>65.80 (13.89)</td>
<td>70.75 (13.09)</td>
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<td>Conners’ DSM-Total</td>
<td>67.85 (12.37)</td>
<td>73.55 (11.05)</td>
</tr>
<tr>
<td>CBCL: Attention Prob.</td>
<td>67.73 (9.97)</td>
<td>71.37 (9.21)</td>
</tr>
<tr>
<td><strong>Externalizing Problems</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conners’ Oppositional</td>
<td>61.33 (13.69)</td>
<td>67.13 (13.15)</td>
</tr>
<tr>
<td>CBCL: Rule-Breaking</td>
<td>59.01 (8.71)</td>
<td>62.15 (8.02)</td>
</tr>
<tr>
<td>CBCL: Aggressive Beh</td>
<td>60.89 (10.74)</td>
<td>64.89 (11.91)</td>
</tr>
<tr>
<td>CBCL: External Problems</td>
<td>58.18 (12.20)</td>
<td>62.87 (11.13)</td>
</tr>
<tr>
<td>DBC: AutismScreenAlg.</td>
<td>11.86 (9.45)</td>
<td>14.59 (8.54)</td>
</tr>
<tr>
<td><strong>Internalizing Problems</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBCL: Anxious-Dep.</td>
<td>59.41 (9.01)</td>
<td>62.48 (9.01)</td>
</tr>
<tr>
<td>CBCL: Intern Problems</td>
<td>58.40 (10.73)</td>
<td>61.67 (11.49)</td>
</tr>
<tr>
<td>DAYS: Anxiety</td>
<td>2.45 (2.21)</td>
<td>3.21 (2.06)</td>
</tr>
<tr>
<td>DAYS: Depression</td>
<td>1.93 (2.12)</td>
<td>2.61 (2.17)</td>
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<td><strong>Social Functioning</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBCL: Social Problems</td>
<td>59.88 (8.23)</td>
<td>62.54 (7.62)</td>
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<tr>
<td>DAYS: Social Maladjust</td>
<td>2.58 (1.74)</td>
<td>3.23 (1.77)</td>
</tr>
</tbody>
</table>

Note: Age group 1=6-12 years, Age group 2=13-18 years, CBCL=Child Behaviour Checklist, DAYS=Depression and Anxiety in Youth Scale, SAST=South Australian Spelling Test, **p<.01, *p<.05

### 6.3.5 Gender Differences

Results for gender differences between the divorced and non-divorced groups are presented in Table 6.4. Boys with AD/HD from divorced families had significantly higher mean scores on the Conners’ DSM-IV Inattentive scale \( (t=-2.36, p<.05) \); the Total item scale \( (t=-2.31, p<.05) \), the Conners’ Oppositional scale \( (t=-2.24, p<.05) \), the DAYS Depression scale \( (t=-2.90, p<.01) \), and on the South Australian Spelling test \( (t=-2.92, p<.01) \) than boys from non-divorced families.
Girls with AD/HD from divorced families had significantly higher mean scores on the Conners’ DSM-IV Hyperactive-Impulsive scale ($t=-3.72, p<.001$), the Total item scale ($t=-2.90, p<.01$), the CBCL Attention Problems scale ($t=-2.45, p<.05$), the Conners’ Oppositional scale ($t=-3.54, p<.001$); the CBCL Rule-Breaking Behaviour scale ($t=-4.98, p<.001$); the Aggressive Behaviour scale ($t=-4.19, p<.001$); the Externalizing Problems scale ($t=-4.24, p<.001$), the Autism Screening Algorithm of the DBC ($t=-3.60, p<.001$), the CBCL Anxious/depressed scale ($t=-2.20, p<.05$), and the DAYS Anxiety scale ($t=-2.35, p<.05$) than did girls from non-divorced families. Significant differences were found when investigating social functioning in girls, with those of divorced parents having significantly higher scores on the Conners’ Social Problems scale ($t=-2.00, p<.05$), the CBCL Social Problems scale ($t=-3.33, p<.001$), the DAYS Social Maladjustment scale ($t=-3.21, p<.01$), and they were also significantly more impaired on the CBCL Social scale ($t=2.07, p<.05$), than girls from non-divorced families.

**TABLE 6.4**: Means, Standard Deviations, and Comparative Statistics of boys and girls with AD/HD of divorced/non-divorced families on symptom severity, externalizing/internalizing problems, academic and social functioning

<table>
<thead>
<tr>
<th></th>
<th>Boys Non-Divorced Mean</th>
<th>Boys Non-Divorced SD</th>
<th>Boys Divorced Mean</th>
<th>Boys Divorced SD</th>
<th>t Value</th>
<th>p Value</th>
<th>Girls Non-Divorced Mean</th>
<th>Girls Non-Divorced SD</th>
<th>Girls Divorced Mean</th>
<th>Girls Divorced SD</th>
<th>t Value</th>
<th>p Value</th>
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<tbody>
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<td><strong>Symptom Severity</strong></td>
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<td>Conners’ DSM-Inattentive</td>
<td>66.81</td>
<td>10.54</td>
<td>70.49</td>
<td>8.47</td>
<td>-2.36*</td>
<td>0.01</td>
<td>72.55</td>
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<td>12.72</td>
<td>-1.77</td>
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<td>14.06</td>
<td>69.14</td>
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<td>0.17</td>
<td>64.07</td>
<td>14.77</td>
<td>74.97</td>
<td>14.47</td>
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<td>Conners’ DSM-Total</td>
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<td>72.16</td>
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<td>70.50</td>
<td>14.64</td>
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<td>-2.90**</td>
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<td>73.31</td>
<td>9.57</td>
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</tr>
<tr>
<td>Conners’ Oppositional</td>
<td>62.30</td>
<td>13.39</td>
<td>66.90</td>
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<td>55.79</td>
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<td>63.19</td>
<td>8.91</td>
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<td>11.00</td>
<td>63.02</td>
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<td>0.50</td>
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<td>10.26</td>
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<td>1.89</td>
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<td>SAST: Spelling</td>
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<td>0.59</td>
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<td>-1.60</td>
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<td>3.03</td>
<td>1.75</td>
<td>-3.21**</td>
<td>0.0001</td>
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</table>

*Note: CBCL=Child Behaviour Checklist, DAYS=Depression and Anxiety in Youth Scale, SAST=South Australian Spelling Test, ***p<.001, **p<.01, *p<.05*
6.4 Discussion

As part of the present study, a replication of findings from Study 1 was undertaken to determine the reliability of the significant group differences found there for comorbid externalizing disorders and learning disabilities. This study further extended these previous investigations of differences in the symptom profile between children with AD/HD from divorced and non-divorced families by examining symptom severity, internalizing behaviour, and social functioning.

Findings from study 1 in regard to the divorce rate among families with AD/HD were replicated in the present study. Approximately one-fifth of children with AD/HD experienced the divorce of their biological parents.

This study found that children with AD/HD from divorced families presented with significantly higher levels of hyperactivity/impulsivity and inattention compared to children from non-divorced families. These results correspond with findings by others who indicated an association between symptoms of hyperactivity/impulsivity or inattention and poor caregiving, marital disharmony and family dysfunction (Brandon, 1971; Hurtig, Taanila, Ebeling, Miettungen, & Moilanen, 2005; Rutter, Cox, Tupling, Berger, & Yule, 1975; Taylor & Warner-Rogers, 2005; Warner-Rogers, Taylor, Taylor, & Sandberg, 2000). Findings of this study can be interpreted in two ways. It is possible that either parental divorce may have exacerbated these symptoms in children with AD/HD, suggesting that environmental factors play a role in the presentation of the core features of AD/HD, or simply that children with severe symptomatology have contributed to more marital discord, contributing to the occurrence of divorce. This needs further investigation.

The present results showed a high level of replication of the previous findings in Study 1 for externalizing behaviour in children with AD/HD. The significantly higher occurrence of comorbid CD/ODD in children of divorced parents found in the previous
study was supported in the present study by findings of significantly more oppositional, aggressive, and rule breaking behaviour in children of divorced parents relative to those from non-divorced families. These results reflect findings by Drabick, Gadow, and Sprafkin (2006) that poor parenting, low marital satisfaction, and family conflict related to conduct problems in boys with AD/HD. Hurtig et al. (in press) found an association between externalizing disorders in AD/HD and family characteristics such as single parenthood, divorce and remarriage.

This study further found a higher occurrence of internalizing problems, with children from divorced families presenting with significantly more symptoms of anxiety and depression than those with non-divorced parents. Findings are in line with the divorce literature, suggesting higher rates of emotional and internalizing problems in children experiencing parental divorce (Amato, 2005, Cheng et al., 2006; Hetherington, 2005). Results are also in correspondence with studies by others who found an association between depressive symptoms in children with AD/HD and a disruptive family environment (Biederman et al., 1995; Drabick et al., 2006; Hurtig et al., in press).

Both the literature and results from Study 1 reported academic underachievement in children with AD/HD (Decker, McIntosh, Kelly, Nicholls, & Dean, 2001; Kube, Petersen, & Palmer, 2002). Results in this study were less stable in regard to learning disabilities. In Study 1 no significant divorce group differences were found in terms of learning disabilities in children with AD/HD. However, the present study found that children of divorced parents presented with greater spelling impairment than those of non-divorced parents. Since there is suggestion of a somewhat poorer academic outcome in children of divorce (Jeynes, 1999; Lansford et al., 2006), findings of this study suggest that the deficits in spelling found in children with AD/HD may be associated with parental divorce. It is also possible that the higher occurrence of spelling difficulties found in these children may be related to the higher prevalence of internalizing problems in children who experienced parental divorce, a correlate that was not investigated in the previous study.
The existence of less social competence in children of divorce is a common view upheld in the literature (Amato, 2005; Lindner, Stanley-Hagan, & Cavanaugh-Brown, 1992; Liu et al., 2000). This study found that children from divorced families presented with significantly greater impairment in social adjustment than those from non-divorced families. Thus, this study was able to replicate general findings of the literature and also showed a link between parental divorce and poor social functioning in children with AD/HD.

This study found that inattentive children of divorced parents were more severely impaired in regard to AD/HD core symptoms than those living in non-divorced families. Similarly, children of the combined subtype from divorced families presented with more severe symptomatology than those of the non-divorced group. These data suggest that parental divorce may be associated with increased hyperactive-impulsive behaviour in children of the inattentive subtype, a subtype which is primarily characterized by attention problems; and also with more symptom severity in those of the combined subtype. There is some suggestion that parental divorce, as a psychosocial risk factor, may play a role in the exacerbation of AD/HD core symptoms in children with AD/HD. However, further research is needed for the resolution of this issue.

Findings in Study 1 suggested a higher occurrence of comorbid externalizing disorders in children of the combined subtype from divorced families. The present study did not replicate those findings. Children with the inattentive subtype living with divorced parents presented with significantly more oppositional, rule breaking and aggressive behaviours compared to those living with non-divorced parents. No significant group differences were found in children of the combined subtype. These findings suggest an association between divorce and externalizing behaviour problems in children of the inattentive subtype of AD/HD, a subtype that is predominantly characterized by problems of attention and distractibility.
Within the clinical population, investigations have shown that internalizing problems are more common in children of the combined subtype of AD/HD (Gaub & Carlson 1997; Hinshaw, 2002). This study found that children of the inattentive subtype of divorced parents presented with more internalizing symptoms than those of non-divorced parents. However, no significant differences associated with divorce were found for children with the combined subtype. These findings suggest that parental divorce is associated with internalizing problems primarily in inattentive children.

The present study did not find group differences in terms of reading or spelling problems in either subtype. These results partially replicate findings of Study 1, where no significant group differences were found for children of the combined subtype, but learning disabilities in inattentive children were less common in divorced families.

As known from previous research, children of divorce present with less social skills (Hetherington, Cox & Cox, 1982). In this study, children of the inattentive subtype living with divorced parents had significantly more social problems than those living in non-divorced families. However, no significant group differences were found in children of the combined subtype. A possible explanation for this finding might be that the more severe AD/HD symptoms and the higher occurrence of internalizing/externalizing problems found in this study for children of the inattentive subtype in the divorced group may have contributed to their poor social performance.

Further, this study found that age was an important correlate in terms of marital status, especially in families with children of the inattentive subtype. Those living with divorced parents were significantly older than those living in non-divorced families, a trend also found – however it was non-significant – in children of the combined subtype. These results replicated findings of Study 1, where a similar trend for both subtypes was found. Thus it appears that parents decided to seek divorce after their children became older. It is possible that children of the inattentive subtype presented with less disruptive behaviour and may therefore have experienced fewer problems at home.
Since AD/HD has been recognized as a developmental disorder with a wide range of co-occurring behavioural, emotional, academic and social problems found in different age cohorts (Barkley et al., 1990; Biederman et al., 1998; Kato et al., 2001; Young et al., 2005), this study investigated a possible relationship between divorce and these co-occurring conditions as a function of age. Results of the present study show that younger children from divorced families displayed more inattentive and hyperactive/impulsive behaviour than did those from intact families. In contrast older subjects presented with only more severe symptoms of hyperactivity, compared to same-aged children from non-divorced families. These results suggest that parental divorce may be associated with the severity of AD/HD core symptoms, especially in younger children. Findings are consistent with those by Warner-Rogers, Taylor, Taylor, and Sandberg (2000) who reported that overactivity in 6-7 years old boys was associated with poor parenting. Similar results were found by others (Brandon, 1971; Tallmadge & Barkley, 1983).

The present study found that divorce correlated with externalizing problems in our younger children (6-12 yrs), who showed a wide range of conduct problems relative to those from intact families. In contrast, older subjects (13-18 yrs) were slightly more impaired than those from non-divorced families. Our results echo some research findings (Cheng et al. 2006; Lansford et al. 2006) but not others (Amato, 2001; Hetherington, 2005). This study replicated some results from study 1 where a higher occurrence of CD/ODD was found in children from divorced families in age group 3 (13-15 yr). However, the previous study did not reveal significant group differences for externalizing disorders in younger children with AD/HD. It is possible that the higher occurrence of behavioural problems in younger children with AD/HD found in the present study may be related to the more severe AD/HD symptoms found in this age cohort.

The present study found a possible relationship between parental divorce and internalizing problems in younger children with AD/HD. Those from divorced families
presented with more symptoms of anxiety and depression compared to children from intact families. However, no group differences were found for adolescents. This is in contrast to others who reported more internalizing problems in older children of divorce (Amato, 2001). Since this study found that younger children from divorced families displayed more externalizing behaviour and more social maladjustment, it is possible that these behaviour difficulties are linked with these internalizing problems in younger children with AD/HD.

Results of Study 1 indicated that children and adolescents with AD/HD from divorced families did not differ to those from intact families in their academic performance. These findings were replicated in the present study where no significant group differences in terms of academic functioning were found in either age group.

This study found that divorce correlated with poor social functioning in younger children, but not in adolescents. This is congruent with some studies investigating age differences in children (Dunn et al., 1998) but not with others (Pliszka, 2000). It is possible that the social problems found in younger children in the present study may correlate with the higher occurrence of AD/HD symptoms and internalizing/externalizing problems found in this age group. Overall, findings of the present study suggest that divorce is associated with poor psychological well-being in children with AD/HD, particularly in those of younger age.

In addition, this study investigated the timing of the divorce and children’s age at divorce. Results show that children who experienced their parent’s divorce less than 3 years ago were less socially active and showed greater impairment in reading than did children whose parent’s divorce dated back more than 3 years ago. These findings suggest that the timing of the divorce may correlate with academic and social functioning in children with AD/HD. It is possible that the longer ago a divorce occurs the better the adjustment of children is; an explanation which is in line with others who suggested that especially the first years after a divorce happens are exceptionally stressful for most children (Spigelman, Spigelman, & Englesson, 1994). In the present
study, the mean age of children at the time of divorce was 5.4 years. Thus, for younger children the divorce was more recent, whereas for adolescents, the divorce happened years ago. Therefore, it may be possible that both children and the custodial parent adapted to the new family situation over time, resulting in improved parenting, a more positive parent-child relationship, less emotional distress, and better coping strategies.

Research into the impact of divorce on gender shows an overall trend towards boys being more vulnerable than girls (Guidubaldi & Perry, 1985; Hetherington et al., 1982). This study found that boys of divorced parents were slightly more impaired in terms of AD/HD core symptoms than boys from intact families, and girls of divorced parents presented with significantly elevated levels of inattention and hyperactivity/impulsivity relative to those of non-divorced parents. These findings suggest a possible relationship between parental divorce and AD/HD symptomatology for both sexes. Results also suggest that girls compared to boys from divorced families displayed more severe symptomatology. These findings correspond with those of Kasen, Cohen, Brook, and Hartmark (1996), who reported a greater risk for AD/HD symptoms in girls after divorce/remarriage.

The present study found that oppositional behaviour in boys with AD/HD was significantly more common in divorced than in non-divorced families, whereas girls of divorced parents scored significantly higher on all measures in the domain of externalizing behaviour problems compared to girls of non-divorced parents. These findings partly replicate results found in Study 1 where boys of divorced families were found to demonstrate significantly more externalizing behaviour than those of intact families. However, the previous study did not reveal significant group differences for girls, and those findings were in line with reports from the literature (Cheng et al., 2006; Dunn et al., 1998; Spigelman et al., 1994). It is possible that the higher occurrence of externalizing behaviour in girls in the present study may correlate with the more severe AD/HD symptoms found for girls of divorced parents.
This study found that boys with AD/HD of divorced parents presented with significantly more depressive symptoms than did boys from non-divorced families. Girls living with divorced parents were slightly more anxious and depressed compared to those of non-divorced families. The finding that boys presented with more severe depressive symptoms is not in line with previous research into divorce, where internalizing problems were predominantly demonstrated by girls (Huurre, Junkkari, & Aro, 2006; Kasen et al., 1996; Spigelman et al., 1994; VanderValk et al., 2005). The greater prevalence of depressive symptoms found in boys from divorced families might be linked with their poor performance at school; as this study found boys of divorced parents presenting with more spelling problems than those from non-divorced families, an association previously made by others (Wallerstein & Kelly, 1980; Willcutt & Pennington, 2000).

In Study 1 no group differences were found for either gender in terms of learning disabilities. Findings of the present study indicated that boys of divorced parents presented with more spelling problems than boys from non-divorced families. However, no significant group differences were found for girls with AD/HD. As mentioned above, it is possible that these spelling difficulties in boys of divorced parents may correlate with their higher occurrence of depressive symptoms.

This study found that girls of divorced parents showed significantly greater impairment in social functioning compared to girls from non-divorced families. However, no significant group differences were found for boys with AD/HD. These findings are in accordance with some studies which found girls of divorce more socially maladjusted than boys (Huurre et al., 2006) but not with others (Amato, 2005; Wallerstein & Kelly, 1980). It is possible that the greater social maladaptiveness found in girls with AD/HD is linked with the greater prevalence of externalizing and internalizing problems and the more severe AD/HD symptoms found for girls in this study.
Overall, findings of the present study indicate a possible association between parental divorce and children’s psychological well-being, particularly for girls. The most common reasons reported in the literature for this phenomenon are the additional burden imposed on girls in case of single parenthood, or a more negative relationship with stepfathers in the event of remarriage (Hetherington, 1999).

In summary, the results of this study imply an association between parental divorce and the psychological well-being of children with AD/HD, in terms of symptom severity, internalizing/externalizing behaviour and social functioning, but to a lesser extent with learning difficulties, which was only present in the total group comparisons and in boys with AD/HD. With the present study, some of the findings revealed in Study 1 were replicated; however subtype, age and gender differences occurred. Overall, findings of the previous study suggested greater impairment for children of the combined subtype, older subjects and for boys of divorced families relative to intact families; whereas the present study found poorer psychological well-being for children of the inattentive subtype, younger subjects and for girls. It is possible that these differences between the two studies are the result of including additional correlates such as symptom severity, internalizing and social functioning in the present study. Further, differences in family characteristics and other environmental factors such as low-income or parental psychopathology may be attributable to the variations found between the two samples studied. However, with findings of Study 1 and the present study it cannot be determined whether these behavioural problems found in children with AD/HD are attributable to parental breakup, or whether these conditions were already present in these children and contributed or caused parental divorce. However, a possible argument against the child’s behaviour causing or contributing to the divorce is that, in general, inattentive children do not present with behavioural problems, and thus are less likely to put stress on the family. However, in this study, inattentive children presented with more behaviour and emotional problems in divorced relative to intact families. Thus, it is possible that these difficulties rather occurred as a
consequence of marital dissolution than vice versa. However, this needs to be investigated further in future research.

In conclusion, findings of this study propose a relationship of parental divorce and the symptom profile of children with AD/HD. With these present findings, there is some suggestion, that environmental factors, such as parental divorce, may correlate with the occurrence of comorbid conditions and the exacerbation of core AD/HD symptoms in children with this disorder. However, this study cannot fully determine the cause of these adjustment difficulties in children with AD/HD. Further research is needed to assess the relationship between parental divorce and the symptom profile of children with AD/HD. With the establishment of a possible association between divorce and AD/HD, the importance of including treatment approaches other than medication in the management of children with AD/HD from divorced families is crucial. Psychological treatment approaches are necessary to prevent family adversity, to improve marital relationships, to supply parents with effective coping strategies, and to reduce behavioural problems in children with AD/HD.
CHAPTER 7: STUDY 2B. ASSOCIATIONS
BETWEEN SINGLE-PARENTHOOD, STEP-FAMILIES, MULTIPLE DIVORCES, THE QUALITY OF RELATIONSHIPS, AND CHILDREN WITH AD/HD
7.1 Introduction

A review of the literature on divorce indicates remarriage rates of approximately 70% among women and 80% among men (Hetherington, Cox, & Cox, 1982). Studies on family type show that divorce and remarriage play an important role in the development of social, behavioural, and academic problems in children (Hetherington, Stanley-Hagen, & Anderson, 1989). Overall, when compared with nuclear families, the literature suggests similar negative outcomes in children from single-parent households and step-families, suggesting that remarriage does not re-establish the family situation that symbolizes stable two-parent households (Dunn, Deater-Deckard, Pickering, & O’Connor, 1998; Lindner, Stanley-Hagan, & Cavanaugh-Brown, 1992). However, it has been argued that children living in step-families are generally not better off than those living in single-parent households (Amato, 2005). Hetherington, Cox, and Cox (1985) reported more problem behaviour in children after 2 years of remarriage, relative to those residing with their single custodial mother. These data found support by Amato and Keith (1991) who found more psychological adjustment problems and more conduct difficulties in children from step-families than in those from divorced single-parent homes. Impaired academic functioning in children was also found to be associated with remarriage. Marks (2006) studied the impact of various family types on student achievement, and found weaker academic performances in children from reconstituted families compared with their counterparts from single-parent households. Similar results were reported by other investigators (Jeynes, 1999). However, in contrast to these findings, there is empirical evidence that children from step-families and single-parent homes are more similar than different. Zill (1988) found that children from single-parent households had as many problem behaviours as did those from step-families. These findings are in line with those by Funder and Kinsella (1991) who
failed to find significant differences between children when comparing the two family
types in terms of psychological deficits.

While there is some suggestion in the literature that children in step-families
may have more adjustment problems than those residing in single-parent households,
this implication may vary as a function of gender and age. There is a trend towards
boys being more negatively affected in single-parent households and girls having more
problems in adjusting to remarriage (Fergusson, Dimond, & Horwood, 1986;
(1997) suggested that this may be the result of a somewhat poorer child-parent
relationship between boys and their divorced mother, and between girls and their step-
parent. This is in line with a number of studies reporting that the presence of a step-
parent increases the well-being of boys but has no effect or decreases the well-being of
girls (Chapman, 1977; Hetherington et al., 1985; Santrock, 1972; Santrock, Warshak,
Lindbergh, & Meadows, 1982).

The literature provides evidence that the effects of divorce and remarriage vary
qualitatively according to children’s age. It has been argued that living in step-families
is associated with adjustment problems predominantly in early adolescence, but less in
younger children (Hetherington, 1981, 1989; Hetherington et al., 1982; Hetherington,
McDuff (1998) reported a greater risk for delinquency in adolescent boys who
experienced their custodial parent’s remarriage compared to those where the families
remained intact.

There is confirmation that remarriages following divorce are less stable than first
marriages and therefore are more likely to end in divorce (Cherlin, 1992; Furstenberg &
Spanier, 1984; Goetting, 1982; Sweet & Bumpass, 1987). Research suggests that
about 50% of children who have experienced the divorce and remarriage of their
custodial parent will be confronted with another collapse of the new family system
(Bumpass, 1984). Children who are consequently exposed to multiple marital
transitions have been found to experience more adverse adjustment difficulties (Capaldi & Patterson, 1991; Pryor & Trinder, 2004) than those of single-divorced parents. Dunn, Deater-Deckard, Pickering, and O’Connor (1998) investigated the relationship of repeated transitions and children’s adjustment outcome in 7-8 year olds and discovered that an increased number of transitions were associated with elevated levels of hyperactivity, conduct and emotional difficulties, peer problems and less pro-social behaviour. Dunn et al. (1998) also postulated that the behaviour problems found in their subjects were not attributable to maternal personality characteristics or child rearing practices. Brody, Neubaum, and Forehand (1988) examined the consequences of serial marriages as an accumulation of adverse life experiences on children’s well-being, and found more behaviour problems, stronger suicide tendencies, higher rates of depression, and a poorer parent-child relationship, as well as stronger feelings of helplessness and incompetence among their subjects. Similar negative consequences for children experiencing multiple transitions were found by others (Fergusson, Horwood, & Lyskey, 1992; Kurdek, Fine, & Sinclair, 1995). Some investigators proposed that multiple transitions may impact negatively on children’s educational attainment. Cockett and Tripp (1994) found more school problems and lower grades for children if they had experienced more than two transitions. Aquilino (1996) reported that children who had undergone more than two family changes were less likely to enter tertiary education, and to join the workforce and have children earlier, compared to those of single divorced parents. Similar results were reported by others (Wu & Martinson, 1993). While the majority of studies support the notion of more adverse outcome in children experiencing multiple divorces compared to those who only experience a single divorce or remarriage, some have failed to find any significant differences in children’s adjustment when comparing those who experienced repeated transitions with those who did not (McLanahan & Sandefur, 1994).

Within the AD/HD literature, there is evidence that social interactions of children with AD/HD, with their family members, differ from those found in normal families
(Barkley, 1990). Relationships in AD/HD families have been found to be more negative and stressful for all family members, implying strong reciprocal effects in these interactions (Campbell, 1975; Cunningham & Barkley, 1979). While the literature suggests more parent-child conflicts for younger children with AD/HD than for adolescents (Barkley, Karlsson, & Pollard, 1985; Barkley, Karlsson, Strezelecki, & Murphy, 1984), no significant gender differences have been found, with both boys and girls showing similar patterns of negativity in their interactions with their parents (Befera & Barkley, 1985; Breen & Barkley, 1988). Differences have been found in regard to sibling interactions. Studies have documented that relationships between children with AD/HD and their siblings are more conflict-ridden than those between normal children and their siblings (Mash & Johnston, 1983). Despite the bulk of research investigating the quality of relationships within AD/HD families, not very much is known about social interactions between children with this disorder and their parents and siblings after divorce and remarriage. However, the quality of relationships among divorced/remarried family members is an important correlate in the adjustment of children.

The divorce literature points to a somewhat poorer parent-child relationship, especially for boys with their custodial mother, and more conflict-ridden interactions between girls and their step-mothers/fathers (Hines, 1997). Sibling relationships have been described as either hostile or supportive in both divorced and remarried families, and boys have been found to receive less emotional support from their siblings (Kim, Hetherington, & Reiss, 1999). Further, there is evidence that negative interactions between family members after divorce and remarriage are associated with poor outcomes in children, including internalizing and externalizing problems (Wood, Repetti, & Roesch, 2004) as well as social maladjustment and academic underachievement (Hetherington, 1999; Jodl, Bridges, Kim, Mitchell, & Chan, 1999; Peterson & Zill, 1986).
In summary, the majority of these studies suggest that divorce, remarriage, multiple family interruptions, and poor relationships with family members, are likely to be associated with behavioural and emotional problems, social maladjustment and scholastic difficulties in children.

The aim of this study was to investigate a possible relationship between divorce, remarriage, repeated marital transitions and the psychological well-being of children with AD/HD, and whether the quality of relationships between children with AD/HD and their family members correlates with the symptom profile of these children. This was achieved by examining differences in psychological well-being between children of single-parent households and step-families, as well as between children who experienced a single divorce and multiple transitions of their custodial parent. Additionally, subtype, age and gender differences were examined.

7.2 Method

7.2.1 Subjects and Procedure

The same procedure as in Study 2A was applied in this study. All children in the present study were drawn from the pool of subjects used in Study 2A. However, in this study only those children with divorced parents (86) were included for analysis. These subjects came from urban, suburban, and rural populations throughout the state of New South Wales and were either diagnosed with the inattentive or the combined subtype of AD/HD. Age of children ranged from 6 to 18 years (mean age of 11.6 years). The group was split into two age groups to examine age-related differences in the symptom profile. Group 1 included primary school children (grade 1-6, age 6-12) and group 2 consisted of secondary school children (grade 7-12, age 13-18). All children had a full-scale IQ score of 75 or higher. The group used consisted of subjects
diagnosed with AD/HD combined and inattentive subtypes, and inclusion criteria were the same as in Study 2A. For analysis, only divorces experienced by parents after the birth of the child were taken into consideration, as this represents the dissolution of the child’s biological parents, and also only includes remarriages of one or both biological parents that the child might have experienced.

A purpose-designed questionnaire to gather information about marital status, family compositions and the quality of relationships (Appendix 2A), which was previously included in the assessment package used in Study 2A and completed by the parent while the child received a clinical assessment by a paediatrician and a psychologist, was used in this study. This questionnaire contained a rating scale to measure the quality of relationships between children with AD/HD and their family members. Parents were asked to describe their child’s relationship with the persons he/she is living with, including biological mother, biological father, step mother/unrelated female, step father/unrelated male, other adults, brothers, sisters, half brothers, half sisters, step brothers, step sisters, or other children. The quality of relationships was scored on a 6-point scale ranging from very poor to very good. Approval of the ethical review board at the University of Wollongong was obtained for this research study prior to data collection.

7.2.2 Statistical Analysis

Psychological well-being was defined and evaluated using the same measures as in Study 2A (6.2.3). An independent sample t-test was performed to examine the relationship between divorce, remarriage, multiple transitions and children’s symptom profile, and to investigate a possible association between the quality of children’s relationships with family members and their psychological well-being. Subtype, age and gender differences were also investigated. Group comparisons included children from single-parent households versus step-families, and children who experienced a single
divorce versus multiple transitions. However, due to small cell sizes, statistical analysis for single and multiple transitions in regard to the quality of relationships among family members were not conducted. For statistical analysis, relationship ratings were combined into two groups: Group 1 = poor (ratings 1-3), and Group 2 = good (ratings 3-6).

7.3 Results

7.3.1 Demographic Data

There were 67 (78%) children living with single divorced parents and 19 (22%) who experienced multiple transitions of their parents. The majority of children (57, 66%) lived in a single-parent household, whereas 29 (34%) were living in step-families. There were 15 custodial fathers (11 divorced, 4 remarried), and 77 custodial mothers (52 divorced, 25 remarried). Among those, 6 had shared custody, where the child resided with both parents (50% each). The majority of children had siblings (brother: 30, sister: 30) and of those living in step-families, 4 had a step-brother and 6 a step-sister.

7.3.2 Single-parent Household Versus Step-family

7.3.2.1 Total Group Comparisons

In regard to the psychometric measures, the number of subjects in each domain of functioning varied as a result of missing parent rating. Descriptive and comparative statistics for differences in children with AD/HD from single-parent homes and step-families are presented in Table 7.1. Significant results were found in various domains
of functioning. In the domain of externalizing problems, using measures on the Conners’ Oppositional scale, children living in step-families had higher mean scores than those living with a single-parent, but this difference only approached significance (t=-1.96, p=0.53). In the domain of internalizing problems, children living in step-families scored significantly higher on measures of the DAYS Anxiety scale compared to those living with a single-parent (t=-2.43, p<.05). In the domain of social functioning, significant results were obtained on measures of the CBCL Social Problems scale, with children living in step-families having significantly higher mean scores than those living with a single-parent (t=-2.16, p<.05). In contrast, children from single-parent households had significantly lower mean values on measures of the CBCL Activities scale, compared to those from step-families (t=-2.50, p<.05).

| TABLE 7.1: Means, Standard Deviations, and Comparative Statistics on psychological well-being of children with AD/HD living with a single-parent or step-family |
|-------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                                  | Single-parent   | N   | Mean   | SD | N   | Mean   | SD | t Value |
| Externalizing Problems                           |                 |     |        |    |     |        |    |         |
| Conners’: Oppositional                           |                 | 55  | 66.16  | 13.26 | 29  | 72.34  | 14.56 | -1.96   |
| Internalizing Problems                           |                 | 56  | 2.71   | 1.91  | 29  | 3.83   | 2.17  | -2.43*  |
| Social Functioning                               |                 |     |        |    |     |        |    |         |
| CBCL: Social Problems                            |                 | 53  | 60.53  | 7.47  | 27  | 64.78  | 9.78  | -2.16*  |
| CBCL: Activities                                 |                 | 53  | 41.13  | 10.23 | 27  | 46.96  | 9.06  | -2.50*  |

Note: DAYS=Depression and Anxiety in Youth Scale, CBCL=Child Behaviour Checklist, *p<.05

7.3.2.2 Subtype, Age, and Gender Differences

Descriptive and comparative statistics for differences in AD/HD subtypes are presented in Table 7.2. Significant differences for the inattentive subtype were found only in the domain of social functioning. Children living in a single-parent household scored significantly lower on measures of the CBCL Activities scale (t=-2.73, p<.01) compared to those living in step-families. Significant results for children of the combined subtype were found in domains of AD/HD symptomatology and externalizing problems. Children living in a step-family scored significantly higher on measures of the Conners’ DSM-Hyperactive/Impulsive scale (t=-2.19, p<.05), and the CBCL Rule
Breaking scale (t=-2.39, p<.05) compared to those living with a single-parent. In the domain of internalizing problems, differences on the DAYS Anxiety scale only approached significance (t=-1.97, p=.058), with children living in step-families having higher mean scores compared to those living with a single-parent.

### TABLE 7.2: Means, Standard Deviations, and Comparative Statistics on psychological well-being of children with the inattentive and combined subtype of AD/HD, living with a single-parent or step-family

<table>
<thead>
<tr>
<th></th>
<th>Single-parent</th>
<th>Step-family</th>
<th>t Value</th>
</tr>
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<tbody>
<tr>
<td><strong>Inattentive Subtype</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Social Functioning</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CBCL: Activities</td>
<td>32 42.00 9.66</td>
<td>14 50.43 9.61</td>
<td>-2.73**</td>
</tr>
<tr>
<td><strong>Combined Subtype</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AD/HD-related Symptomatology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conners': DSM-Hyperactive/Imp.</td>
<td>20 77.40 10.61</td>
<td>14 84.50 7.04</td>
<td>-2.19*</td>
</tr>
<tr>
<td>Externalizing Problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBCL: Rule Breaking Behaviour</td>
<td>21 63.38 6.87</td>
<td>13 68.77 5.48</td>
<td>-2.39*</td>
</tr>
<tr>
<td>Internalizing Problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAYS: Anxiety</td>
<td>21 2.62 1.88</td>
<td>14 4.00 2.25</td>
<td>-1.97</td>
</tr>
</tbody>
</table>

Note: CBCL=Child Behaviour Checklist, DAYS=Depression and Anxiety in Youth Scale, **p<.01, *p<.05

Descriptive and comparative statistics for age differences are presented in Table 7.3. Significant differences were found for children in Age group 1 (6-12 yrs) in various domains of functioning. In the domain of externalizing problems, differences on the CBCL Oppositional scale only approached significance (t=-1.91, p=.062), with children living in step-families having higher mean scores than those living with a single-parent. In the domain of internalizing problems and social functioning, children living in step-families scored significantly higher on the DAYS Anxiety scale (t=-2.00, p<.05), the DAYS Depression scale (t=-2.13, p<.05), the CBCL Social Problems scale (t=-2.11, p<.05), and had lower values on the CBCL Social scale (t=2.23, p<.05), compared to those living with a single-parent. Significant differences for children in age group 2 (13-18 yrs) were only found in the domain of social functioning. Children living in a single-parent household had significantly lower scores on measures of the CBCL Activities scale compared to those living in step-families (t=-2.86, p<.01).
TABLE 7.3: Means, Standard Deviations, and Comparative Statistics on psychological well-being of children with AD/HD in age group 1 and 2, living with a single-parent or step-family

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th>Step-family</th>
<th></th>
<th>t Value</th>
</tr>
</thead>
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<td></td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td><strong>Age Group 1 (6-12 yrs.)</strong></td>
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<td><strong>Externalizing Problems</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conners': Oppositional</td>
<td>41</td>
<td>65.20</td>
<td>12.43</td>
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</tr>
<tr>
<td>DAYS: Anxiety</td>
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<td>2.91</td>
<td>1.97</td>
<td>14</td>
<td>4.14</td>
</tr>
<tr>
<td>DAYS: Depression</td>
<td>42</td>
<td>2.26</td>
<td>1.89</td>
<td>14</td>
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<td><strong>Social Functioning</strong></td>
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<td>CBCL: Social Problems</td>
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<td>66.31</td>
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<tr>
<td>CBCL: Social</td>
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<td>8.42</td>
<td>13</td>
<td>36.92</td>
</tr>
<tr>
<td><strong>Age Group 2 (13-18 yrs.)</strong></td>
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<tr>
<td><strong>Social Functioning</strong></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>CBCL: Activities</td>
<td>12</td>
<td>37.67</td>
<td>8.56</td>
<td>14</td>
<td>48.21</td>
</tr>
</tbody>
</table>

Note: DAYS=Depression and Anxiety in Youth Scale, CBCL=Child Behaviour Checklist, **p<.01, *p<.05

Results for each gender are presented in Table 7.4. Significant differences were found for boys in domains of internalizing problems and social functioning. Boys living in a step-family had significantly higher mean scores on measures on the DAYS Anxiety scale relative to those living with a single-parent (t=-2.12, p<.05). Differences on the DAYS Depression scale approached statistical significance, with boys living in a step-family having higher mean scores compared to those living with a single-parent (t=-1.93, p=.060). In the domain of social functioning, a significant result was found on measures of the CBCL Activities scale, with boys living in single-parent households having significantly lower scores than those living in step-families (t=-2.23, p<.05).

Significant results for girls were found only in the domain of academic functioning. Girls living in step-families showed significantly greater impairment on measures of the CBCL School scale (t=-2.32, p<.05), compared to girls living in a single-parent household.

TABLE 7.4: Means, Standard Deviations, and Comparative Statistics on psychological well-being of boys and girls with AD/HD, living with a single-parent or step-family

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Single-parent</th>
<th>Mean</th>
<th>SD</th>
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<td><strong>Boys</strong></td>
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<td><strong>Internalizing Problems</strong></td>
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<td>2.48</td>
<td></td>
<td>17</td>
<td>4.18</td>
<td>2.74</td>
<td></td>
<td>-1.93</td>
</tr>
<tr>
<td><strong>Social Functioning</strong></td>
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<tr>
<td>CBCL: Activities</td>
<td>33</td>
<td>40.03</td>
<td>11.30</td>
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<td>15</td>
<td>47.27</td>
<td>8.14</td>
<td></td>
<td>-2.23*</td>
</tr>
<tr>
<td><strong>Girls</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Cognitive/Academic Functioning</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>CBCL: School</td>
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<td>33.05</td>
<td>7.22</td>
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<td>12</td>
<td>39.42</td>
<td>7.81</td>
<td></td>
<td>-2.32*</td>
</tr>
</tbody>
</table>

Note: DAYS=Depression and Anxiety in Youth Scale, CBCL=Child Behaviour Checklist, **p<.01, *p<.05
7.3.3 Single Versus Multiple Transitions

7.3.3.1 Total Group Comparisons

When comparing children with AD/HD to examine differences in psychological well-being among those who experienced only a single divorce and those who experienced multiple divorces of their biological parents, no statistically significant results were found.

7.3.3.2 Subtype, Age, and Gender Differences

Descriptive and comparative statistics for differences in subtypes and age are presented in Table 7.5. When investigating subtype differences among the single and multiple divorced groups, significant results were found for children of the combined subtype in the domain of internalizing problems. Those living with multiple divorced parents scored significantly higher on measures of the Conners’ Anxious-Shy scale than did those of single divorced parents (t=-2.36, p<.05).

When investigating age differences among the single and multiple divorced groups, significant differences were found only for children in age group 2 (13-18 yrs.) Although the effect only approached statistical significance, children of single divorced parents had higher mean scores on the DAYS Depression scale than did those of multiple divorced parents (t=1.97, p=.059). Those living with single divorced parents scored significantly higher on the DAYS Social Maladjustment scale (t=3.02, p<.01) than did children of multiple divorced parents.

When investigating gender differences among the single and multiple divorced groups, no significant results were found.
TABLE 7.5: Means, Standard Deviations, and Comparative Statistics on psychological well-being of children with the combined subtype of AD/HD and for children in age group 2 who experienced single/multiple divorces of their parents

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<tr>
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<td>Mean</td>
<td>SD</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>Combined Subtype</td>
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<td></td>
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<tr>
<td>Internalizing Problems</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conners': Anxious-Shy</td>
<td>26</td>
<td>57.19</td>
<td>12.74</td>
<td>8</td>
<td>69.00</td>
</tr>
<tr>
<td>Age Group 2 (13-18 yrs.)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internalizing Problems</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>DAYS Depression</td>
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<td>2.43</td>
<td>7</td>
<td>2.00</td>
</tr>
<tr>
<td>Social Functioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAYS Social Maladjustment</td>
<td>22</td>
<td>3.36</td>
<td>1.40</td>
<td>7</td>
<td>1.43</td>
</tr>
</tbody>
</table>

Note: DAYS=Depression and Anxiety in Youth Scale, *p<.05, **p<.01

7.3.4 The Quality of Relationships Between Children with AD/HD and Their Family Members

7.3.4.1 Total Group Comparisons

When investigating a possible relationship between the quality of children’s relationships with their family members and their psychological well-being, significant results were found in various domains (Table 7.6). Children with AD/HD having a poor relationship with their custodial mother, compared to those who had a good relationship, had significantly lower scores on the CBCL Social scale (t=-3.15, p<.01), and measures on the CBCL Rule Breaking scale were approaching significance (t=1.98, p=.052) with those having a poor relationship with their mother scoring higher than those who had a good relationship. Further, children with AD/HD having a poor relationship with their custodial father, compared to those who had a good relationship, scored significantly higher on the Conners’ Oppositional scale (t=2.85, p<.05), and measures on the Conners’ DSM-Total scale (t=2.01, p=.065) and the DAYS Anxiety scale (t=2.10, p=.056) were approaching significance, with higher scores obtained by children who had a good compared to those who had a poor relationship with their custodial father. Additionally, children with AD/HD having a poor relationship with their sister, compared to those who had a good relationship, scored significantly higher on measures of the Conners’ Oppositional scale (t=2.60, p<.05), the CBCL Aggressive
Behaviour scale \((t=2.93, p<.01)\), CBCL Anxious/Depressed scale \((t=3.40, p<.01)\), CBCL Internalizing Problems scale \((t=3.06, p<.01)\), the DAYS Anxiety scale \((t=2.42, p<.05)\), and the DAYS Social Maladjustment scale \((t=2.21, p<.05)\). Differences approaching significance were found on the CBCL Externalizing Problems scale \((t=2.07, p=.051)\) and the CBCL Social Problems scale \((t=2.01, p=.057)\), with higher scores obtained by those who had a poor relationship relative to those who had a good relationship with their sister. Finally, children with AD/HD having a poor relationship with their brother, compared to those who had a good relationship, scored significantly higher on measures of the CBCL Rule Breaking scale \((t=2.19, p<.05)\), and the CBCL Externalizing Problems scale \((t=2.12, p<.05)\). In contrast, however only approaching significance was our finding that children who had a good relationship with their brother had higher mean scores on measures of the Conners’ Anxious/Shy scale \((t=-1.97, p=.061)\), compared to those who had a poor relationship. No significant results were found in respect to children’s relationships with their step-fathers.

**TABLE 7.6:** Means, Standard Deviations, and Comparative Statistics of outcome variables regarding the quality of relationships with family members from divorced/remarried families

<table>
<thead>
<tr>
<th>Relationship with custodial mother</th>
<th>Relationship with custodial father</th>
<th>Relationship with sister</th>
<th>Relationship with brother</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Functioning</strong></td>
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<tr>
<td>CBCL Social</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>good N Mean SD</td>
<td>poor N Mean SD</td>
<td>t Value</td>
<td></td>
</tr>
<tr>
<td>52 42.73 8.76</td>
<td>19 35.79 6.49</td>
<td>-3.15**</td>
<td></td>
</tr>
<tr>
<td><strong>Externalizing Problems</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBCL Rule Breaking Behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52 60.67 8.31</td>
<td>19 65.00 7.79</td>
<td>1.98</td>
<td></td>
</tr>
<tr>
<td><strong>Conners’ Oppositional Behaviour</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 59.38 10.57</td>
<td>7 74.71 10.23</td>
<td>2.85*</td>
<td></td>
</tr>
<tr>
<td><strong>AD/HD-related Symptomatology</strong></td>
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</tr>
<tr>
<td>Conners’ DSM-Total</td>
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<td></td>
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</tr>
<tr>
<td>8 74.63 9.96</td>
<td>7 84.00 7.75</td>
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<tr>
<td><strong>Internalizing Problems</strong></td>
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</tr>
<tr>
<td>DAYS Anxiety</td>
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</tr>
<tr>
<td>8 2.13 1.55</td>
<td>7 4.00 1.92</td>
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<td><strong>Conners’ Oppositional Behaviour</strong></td>
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<td>CBCL Aggressive Behaviour</td>
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<td>11 72.45 15.71</td>
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</tr>
<tr>
<td>13 56.39 6.78</td>
<td>10 70.60 15.77</td>
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</tr>
<tr>
<td>CBCL Anxious/Depressed</td>
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</tr>
<tr>
<td>13 54.54 11.78</td>
<td>10 65.80 14.37</td>
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<tr>
<td><strong>Conners’ DSM-Total</strong></td>
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<td></td>
</tr>
<tr>
<td>13 55.31 7.72</td>
<td>10 66.80 8.47</td>
<td>3.40**</td>
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<td><strong>DAYS Anxiety</strong></td>
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<td></td>
</tr>
<tr>
<td>14 2.14 1.99</td>
<td>10 4.00 1.63</td>
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<td><strong>Social Functioning</strong></td>
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</tr>
<tr>
<td>DAYS Social Maladjustment</td>
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<td></td>
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</tr>
<tr>
<td>14 2.14 1.17</td>
<td>10 3.70 2.26</td>
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<tr>
<td>CBCL Social Problems</td>
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<td></td>
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<tr>
<td>13 56.15 8.32</td>
<td>10 64.00 10.39</td>
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<td><strong>Conners’ DSM-Total</strong></td>
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<td><strong>Conners’ Anxious/Shy</strong></td>
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<tr>
<td>13 58.61 14.44</td>
<td>12 49.25 8.15</td>
<td>-1.97</td>
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</tr>
</tbody>
</table>

Note: CBCL=Child Behaviour Checklist, AD/HD=Attention Deficit Hyperactivity Disorder, DAYS=Depression and Anxiety in Youths Scale, **p<.01, *p<.05
7.3.4.2 Subtype Differences

Descriptive and comparative statistics for subtype differences are presented in Table 7.7. Children of the inattentive subtype having a poor relationship with their custodial mother, compared to those who had a good relationship, scored significantly higher on measures of the CBCL Rule Breaking scale (t=2.55, p<.05), the CBCL Externalizing Problems scale (t=2.36, p<.05), results on CBCL Aggressive Behaviour scale were approaching significance (t=2.00, p=.053), and had significantly lower scores on the CBCL Social scale (t=-2.35, p<.05). Further, inattentive children having a poor relationship with their sister, relative to those who had a good relationship, scored significantly higher on the CBCL Anxious/Depressed scale (t=2.90, p<.05), and measures on the CBCL Aggressive Behaviour scale were approaching significance (t=2.10, p=.056), with higher scores obtained by children who had a poor relationship with their sister, compared to those who had a good relationship. Finally, inattentive children having a poor relationship with their brother had significantly higher mean scores on the CBCL Rule Breaking Behaviour scale (t=2.50, p<.05), Aggressive Behaviour Scale (t=2.29, p<.05), and the Externalizing Problems scale (t=2.84, p<.05), compared to those who had a good relationship.

Children of the combined subtype who had a good relationship with their custodial mothers, compared to those who had a poor relationship, scored higher on the Conners’ DSM-Inattentive scale (t=-2.03, p=.052), but the differences were only approaching significance.
TABLE 7.7: Means, Standard Deviations, and Comparative Statistics of AD/HD subtypes outcome variables regarding the quality of relationships with family members from divorced/remarried families

<table>
<thead>
<tr>
<th>Inattentive subtype</th>
<th>Relationship with custodial mother</th>
<th>Relationship with custodial mother</th>
<th>Relationship with sister</th>
<th>Relationship with brother</th>
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<th>Relationship with custodial mother</th>
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</thead>
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<td></td>
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<td>SD</td>
<td>poor N</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Externalizing Problems</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBCL Rule Breaking Behaviour</td>
<td>31</td>
<td>57.42</td>
<td>7.78</td>
<td>9</td>
<td>65.22</td>
<td>9.05</td>
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<td>9.91</td>
<td>9</td>
<td>66.78</td>
<td>12.49</td>
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<td>Social Functioning</td>
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</tr>
<tr>
<td>CBCL Social</td>
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<td>44.77</td>
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<td>9</td>
<td>37.56</td>
<td>6.61</td>
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<td>Internalizing Problems</td>
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<td>54.43</td>
<td>5.71</td>
<td>8</td>
<td>67.13</td>
<td>15.00</td>
</tr>
</tbody>
</table>

Note: CBCL=Child Behaviour Checklist, AD/HD=Attention Deficit Hyperactivity Disorder, *p<.05

7.3.4.3 Age Differences

Results for age differences are presented in Table 7.8. Children with AD/HD in age group 1 (6-12 yrs.) having a poor relationship with their custodial mother, compared to those who had a good relationship, scored significantly lower on the CBCL Social scale (t=-2.31, p<.05). Further, children having a poor relationship with their sister had significantly higher mean scores on measures of the CBCL Internalizing Problems scale (t=4.04, p<.01), relative to those who had a good relationship, and results on the CBCL Anxious/Depressed scale were approaching significance (t=2.19, p=.053), with higher scores obtained by children who had a poor relationship with their sister, compared to those who had a good relationship. Finally, children with a poor relationship with their brother scored significantly higher on the CBCL Rule Breaking scale (t=2.41, p<.05), compared to those who had a good relationship.

Children with AD/HD in age group 2 (13-18 yrs.) having a poor relationship with their custodial mother, compared to those who had a good relationship, had lower scores on measures of the CBCL Social scale (t=-2.03, p=.057), however results were only approaching significance.
### Table 7.8: Means, Standard Deviations, and Comparative Statistics of age-related outcome variables regarding the quality of relationships with family members from divorced/remarried families

<table>
<thead>
<tr>
<th>Age group 1 (6-12 yrs.)</th>
<th>Relationship with custodial mother</th>
<th>Relationship with sister</th>
<th>Relationship with brother</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Functioning</td>
<td>CBCL Social</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>good</td>
<td></td>
<td>40</td>
<td>42.73</td>
</tr>
<tr>
<td>poor</td>
<td></td>
<td>11</td>
<td>36.00</td>
</tr>
<tr>
<td>Internalizing Problems</td>
<td>CBCL Internalizing Problems</td>
<td>6</td>
<td>47.67</td>
</tr>
<tr>
<td></td>
<td>CBCL Anxious/Depressed</td>
<td>6</td>
<td>56.67</td>
</tr>
<tr>
<td>Externalizing Problems</td>
<td>CBCL Rule Breaking Behaviour</td>
<td>8</td>
<td>54.63</td>
</tr>
<tr>
<td>Age group 2 (13-18 yrs.)</td>
<td>Relationship with custodial mother</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>Social</td>
<td>CBCL Social</td>
<td>12</td>
<td>42.75</td>
</tr>
</tbody>
</table>

Note: CBCL=Child Behaviour Checklist, **p<.01, *p<.05

7.3.4.4 Gender Differences

Descriptive and comparative statistics for gender differences are presented in Table 7.9. Boys with AD/HD having a poor relationship with their custodial mother, compared to those who had a good relationship, scored significantly lower on measures of the CBCL Social scale (t=-3.57, p<.001). Boys with AD/HD having a poor relationship with their sister, compared to those having a good relationship, scored significantly higher on measures of the Conners’ Oppositional scale (t=2.18, p<.05), the CBCL Aggressive Behaviour scale (t=2.80, p<.05), the Autism Screening Algorithm of the DBC (t=2.50, p<.05), measures on the CBCL Externalizing Problems (approaching significance; t=2.01, p=.064), the CBCL Anxious/Depressed scale (t=3.76, p<.01), the CBCL Internalizing Problems scale (t= 2.32, p<.05), the DAYS Anxiety scale (t=2.29, p<.05), the CBCL Social Problems scale (t=2.25, p<.05), and on the DAYS Social Maladjustment scale (t=2.95, p<.01). Findings in regard to relationships with their brothers were non-significant.

Girls with AD/HD having a good relationship with their custodial mother, compared to those who had a poor relationship, scored significantly higher on measures of the Conners’ DSM-Inattentive scale (t=-2.26, p<.05), the DSM-Total scale (t=-2.05, p<.05), and on the CBCL Attention Problems scale (t=-2.64, p<.05).
TABLE 7.9: Means, Standard Deviations, and Comparative Statistics of gender outcome variables regarding the quality of relationships with family members from divorced/remarried families

<table>
<thead>
<tr>
<th>Boys with AD/HD</th>
<th>Relationship with custodial mother</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>good</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Social Functioning</td>
<td></td>
</tr>
<tr>
<td>CBCL Social</td>
<td>29</td>
</tr>
<tr>
<td>Externalizing Problems</td>
<td></td>
</tr>
<tr>
<td>Conners' Oppositional Behaviour</td>
<td>10</td>
</tr>
<tr>
<td>CBCL Aggressive Behaviour</td>
<td>9</td>
</tr>
<tr>
<td>DBC Autism Screening Algorithm</td>
<td>10</td>
</tr>
<tr>
<td>CBCL Externalizing Problems</td>
<td>9</td>
</tr>
<tr>
<td>Internalizing Problems</td>
<td></td>
</tr>
<tr>
<td>CBCL Anxious/Depressed</td>
<td>9</td>
</tr>
<tr>
<td>CBCL Internalizing Problems</td>
<td>9</td>
</tr>
<tr>
<td>DAYS Anxiety</td>
<td>10</td>
</tr>
<tr>
<td>Social Functioning</td>
<td></td>
</tr>
<tr>
<td>CBCL Social Problems</td>
<td>9</td>
</tr>
<tr>
<td>DAYS Social Maladjustment</td>
<td>10</td>
</tr>
<tr>
<td>Girls with AD/HD</td>
<td>Relationship with custodial mother</td>
</tr>
<tr>
<td>AD/HD-related symptomatology</td>
<td></td>
</tr>
<tr>
<td>Conners' DSM-Inattentive</td>
<td>24</td>
</tr>
<tr>
<td>Conners' DSM-Total</td>
<td>24</td>
</tr>
<tr>
<td>CBCL Attention Problems</td>
<td>23</td>
</tr>
</tbody>
</table>

Note: CBCL=Child Behaviour Checklist, DBC=Developmental Behaviour Checklist, DAYS=Depression and Anxiety in Youths Scale, ***p<.001, **p<.01, *p<.05

7.3.4.5 Single-parent Households and Step-families

Results for differences in children with AD/HD from single-parent households and step-families are presented in Table 7.10. Children with AD/HD living in a single-parent household, and having a poor relationship with their custodial mother, scored significantly higher on measures of the DAYS Depression scale (t=2.21, p<.05), and had significantly lower scores on the CBCL Social scale (t=-2.12, p<.05), compared to those who had a good relationship. Further, children with AD/HD having a poor relationship with their sister had significantly higher mean scores on the Conners' Oppositional Scale (t=2.11, p<.05), the CBCL Aggressive Behaviour scale (t=2.26, p<.05), CBCL Anxious/Depressed scale (t=2.67, p<.05), CBCL Internalizing Problems scale (t=3.22, p<.01), and on the DAYS Anxiety scale (t=2.58, p<.05). Children with AD/HD having a good relationship with their brother scored significantly higher on the Conners' Anxious/Shy scale (t=-2.18, p<.05) compared to those who had a poor relationship.

Children with AD/HD living in step-families, and having a poor relationship with their custodial mother, compared to those who had a good relationship, scored
significantly higher on the CBCL Rule Breaking scale ($t=2.27$, $p<.05$), and had lower scores on the CBCL Social scale ($t=-2.18$, $p<.05$). Surprisingly, no significant results were found in respect to children's relationships with their step-fathers.

**TABLE 7.10:** Means, Standard Deviations, and Comparative Statistics of outcome variables regarding the quality of relationships with family members for children with AD/HD living in single-parent homes and step-families

<table>
<thead>
<tr>
<th>Relationship with custodial mother</th>
<th>Relationship with sister</th>
<th>Relationship with brother</th>
<th>Step-family</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single-parent Household</strong></td>
<td><strong>Relationship with custodial mother</strong></td>
<td><strong>Relationship with custodial mother</strong></td>
<td><strong>Relationship with custodial mother</strong></td>
</tr>
<tr>
<td>Good N Mean SD Poor N Mean SD t Value</td>
<td>Good N Mean SD Poor N Mean SD t Value</td>
<td>Good N Mean SD Poor N Mean SD t Value</td>
<td>Good N Mean SD Poor N Mean SD t Value</td>
</tr>
<tr>
<td>Internalizing Problems</td>
<td>DAYS Depression</td>
<td>Social Functioning</td>
<td>CBCL Social</td>
</tr>
<tr>
<td>N Mean SD</td>
<td>38 2.11 2.00 12 3.67 2.54 2.21*</td>
<td>36 43.17 8.59 11 37.09 7.29 -2.12*</td>
<td>36 43.17 8.59 11 37.09 7.29 -2.12*</td>
</tr>
<tr>
<td>Externalizing Problems</td>
<td>Conners' Oppositional Behaviour</td>
<td>CBCL Aggressive Behaviour</td>
<td>9 58.89 10.24 10 72.40 16.56 2.11*</td>
</tr>
<tr>
<td>Internalizing Problems</td>
<td>CBCL Anxious/Depressed</td>
<td>CBCL Internalizing Problems</td>
<td>9 55.33 8.31 9 65.56 7.96 2.67*</td>
</tr>
<tr>
<td>DAYS Anxiety</td>
<td>Conners' Anxious/Shy</td>
<td>DAYS Anxiety</td>
<td>9 1.78 1.92 9 4.00 1.73 2.58*</td>
</tr>
</tbody>
</table>

Note: DAYS=Depression and Anxiety in Youths Scale, CBCL=Child Behaviour Checklist, AD/HD=Attention Deficit Hyperactivity Disorder

7.4 Discussion

Following divorce the majority of children reside with their custodial mother in a single-parent home. However, this family type is often only a temporary living arrangement, as about 70% of women remarry (Cherlin & Furstenberg, 1994; Hetherington et al., 1982). In this study we found that almost two thirds of the children with AD/HD lived in a single-parent household (66%), whereas one third lived in step-families (34%). In the present study, the majority of children (78%) had undergone only a single divorce of their biological parents, while a small group (22%) experienced multiple transitions. This is in contrast to Cherlin and Furstenberg (1994), who suggested a divorce rate of 60 % after remarriage. The results found in this study suggest that the presence of a child with AD/HD may interact with the custodial
parents’ decision to cohabit with another partner or to enter into a new marriage. It is possible that the behavioural problems displayed by children diagnosed with AD/HD may correlate with reluctant “pairing” responses from individuals, resulting in more difficulties for the custodial parent to find a new partner. However, this issue needs further investigation. The findings of this study also suggest that, after having found a new spouse, remarriages seem to be fairly stable.

A great deal of research has been carried out to investigate children’s adjustment after divorce in regard to family type (Dunn et al., 1998; Hetherington & Clingempeel, 1992; Sandefur, McLanahan, & Wojtkiewicz, 1992). Some argue that children with remarried parents are not better off than those with a single-parent (Amato, 2005; Hetherington & Clingempeel, 1992; Lindner, Hagan, & Cavanaugh-Brown, 1992). Studies indicate more behavioural, emotional, academic and social problems in children living in step-families, compared to those residing in single-parent households (Amato & Keith, 1991; Hetherington et al., 1985; Jeynes, 1999; Marks, 2006). Within the divorce literature for AD/HD, Kasen, Cohen, Brook, and Hartmark (1996) studied the effects of divorce on psychiatric disorders in children. Findings suggested that both boys and girls from step-families were at increased risk for AD/HD. Results of the present study show that children living in step-families displayed more oppositional behaviour, more symptoms of anxiety, and presented with greater social impairment relative to those from single-parent homes. This is in line with Lindner, Hagan, and Cavanaugh-Brown (1992), who found children in step-families presenting with more behavioural problems and less social competency. Findings of this study show that the entry into a step-family is associated with problem behaviour in children with AD/HD. Further, in this study, lower levels of activity were found in children with AD/HD living with a single custodial parent relative to those from step-families. It is possible that children in single-parent homes are more involved in household jobs and taking care of siblings after parental divorce and this may limit their social activities, such as meeting friends, participation in sports, or other areas of interest. Overall,
findings of the present study suggest that children with AD/HD from step-families show more behaviour problems than those from single-parent homes, which replicate general findings of the literature.

This study found lower levels of activities in children of the inattentive subtype from single-parent households relative to those from step-families. Children of the combined subtype living in step-families presented with higher levels of hyperactivity-impulsivity, more rule breaking and anxious behaviour, than did those living with a single custodial parent. The behavioural problems found in children of the combined subtype are common co-existing conditions. However, it seems that those living in step-families present with more conduct problems than those living in a single-parent household. It is possible that the familial changes involved in remarriage, including relationships with new family members, may correlate with these conditions. These findings suggest a possible relationship between remarriage and the occurrence of comorbid conditions, as well as more severe AD/HD symptomatology, particularly in children with the combined subtype.

Within the literature there are consistent results for age differences, suggesting better adjustment in the event of remarriage in younger children (Hetherington, Stanley-Hagan, & Anderson, 1989; Hines, 1997; Pagani, Tremblay, Vitaro, Kerr, & McDuff, 1998). However, the present study found that children in age group 1 (6-12 yrs.) living in step-families, were more oppositional, displayed more symptoms of anxiety and depression, and were more socially maladjusted, than those living in a single-parent household. Perhaps younger children see the entry of a step-parent as a danger to their relationship with the non-custodial parent, or be confronted with defending from step-siblings their previously-established roles and responsibilities during single-parenthood. In contrast, externalizing behaviour has been found to be more prevalent in younger children with AD/HD (Barkley, Fischer, Edelbrock, and Smallish, 1990), and it is possible that these problems are linked to more adversity in step-families. This needs further research investigation. Further, in children of age
group 2 (13-18 yrs.), lower levels of activities were found in those who resided with their single custodial parent compared to adolescents from step-families. It is possible that adolescents living in a single-parent home are more involved in household duties and other responsibilities which might limit their social activities, whereas others living in step-families may benefit from the new family members by sharing domestic chores and being less responsible for emotional and economic support of their single custodial parent. These findings suggest that remarriage correlates with adjustment problems predominantly in younger children with AD/HD, whereas single-parenthood seems to be associated with less social activities in adolescents.

The divorce literature on gender differences generally implies that boys fare better in step-families, whereas girls are better off in one-parent homes (Chapman, 1977; Hetherington, 2005; Hetherington & Clingempeel, 1992; Peterson & Zill, 1986; Santrock, Warshak, Lindbergh, & Meadows, 1982). Results in this study only partially support those previous findings. Boys living in step-families were significantly more impaired than those from single custodial households. These boys presented with more depressive and anxious symptoms. This is in contrast to Peterson and Zill (1986), who found that boys from single-parent homes were more depressed and withdrawn than those from step-families. It is possible that the behavioural problems of boys with AD/HD may correlate with a poorer relationship with the step-parent and the step-siblings, which in turn might be associated with difficulties displayed in form of anxious and depressed behaviour. In contrast, this study found that boys from single-parent homes were less socially active than those from step-families. It is possible that the new family members resulted in a greater amount of free time, with less domestic responsibilities for boys.

This study found that girls residing in step-families presented with more difficulties at school relative to those from single custodial households. Research suggests greater academic impairment in children from step-families (Jeynes, 1999; Wolfinger, Kowaleski-Jones, & Smith, 2003). It is possible that the remarriage of the
custodial parent, often accompanied by a poor daughter-parent relationship, may be associated with academic underachievement in girls with AD/HD, a phenomenon observed by Peterson and Zill (1986). These findings show that both boys and girls with AD/HD present with more problems in step-families than in single-parent homes, suggesting that remarriage correlates with poor psychological well-being in children with this disorder.

Since the literature suggests higher divorce rates in remarriages than in first marriages, many children experience a series of family formations (Hetherington & Stanley-Hagan, 1999). There is evidence that children who are exposed to multiple transitions present with the most adverse problems in adjustment (Brody, Neubaum, & Forehand, 1988; Capaldi & Patterson, 1991; Dunn, Deater-Deckard, Pickering, & O’Connor, 1998). However, others found children’s adjustment after having gone through multiple divorces no more or less different to those who only experienced a single family disruption (McLanahan & Sandefur, 1994). This study found very few group differences, with some findings only approaching significance. No statistically significant results were found in children's behaviour between the single and multiple divorced groups.

However, subtype differences emerged; children of the combined subtype in the multiple divorced group displayed more anxious and shy behaviour, relative to those in the single divorced group. These findings suggest a possible relationship between internalizing behaviour in children of the combined subtype and multiple marital transitions. Research has shown that the combined subtype of AD/HD is related to more disruptive behaviour (Goodyear & Hynd, 1992) but findings in regard to the occurrence of internalizing problems have shown mixed results (Hinshaw, 2002; Power, Costigan, Eiraldi, & Leff, 2004). As a result of more behaviour problems in children of this AD/HD subtype, it is possible that these children may have more difficulties in coping with repeated family disruptions, which in turn may correlate with a higher occurrence of internalizing problems in these children. Interestingly, no
significant group differences were found for children of the inattentive subtype of AD/HD, suggesting no relationship between multiple transitions and adjustment problems in these children. It is possible that the inattentive subtype is less likely to contribute to family adversity, as it is predominantly characterized by problems of attention, and as such may not be related to multiple marital break-downs. On the other hand, inattentive children may be better able to deal with family changes, as they have been found to present with greater social competence (Gaub & Carlson, 1997; Graetz, Sawyer, Hazell, Arney, & Baghurst, 2001). However, this issue needs to be investigated further in future research.

VanderValk, Spruijt, deGoede, Maas, and Meeus (2005) suggested more behavioural and emotional problems in adolescents following parental divorce, and this was also found in the present study. Children in age group 2 (13-18 yrs.) who only experienced a single divorce, displayed significantly more symptoms of depression and greater social maladjustment, compared to those who were exposed to multiple family transitions. In contrast, younger children, aged 6-12 years, did not differ in their psychological well-being in the experience of single and multiple marital changes. These findings suggest that multiple transitions are unrelated to adjustment problems in children with AD/HD of all ages, whereas the experience of a single divorce seems to correlate with internalizing problems and social dysfunction in adolescence.

No significant gender differences were found in this study. Both girls and boys who experienced multiple family break-ups showed similar impairment compared to those who were exposed to only a single divorce of their custodial parent. These findings suggest that multiple remarriages are not related to greater adjustment problems in children of either sex.

The quality of relationships among family members is an important correlate in the adjustment of children experiencing divorce or remarriage. Research points to a somewhat poorer parent-child relationship, especially for boys with the custodial mother, and for girls with the step-parent (Hetherington, Cox, & Cox, 1982; Hines,
Sibling relationships have been found to be problematic in both divorced and remarried families, and particularly boys were reported to receive less emotional support from their siblings (Kim, Hetherington, & Reiss, 1999). Divorce-related stress can influence parents’ ability to communicate and interact with their children (Hines, 1997), and custodial mothers often become more erratic and uncommunicative, provide less support, and show increased difficulties in controlling and monitoring their children’s behaviour, especially remarried mothers (Hetherington, 1991). In the event of remarriage, children need to form new relationships with step-parents and step-siblings. Step-parents are found to be less cohesive and communicative, and engaged by supplying less control and monitoring for step-children (Vuchinich, Vuchinich, Hetherington, & Clingempeel, 1991). Since the literature suggests that a poor parent-child relationship after divorce correlates with the occurrence of internalizing and externalizing behaviour as well as social and academic problems in children (Forgatch, Patterson, & Ray, 1995; Hetherington, 1999; Hetherington & Jodl, 1994; Peterson & Zill, 1986; Wood, Repetti, & Roesch, 2004), this study aimed to examine the association between psychological well-being in children with AD/HD and the quality of relationships with their family members after parental divorce and remarriage.

Findings of the present study show that a poor relationship with the custodial mother correlated with increased rule breaking behaviour (approaching significance) and greater social impairment in children with AD/HD. Previous research had found externalizing behaviour associated with inadequate monitoring by mothers, especially in boys living with remarried mothers and in girls residing with single custodial mothers (Kim, Hetherington, & Reiss, 1999). Further, Santrock, Warshak, and Elliott (1982) found greater social impairment in children, especially in girls, after the custodial mother developed a permissive parenting style. While results of this study indicate an association between misconduct in children with AD/HD and poor mother-child interactions, it is unclear whether deficient parenting, the child’s behaviour problems, or both contributed to the conflict-ridden relationship, resulting in greater maladjustment.
This study also found that a poor relationship with the custodial father correlated with increased oppositional behaviour in children with AD/HD. Further, poor father-child interactions were associated with elevated levels of anxious symptoms, and a greater severity of AD/HD core symptoms in children with this disorder, however these findings were only approaching significance. A great deal of research has studied the effects on children growing up in mother custody, but less is known about children’s outcome in father-headed homes or step-mother families. Santrock et al. (1982) reported anxious behaviour in children residing with a custodial father related to authoritarian parenting, especially in boys. However, findings in this study indicate that a poor relationship with the custodial father correlated not only with internalizing but also with externalizing behaviour and greater AD/HD symptomatology in children with AD/HD.

Finally, poor relationships with sisters were associated with highly elevated mean scores on nearly all measures of externalizing and internalizing scales, and also greater social maladjustment for children with AD/HD. Poor relationships with brothers correlated with increased externalizing behaviour, however to a smaller extent than the corresponding association with sisters, and even a good relationship with brothers was linked with the occurrence of symptoms of anxiety in children with AD/HD. These results echo previous findings suggesting poor sibling relationships being associated with greater adjustment problems in children of divorced and remarried families (Hetherington, 1999; Kim, Hetherington, & Reiss, 1999). However, no significant results were found in respect to relationships with step-fathers. This is surprising as research suggests an association between step-father’s negative behaviour and more externalizing problems in step-children (Kim et al., 1999).

This study found that poor relationships with the custodial mother, with their brother, and to a lesser extent with their sister (approaching significance) were associated with externalizing behaviour in children of the inattentive subtype. Further, a poor relationship with the custodial mother correlated with social maladjustment, and a
poor relationship with their sister was associated with internalizing problems in inattentive children. A good relationship with the custodial mother was associated with more symptoms of inattention in children of the combined subtype (approaching significance). These results indicate that dysfunctional relationships with family members are associated with more behavioural problems and greater social maladjustment in children of the inattentive subtype, a subtype which is primarily characterized by inattention. Findings also show that a good relationship with the custodial mother was not a protective factor in the occurrence of more severe AD/HD symptoms in children of the combined subtype. It is possible that other environmental factors, involved in the divorce process, may be linked with the exacerbation of symptoms of inattention in these children.

Results in this study indicated that younger children with AD/HD (6-12 yrs.) presented with greater impairment in social functioning which was associated with a poor relationship with the custodial mother, increased externalizing behaviour which related to a poor relationship with their brother, and internalizing problems which correlated with a poor relationship with their sister. Social maladjustment (approaching significance) in adolescents (13-18 yrs.) was found to be related to a poor relationship with the custodial mother. These findings suggest that younger children with AD/HD have less intact relationships with their family members compared to adolescents, which is in line with findings by Barkley, Karlsson, and Pollard (1985). It is possible that limited cognitive and social competencies in younger children are partially responsible for these disruptive relationships. Younger children may be less able to fully understand the reasons for the divorce and the departure of the non-custodial parent, and might either blame themselves or the custodial parent, resulting in negative interactions with their family members. It is also possible that in single-parent households, adolescents may become more involved in looking after their younger siblings, who in turn may not accept another authority figure beside the custodial parent, causing more tension and conflict in their relationships and also more
behavioural problems in younger children. For adolescents, negative behaviour in the form of social maladjustment was found to be related only to a poor relationship with the custodial mother. This finding is in partial agreement with previous research, suggesting that older children have more intact relationships with their family members after divorce, as a result of disengagement during adolescence (Anderson & Rice, 1992).

Study 2B found that boys had more conflict-ridden relationships with family members and presented with significantly more behavioural problems than girls. For boys, poor relationships with the custodial mother and their sister correlated with greater social dysfunction. Further, a poor relationship with their sister was associated with a wide range of externalizing and internalizing behaviours; however, no significant results were found regarding the relationship with their brother. Research so far suggests a somewhat poorer mother-son relationship in divorced families due to the use of more negative sanctions and commands by mothers towards their sons, resulting in greater social maladjustment in boys (Hetherington et al., 1982; Hetherington, 1992). Further, it has been argued that sibling relationships after divorce become more rival, hostile and disengaged, and that sisters are less likely to provide emotional support for their brothers (Anderson & Rice, 1992; Hetherington, 1992).

For girls, statistical analysis showed that a good relationship with the custodial mother was associated with increased levels of AD/HD symptoms in girls. No significant results were found regarding relationships with other family members. This is in contrast to Peterson and Zill (1986) who reported poorer relationships for girls than for boys. There is evidence in the literature that children adjust better in the custody of a parent of the same sex (Zill, 1988). It has also been argued that custodial mothers form a positive and exceptionally close relationship with their daughters after divorce (Hetherington et al., 1989) where mothers primarily confide with their daughters, resulting in more responsibility and a greater burden in girls. It is possible that the
higher occurrence of AD/HD symptoms in girls is linked to these circumstances; however this needs further investigation.

This study investigated outcome differences in children with AD/HD living with a single custodial parent and in step-families. Results indicated that a poor mother-child relationship was associated with internalizing problems and social maladjustment in children living in a single-parent household. The literature suggests that following divorce, custodial parents present with marked emotional lability, resulting in changes in self-concept, self-esteem, and in a poor parent-child relationship (Brown, 2000; Dunn, Deater-Deckard, Pickering, & O’Connor, 1998; Hetherington, Stanley-Hagan, & Anderson, 1989; McLanahan & Sandefur, 1992). Others found that low levels of well-being in parents following divorce not only impacted negatively on the quality of parenting and the sensitivity towards children’s adjustment problems (Carlson & Corcoran, 2001; McLanahan & Sandefur, 1994), but also produced internalizing and externalizing behaviour problems in children (Wood, Repetti, & Roesch, 2004). It is possible that these factors correlated with the poor mother-child relationship found in this study, resulting in symptoms of depression and impaired social functioning in children with AD/HD. However, further investigations are needed to evaluate reciprocal effects in these interactions.

This study found more internalizing and externalizing problems in children with AD/HD from single-parent homes who had a poor relationship with their sister. There is evidence in the literature that girls of divorced parents are more likely to show supportive and pro-social behaviour towards their siblings; however, they are not necessarily less antisocial than boys (Bryant, 1982; Dunn, 1983). Girls in single-parent households often take over the role of a surrogate mother by teaching and controlling their younger siblings, resulting in a relatively poor relationship. It is possible that the higher levels of behaviour problems found in children with AD/HD in this study are associated with such a disturbed family constellation. Further, brothers have been found to be less able to assist with emotional support (Hetherington, 1992), and results
of this study indicate that even a good relationship with their brother was no guarantor of a positive outcome in children with AD/HD.

Study 2B found significant results for children with AD/HD living in step-families. A poor relationship with the remarried mother correlated with increased externalizing behaviour and greater social impairment. These findings correspond with those by Jodl, Bridges, Kim, Mitchell, and Chan (1999), who found that a hostile and coercive relationship between mother and child in step-families was related to higher levels of externalizing behaviour and lower levels of social responsibility.

In summary, this study found that children in step-families are coping less satisfactory than those who reside in single-parent households, suggesting a possible relationship between children’s behaviour problems and remarriage. However, multiple marital transitions were found to be largely unrelated to children’s psychological well-being. In addition, findings of this study indicate that disturbed relationships with family members correlate with more symptoms of externalizing and internalizing behaviour, greater AD/HD symptomatology and social maladjustment in children with this disorder, but not with academic problems. This was found especially in those of the inattentive subtype, younger children, and in boys. Children’s behavioural problems were predominantly associated with poor relationships with their custodial mother and their sister, and to a lesser extent, with their brother. Children’s relationships with family members in single-parent households were found to be very deficient and correlated with poor psychological well-being in children with AD/HD. Due to small cell sizes in the step-family group, investigations of the quality of relationships between children with AD/HD and their biological siblings, step-siblings and step-parents could not be computed. Therefore, a comparison between children’s outcomes in single-parent households and step-families could not be examined in this study.

While findings of the present study suggest that remarriage and poor relationships with family members after parental divorce and remarriage is associated with poor psychological well-being in children with AD/HD, this study can not fully
determine whether the behaviour problems in these children were the cause or the consequence of remarriage and disturbed family interactions. Therefore, further research is needed to study reciprocal effects in parent-child and sibling relationships among AD/HD families, and to investigate additional correlates, such as parental psychopathology and child’s characteristics. Overall, results of this study imply the need of psychological support and assistance for AD/HD families after parental divorce and remarriage, in order to improve the quality of relationships among family members and to reduce behaviour problems in children with AD/HD.
CHAPTER 8: THE RELATIONSHIP BETWEEN BEHAVIOUR OF CHILDREN WITH AD/HD AND PARENTS’ MARITAL STATUS
8.1 Introduction

In Studies 1 and 2, differences in psychological well-being of children diagnosed with AD/HD from divorced and non-divorced families were investigated. Results of Study 1 indicated that comorbid conditions such as CD/ODD were more common among children with AD/HD in divorced families, whereas LDs in children were more frequently observed in non-divorced families. Thus, these results suggested a possible relationship between parental divorce and the occurrence of externalizing disorders, but no association with academic performances in children with AD/HD.

In Study 2, most findings were replicated. Children with AD/HD from divorced families presented with more symptom severity and internalizing/externalizing behaviour, as well as with poorer academic and social functioning, compared to children from non-divorced families. Differences in adjustment in children from single parent households and step-families were found. Those residing in step-families presented with significantly more behaviour problems in almost all domains of functioning relative to children living in a single parent household. Further, differences occurred between children with AD/HD who were exposed to multiple family breakdowns and those who experienced a single divorce of their biological parents. Findings indicated a possible relationship between multiple transitions and the occurrence of internalizing behaviour in children of the combined subtype. Overall, findings suggested that the exposure to serial family collapses was largely unrelated to children’s psychological well-being, whereas the exposure to a single divorce was associated with maladjustment in children with AD/HD. Finally, poor relationships with family members were associated with a wide range of behaviour difficulties in children with this disorder. Therefore, these results were interpreted as suggesting that parental divorce and remarriage correlated with both the exacerbation of AD/HD core symptoms, and the occurrence of comorbid conditions in children with this disorder.
In both Studies, a possible association between parental divorce and the psychological well-being of children with AD/HD was investigated. While there is support in the literature about the existence of a relationship between AD/HD and family adversity (Barkley, Fischer, Edelbrock, & Smallish, 1990; Biederman, Faraone, Keenan, Steingard, & Tsuang, 1991; Biederman et al., 1998; Brown & Pacini, 1989; Hinshaw, 2002), it is uncertain whether family instability acts as a modifier in the course of the illness and contributes to maladjustment and dysfunctions in children with AD/HD, or in contrast, whether the child’s negative behaviour can be seen as a causal factor of marital discord. There is some evidence in the literature that a non-supportive family environment, poor parenting, marital dissatisfaction or a conflict-ridden child-parent relationship would produce more internalizing and externalizing behaviour in children with AD/HD (Biederman, Faraone, & Monuteaux, 2002; Biederman et al., 1995; Drabick, Gadow, & Sprafkin, 2006; Hurtig, Taanila, Ebeling, Miettungen, & Moilanen, 2005; Hurtig et al., in press) and would also correlate with more AD/HD symptom severity (Brandon, 1971; Burt, Krueger, McGue, & Iacono, 2003; Hurtig et al., 2005; Tallmadge & Barkley, 1983; Taylor & Warner-Rogers, 2005; Warner-Rogers, Taylor, Taylor, & Sandberg, 2000). Other investigators found that the child’s behaviour would contribute to family adversity including parental stress, negative emotions and ineffective parenting (Khamis, 2006; Maniadaki, Sonuga-Barke, Kakouros, & Karaba, 2005; Morris, 2001). When investigating subtype differences in children with AD/HD, Graetz, Sawyer, Hazell, Arney, and Baghurst (2001) found that the behaviour displayed by children of the combined subtype, relative to that observed in children of the inattentive or hyperactive-impulsive subtype, was associated with greater disruption of family activities and greater reduction in the time parents had to meet their own personal needs. Counts, Nigg, Stawicki, Rappley, and Von Eye (2005) examined the relationship between family adversity (socio-economic status, parental psychopathology, marital conflict, stressful events) and AD/HD subtypes. Findings indicated that the combined subtype of AD/HD was more associated with family
adversity than the inattentive subtype. The authors suggested that marital conflict might influence the child’s behaviour but the parental relationship may also be influenced by these problems. In contrast, others have found that childhood hyperactivity did not predict relationship problems with parents in adolescence (Young, Chadwick, Heptinstall, Taylor, & Sonuga-Barke, 2005; Young, Heptinstall, Sonuga-Barke, Chadwick, & Taylor, 2005).

As a result of insufficient evidence in the literature to determine whether behavioural problems in children with AD/HD contribute as a causal factor for parental break-up, this study aimed to investigate whether maladjusted behaviour displayed by children with AD/HD is associated with family and parental functioning, and thus may contribute to marital dissolution. Therefore, this study will test the following hypotheses: (1) children’s behavioural problems are related to family dysfunction and problems in the marital relationship of non-divorced parents; (2) children’s behavioural problems are related to differences in family/parental functioning in non-divorced families before and after children’s AD/HD assessment, as the majority of children (85%) commenced treatment after they were diagnosed with AD/HD; (3) children’s behavioural problems are related to differences in family/parental functioning between non-divorced and divorced parents.

8.2 Method

8.2.1 Subjects

Subjects in this Study were drawn from families who already participated in Study 2 and had consented to be contacted again. The original sample of Study 2 consisted of 586 children; of those, 363 parents gave permission to be further contacted. Of target children in these families, 293 came from non-divorced (ND) and
70 from divorced (D) families. Marital status of these parents was obtained at the time of their child’s initial assessment. After initial contact, a number of parents chose not to participate, giving final figures of 123 families, comprising 105 non-divorced and 18 divorced parents. We previously excluded children in the divorced group who were younger than 6 years when their parents dissolved. This cut off was used in relation to the age of onset criterion in the DSM-IV and to assure reliable data for the investigation of a possible relationship between the child’s AD/HD symptoms and family/parental functioning.

8.2.2 Family and Parental Functioning Questionnaire (FPF)

A purpose-designed questionnaire, based on the Child Health Questionnaire (Landgraf, Abetz, & Ware, 1996), was used to measure family and parental functioning (FPF) in AD/HD families. This questionnaire contained a set of 8 statements which related to the impact of the child’s behaviour on family life and the marital relationship. These statements were as follows: I wasn’t able to spend enough time for my own needs because of my child’s behaviour; I wasn’t able to spend enough valuable time with my spouse because of our child’s behaviour; Family activities were limited because of our child’s behaviour; family activities were interrupted by our child’s behaviour; Our child’s behaviour caused tension/conflict between me and my spouse; Our child’s behaviour caused disagreements/arguments between me and my spouse; Our child’s behaviour had no impact on our family life; and My spouse and I felt exhausted and fatigued due to our child’s behaviour. Parents were asked to rate the impact of their child’s behaviour on family life and marital relationship on a 4-point scale ranging from very true to not true at all. This set of questions was applied to a) non-divorced parents and was related to both family/parental functioning before and after their child was diagnosed with AD/HD, and to b) divorced parents and referred to family/parental functioning before the divorce occurred.
8.2.3 Procedure

Emails were sent to those parents who previously provided an email address for further contact. A package consisting of a consent/refusal form, an information sheet, and the Family and Parental Functioning Questionnaire (FPF) was attached (Appendices 1B and 2B). Parents were asked to return the consent/refusal form together with the completed questionnaire to a University of Wollongong email address. After a waiting period of 14 days, a reminder email was sent to confirm participation or refusal. Further, the same package used for the email contacts, and a postage-free envelope were sent by mail to those parents who previously did not provide an email address. The parents were asked to fill in the consent/refusal form together with the questionnaire and to send them back to the University of Wollongong. If necessary, after a 14 days waiting period, phone contact was made to determine participation or refusal. Prior to data collection approval of the ethical review board at the University of Wollongong was obtained for this research study.

8.2.4 Statistical Analysis

Chi-square was used to compare groups on categorical descriptive variables and to analyze frequency data. To test hypothesis 1, bivariate Spearman Correlation Analysis was applied to investigate the relationship between AD/HD core symptoms and family/parental functioning in non-divorced families, using T-scores of the Conners’ DSM-IV Inattentive, Hyperactive-Impulsive, and Total item scales, and raw scores of ratings on the FPF questionnaire. To test hypothesis 2, a paired sample repeated measures t-test was applied in the comparison of non-divorced parents’ ratings on the FPF questionnaire before and after the child was assessed. To test hypothesis 3, a two-tailed independent t-test was used in the comparison of divorced and non-divorced families on ratings from the FPF questionnaire. For statistical interpretation, the rating
scale of the FPF has been recoded post-hoc so that higher scores indicated higher levels of disruption.

8.3 Results

8.3.1 Demographic Data

The full scale IQs of children with AD/HD ranged from 75 to 151, with the mean IQ being 100. Age of children ranged from 6 to 18 years, with the mean age being 10.6 years. A male to female ratio of approximately 3:1 was found, with boys (90; 73%) being more prevalent than girls (33, 27%). Within this sample, the inattentive subtype of AD/HD (73, 59%) was more common than the combined subtype (50, 41%), reflecting a ratio of approximately 1.5:1. Significant gender differences were found within the divorced and non-divorced groups ($X^2=5.72, df=1, p<.05$): while boys were significantly more common in the non-divorced group than girls, both boys and girls were equally represented in the divorced group. No significant subtype differences were found within the divorced and non-divorced groups, as well as no significant gender differences within the subtypes. In the non-divorced group (N=105), the majority of children received treatment after their AD/HD diagnoses (89, 85%); only a few remained untreated (16, 15%). Of parents in the non-divorced group (non-divorced at the time of their child’s assessment and AD/HD diagnosis), two couples separated after their child was diagnosed with AD/HD. In one case divorce/separation occurred after 1 month, and the child received treatment after diagnosis; in the other case parents divorced after 19 months, and the child remained unmedicated after the diagnosis.
8.3.2 The Relationship Between the Child’s Behaviour and Family/Parental Functioning in Non-divorced Families

Spearman Correlation analysis was applied to examine a possible relationship between family functioning and parental relationship, and the child’s behaviour before a diagnosis of AD/HD was received. Significant positive correlations between scores on the Conners’ Parent Rating Scale for measures of DSM-IV Inattentive, Hyperactive-impulsive, and Total scores, and items from the FPF questionnaire, were found (Table 8.1). Thus, elevated scores on all the aforementioned subscales of the Conners’ Parent rating scale were associated with higher scores on questions of the FPF. The first question, “I wasn’t able to spend enough time for my own needs because of my child’s behaviour”, was significantly correlated with the Conners’ DSM Inattentive scale ($r=.295, p<.01$), DSM Hyperactive-impulsive scale ($r=.462, p<.001$), and the DSM Total scores ($r=.397, p<.001$). A significant relationship was found between the second question, “I wasn’t able to spend enough valuable time with my spouse because of our child’s behaviour”, and the Conners’ DSM Inattentive scale ($r=.275, p<.01$), DSM Hyperactive-impulsive scale ($r=.446, p<.001$), and the Conners’ DSM Total scores ($r=.371, p<.001$). The third question, “Family activities were limited because of our child’s behaviour”, was significantly correlated with the Conners’ DSM Inattentive scale ($r=.224, p<.05$), DSM Hyperactive-impulsive scale ($r=.412, p<.001$), and the DSM Total scores ($r=.336, p<.001$). Question number 4, “Family activities were interrupted by our child’s behaviour”, was significantly related to the Conners’ DSM Inattentive scale ($r=.273, p<.01$), DSM Hyperactive-impulsive scale ($r=.470, p<.001$), and the DSM Total scores ($r=.402, p<.001$). A significant correlation was found between question 5, “Our child’s behaviour caused tension/conflict between me and my spouse”, and the Conners’ DSM Hyperactive-Impulsive scale ($r=.415, p<.001$), and the DSM Total scores ($r=.327, p<.001$). Similarly, question 6, “Our child’s behaviour caused disagreements/arguments between me and my spouse”, was significantly correlated
with the Conners’ DSM Hyperactive-impulsive scale \((r=.370, p<.001)\), and the DSM Total scores \((r=.241, p<.05)\). A significant negative correlation was found between question 7, “Our child’s behaviour had no impact on our family life”, and the Conners’ DSM Inattentive scale \((r=-.214, p<.05)\), DSM Hyperactive-impulsive scale \((r=-.373, p<.001)\), and the DSM Total scores \((r=-.301, p<.01)\). Finally, a relationship was found between question 8, “My spouse and I felt exhausted and fatigued due to our child’s behaviour”, and the Conners’ DSM Inattentive scale \((r=.222, p<.05)\), DSM Hyperactive-impulsive scale \((r=.487, p<.001)\), and the DSM Total scores \((r=.389, p<.001)\).

**TABLE 8.1:** Correlation between children’s AD/HD symptoms and family/parental functioning of non-divorced parents

<table>
<thead>
<tr>
<th>FPF</th>
<th>Conners’ DSM-In (mean: 69.87)</th>
<th>Conners’ DSM-Hyp/Imp (mean: 66.57)</th>
<th>Conners’ DSM-Total (mean: 70.15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>0.30** 9%</td>
<td>0.46*** 21%</td>
<td>0.40*** 16%</td>
</tr>
<tr>
<td>Q2</td>
<td>0.28** 8%</td>
<td>0.45*** 20%</td>
<td>0.37*** 14%</td>
</tr>
<tr>
<td>Q3</td>
<td>0.22* 5%</td>
<td>0.41*** 17%</td>
<td>0.34*** 11%</td>
</tr>
<tr>
<td>Q4</td>
<td>0.27** 8%</td>
<td>0.47*** 22%</td>
<td>0.40*** 16%</td>
</tr>
<tr>
<td>Q5</td>
<td>0.18 3%</td>
<td>0.42*** 17%</td>
<td>0.33*** 11%</td>
</tr>
<tr>
<td>Q6</td>
<td>0.06 0.4%</td>
<td>0.37*** 14%</td>
<td>0.24* 6%</td>
</tr>
<tr>
<td>Q7</td>
<td>0.21* 5%</td>
<td>0.37*** 14%</td>
<td>0.30** 9%</td>
</tr>
<tr>
<td>Q8</td>
<td>0.22* 5%</td>
<td>0.49*** 24%</td>
<td>0.39*** 15%</td>
</tr>
</tbody>
</table>

*Note: FPF=Family and Parental Functioning Questionnaire. *** Correlation is significant at the 0.001 level, **Correlation is significant at the 0.01 level, * Correlation is significant at the 0.05 level*

8.3.3 The Relationship Between the Child’s Behaviour and Family/Parental Functioning of Non-divorced Parents Before and After AD/HD Diagnosis

Repeated measures t-tests were applied to investigate differences in family functioning and parental relationships before and after the child received their diagnosis of AD/HD. Results are shown in Table 8.2. Significant differences were found for question 1, “I wasn’t able to spend enough time for my own needs because of my child’s behaviour”, with mean scores being significantly higher before than after the child was diagnosed with AD/HD \((t=5.11, p<.001)\). Comparing measures for question 2, “I wasn’t able to spend enough valuable time with my spouse because of our child’s behaviour”, indicated significantly higher mean scores on the FPF questionnaire before than after the child’s assessment \((t=4.23, p<.001)\). Significantly higher mean scores
were also found before the child was diagnosed with AD/HD on question 3, “Family activities were limited because of our child’s behaviour”, compared to scores after assessment (t=5.64, p<.001). For question 4, “Family activities were interrupted by our child’s behaviour”, mean scores were significantly higher before than after assessment (t=6.07, p<.001). Statistically significant differences were also found for mean scores for question 5, “Our child’s behaviour caused tension/conflict between me and my spouse”, with scores being higher before than after assessment (t=5.41, p<.001). Mean scores for question 6, “Our child’s behaviour caused disagreement/arguments between me and my spouse”, were found to be significantly higher before than after the child’s diagnosis (t=4.71, p<.001). When comparing mean scores for question 7, “Our child’s behaviour had no impact on our family life”, significantly lower scores were found before than after assessment (t=-2.22, p<.05). Finally, mean scores for question 8, “My spouse and I felt exhausted and fatigued due to our child’s behaviour”, were significantly higher before than after the child was diagnosed with AD/HD (t=6.75, p<.001).

| TABLE 8.2: Comparison of family/parental functioning in non-divorced families before and after the child’s AD/HD diagnosis |
|---|---|---|---|---|---|---|---|---|---|
| | Q 1 | Q 2 | Q 3 | Q 4 | Q 5 | Q 6 | Q 7 | Q 8 |
|---|---|---|---|---|---|---|---|---|---|
| Mean (SD) before | 1.98(1.10) | 1.85(1.05) | 1.97(1.11) | 2.17(1.15) | 2.09(1.11) | 2.09(1.11) | 1.96(1.15) | 2.20(1.16) |
| after | 1.56(0.86) | 1.50(0.81) | 1.50(0.81) | 1.61(0.89) | 1.62(0.90) | 1.69(0.92) | 2.17(1.22) | 1.59(0.77) |
| t-Value | 5.11*** | 4.23*** | 5.64*** | 6.07*** | 5.41*** | 4.71*** | -2.22* | 6.75*** |

Note: FPF=Family and Parental Functioning Questionnaire. ***0.001 level of significance, *0.05 level of significance

From the original non-divorced group, two divorced families were identified at follow-up. However, this sample was too small for statistical analysis to produce differences at a significant level between the two groups. Nevertheless, when examining differences in psychological well-being, those two children from divorced families had elevated mean scores on measures of the CBC Oppositional and Aggressive scales, and the DAYS Anxiety, Depression and Social Maladjustment...
scales, compared to other children of non-divorced families (Table 8.3). When evaluating parents’ ratings on the FPF questionnaire, these two divorced families had higher mean scores on questions 5, and 6, “our child caused tension/conflict, disagreements/arguments between me and my spouse” compared to ratings of the non-divorced group.

**TABLE 8.3: Comparison of measures in the initial non-divorced group after follow-up**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Non-Divorced</th>
<th>Divorced</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBC Oppositional</td>
<td>101</td>
<td>2</td>
</tr>
<tr>
<td>CBC Aggressive</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>DAYS Anxiety</td>
<td>102</td>
<td>2</td>
</tr>
<tr>
<td>DAYS Depression</td>
<td>102</td>
<td>2</td>
</tr>
<tr>
<td>DAYS Social Maladjustment</td>
<td>102</td>
<td>2</td>
</tr>
<tr>
<td>Q5</td>
<td>103</td>
<td>2</td>
</tr>
<tr>
<td>Q6</td>
<td>101</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: CBC=Child Behaviour Checklist, DAYS=Depression and Anxiety in Youth Scale

8.3.4 The Relationship Between the Child’s Behaviour and Family/Parental Functioning of Divorced and Non-divorced Parents

An independent sample t-test was applied to investigate the relationship between the children’s behaviour and family and parental functioning in divorced couples (before the child was diagnosed with AD/HD and before the parents dissolved); and in non-divorced parents (before the child was assessed). However, statistical analysis did not indicate any significant differences between the divorced and non-divorced groups on measures of the FPF questionnaire.

8.4 Discussion

There are only a few studies that provide some support for the existence of a relationship between children’s AD/HD-related behaviour problems and family adversity (Barkley, Fischer, Edelbrock, & Smallish, 1990; Biederman et al., 1998; Hinshaw, 2002; Weiss & Trokenberg-Hechtman, 1993). Research so far typically investigated family
factors contributing to negative outcomes in children with AD/HD, such as parental pathology, a dysfunctional parent-child relationship, including ineffective child-rearing practices, low socio-economic status, or a stressed marital relationship (Mendelson, Johnson, & Stewart, 1971; Minde, Weiss, & Mendelson, 1972; Weiss, Minde, Werry, Douglas, & Nemeth, 1971; Werner & Smith, 1977). While these studies hypothesised that family factors such as poor parenting might cause the condition, some investigators provided evidence that negative parenting was the result of the child’s behaviour (Bell & Harper, 1977; Cunningham & Barkley, 1979; Humphries, Kinsbourne, & Swanson, 1978).

Therefore, the present study aimed to investigate the relationship between the behaviour of children diagnosed with AD/HD and overall family functioning, parental relationship and marital status, which is important for interpreting the results from the first two studies. The presence of a possible association was examined by evaluating family adversity in non-divorced parents before the child was diagnosed with AD/HD (hypothesis 1). Parent’s ratings on the FPF on the time they had available for their own needs and also for each other (question 1 and 2), on limited family activities and the interruption of those by the child’s behaviour (question 3 and 4), on tension, conflict, disagreements and arguments among couples (question 5 and 6), and on feelings of exhaustion and fatigue in parents (question 8), were positively correlated with all three core symptoms of AD/HD. A negative correlation was found between the severity of impact of the child’s behaviour on the family (question 7). Results indicated that ratings on the FPF for all questions (1-8) could be best predicted from scores of the Conners’ hyperactive/impulsive scale with an explained variance ranging from 14% to 24%. However, findings also indicated that the child’s AD/HD symptoms accounted for 0.4% to 24% of the total variance explained on measures of the FPF, suggesting that the child’s behaviour only had a small impact on family functioning. In conclusion, despite children’s symptoms which were in the clinical range on the Conners’ rating scale, parents seemed to manage their child’s behaviour satisfactory. While the relationship
between AD/HD symptoms and family adversity was significant, the total variance explained indicated only a weak relationship. Thus results of this study provided only a relatively weak link between the child’s behaviour and family functioning.

Secondly, this study aimed to examine differences in family and parental functioning of non-divorced parents before and after the child received their diagnosis of AD/HD (hypothesis 2). Overall, parents indicated that family and parental functioning was poorer before than after their child was diagnosed with AD/HD. While differences were statistically significant, ratings on the FPF questionnaire for the majority of questions ranged between “not true at all” and “slightly true”. These differences in family and parental functioning before and after diagnosis were indicated by a) lower amount of time available to spend for their own needs and also with their spouses, b) greater limitations and more interruptions of family activities, c) more tension, conflict, disagreements, and arguments among couples, d) more feelings of exhaustion and fatigue in parents, and e) a greater impact of their child’s behaviour on the family. However, after the child was diagnosed ratings on the FPF questionnaire indicated improvements in family functioning and parental relationships, with mean scores for all questions, with the exception of question 7, being significantly lower compared to those before the child was diagnosed. There are two possible explanations for these findings. Firstly, after having accepted the diagnostic status of their child, parents may have adopted proactive parenting practices, resulting in better family functioning and a less conflict-ridden and tense relationship among spouses. Taylor, O’Donoghue, and Houghton (2006) found that after having received their child’s AD/HD diagnosis, parents would go through a period of grieving for the loss of their child’s “normal status”. This grieving process would then be followed by parents’ acceptance of their child’s diagnosis and the development of a more positive approach to the parenting of their child with AD/HD. Secondly, the majority of children (85%) received treatment after they were diagnosed with AD/HD. This might have led to improvements of symptoms displayed by the child, which in turn may have enhanced family life and
marital relationships. Barkley and Cunningham (1980) clearly demonstrated that when hyperactive children were on medication, compliance increased and contributed to less intrusive and more responsive behaviour in their mothers. However, levels of interactions did not equal those of normal controls. In contrast, higher ratings on the FPF questionnaire found in this study before the child was diagnosed with AD/HD leads to the assumption that the child’s behaviour correlated with difficulties in family functioning and marital discord. This is in line with some investigators who provided evidence that negative parenting resulted from the child’s behaviour (Bell & Harper, 1977; Cunningham & Barkley, 1979; Humphries, Kinsbourne, & Swanson, 1978). Further, Graetz, Sawyer, Hazell, Arney, and Baghurst (2001) demonstrated that behavioural problems in children of the combined subtype correlated with greater disruption of family activities and greater reduction in time parents had for their own personal needs. However, in this study the majority of ratings for questions referring to family life before diagnosis were indicated as “slightly true” only, and improved after diagnosis with ratings ranging between “slightly true” and “not true at all”. Therefore, the correlation between the child’s behaviour and family/marital dysfunction can only be interpreted as being relatively weak.

This may explain the small number of divorced cases found in this sample, as only two parents divorced/separated during the study after their child was diagnosed with AD/HD. However, these two children had displayed more oppositional and aggressive behaviour, and were also more anxious, depressed and socially maladjusted compared to children where parents remained married. Further, ratings on the FPF questionnaire indicated that the behaviour displayed by these two children was associated with marital disharmony, including tension, conflict, disagreements and arguments among the couples. Although no definite conclusion can be drawn from these findings, as results were not significant and statistical analysis was inconclusive due to the small sample of two divorced cases, there is suggestion that behavioural problems in children with AD/HD might be related to relationship problems among
spouses. However, there is a need for future research to further investigate this hypothesis.

Thirdly, this study evaluated differences in family and parental functioning between divorced parents and non-divorced couples before the divorce occurred and before their child was diagnosed with AD/HD (hypothesis 3). The fact that no significant differences were found between the two groups, indicating that both parents in the divorced and non-divorced group were coping satisfactorily with their child’s behaviour, leads to the suggestion that the symptoms displayed by the child were unrelated to family dissolution in the divorced group. Therefore, results of this study did not favour hypothesis 3. However, it is unclear what factors might have been associated with the parental break-up and whether those parents in the non-divorced group remained married only for the sake of the child. If this was the case, the child’s behaviour could be regarded as a possible risk factor for marriage stability. This needs further investigation.

In summary, the present Study found only a weak relationship between children’s behavioural problems and family instability. The results may add some support to the conclusions of other studies that have proposed that poor parenting and marital disharmony is the result of children’s negative behaviour, and that hyperactivity and inattention in children is associated with a reduction in time parents have for themselves and each other as well as with more disruptions of family activities (Graetz et al., 2001; Khamis, 2006; Mash & Johnston, 1982; Morris, 2001). The finding that only two couples of the non-divorced group ended up in divorce during the study after their child was diagnosed with AD/HD, might be the result of the short follow-up period in this study (2 years and less). Therefore, longitudinal investigations of the relationship between AD/HD and divorce are needed in future research.

While findings of Studies 1 and 2 implied a relationship between parental divorce and the symptom profile of children with this disorder, it was unclear whether divorce was the consequence or the cause of the child’s behaviour problems. Findings
of this study showed that parents perceived their child’s behaviour as less problematic, indicating that it did not impact substantially on their family life and marital relationship. Therefore, results of the present Study provided only a weak but significant relationship between behaviour problems in children with AD/HD, and family functioning and marital instability. Thus, it may be suggested that parental divorce, and changes in family life resulting from this event, is more likely to contribute to children’s behavioural problems than the converse, that children with AD/HD cause marital instability and parental divorce. However, these findings cannot be considered conclusive and therefore more research will be necessary to investigate the relationship between divorce and the psychological well-being in children with this disorder.
CHAPTER 9: GENERAL DISCUSSION
9.1 Overview of Studies

A number of studies have indicated higher rates of divorce and more disruptive interpersonal relationships among family members of children with AD/HD. These studies primarily provided descriptive data, with very few studies investigating the relationship of divorce or parental separation and the symptom profile of children with AD/HD. Study 1 examined differences in the occurrence of comorbid CD/ODD and LD in children with AD/HD from divorced and non-divorced families. This Study also investigated differences in subtypes, age and gender. File audit data of 1000 children with AD/HD were used in this Study, and the sample consisted of 787 non-divorced and 213 divorced families. Results indicated a higher occurrence of comorbid CD/ODD in children of divorced families. While children of the combined subtype with comorbid CD/ODD were more common in divorced families, children of the inattentive subtype with comorbid LD were less frequent. Age differences indicated higher divorce rates with increasing age of children, a trend particularly found in subjects of the combined subtype of AD/HD. Children aged between 13 to 15 years (age group 3) with a co-diagnosis of CD/ODD were found more often in divorced families. Gender differences occurred, with boys of divorced parents presenting with more CD/ODD. These findings suggest that parental divorce correlated with more disruptive behaviour in children with AD/HD, reflected in the diagnosis of CD/ODD. This phenomenon was present in the combined subtype of the disorder, in older children, and in boys. The results of this Study also implied that divorce was unrelated to LD in children with AD/HD.

In Study 2A, a replication of Study 1 was conducted to test the reliability of differences found between the divorced and non-divorced groups, as well as those between the two subtypes, age, and genders. This Study was further extended to examine group differences in regard to symptom severity, the occurrence of internalizing problems, and difficulties in social functioning in children with AD/HD. The
sample comprised of 479 subjects, including 393 children from non-divorced and 86 children from divorced families. These participants were independent of those used in Study 1. The results showed a high level of replication of Study 1 results in terms of disruptive behaviour. The higher occurrence of CD/ODD found in children from divorced families in the previous Study was also present in Study 2A, with those in the divorced group presenting with significantly more externalizing problems relative to children from non-divorced families. The results were less stable in regard to learning difficulties. While in Study 1 LD was less common in children from divorced parents relative to those from intact families, Study 2A found that children with AD/HD from divorced families presented with more spelling problems than those from non-divorced families. Additional group differences occurred, with children of divorced parents presenting with significantly more symptom severity, internalizing problems, and difficulties in social functioning than those from intact families.

Differences in subtypes found in Study 1 were not replicated in Study 2A. The finding that comorbid CD/ODD in children of the combined subtype was more common in divorced families was not replicated in Study 2A. In addition, children of the combined subtype in the divorced group presented with more symptom severity relative to those in the non-divorced group. The finding that comorbid LD in children of the inattentive subtype was significantly less common in divorced families was not replicated in Study 2A. Further, children of the inattentive subtype from divorced parents differed significantly from those of intact families, with greater impairment in domains of symptom severity, externalizing/internalizing problems, and social functioning. These results suggested that divorce was associated with greater maladjustment, predominantly in children of the inattentive subtype, which is in contradiction to findings in Study 1, where parental divorce was related to behavioural problems primarily in children of the combined subtype of AD/HD. It is possible that these differences between the two studies are the result of including additional correlates such as symptom severity, internalizing and social functioning in Study 2A. It
is also possible that differences in family characteristics and other factors such as low-income or parental psychopathology may be attributable to the variations found between the two samples studied.

Study 1 found that older children (13-15 yrs) from divorced families had more comorbid diagnoses of CD/ODD than those from intact families, and this was replicated in Study 2A. Children in age group 2 (13-18) from divorced families presented with more externalizing problems, and also displayed more hyperactive/impulsive behaviour, than those from intact families. While no group differences were found in Study 1 among younger children, findings in Study 2A showed that children in age group 1 (6-12 yrs) from divorced families presented with more symptom severity, externalizing and internalizing problems, as well as more difficulties in social functioning, relative to those from non-divorced families. These results suggested that parental divorce was associated with the occurrence of comorbid conditions, particularly in younger children, and also with the exacerbation of AD/HD core symptoms in adolescents with AD/HD.

Examination of the effect of the timing of the divorce suggested greater impairment in reading and more difficulties in social functioning in children who experienced the parental divorce less than 3 years ago, relative to those where the divorce dated back more than 3 years. With a mean age of children at the time of divorce of 5.4 years, these results suggested that parent’s and children’s adjustment improved with time since the divorce, and that both parties may have adapted to the new family situation over time.

Gender differences found in Study 1 were partially replicated in Study 2A. The higher occurrence of comorbid CD/ODD in boys with AD/HD from divorced families compared to boys from intact families was also found in Study 2A. Boys in the divorced group presented with more oppositional behaviour than did those in the non-divorced group. These boys also showed more symptom severity, internalizing problems, and difficulties in spelling. Study 2A found significant group differences for girls with AD/HD.
Girls in the divorced group were severely impaired in domains of symptom severity, externalizing and internalizing behaviour, and social functioning, relative to those in the non-divorced group. These results are in contradiction to findings in Study 1, where no group differences occurred for girls. It was concluded that parental divorce was associated with adjustment problems in both sexes and with severe conditions in girls in particular.

In Study 2B, differences in children’s adjustment between those living with single custodial parents and those residing with step-families, and also between children who experienced multiple transitions compared to those who were exposed to a single divorce only, were investigated. Further, the quality of relationships between children with AD/HD and their family members were evaluated. The 86 children from divorced families were drawn from the existing pool of subjects used in Study 2A. The sample consisted of 57 children from single-parent households, and 29 children who lived in step-families. 67 experienced only one parental divorce, whereas 19 went through multiple transitions of their custodial parent. This study also investigated subtype, age and gender differences. Results indicated that children with AD/HD from step-families presented with more externalizing and internalizing problems relative to those from single-parent households. Children in both groups showed impairment in regard to social functioning. While subjects from step-families had higher levels of social problems, those living with a single custodial parent presented with less social activity. These results indicated that children with AD/HD who lived in step-families had more behaviour problems than those who resided in single-parent households, suggesting a possible relationship between children’s maladjustment and remarriage.

Subtype differences between the two groups showed that children of the inattentive subtype who resided with a single custodial parent presented with less social activities than did those who lived in a step-family. Children of the combined subtype who resided in step-families displayed more hyperactive/impulsive behaviour and presented with more externalizing problems compared to those from single-parent
homes. Findings in regard to internalizing behaviour were approaching significance with children of the combined subtype who resided in a step-family showed more symptoms of anxiety than those who lived with a single custodial parent. These results suggest that, while single parenthood was associated with lower levels of activity only in children of the inattentive subtype, remarriage correlated not just with behavioural problems but also with more severe AD/HD symptoms in children of the combined subtype. While behavioural problems are common co-existing conditions in children of the combined subtype, it seems that those living in step-families are coping less satisfactorily than those living in a single-parent household. It is possible that the familial changes involved in remarriage, including relationships with new family members, may correlate with these conditions. However, further research is needed to resolve this issue.

Age differences were found, as younger children who lived in step-families displayed more externalizing and internalizing behaviour and showed greater impairment in their social functioning than did those who resided with a single custodial parent. In contrast, adolescents who lived in a single-parent household showed less social activity compared to those from step-families. These results indicated that remarriage correlated with adjustment problems in children of younger age but not in adolescents with AD/HD.

Gender differences were found in domains of internalizing problems, social functioning and academic performance. Boys who lived in step-families presented with more internalizing problems, and those who resided with a single custodial parent were less socially active. In contrast, girls from step-families presented with more problems at school than did those from single-parent households. These results indicated that remarriage was associated with adjustment problems in both sexes, suggesting a possible relationship between remarriage and the symptom profile of boys and girls with AD/HD.
Study 2B also investigated group differences between children with AD/HD who experienced multiple transitions of the custodial parent, and those who were exposed to a single divorce only. No significant differences in the symptom profile were found between children who experienced a single family dissolution and those who went through multiple divorces. In the comparison of the two groups, only a few subtype and age differences were found. Boys and girls were found to be equally impaired and did not differ significantly between the two groups. Children of the combined subtype, who experienced multiple family breakdowns, presented with more internalizing behaviour problems compared to those in the single divorced group. Children of the inattentive subtype did not differ between the two groups. These findings suggested that repeated marital break-downs correlated with the occurrence of symptoms of anxiety in children of the combined subtype. Since the combined subtype of AD/HD is associated with more problem behaviour, it is possible that these children felt responsible for the repeated break-downs of family formations, which might have caused anxiety. However, this issue needs further investigation. Age differences found in this Study indicated more internalizing problems (approaching significance) and greater social maladjustment in adolescents in the single divorced group relative to those in the multiple divorced groups; this was not apparent in younger children. These findings suggested that multiple family break-downs were unrelated to behaviour problems in children with AD/HD of all ages.

Finally, the quality of relationships among AD/HD family members and a possible association with children’s psychological well-being was assessed in Study 2B. Overall, findings indicated that a poor mother-child relationship, as well as conflict-ridden relations with their siblings, especially with sisters, was associated with maladjustment in children with AD/HD in multiple domains, with the exception of academic functioning, which remained unrelated. This phenomenon was observed predominantly in children of the inattentive subtype, younger children, and in boys with AD/HD.
Further, this study investigated the quality of relationships between children with AD/HD and their family members from single-parent households and step-families. Results indicated that poor relationships with their custodial mother, their sister, and to a lesser extent with their brother, correlated with internalizing/externalizing problems and social dysfunctions in children from one-parent homes. Investigations regarding relationships among step-families were limited due to the small sample size. However, findings indicated that a poor relationship with the custodial mother was associated with more conduct problems and greater social maladjustment in children with AD/HD. Results of Study 2B suggest that children with AD/HD experienced disruptive relationships with their family members after divorce and remarriage, which correlated with the occurrence of conduct problems, internalizing behaviour, social dysfunctions and greater symptom severity. However, findings of this study cannot fully determine the causes of these disruptive interactions, and therefore further research is needed to investigate reciprocal effects of children's relationships with their family members.

While Study 1 and 2 investigated the relationship between divorce and the symptom profile of children with AD/HD, Study 3 examined the relationship between behaviour in children with AD/HD and parents’ marital status. Thus, parents’ perceptions of the impact of their child's behaviour on family and parental functioning were assessed. Subjects used in this study were drawn from families who participated in Study 2 and consented to be contacted again for further research. After initial contact was made, some families chose not to participate, giving final figures of 105 non-divorced and 18 divorced parents. After a follow up period of 18 months since initial assessment, the impact of the child’s AD/HD symptoms on family life and the parental relationship was examined.

Firstly, the relationship between AD/HD core symptoms and family/parental functioning in the non-divorced group before an initial diagnosis of AD/HD was given to the child, was investigated. Results suggested that AD/HD core symptoms correlated significantly with family adversity, which was best predicted by symptoms of
hyperactivity/impulsivity. However, the total variance explained indicated only a weak relationship between the child’s behaviour and family/parental dysfunction.

In the comparison of families in the non-divorced group regarding family/parental functioning before and after the child received their initial diagnosis, significant results were found. Parents indicated poorer functioning before than after their child was diagnosed, suggesting that the child’s behaviour correlated with difficulties in family functioning and marital discord before assessment. However, the majority of parents answered the questions in regard to the impact of the child’s behaviour on family functioning and on their marital relationship before diagnosis as “slightly true” and after diagnosis as “not true at all” or “slightly true”, indicating a somewhat weak relationship between AD/HD and family adversity.

Study 3 also identified 2 divorced couples after follow up who were previously non-divorced. These families indicated that the child’s behaviour was associated with problems in the marital relationship, in the form of tension, disagreements and arguments among couples. However, results did not reach statistical significance and the sample was too small to draw reliable conclusions. Findings suggested that the children’s behaviour may be related to marital disharmony and might have played a role in the marital dissolution of their parents. However, this issue is worth further investigation.

Finally, group differences were examined in the comparison of non-divorced families before the child’s assessment and divorced families before the divorce occurred. No significant results were found, indicating that parents in both groups were coping satisfactorily with their child’s behaviour. These findings also suggested that the behaviour problems of children with AD/HD were unrelated to parental divorce in families of the divorced group.
9.2 The Relationship Between Divorce and the Psychological Well-being of Children with AD/HD

Within the divorce literature for AD/HD, the relationship between parental divorce and the psychological well-being of children with AD/HD has not been widely investigated. This lack of research is partly due to existing aetiological and pathophysiological models of AD/HD, which solely imply a neurological basis for this disorder, and which have led to the commonly-held view that environmental or social factors play only a subordinate role in the development of AD/HD (Barkley, 1990, 1997; Faraone & Doyle, 2001).

Research previously suggested that families of children with AD/HD present with problematic interpersonal relationships and somewhat fewer intact marriages (Brown & Pacini, 1989; Cohen, Adler, Kaplan, Pelcovitz, & Mandel, 2002; Kasen, Cohen, Brook, & Hartmark, 1996). While there is agreement among researchers on the existence of a relationship between family adversity and AD/HD in general, very few studies have investigated a possible link between parental divorce and the symptom profile of children with this disorder. Some researchers implied that the quality of caregiving could negatively influence attention, impulse control and self-regulation in children with AD/HD (Taylor & Warner-Rogers, 2005). Hurtig et al. (in press) studied adolescents with AD/HD, aged 16 to 18 years old, who presented with comorbid conditions, such as CD, ODD, substance abuse and mild depression, and found that these subjects, relative to those with AD/HD alone, were significantly more common in non-intact families. Therefore, the authors concluded that family characteristics may be associated with the presence of comorbid conditions in AD/HD. Others reported that high conflict among AD/HD family members was related to the occurrence of internalizing/externalizing behaviour problems and social dysfunctioning, but was
unrelated to learning disabilities in children with AD/HD (Biederman, Faraone, & Monuteaux, 2002; Biederman et al., 1995).

In Studies 1 and 2A of this thesis, a possible link between parental divorce and the symptom profile of children and adolescents with AD/HD was assessed. Findings supported those of Hurtig et al. (2005, in press), as results of these studies indicated higher rates of externalizing behaviour, including diagnoses of CD and ODD, in children from divorced families, relative to those from intact homes. These studies also examined learning difficulties, not widely investigated in previous research. While in Study 1 no relationship between LD and divorce was found, results in Study 2A indicated more scholastic difficulties, and also more symptom severity, internalizing problems and difficulties in social functioning, in children with AD/HD from divorced than non-divorced families. These findings indicated that parental divorce correlated with increased AD/HD symptom severity, and also with the occurrence of comorbid conditions in children with AD/HD. Compared with the existing divorce literature for AD/HD, the present data set included subjects with a somewhat wider age range (6-18 yrs) and various comorbid conditions. Therefore, findings of these studies extended the little previous knowledge in regard to the relationship between parental divorce and AD/HD.

9.3 Single-Parenthood, Step-families, Multiple Transitions, and the Quality of Relationships

In Studies 1 and 2A, differences in the symptom profile of children with AD/HD from divorced and non-divorced families were investigated. Results indicated that parental divorce was associated with psychological maladjustment in children diagnosed with this disorder. Since the literature into divorce indicates remarriage rates of approximately 70% (Hetherington, Cox, & Cox, 1982), and studies on family type
suggest that divorce and remarriage are important correlates in the development of
social, behavioural, and academic problems in children (Hetherington, Stanley-Hagen,
& Anderson, 1989; Jeynes, 1999; Marks, 2006). Study 2B investigated differences in
outcomes between children with AD/HD from single-parent households and step-
families. There are suggestions in the literature that children residing in step-families
are not better off than those from single-parent households (Amato, 2005).
Hetherington, Cox, and Cox (1985) investigated children’s outcome after 2 years of
remarriage and found that these children presented with more behavioural problems
than did those who resided with their single custodial mother. These findings are in line
with those of Amato and Keith (1992), who reported more conduct problems and
psychosocial maladjustment in children from step-families than single-parent
households. Other investigators found that children of remarried parents showed
greater impaired academic performances relative to those where the divorced custodial
parent remained single (Jeynes, 1999; Marks, 2006). In contrast, there are studies that
found contradictory results, suggesting that children from single-parent households
present with as many behavioural and psychological deficits as those from step-
families (Funder & Kinsella, 1991; Zill, 1988).

At the time of conducting Study 2B, no divorce studies of AD/HD had been
published which investigated differences in outcomes of children with this disorder from
step-families and single-parent households. In this study, the majority of children (66%)
resided with a single custodial parent, while 34% lived in step-families. In this study,
results for the occurrence of externalizing behaviour were approaching significance,
with children in step-families presenting with more oppositional behaviour than those
from single-parent homes. After remarriage, children were found to display more
internalizing problems relative to those where the custodial parent remained single.
These findings are in line with those of Hetherington et al. (1985) and Amato and Keith
(1992), indicating greater psychological impairment in children from step-families than
single-parent households. In contrast, results for social functioning suggested that
children who resided in step-families had more social problems, whereas those who lived with a single custodial parent were less socially active. This study did not find any significant differences in symptom severity and academic performances between the two groups, suggesting that remarriage is unrelated to children’s AD/HD symptomatology and scholastic achievement, which supports the results of Zill (1988) and Funder and Kinsella (1991). Overall, results of Study 2B suggested that remarriage was related to internalizing/externalizing problems and social maladjustment in children with AD/HD, as those living in step-families presented with more conduct and emotional problems compared to those residing in a single custodial household.

Since the literature in relation to divorce confirmed that remarriages are less stable than first marriages, and more likely to end in divorce (Cherlin, 1992; Furstenberg & Spanier, 1984; Goetting, 1982; Sweet & Bumpass, 1987), Study 2B examined the relationship between multiple transitions and the psychological well-being of children with AD/HD. This issue had not been investigated in the divorce literature for AD/HD, and results of this study added novel findings to the current knowledge on family adversity of children with this disorder.

Bumpass (1984) reported that approximately 50% of children who experienced the divorce and remarriage of their custodial parent will face another breakdown of the new family formation. The literature into divorce indicates more severe adjustment problems in children who are exposed to multiple marital transitions relative to those who have undergone only one divorce or separation of their biological parents (Capaldi & Patterson, 1991; Pryor & Trinder, 2004). Dunn, Deater-Deckard, Pickering, and O’Connor (1998) examined the impact of repeated transitions on children’s adjustment in 7-8 year olds, and found that the number of transitions was associated with elevated levels of hyperactivity, conduct and emotional difficulties, peer problems and less pro-social behaviour. Support for these results was found by Brody, Neubaum, and Forehand (1988), who reported more behaviour problems, stronger suicide tendencies, higher rates of depression, and a poorer parent-child relationship in children who
experienced serial marriages compared to those where the custodial parent divorced only once. Further, multiple transitions were found to be associated with children’s educational attainment, including lower grades, more problems at school, less tertiary education, and a tendency to leave school early (Aquilino, 1996; Cockett & Tripp, 1994; Wu & Martinson, 1993). While the majority of studies found serial marriages as an accumulation of adverse life experiences, impacting negatively on children’s well-being, some investigators failed to find any significant differences in children’s adjustment when comparing those who experienced repeated transitions with those who went through only a single divorce of their custodial parent (McLanahan & Sandefur, 1994).

In Study 2B, the majority (78%) of children with AD/HD in divorced families had been exposed to a single divorce and 22% had experienced serial marital transitions of their parents. Results indicated no significant differences in psychological adjustment in children of the two groups. These findings are in line with those of McLanahan and Sandefur (1984), but in contradiction with the majority of studies which suggested greater impairment in children who went through multiple than single divorces of their custodial parent. Findings of this study suggest that the exposure to a series of family formations was unrelated to the psychological well-being in children with AD/HD. Therefore, future research should investigate possible factors that may have correlated with this phenomenon.

Since the divorce literature highlights the quality of relationships among family members as an important correlate in the psychological well-being of children experiencing divorce and remarriage, studies have been conducted to investigate children’s relationships with their family members after divorce. Overall, findings have indicated poorer parent-child interactions, particularly between boys and their custodial mother, and between girls and their step-parent (Hetherington, Cox, & Cox, 1982; Hines, 1997). Further, problematic sibling relationships, characterized by less pro-social and more hostile behaviour, have been found in divorced and remarried families (Kim, Hetherington, & Reis, 1999). Finally, research findings suggested that a
disruptive parent-child relationship is associated with more internalizing/externalizing behaviour as well as with greater social maladjustment and academic problems in children (Forgatch, Patterson, & Ray, 1995; Hetherington, 1999; Hetherington & Jodl, 1994; Peterson & Zill, 1986; Wood, Repetti, & Roesch, 2004).

Therefore, Study 2B aimed to investigate the quality of relationships among AD/HD family members and a possible association of these interactions with children's psychological well-being after parental divorce and remarriage. In line with previous divorce research (Kim et al., 1999; Santrock, Warshak, & Elliott, 1982) is the finding that a poor relationship with the custodial mother correlated with more externalizing behaviour and greater social maladjustment in children with AD/HD. Further, disruptive interactions with the custodial father were associated with more oppositional behaviour in children, and approaching significance were findings that a poor father-child relationship correlated with greater AD/HD symptom severity and more internalizing problems. While others previously reported an association between anxious behaviour in children and authoritarian parenting by the custodial father (Santrock et al., 1982), results of this study also suggest that a poor father-child relationship was associated with the occurrence of conduct problems and the exacerbation of AD/HD core symptoms in children with this disorder. However, this issue needs further investigation in order to examine reciprocal effects of these interactions. Findings of this study indicated that a poor relationship with their sister correlated significantly with a wide range of internalizing/externalizing behaviour and greater social maladjustment; whereas disruptive interactions with their brother was associated only with more externalizing problems, and a good relationship correlated with more symptoms of anxiety. These results are in contrast to findings by others suggesting that girls of divorced parents are more likely to show supportive and pro-social behaviour towards their siblings compared to boys (Bryant, 1982; Dunn, 1983).

Study 2B also investigated differences in the quality of relationships and children’s psychological well-being between single-parent households and step-
families. Results showed that internalizing problems in children from one-parent homes correlated with poor interactions with their custodial mother and their sister, as well as with a good relationship with their brother. Further, a greater occurrence of conduct problems in these children was associated with a disruptive sister relationship, and greater social dysfunctions correlated with poor interactions with their custodial mother. It is possible that the greater maladjustment in children who had a conflict-ridden relationship with their mother was the result of low levels of well-being in the parent after divorce, a phenomenon observed by Wood et al. (2004). However, this issue needs further investigation. Girls in single-parent homes have been found to take over the role of a surrogate mother, resulting in negative relationships with their siblings (Dunn, 1993); therefore it might be possible that the behavioural problems found in children with AD/HD who experienced a difficult relationship with their sister in this study are associated with such a disturbed family constellation. Hetherington (1999) reported that brothers would be less able to support their siblings after parental divorce, which is in line with findings of this study, indicating that even a good relationship with their brother was associated with more internalizing problems in children with AD/HD. Statistical analysis of relationships among step-families was limited due to small cell sizes. However, results indicated that a poor custodial mother-child relationship was associated with more conduct problems and greater social dysfunctions in children with AD/HD. This corresponds with previous research by Jodl, Bridges, Kim, Mitchell, and Chan (1999) who found that a conflict-ridden custodial mother-child relationship in step-families correlated with more conduct problems and less social responsibility in children.
9.4 Differences in Associations with Subtypes of AD/HD

Within the AD/HD literature, Graetz, Sawyer, Hazell, Arney, and Baghurst (2001) studied subtype differences in children aged 6 to 17 years, and found that the problems associated with the combined subtype of AD/HD were related to greater disruption of family activities and greater limitations on the amount of time parents had for their own personal needs, compared with the problems displayed by children of the inattentive or hyperactive-impulsive subtype. Similar results were found by Counts, Nigg, Stawicki, Rappley, and von Eye (2005), who reported that family adversity was related to the combined subtype of AD/HD. These findings were confirmed in Study 1, where the combined subtype was found to be more common in the divorced group than the inattentive subtype, indicating a ratio of approximately 1.5:1, whereas in the non-divorced group a ratio of 1:1 was observed.

These studies also aimed to extend the investigation of subtype differences in terms of comorbidity, as no divorce studies of AD/HD had investigated the occurrence of comorbid conditions among subtypes of children from divorced and intact families. The results of Study 2A did not replicate the findings of Study 1. Children of the combined subtype in the divorced group did not present with significantly more externalizing behaviour compared to those in the non-divorced group. In contrast, children of the inattentive subtype from divorced families presented with significantly more externalizing problems, such as oppositional, rule breaking and aggressive behaviour, relative to those from intact families. These results suggested that parental divorce was associated with behavioural problems in children of the inattentive subtype, a subtype which is predominantly characterized by attention problems.

No significant group differences were found in either subtype in terms of learning disabilities in Study 2A. These results partially replicated findings of Study 1, where no significant group differences were found for children of the combined
subtype, and a lower occurrence of learning disabilities in inattentive children of divorced families. These findings suggest that parental divorce may not be related to learning disabilities in children of either subtype.

Study 2A was further extended to examine group differences among subtypes in regard to symptom severity, internalizing behaviour, and problems in social functioning. Results indicated that children of the combined subtype in the divorced group displayed more symptom severity compared to those in the non-divorced group. Children of the inattentive subtype in the divorced group also presented with more symptom severity, displaying increased hyperactive-impulsive behaviour, but also had significantly more internalizing problems and greater social maladjustment compared to those in the non-divorced group. The fact that inattentive children of divorced parents presented with elevated levels of hyperactive/impulsive symptoms relative to those from intact homes, may imply that divorce correlated with the severity of core AD/HD symptoms. However, this study cannot determine causal effects and therefore further research is needed to investigate this issue.

Further, children of the inattentive type from divorced families had more social problems than those from intact homes. It is possible that these difficulties may be related to the higher occurrence of behavioural and internalizing problems found in these children. These results indicate that divorce is associated with maladjustment in both subtypes of the disorder, and Study 2A showed that children of the inattentive subtype were coping less satisfactorily compared to those of the combined subtype.

Study 2B further explored subtype differences between children of the divorced group in terms of family type and multiple marital transitions. Findings suggested lower levels of social activities in children of the inattentive subtype of AD/HD who lived with a single custodial parent, compared to those from step-families. Children of the combined subtype, living in step-families, presented with greater symptom severity and more externalizing behaviour compared to those from single parent homes. Results for internalizing behaviour were approaching significance, with children of the combined
subtype from step-families showing greater impairment than those from single parent households. Overall, findings indicated an association between both family type and adjustment problems in children with AD/HD. However, remarriage was found to correlate predominantly with behaviour problems in the combined subtype of the disorder. While conduct problems are common co-existing conditions in the combined subtype, this study could not fully determine whether the occurrence of externalizing behaviour and greater AD/HD symptom severity can be seen as the consequence of remarriage or whether they were already present prior to the entry into the step-family. Therefore, this issue needs further investigation.

This study also examined subtype differences in regard to serial marital transitions. While no significant differences between children with AD/HD who experienced a single divorce and those who were exposed to multiple marital transitions were found in previous analysis, subtype differences occurred when the relationship of multiple family break-downs and children’s adjustment was investigated here. Children of the combined subtype who experienced multiple divorces of their custodial parent presented with more internalizing behaviour than did those who were exposed to a single divorce only. No significant differences were found for children of the inattentive subtype, suggesting equal impairment of inattentive children in the single and multiple divorced groups. These findings suggest that children of the combined subtype were coping satisfactorily in the event of a single divorce; however, repeated family transitions correlated with the occurrence of symptoms of anxiety. Since the combined subtype of AD/HD is associated with more problematic behaviour patterns, it is possible that those children may have felt responsible for repeated family break-downs, which in turn contributed to the higher occurrence of anxiety. However, this issue needs to be resolved in future investigations.

Finally, Study 2B investigated subtype differences in children with AD/HD in regard to the quality of relationships among family members. Findings suggested that poor relationships between children of the inattentive subtype and their custodial
mother, their brother and their sister, correlated with more externalizing problems. In addition, greater social dysfunction in inattentive children was linked to disruptive interactions with their custodial mother, and internalizing problems with a poor sister relationship. These results suggest that dysfunctional relationships with the custodial parent and with siblings are associated with behaviour problems in children of the inattentive subtype, a subtype which is predominantly characterized by attention problems. Results for children of the combined subtype were only approaching significance and less profound than those for the inattentive subtype. This was unexpected, as research generally suggests more behaviour problems in children of the combined subtype (Gadow et al., 2000). Findings indicated only that a good mother-child relationship was associated with more AD/HD symptom severity. It is likely that other divorce-related factors are linked with the higher occurrence of AD/HD core symptoms in these children. Overall, findings indicated more conflict-ridden relationships between children of the inattentive than the combined subtype and their family members. Since inattentive children have been found to present with less behavioural problems it is possible that they are less likely to be involved in family conflicts and arguments. However, in order to fully determine the cause for these disturbed family interactions, further research is needed to study reciprocal effects in parent-child and sibling relationships among AD/HD families.

9.5 Differences in Associations with Age

Another objective of this research program was to investigate the relationship of parental divorce and children's psychological well-being as a function of age. The divorce literature indicates increased problem behaviour and somewhat poorer relationships in children of all ages (Amato, 2001). However, higher levels of distress after parental separation have been found in younger and cognitively more immature
children, and therefore it was hypothesised that these children may not be capable of understanding the underlying reasons for the divorce, resulting in feelings of guilt and responsibility for the family breakdown (Hetherington, 1989; Hetherington, Stanley-Hagen, & Anderson, 1989; Wallerstein & Kelly, 1980). In contrast, older children and adolescents have been found to be more cognitively skilled and also to present with greater social competence, and therefore it was assumed that they would have a better understanding of their parent’s motives for the divorce and a greater ability to resolve loyalty conflicts (Cheng, Dunn, O’Connor, & Golding, 2006).

Within the divorce literature for AD/HD, very few studies have investigated age differences in children with this disorder who experienced the divorce of their biological parents. Hurtig et al. (in press) studied adolescents with AD/HD, aged 16-18 years, and found that those who presented with comorbid conditions, such as CD, ODD, mild depression or substance abuse, were more common in non-intact families relative to those with AD/HD alone. The problem with this study is the use of a very narrow age range which focused on subjects in late adolescence only. This limitation makes it difficult to draw conclusions on age differences in children with AD/HD from divorced families.

Studies 1 and 2A of this thesis aimed to expand this limited research by examining the impact of parental divorce in children with AD/HD, aged 6 to 18 years. In Study 1, a higher occurrence of externalizing disorders were found in 13 to 15 year olds from divorced families, relative to those from intact homes. This finding corresponds with that of Hetherington (2005), who suggested more delinquent and antisocial behaviour in adolescents from divorced families. Study 2A produced somewhat different results. While older children (13 to 18 yrs) in the divorced group were slightly more impaired than those in the non-divorced group, younger children (6 to 12 yrs) from divorced parents presented with a wide range of conduct problems, compared to those from non-divorced parents. This is in line with the majority of divorce studies, and with findings by Cheng et al. (2006), who reported more
behavioural problems in younger children of divorced families. Study 1 did not find any
significant age differences between children in terms of learning disabilities, suggesting
similar impairment in academic performances in children with AD/HD of all ages in both
the divorced and non-divorced groups. This finding was replicated in Study 2A, and
corresponds with previous research (Biederman, Faraone, & Monuteaux, 2002;
Biederman et al., 1995). Study 2A further explored age differences in children with
AD/HD of divorced families in regard to symptom severity, internalizing behaviour and
problems in social functioning. Results indicated that younger children presented with
significantly elevated levels of all AD/HD core symptoms, whereas adolescents
displayed only more hyperactive-impulsive behaviour, compared to same-aged
subjects from intact families. This study also found that younger children from divorced
homes had more symptoms of anxiety and depression, and were less socially adjusted,
compared to those from intact families. No group differences in these domains were
found for adolescents. These results suggested that divorce was associated with
adjustment problems in both age groups, but with those in younger children in
particular.

Since the divorce literature implies that children’s adjustment to parental divorce
depends on factors such as the child’s age at divorce or the timing of the divorce
(Spigelman, Spigelman, & Englesson, 1994), these aspects have also been examined
in Study 2A. Lansford et al. (2006) found that parental separation during elementary
school was associated with internalizing and externalizing problems in children,
whereas later divorce produced poorer academic achievements. Spigelman et al.
(1994) reported lower levels of anxiety, aggression and distress in children who were
older than six years when their parents divorced. This study found that children who
experienced the divorce less than 3 years ago were less socially active and had more
spelling problems at school, compared to those where the divorce happened more than
3 years ago. These results suggest that the child’s behaviour improves with time since
the divorce. In this study, the mean age of children at the time of the parental divorce
was 5.4 years. Thus, for younger children the divorce was more recent, while for adolescents it happened years ago. It might be suggested that both children and the custodial parent adapted to the new family situation over time, resulting in improved parenting and a more positive parent-child relationship.

In Study 2B, the relationship between family type and the psychological well-being of children with AD/HD of different ages was assessed. Within the divorce literature, younger children have been found to better adjust to living in step-families than adolescents (Hines, 1997; Pagani, Tremblay, Vitaro, Kerr, & McDuff, 1998). Hetherington and Stanley-Hagen (1999) found higher rates of academic problems, sexual misconduct and other delinquent activities among individuals from step-families during early adolescence. The present study did not replicate these findings. Results showed that younger children from step-families displayed significantly more oppositional behaviour, more symptoms of anxiety and depression, and were less socially adjusted than those from single parent households. Significant differences for adolescents were found only in the domain of social functioning. Those from single parent homes were less socially active than adolescents living in step-families. These results indicate a relationship between remarriage and maladjustment, primarily in younger children with AD/HD, whereas single-parenthood seems to be associated with less social activities in adolescence.

This study also examined the relationship between multiple divorces and adjustment problems in children and adolescents with AD/HD. Results indicated that younger children who experienced a single divorce and those who were exposed to repeated marital transitions did not differ significantly in their psychological well-being. Adolescents who went through a single divorce of their custodial parent presented with more internalizing problems and greater social dysfunction, compared to those who experiences serial marital transitions. These findings suggested that multiple family break-downs were unrelated to behavioural problems in children with AD/HD of all ages.
Further, Study 2B investigated age differences in regard to the quality of relationships within AD/HD families. In this study, younger children have been found to have more conflict-ridden relationships with their family members than adolescents. Poor interactions with the custodial mother correlated with more social dysfunction in adolescents with AD/HD, a phenomenon which was also observed in younger children with this disorder. However, younger children also presented with more internalizing behaviour, which was found to be linked to poor interactions with their sister, and more conduct problems, which correlated with a disruptive brother relationship. These results are in correspondence with findings by Barkley, Karlsson, and Pollard (1985), suggesting less intact relationships between family members and younger children than adolescents with AD/HD, and also with Anderson and Rice (1992), who reported more positive relationships between older children and the custodial parent, as a result of family disengagement during adolescence.

9.6 Differences in Associations with Gender

Within the divorce literature, there are suggestions that boys are more negatively affected than girls by parental divorce (J.H. Block, J. Block, and Gjerde, 1986; Hetherington, Cox, & Cox, 1982). Studies have found that boys presented with more conduct problems and greater social maladjustment, whereas girls displayed more internalizing behaviour, such as depression, anxiety, and withdrawal (Amato & Keith, 1991; Cheng, Dunn, O’Connor, & Golding, 2006; Dunn, Deater-Deckard, Pickering, & O’Connor, 1998; VanderValk, Spruijt, DeGoede, Maas, & Meeus, 2005). Lindner, Stanley-Hagan, and Cavanaugh-Brown (1992) reported fewer behavioral and emotional problems, more symptoms of depression, less social adjustment problems, and greater scholastic competency in girls than in boys of divorced parents. Other investigators found similar results (Huurre, Junkkari, & Aro, 2006; Kinard & Reinherz,
While the majority of studies imply the existence of gender differences in the effects resulting from parental divorce, some investigators did not find any significant variations among boys and girls in terms of behavioural and emotional problems, academic performances and social functioning (Ruschena, Prior, Sanson, & Smart, 2005; Sun, 2001).

Within the divorce literature of AD/HD, there are very limited studies investigating differences in effects of parental divorce associated with gender. Counts et al. (2005) found a relationship between family adversity and AD/HD in girls, particularly in those of the combined subtype. Studies of this thesis expanded on this limited foundation by examining the associations of parental divorce and the psychological well-being of boys and girls with this disorder. Findings in Study 2A partially replicated those from Study 1. In both studies, boys in the divorced group presented with more externalizing behaviour than did those in the non-divorced group. While in Study 1 boys did not differ between divorce groups in their academic performance, Study 2A found more spelling difficulties in boys of divorced than intact families. Extended investigations in Study 2A showed that boys from divorced families also presented with slightly more symptom severity and severe internalizing problems, relative to those from non-divorced parents. The finding that boys from divorced families presented with more depressive symptoms than those from intact families is not in line with research into divorce, where internalizing problems were found predominantly in girls (Cheng et al., 2006; VanderValk et al., 2005). It is possible that the higher occurrence of depressive symptoms may be linked with the poor spelling performance found in these boys.

Results obtained for girls in Study 2A indicated greater impairment in domains of symptom severity, externalizing and internalizing behaviour, and social functioning for those in the divorced group, relative to girls in the non-divorced group. These findings are inconsistent with those of Study 1, where no group differences occurred for girls. It is possible that the inclusion of additional correlates such as symptom severity,
internalizing behaviour and social functioning in Study 2A are responsible for these differences between the two studies. Thus, it is likely that the social maladaptiveness after parental divorce may have correlated with the severe behavioural problems found in these girls.

Overall, these studies established an association between parental divorce and adjustment problems in both genders, and in girls with AD/HD in particular, as those presented with more severe impairments in their psychological functioning than did boys from divorced families. This is in contradiction to the general literature on divorce, where boys were found to present with more adjustment problems than girls. Findings in the present studies may be due to the nature of the sample, as girls with AD/HD in clinical settings are found to present with severe dysfunction in multiple domains (Biederman et al., 1999).

Study 2B was the first to investigate the existence of gender differences in children with AD/HD in terms of the associations with family type and multiple transitions. The divorce literature implies that remarriage has more detrimental effects on girls than boys (Chapman, 1977; Hetherington, Cox, & Cox, 1985; Santrock, 1972; Santrock, Warshak, Lindbergh, & Meadows, 1982). Higher rates of conduct problems have been reported in girls residing in step-families, relative to girls living with a single-custodial parent after divorce (Fergusson, Dimond, & Horwood, 1986; Peterson & Zill, 1986). A study conducted by Zaslow (1989) produced similar results regarding gender differences in children of divorce. In single-parent households, boys were found to present with more externalizing behaviour, whereas similar levels of impairment were found among boys and girls for internalizing problems. In step-families, girls compared to boys displayed more of both types of problem behaviour.

Study 2B found more symptoms of anxiety and depression in boys after remarriage, and fewer social activities in those from single-parent homes. These findings are in contrast to that of Peterson and Zill (1986) who found more depression and withdrawal symptoms in boys from single-parent households, compared to those
living in step-families. Results of this study are also in contradiction to the majority of divorce research, implying that boys are better off in step-families than with a single custodial parent. Girls with AD/HD residing in step-families had more problems at school than did those living with a single-custodial parent. It is possible that a negative daughter/(step-)parent relationship after remarriage might be linked with the school problems found in these girls, a suggestion proposed by Peterson and Zill (1986).

Overall, results of this study indicated that living in step-families correlated with adjustment difficulties in both boys and girls. However, it is unclear whether the higher occurrence of problem behaviours in children with AD/HD were the result of remarriage or whether the parents of these children with behaviour problems were simply more likely to get remarried. This issue needs to be addressed and resolved in future research.

Study 2B also investigated gender differences in regard to repeated marital transitions. Results indicated no significant differences between boys and girls who experienced serial marriages, implying similar impairment in children with AD/HD of either sex among the single and multiple divorced groups. These findings implied that the exposure to repeated family changes did not correlate with greater adjustment problems in both boys and girls with this disorder.

Study 2B further investigated gender differences in regard to the quality of relationships among AD/HD families. Findings indicate that boys had more conflict-ridden interactions with family members than girls, which is in contrast to previous research (Peterson & Zill, 1986). Poor relations with their custodial mother and their sister correlated with greater social dysfunction in AD/HD boys; moreover, a problematic relationship with their sister was also associated with a wide range of internalizing and externalizing problems in these boys. These findings are in line with previous research indicating a relatively problematic mother-son relationship after parental divorce (Hetherington et al., 1989; Hetherington, 2005) and sisters being less able to provide emotional assistance for their brothers (Hetherington, 1988;
Wallerstein, Corbin, & Lewis, 1988). In contrast, girls in this study were found to present with greater AD/HD symptomatology even if they had a good relationship with their mother; however no significant results were found regarding interactions with other family members. Zill (1988) argued that children would adjust better in the custody of a parent of the same sex. Others suggested that custodial mothers established a relatively positive and close relationship with their daughters, by confiding and discussing their personal problems with them, resulting in more responsibility and a greater burden in these girls (Hetherington et al., 1989). Therefore, it is possible that the higher occurrence of AD/HD core symptoms found in girls in this study are linked to such circumstances. However, this issue needs to be investigated in future research.

9.7 The Relationship Between Behaviour of Children with AD/HD, and Parents’ Marital Status

In Studies 1 and 2 a possible relationship between parental divorce and the psychological well-being in children with AD/HD was investigated. Within the divorce literature for AD/HD there is consistency about the existence of a relationship between AD/HD and family adversity (Barkley, Fisher, Edelbrock, & Smallish, 1990; Counts et al., 2005, Graetz et al., 2001, Hurtig et al., in press). However, findings support both reciprocal and transactional models reflecting the impact of the child's behaviour on parents as well as parents’ effects on the child. Therefore, it is unclear whether an unstable family situation acts as a modifier in the course of this disorder and contributes to behavioural problems in children with AD/HD, or whether the child's negative conduct can be regarded as a causal factor of family difficulties. Graetz et al. (2001) found an association between the behavioural problems displayed by children of the combined subtype and greater disruption of family activities, as well as greater reduction in time parents had to meet their own personal needs. Similarly, Counts et al.
(2005) found greater family adversity associated with children of the combined subtype of AD/HD, and suggested that marital discord may influence the child’s behaviour, but the parental relationship might also be affected by the child’s conduct. Other researchers hypothesised that various family factors, such as parental pathology, dysfunctional parent-child relationships, low socio-economic status, or a stressed marital relationship, might cause negative outcomes in children with AD/HD (Mendelson, Johnson, & Stewart, 1971; Minde, Weiss, & Mendelson, 1972; Weiss, Minde, Werry, Douglas, & Nemeth, 1971; Werner & Smith, 1977). Others suggested that negative parenting would be the result of the child’s behaviour (Bell & Harper, 1977; Cunningham & Barkley, 1979; Humphries, Kinsbourne, & Swanson, 1978).

Since the literature does not provide sufficient evidence of whether AD/HD can be seen as a causal factor for family adversity, Study 3 aimed to investigate the relationship of behaviour of children diagnosed with this disorder and family/parental functioning, and to clarify whether the child’s conduct correlates with a disruptive marital relationship and parental divorce.

Firstly, this study investigated a possible relationship between AD/HD core symptoms and family/parental functioning in non-divorced families, before the child received a clinical diagnosis. This was done to evaluate the pure impact of children’s behaviour on intact families, without the influence of medical or psychological interventions. Results indicated that the majority of parents rated the impact of their child’s behaviour on family and parental functioning as ‘slightly true’, suggesting that parents thought they managed their child’s conduct satisfactorily. Ratings for all questions on the Family and Parental Functioning Questionnaire (FPF) were best predicted by the child’s hyperactive-impulsive behaviour. However, the total variance explained indicated only a weak relationship between AD/HD symptomatology and family/parental functioning. Overall, findings did not indicate detrimental effects of the child’s behaviour on the parental relationship, and suggested that AD/HD may not be regarded as a substantive causal factor of marital dissolution.
Secondly, this study assessed differences in family and parental functioning of non-divorced parents before and after the child was diagnosed with AD/HD. This was done to identify any divorced cases after a follow-up period of 18 months since the child’s clinical assessment and also to examine the effects of treatment on the family, as the majority of children (85%) received treatment after their diagnosis. Results indicated that family and parental functioning was poorer before than after the child was diagnosed with AD/HD. The majority of parents stated that family functioning improved after the child was assessed and started treatment. The higher impact ratings found in this study before the child received an AD/HD diagnosis and started treatment may lead to the assumption that the child’s behaviour might have contributed to difficulties in family and parental functioning. However, mean ratings of the impact of the child’s conduct on family life before diagnosis was indicated as ‘slightly true’ and improved after diagnosis and treatment, with ratings ranging from ‘slightly true’ to ‘not true at all’. Therefore, the impact of the child’s behaviour on family and marriage can only be interpreted as relatively weak. These results also explained the small number of divorced couples found after the follow-up period of 18 months, as only two parents divorced after their child was diagnosed with AD/HD. Those two children presented with more externalizing and internalizing behaviour and were also less socially adjusted. Ratings on the FPF questionnaire indicated that the behavioural problems of these two children correlated with marital disharmony by causing tension, conflict, disagreements and arguments among the couples. However, as a result of this relatively small sample, no definite conclusion can be drawn, but there is some suggestion that children’s behaviour may impact adversely on marital relationships and contribute to parental divorce. This needs to be investigated further in future research.

Thirdly, Study 3 evaluated differences in family and parental functioning between divorced parents and non-divorced parents. This was done to examine the impact of the child’s behaviour on the family before the divorce occurred (divorced group) and before the child was diagnosed with AD/HD (non-divorced group). Results
indicated no significant differences between the two groups, suggesting that both
divorced and non-divorced parents were equally affected by their child’s behaviour.
This would indicate that the behaviour displayed by the child was unrelated to marital
dissolution in parents of the divorced group. However, it is unclear what factors might
have caused the parental divorce, and whether the non-divorced couples stayed
together only for the sake of the child. Further exploration to clarify this issue is
necessary, as if the latter explanation is valid, the behaviour of the child could be seen
as a risk factor for marriage stability.

9.8 Summary of Studies

Studies 1 and 2 investigated the relationship between divorce and the
psychological well-being of children with AD/HD. Overall, results suggested that
parental divorce was associated with impaired performance in several domains of
functioning in children with this disorder. These studies found more severe AD/HD core
symptoms, a higher occurrence of internalizing and externalizing behaviour, and more
problems in academic and social functioning in children from divorced families,
compared to those from intact homes. Findings also indicated that children with AD/HD
who experienced the remarriage of their custodial parent and had to adjust to living in
step-families presented with more psychopathology than did those who remained in a
single-parent household. The exposure to repeated marital transitions of the custodial
parent correlated only slightly with behaviour problems in children with AD/HD. Further,
disturbed relationships among family members after parental divorce was associated
with negative outcomes in various domains of functioning in children with AD/HD,
which were predominantly associated with poor relationships with their custodial
mother and their sister, and to a lesser extent with their brother. Differences in
subtypes, age and gender occurred, showing an association between parental divorce
and adjustment problems primarily in children of the inattentive subtype, younger children and females. While the results of these studies showed an association between parental divorce and adjustment problems in children with AD/HD, it was unclear whether divorce was to be seen as the consequence or the cause of the child’s conduct. A possible argument against the child’s behaviour causing the divorce is our finding that children of the inattentive subtype presented with severe behavioural problems. In general, the inattentive subtype of AD/HD is predominantly characterized by attention deficits and is as such, less likely to put stress on the family or to contribute to marital discord. Therefore, there is some suggestion that parental divorce and familial changes involved in this process may have lead to conduct problems in these children.

Overall, findings of Studies 1 and 2 indicated a relationship between parental divorce and children’s psychological well-being. Results suggested an association between family break-downs and the occurrence of comorbid conditions and a greater severity of AD/HD core symptoms in children with AD/HD. In contrast, results of Study 3 provided a significant but weak relationship between behaviour problems in children with AD/HD and family functioning and marital instability. Findings indicated a relatively weak correlation between AD/HD core symptoms and parental problems, as well as poorer family/parental functioning before than after the child was diagnosed with AD/HD. However, no significant differences in family disruptions were found between divorced and non-divorced parents.

In conclusion, it appears that parental divorce, remarriage, and the changes in family life resulting from these events, as well as poor relationships with family members correlate with the symptom profile of children with AD/HD. There is some suggestion, that parental divorce may be associated with the occurrence of comorbid conditions and the severity of core AD/HD symptoms in children with this disorder, but findings also indicated that parental dissolution was relatively unrelated to learning difficulties in children with AD/HD. Findings of this research program also suggest that
parental divorce may have contributed to adjustment difficulties in children with this disorder. This assumption is supported by findings from Study 3, where parent’s perceptions of their child’s behaviour indicated a relatively low impact on family life and the marital relationship; and by findings from Study 2A where children of the inattentive subtype from divorced families were found to present with a wide range of behavioral problems relative to those from intact homes. Children of this subtype are predominantly characterised by problems of attention and distractibility and do not present with severe behavioural problems and as such less likely to put stress on the family and the marital relationship. However, this research program cannot fully answer the question of causality, and therefore more research is necessary to further explore the relationship between AD/HD and parental divorce. However, findings of these studies stress the implementation of psychological treatment regimes to improve parent-child relationships and to minimize marital discord in AD/HD families. Results also urge a reconsideration of the aetiology of AD/HD and there is some suggestion to view AD/HD as a bio-psychosocial disorder in childhood rather than purely a neurological disorder.

9.9 Future Research

The results of these studies indicate that social and environmental factors, such as parental divorce and remarriage correlate with the symptom severity of children with AD/HD and also with the occurrence of externalizing/internalizing problems, academic underachievement, and social maladjustment. These findings make a contribution to the existing knowledge regarding associations between behaviour problems in children with AD/HD and familial difficulties. However, the majority of AD/HD studies examined parent-child interactions and marital relationships within intact families, but only very few investigations studied divorced or step-families and those that did were relatively
limited in their sample size, included boys with AD/HD only, investigated within a very narrow age range, and did not differentiate between AD/HD subtypes.

It is also important to note that divorce should not be seen as a single life event, but as a process that involves sequences of pre and post-divorce experiences. Thus, longitudinal studies would be helpful to further explore the associations between family break-down and AD/HD. Since this research program studied the relationship between divorce and behaviour problems in children with AD/HD within a clinical sample, results may be biased. Therefore, population-based investigations would be advantageous to further explore the associations found in these studies. In addition, the inclusion of other possible factors, such as parental psychopathology, child characteristics (e.g. temperament) or socio-economic status of AD/HD families in the association between divorce and children’s psychological well-being would be useful in future research.

With findings of this research program treatment regimes other than medication in the management of children with AD/HD are highlighted. Psychological treatment approaches are necessary to prevent family adversity, to improve marital relationships, to supply parents with effective coping strategies, and to reduce behavioural problems in children with AD/HD. Therefore further research into non-pharmaceutical methods is needed.

With the establishment of a relationship between parental divorce and the symptom profile of children with AD/HD in this research program, it is important in both clinical practice and in future research to take into consideration parents’ marital status when treating and studying children with this disorder. Further, while the results of Studies 1, 2, and 3 may recommend the consideration of AD/HD as a bio-psychosocial disorder, more research will be necessary to resolve the relationship between environmental factors, such as parental divorce, and the symptom profile of children with AD/HD.
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APPENDIX 1: PARENT INFORMATION LETTERS AND PARENT CONSENT FORMS
A. Information Sheet Study 2

THE UNIVERSITY OF WOLLONGONG
DOCTOR OF PHYLOSOPHY RESEARCH
PARTICIPANTS INFORMATION SHEET.

Dr. Adam Clarke from the Department of Psychology, at The University of Wollongong, in conjunction with Dr. Selikowitz and Dr. McCarthy are conducting research into differences in the brain electrical activity of children who have been diagnosed as having an Attention Deficit Hyperactivity Disorder (ADHD). ADHD is presently considered to result from a dysfunction in the central nervous system. However, we do not know the exact nature of this dysfunction. The aim of this study is to investigate differences in the electrical activity produced by the brain of children with and without ADHD.

To conduct this study, we would like to use the results from the normal brain scan assessment that the practice will conduct. We would also like to use the results from reading, spelling and IQ tests that your child will do. These tests are done as part of the normal testing procedure of this practice. In addition to these tests, we would like you to complete a number of questionnaires. These are designed to measure the type and severity of the ADHD, the presence of other problems as well as ADHD, and your child's family background. This will allow us to better determine how each of these factors impacts on your child's brain scan.

The data collected will be securely stored in the Department of Psychology. Your child's results will remain anonymous to everyone except the research team. You are free to refuse to participate or, having consented, to withdraw your consent at any time. If you decide to withdraw your consent, your data will not be used without your permission. Refusal to participate in this study will not affect future treatment at this practice in any way. If you have any concerns or complaints regarding the way in which the research is conducted you should contact the Ethics Officer of the University of Wollongong Human Research Ethics Committee on 4221 3350.
A. Consent Form Study 2

THE UNIVERSITY OF WOLLONGONG
DOCTOR OF PHYLLOSOPHY RESEARCH
CONSENT FORM.

My child and I have been given information about the procedure and equipment for this experiment and have discussed the research project with the researchers who are conducting this research at the practice of Dr. Selikowitz and Dr. McCarthy.

My child and I understand that, if my child consents to participate in this project he/she will be asked to allow the researchers to have access to the results of my child’s reading, spelling and IQ assessment, and their EEG results, which are conducted as part of their normal assessment. I also understand that I am being asked to complete a number of questionnaires about my child.

We understand that both my participation and my child’s is voluntary, and that we are free to refuse to participate, and free to withdraw from the research at any time. Our refusal to participate or withdrawal of consent will not affect our relationship or treatment by this practice.

We are also aware that any data obtained will be used only for the purposes of this study and will not be made available to any persons but the researchers involved. Individuals cannot be distinguished from one another such that anonymity is kept at all times.

If we have any enquiries about the research, we can contact Dr Adam Clarke (tel: 4221 5775). If we have any concerns or complaints regarding the way the research is or has been conducted, we can contact the Ethics Officer, University of Wollongong Human Research Ethics Committee on 4221 3350.

By signing below we are indicating consent for our participation in the research entitled “Towards a unified model of electrophysiological dysfunction in children with ADHD”. We understand that the data collected will be used for research (with potential journal publication), and we consent for it to be used in that manner.

Signed (Parent/Guardian) Name Date

Signed (Child) Name Date
B. Information Sheet Study 3

THE UNIVERSITY OF WOLLONGONG
DOCTOR OF PHILOSOPHY RESEARCH
PARTICIPANTS INFORMATION SHEET.

Dear parent/caregiver,

Lella Heckel and Dr. Adam Clarke from the School of Psychology, at the University of Wollongong, in conjunction with Dr. Seilikowit and Dr. McCarthy from the Child Developmental Clinic in Sydney are conducting research into the impact of children’s behaviour (who have been diagnosed with Attention Deficit Hyperactivity Disorder/ADHD) on family structure and family functioning. Your child has previously participated in our project, entitled Towards a unified model of electrophysiological dysfunction in children with ADHD. We write to seek your assistance to conduct further research in this field and would like to invite you as the parent/caregiver to participate in our current project.

If you agree to participate, we would like you to complete a questionnaire, which is designed to gather information about your family life before the divorce/separation took place and before your child was diagnosed as having ADHD by Dr. Seilikowit or Dr. McCarthy at the Child and Developmental Clinic in Sydney. This will allow us to better understand the impact of children’s behaviour diagnosed with this disorder on family functioning and the quality of parental relationship, and also to develop better treatment plans for these families.

Apart from the completion of the questionnaire, which will approximately take 10-15 minutes, we can foresee no risk for you as the parent/caregiver or your family members. Your involvement in this study is voluntary and you may withdraw from the study at any time and withdraw any data that has provided to that point. Refusal to participate in this study will not affect future treatment at the Child and Developmental Clinic in Sydney in any way.

This study is funded by a research grant from the School of Psychology. This research will provide a basis for future treatment plans for families of children with ADHD in respect to family structure and family functioning. Findings from the study will be used for research in a PhD thesis. Confidentiality is assured, and your family will not be identified in any part of the research. The data collected will be securely stored in the School of Psychology.

This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong. If you have any concerns or complaints regarding the way in which the research is conducted you can contact the Ethics Officer on 02-4221 4457.
B. Consent Form Study 3

THE UNIVERSITY OF WOLLONGONG
DOCTOR OF PHILOSOPHY RESEARCH
CONSENT/REFUSAL FORM

I have been given information about the procedure of this project, and I also understand that I am being asked to complete a questionnaire via email.

I understand that my participation is voluntary, and that I am free to refuse to participate, and free to withdraw from the research at any time. My refusal to participate or withdrawal of consent will not affect the relationship or my child’s treatment by the Child and Developmental Practice in Sydney.

I am also aware that confidentiality is assured and that the data obtained will not be identified in any part of the research, and also securely stored in the School of Psychology at the University of Wollongong.

If I have any enquiries about the research, I can contact Leila Heckel (tel: 02-4221 4164). If we have any concerns or complaints regarding the way the research is or has been conducted, we can contact the Ethics Officer, University of Wollongong Human Research Ethics Committee on 02-4221 4457.

I am indicating my participation/refusal in this project (which refers to previous research, entitled “Towards a unified model of electrophysiological dysfunction in children with ADHD”) by ticking below (X I consent or X I refuse), by stating my name and date, and by emailing it back to the following address: leila@uow.edu.au. I understand that the data collected will be used for research (with potential journal publication), and I consent for it to be used in that manner.

I consent

I refuse

________________________ Name (parent) __________________________ Date
APPENDIX 2: QUESTIONNAIRES
A. Questionnaire Study 2

The following questions ask about who your child lives with. At present there is no research into the impact of family structure on the symptoms of ADHD, and it is important to know this if better treatments are to be developed. However, we understand that these questions are very personal and you may not want to answer them. If you do not want to fill this page out, just put a line through the page. Thank you for your help.

I. Who does your child live with?

☐ Biological mother  ☐ Biological father

☐ Step mother/unrelated female  ☐ Step father/unrelated male

☐ Other Adult(s) (please specify) ……………………………………………………………………..

☐ Brother/s (with same parents)    How many..............   How old.............(years)

☐ Sister/s (with same parents)     How many..............   How old.............(years)

☐ Half brother/s                   How many..............   How old.............(years)

☐ Half Sister/s                    How many..............   How old.............(years)

☐ Step brother/s                   How many..............   How old.............(years)

☐ Step Sister/s                    How many..............   How old.............(years)

☐ Other Children (please specify) ………………………………………………………………..

II. If your child does not live with both of his/her biological parents, was this the result of a divorce/separation, split-up?

☐ Yes  ☐ No if yes, when did this happen? .................(year)

III. Since the birth of your child, and your present family situation, have you had another marriage/or lived with another significant partner with whom you no longer live?

☐ Yes  ☐ No

IV. Have you had a previous marriage before the birth of your child?

☐ Yes  ☐ No

V. How would you describe your child’s relationship with the person(s) he/she is living with?

<table>
<thead>
<tr>
<th></th>
<th>very poor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological mother</td>
<td></td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological father</td>
<td></td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Step mother/unrelated female</td>
<td></td>
<td>☐</td>
<td></td>
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<td></td>
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<tr>
<td>Step father/unrelated male</td>
<td></td>
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<td></td>
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<tr>
<td>Other Adult/s.................</td>
<td></td>
<td>☐</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brother/s (with same parents)</td>
<td></td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sister/s (with same parents)</td>
<td></td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half brother/s</td>
<td></td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half Sister/s</td>
<td></td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step brother/s</td>
<td></td>
<td>☐</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Step Sister/s</td>
<td></td>
<td>☐</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Other Children.................</td>
<td></td>
<td>☐</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

VI. If we have any further questions, would you be happy for us to contact you to discuss your child’s family life further?

☐ Yes  ☐ No
B. Questionnaires Study 3 – Questionnaire for Non-divorced Families

THE UNIVERSITY OF WOLLONGONG
DOCTOR OF PHILOSOPHY RESEARCH
INTERVIEW QUESTIONS

I. Your child's name

II. Please identify yourself by ticking the correct term

<table>
<thead>
<tr>
<th>Biological Mother</th>
<th>Biological Father</th>
<th>Other Adult (specify)</th>
</tr>
</thead>
</table>

III. Marital Status

<table>
<thead>
<tr>
<th>Married</th>
<th>Divorced</th>
<th>Separated</th>
<th>Widowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Month/Year)</td>
<td>(Month/Year)</td>
<td>(Month/Year)</td>
<td>(Month/Year)</td>
</tr>
</tbody>
</table>

IV. Is your child currently taking medication or receiving any other kind of treatment?

If yes, which one?

V. Think about your family life BEFORE your child received their diagnosis of ADHD. Please rate on the 4-point scale underneath to indicate to what degree the following statements apply to you.

<table>
<thead>
<tr>
<th>Very true</th>
<th>Slightly true</th>
<th>Somewhat true</th>
<th>Not true at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I wasn’t able to spend enough time for my own needs because of my child’s behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I wasn’t able to spend enough valuable time with my spouse because of our child’s behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Family activities were limited because of our child’s behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Family activities were interrupted by our child’s behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Our child’s behaviour caused tension/conflict between me and my spouse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Our child’s behaviour caused disagreements/arguments between me and my spouse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Our child’s behaviour had no impact on our family life</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. My spouse and I felt exhausted and fatigued due to our child’s behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VI. Think about your family life AFTER your child received their ADHD diagnosis. Please rate on the 4-point scale underneath to indicate to what degree the following statements apply to you.

<table>
<thead>
<tr>
<th>Very true</th>
<th>Slightly true</th>
<th>Somewhat true</th>
<th>Not true at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Since our child’s ADHD diagnosis I have not been able to spend enough time for my own needs because of our child’s behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Since our child’s ADHD diagnosis I have not been able to spend enough valuable time with my spouse because of our child’s behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. After our child received their ADHD diagnosis, family activities have been limited due to our child’s behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. After our child received their ADHD diagnosis, family activities have been interrupted by our child’s behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. After our child received their ADHD diagnosis, their behaviour has caused tension/conflict between me and my spouse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. After our child received their ADHD diagnosis, their behaviour has caused disagreements/arguments between me and my spouse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Our child’s ADHD diagnosis, their behaviour have had any impact on our family life</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Since our child’s ADHD diagnosis, my spouse and I feel exhausted and fatigued due to their behaviour</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
B. Questionnaire Study 3 – Questionnaire for Divorced Families

THE UNIVERSITY OF WOLLONGONG
DOCTOR OF PHILOSOPHY RESEARCH
INTERVIEW QUESTIONS

I. Your child’s name

II. Please identify yourself by ticking the correct term

[ ] Biological Mother  [ ] Biological Father  [ ] Other Adult (specify)

III. Marital Status

[ ] Married

[ ] Divorced/Separated Date of Divorce/Separation (month/year)

[ ] Remarried Date of Remarriage (month/year)

IV. Please think about your family life BEFORE the divorce/separation took place, and rate on the 4-point scale underneath to indicate to what degree the following statements apply to you.

<table>
<thead>
<tr>
<th></th>
<th>1 Very true</th>
<th>2 Somewhat true</th>
<th>3 Slightly true</th>
<th>4 Not true at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I wasn’t able to spend enough time for my own needs because of my child’s behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>I wasn’t able to spend enough valuable time with my spouse because of our child’s behaviour</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Family activities were limited because of our child’s behaviour</td>
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<td>4.</td>
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<td>My spouse and I felt exhausted and fatigued due to our child’s behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

V. Was your child taking medication or receiving any other kind of treatment at this time?

[ ] Yes  [ ] No

If yes, which one?
APPENDIX 3: LIST OF PUBLICATIONS AND CONFERENCE PRESENTATIONS
PUBLICATIONS

Currently under Review:


CONFERENCE PRESENTATION