

PhD in Special Education

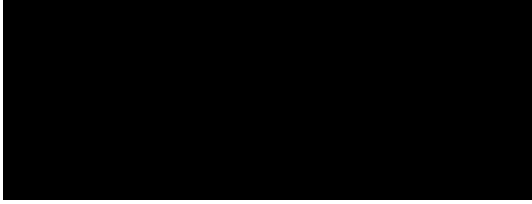
**The Psychological and Family Characteristics of Greek Primary School
Children with Conduct Problems**

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at the Institute of Education, University of London

2008

**I hereby declare that the work presented in this thesis is entirely my
own**



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Abstract

Children with conduct problems are a costly problem for modern society. They fare poorly academically and are more likely than other children to be excluded from education. As they grow older, they are likely to fail to enter training and employment and more likely than other young people to enter long-term criminal careers. As a result, a good deal of research has been conducted into the nature, causes and treatment of conduct problems.

The present thesis argues that, in order to understand and intervene effectively with children with conduct problems, it is necessary to approach them as a heterogeneous group, with a range of associated vulnerabilities. One such vulnerability is poor reading (PR). The thesis proposes that children with conduct problems and associated poor reading (CP-PR) are distinguished by a wide range of psychological and family characteristics, which do not appear to distinguish children with CP-only and children with PR-only.

The main study reported here was conducted in Greece with Second-Grade school children (n=123) drawn from a population of 1354 children. A comparative four-group (CP-only, CP-PR, PR-only, normal-Comparison group,) design was employed. Selection of participants was based upon teachers' ratings (Conners' Teacher Rating Scale-28) and children's scores on the Test for Reading Ability Detection. Participants were assessed and compared on the WISC-III Verbal IQ test; the Conners' Continuous Performance Test (a measure of attention abilities); the Tower of London task (a measure of executive function cognitive abilities); and a set of phonological tests. The participants' parents completed a questionnaire and a telephone interview that assessed parental involvement in children's education and social life.

The findings showed that CP-only children did not exhibit psychological vulnerabilities on measures of attention, executive functions, or phonological abilities. In contrast, CP-PR children did exhibit psychological deficits on these measures. Moreover, they also exhibited significant difficulties in measures of attention and phonological abilities compared to the PR-only children. Contrary to expectations, parents of all groups showed similar interest in educating and socialising their children. The implications of the findings for theoretical models of conduct problems and for intervention planning are discussed.

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INTRODUCTION

Conduct problems are one of the most common forms of psychiatric diagnosis in children (Hill, 2002). They are estimated to affect 5% to 10% of children between the ages of 8 to 16 years old (Hill, 2002). They encompass an extended range of behavioural dysfunctions, which may vary from mild antisocial behaviours such as defiance, hostility, disobedience, stubbornness and truancy to severe deviant acts such as physical violence, theft and drug abuse (Loeber, Burke, Lahey, Winters, & Zera, 2000). Over approximately the last 25 years in the UK (United Kingdom), parent rated conduct problems in adolescents have increased significantly irrespective of gender, social class and family type (Collishaw, Maughan, Goodman, & Pickles, 2004).

Child conduct problems can have a detrimental impact on the individual's well-being. During childhood, children with conduct problems often exhibit serious academic and psychological problems and are likely to be excluded by the school and peers (Farrington, 1995). During adolescence and adult life they are at risk of serious delinquency (Moffitt, 1993a; Moffitt & Caspi, 2001; Moffitt, Caspi, Harrington, & Milne, 2002). Conduct problems are also costly for society (Moffitt et al., 2002). Findings from American (Foster, Jones, & Conduct Problems Prevention Research Group., 2005) and British (Scott, Knapp, Henderson, & Maughan, 2001) studies indicate that the public expenditure for conduct disordered youths from early childhood to adolescence (7-13 years) and young adulthood (10-28 years) was considerably larger (American data: mean total cost per youth: \$12 547; British data: mean total cost: £70 019) than for those without

problems (American data: mean total cost: \$3 830; British data: mean total cost: £7 423). According to the UK Audit Commission *...if effective early intervention had been provided for just one in ten of these young offenders, annual savings in excess of £100 million could have been made* (Allen, 2006, p 11). As a result, a great deal of research has been focused into the prevention and/or treatment of conduct problems.

Contemporary intervention research suggests that in order to resolve these children's problems it is important that treatment programmes should address multiple levels of dysfunction rather than behaviour only (Walker-Hall & Sylva, 2001). Conduct problems comprise a heterogeneous condition of psychopathology which is embedded in a network of multiple vulnerabilities detected not only at the behavioural but at the psychological and family level as well. As Hinshaw, Lahey, & Hart (1993) state *...choice of intervention strategies is likely to follow from conceptions of the problem's locus...* (p. 34). The need to fully explain the multi-faceted nature of conduct problems is considered to be central to the development of effective intervention programmes.

One of the vulnerabilities that are often associated with conduct problems during childhood and, arguably, the one which is most apparent in educational settings, is poor reading (Hinshaw, 1992b). Reading failure is likely to affect children's learning (Sylva & Hurry, 1995) and lead to generalised academic failure (Stanovich, 2000). Academic difficulties compounded by antisocial behaviour can eventually lead to poor school engagement, cutting bonds with school, and school dropout, which has been related to various adverse outcomes such as teenage pregnancy, criminal activity, gang involvement

and substance use (Caraway, Tucker, Reinke, & Hall, 2003). The UK Audit Commission 2004 report concludes that *...the proportion of excluded pupils admitting to offending is considerably higher than among those in school* (Audit Commission., 2004, p. 9).

Empirical findings seem to suggest that children with conduct problems and poor reading are likely to experience complications beyond those experienced by conduct disturbed children without reading problems (Anderson, Williams, McGee, & Silva, 1989; McGee, Williams, & Silva, 1984b; Moffitt, 1990; Smart, Sanson, & Prior, 1996). If this distinction is true, then theory and intervention for child conduct problems should be adjusted accordingly. Although research into unlocking the association between conduct problems and reading has made significant progress, the literature shows that less research has been conducted for the vulnerabilities associated with conduct problems and accompanied poor reading.

This thesis seeks to investigate the psychological and family vulnerabilities of children with conduct problems only and children with conduct problems and poor reading. The investigation is designed to contribute to theoretical understanding of conduct problems, as well as to provide evidence which assists the development of educational interventions for children with conduct problems.

The thesis starts with a literature review divided into two parts. Part one comprises the first chapter of the thesis and it offers a review of the characteristics of children with conduct problems and the effective intervention programmes developed for child conduct

problems. Part two is the second chapter of the thesis and reviews issues on conduct problems and associated poor reading. The thesis continues with the methodology chapter which presents the research questions and the details about the sample and the research methods used for the accomplishment of the empirical part of the thesis. Following that, the results chapter presents the statistical analysis conducted. The results reveal differences in the psychological characteristics of children with conduct problems and associated poor reading and children with conduct problems only. The vulnerabilities of conduct disturbed children with and without poor reading, the implications of the results for theory and intervention along with their limitations and recommendations for further research are discussed in the discussion chapter. The conclusions are presented at the end of the thesis.

1. LITERATURE REVIEW PART I

The Nature and Causes of Child Conduct Problems

1.0 Introduction

The purpose of this part of the literature review is to summarise what is known about conduct problems in school age children. The first section refers to the definition of child conduct problems. The second section deals with the elaboration of the current issues regarding the classification and conceptualisation of conduct problems. Section three reports the findings regarding the prevalence and prognosis of conduct problems, and section four the associated impairments of attention and hyperactivity identified in children with conduct problems. Section five presents the likely factors that are considered to put children at risk for conduct problems. Section six covers issues of identification and evaluation of interventions developed for school age children with or at risk of conduct problems. Section seven briefly summarises the main conclusions in relation to conduct problems in school age children.

1.1 Definition of Child Conduct Problems

Three terms have been identified in the published literature that are most frequently employed for defining conduct problems: externalizing problems, conduct disorders, and delinquency.

Externalizing problems is a broadband term that refers to the narrow-band dimensions of impulsivity-hyperactivity and aggression-conduct disorders that have been established as independent entities within the externalizing problems domain (Waschbusch, 2002). They constitute the antipode of the internalizing problems category, namely anxiety and withdrawal, by being identified as a distinct dimension from the internalizing one (Achenbach & Edelbrock, 1978). The externalizing problems term has replaced what has long been called behavioural problems and it has substituted for the “B” in the term EBDs or Emotional and Behavioural Difficulties.

The term *conduct disorder* alludes to the clinical conditions of conduct disorders included in the American and European psychiatric classification systems. Specifically, the term conduct disorder is synonymous either with the clinical condition of Conduct Disorder (CD) and Oppositional Defiant Disorder (ODD) of the American Diagnostic and Statistical Manual of Mental Disorders, 4th edition, (DSM-IV) (American Psychiatric Association, 1994) or with the clinical condition of CD of the International Classification of Diseases, 10th revision (ICD-10) (World Health Organisation, 1992). According to DSM-IV CD is predominantly characterized by persistent and repetitive violation of the basic rights of others and major age-appropriate societal norms. ODD refers to

negativistic, defiant, disobedient and hostile behaviours towards authority and precedes CD. In line with ICD-10 CD is characterised by a repetitive and persistent pattern of dissocial, aggressive, or defiant conduct.

Finally, the legal term *delinquency* is used to refer to the commitment of illegal acts (American Academy of Child and Adolescent Psychiatry, 1997). Loeber & Farrington (2000) in their state-of-the-art report on child offenders, define child delinquency as the commitment of delinquent acts such as homicide, robberies, rape, shoplifting, and arson, between the ages of 7 to 12.

Undoubtedly, defining conduct problems is quite a problematic procedure creating problems in the field's ability to communicate properly. Since many divergent terms have been invented, either too broad or too narrow and to some extent overlapping, the domain is open to subjective interpretation (Connor, 1994).

The usage of the term conduct problems in this review is very much in line with the definition that Brestan & Eyberg (1998) attribute to conduct problems:

We define a conduct problem as any behaviour that is listed in the Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM-IV; American Psychiatric Association [APA], 1994) as a symptom of ODD or CD or a problem description that is consistent or synonymous with these symptoms, such as temper tantrums, disruptive classroom behaviour, or delinquency (p. 181).

The present review adopts the above definition for conduct problems with the sole exception that it will take into account symptoms of CD that are listed in ICD-10 as well. Therefore, the review will be limited to two groups of children: a) those who meet the DSM-IV or ICD-10 diagnostic criteria for CD or ODD, and b) those who do not meet the DSM-IV or ICD-10 diagnostic criteria for CD or ODD, but present behavioural dispositions similar to the symptoms of CD or ODD that are severe enough to cause significant disturbance in different domains of functioning, and warrant special care and provision.

The reason of the focus being children with conduct problems instead of conduct disorders consists in the fact that, by operating diagnostic boundaries strictly, pivotal differences of type and severity of the dysfunction might be lost.

1.2 Classification of Child Conduct Problems

There are several ways that disturbed behaviour can be classified. Dimensional and categorical methods are the most conventional taxonomic approaches (Egger & Angold, 2006; Hinshaw, 1992a). Consistent with Hinshaw (1992a), dimensional classification is concerned with the summing and averaging of data gathered from rating scales or behaviour observations in order to produce dimensions of behavioural problems. In the categorical method cutoff scores and diagnostic boundaries are employed, yielding diagnostic categories of problem ‘types’. The former considers problematic behavioural manifestations *...precursors of, or risk factors for, later psychopathology, rather than as manifestations of psychiatric disorders...* (Egger & Angold, 2006, p.315). The latter aims

at identifying clinically significant syndromes, ...*that are themselves, early-onset 'disorders', rather than simply risk factors for later disorders* (Egger & Angold, 2006, p 315).

The official classification of conduct problems relies on the DSM-IV and ICD-10 diagnostic manuals, both of which adopt the categorical approach. As mentioned previously, DSM-IV recognises two main categories¹ of conduct problems, CD and ODD respectively (American Psychiatric Association, 1994). In contrast, ICD-10 provides a more general classification pattern by identifying only one category of conduct problems, namely CD (World Health Organisation, 1992). The CD condition of ICD-10 is very similar to the combined version of the DSM-IV CD and ODD conditions (Angold, Costello, & Erkanli, 1999).

Despite the widespread acceptance of the DSM and ICD classification systems as valuable schemes for the identification of behavioural dysfunctions, there is a debate regarding the use of categorical taxonomy of conduct problems due to variation across youngsters in the amounts of aggressive, defiant, and other antisocial behaviour shown. Categorical approaches have been criticised for bearing the risk of losing important differences of severity and/or type of problem below or above a selected diagnostic boundary. Hinshaw, Lahey, & Hart (1993) in their review on the taxonomy of conduct disorders underscore that classifying children according to a certain cutoff point may be arbitrary, unless it is known there are true discontinuities in the domain. Moreover, it may

¹ A category refers to a diagnostic class organised on the basis of *criteria sets with defining features* (American Psychiatric Association, 1994, p. xxii).

also ...*reduce meaningful variations into binary clusters* (p. 33). On the other hand, distinct forms of conduct problems have been shown to significantly diverge with respect to a wide range of factors (Hinshaw, 2002). For instance, longitudinal data on the differences between the course of conduct problems that appear either early in an individual's life or during adolescence (Moffitt, 1993a; Moffitt & Caspi, 2001; Moffitt et al., 2002) suggest that antisocial behaviour is unlikely to lead to maladaptive consequences in adult life until a threshold is reached, in terms of duration. Overall, the categorical approach has advantages both for explanation as well as intervention for antisocial behaviour. The elucidation of viable categories will greatly aid explanation of etiological processes that underlie antisocial behaviour (Hinshaw, 2002). Additionally, as treatment might significantly differ based on knowing that a trait is distributed discretely, the identification of distinct categories places the field in a better position to develop effective prevention and intervention strategies (Beauchaine, 2003).

Apart from the officially recognised categories of conduct problems there have been several attempts to sub-classify conduct dysfunctions in children that have yielded potential sub-types² of conduct problems. Such attempts derive from findings showing that within the diagnostic category of conduct problems there are several disparate behavioural patterns or developmental progressions. The distinctions that have captured the interest of investigators and clinicians are presented in the following paragraphs.

² A sub-type is synonymous with *mutually exclusive and jointly exhaustive phenomenological subgrouping within a diagnosis* (American Psychiatric Association, 1994, p. 1)

1.2.1 Early versus Late Onset Conduct Problems

DSM-IV recognises two sub-types of conduct problems: childhood-onset versus adolescent-onset CD (American Psychiatric Association, 1994). Indeed, Moffitt, (1993a) speculated upon the assumption of the existence of two distinct categories of antisocial behaviour: life-course-persistent (LCP) antisocial behaviour, which starts in childhood, versus adolescence-limited (AL) antisocial behaviour, which begins in adolescence. These hypothetical prototypes are supposed to be generated by different aetiologies and grow through dissimilar developmental pathways. Their central difference is the persistence of the antisocial problems at adulthood within the LCP group, whereas AL antisocial behaviour typically does not continue beyond the transition to young adulthood.

This taxonomic theory has been supported by findings from the Dunedin (New Zealand) Multidisciplinary Health and Development Study. This study is an ongoing longitudinal investigation of the health, development, and behaviour of a cohort of consecutive births between 1 April 1972 and 31 March 1973. Measures on childhood risk characteristics from age 3 to 18 have shown that the LCP path is associated with unfavourable background risk factors such as poor parenting, neurocognitive risk, difficult temperament and inattention-hyperactivity (Moffitt et al., 2002). In contrast, AL youths' background was found to be normative or even better than the average Dunedin child. Further, comparisons between the LCP and AL groups on several domains of life indicate that the antisocial behaviour of the early starters continues into adult life (Moffitt et al., 2002). Specifically, the LCP group tended to be more violent towards women and

children, commit more serious offences, and have more symptoms of antisocial personality disorder and psychopathic personality. Moreover, they had limited education qualifications and low-status unskilled jobs.

1.2.2 Covert, Overt and Authority Conflict Conduct Problems

Loeber et al. (1993) in their seminal report on developmental pathways of disruptive behaviour identified three different patterns of conduct problems: covert, overt and authority conflict. These sub-classes are differentiated by the diverse repertoire of behaviour features that they include and the different forms of delinquency they predict. In particular, children with overt conduct problems display problems of aggression as a first step, and physical fighting and violence as a final step. Those identified with covert conduct problems start their deviant action prior to the age of 15 and exhibit initially minor covert behaviour (lying, shoplifting), property damage as a second step, and moderate to very serious forms of delinquency (joyriding, pick-pocketing, stealing from cars, fencing, illegal credit cards, selling drugs) as a third step. Finally, children who belong to the authority conflict group start before the age of 12 with stubborn behaviour and continue with defiance and authority avoidance as a second and third step, respectively.

1.2.3 Reactive versus Proactive Aggression

Reactive and proactive aggression comprises a taxonomic approach to child conduct problems based on distinct aggression patterns. Reactive aggression refers to angry outbursts in response to provocation, whereas proactive aggression is goal-oriented,

requiring neither provocation nor anger (Vitaro, Gendreau, Tremblay, & Oligny, 1998). Dodge & Coie (1987) suggested that reactive and proactive aggression could be considered as distinct groups of aggressive behaviour on the basis of the attributional bias hypothesis. In particular, by investigating social-information-processing mechanisms in chronic reactive and proactive aggressive behaviour, they concluded that reactive aggressive children, and not proactive ones, tend to over-attribute hostile intent to others.

Some years later Vitaro, Brendgen, & Tremblay (2002) came to confirm the hypothesis of the dual nature of aggression by indicating that proactive and reactive aggression are distinct with regard to temperamental dispositions, behavioural dimensions and prediction for later delinquency. It was shown that reactive children were more inattentive and that they had higher rates of activity level. Conversely, proactive aggressive children were more physically aggressive and more prone to become delinquent. However, recent data derived from an investigation of the developmental trajectories of proactive and reactive aggression in boys suggested that in adolescence it is unlikely that male proactive and reactive aggression is developmentally distinct (Barker, Tremblay, Nagin, Vitaro, & Lacourse, 2006). Results showed that both trajectories were characterized by desistance and that nearly 100% of the participants that followed the highly reactive group also followed the highly proactive group (Barker et al., 2006).

All the above sub-divisions along with the debate regarding the validity of the categorical classification approach to conduct problems expose the difficulty in classifying this

heterogeneous group of children. Similar to the problematic terminology of conduct problems, classification is also intricate, preventing the field from reaching a consensus on the child's clinical profile.

1.3 Prevalence and Prognosis of Child Conduct Problems

The prevalence of conduct problems in children varies according to the defining criteria used and variations exist according to gender, socioeconomic status, and cultural context. In agreement with Hinshaw (1992a), *For categories based on quantitative instruments, cutoff scores of 1.5 or 2 standard deviations above the population mean are often used, yielding rates from about 2% to over 15% of the population, depending on the skewness of the distribution of scores* (p. 128). When clinical interviewing is employed as the defining criterion, prevalence ranges from 1.5% to 3.4% of children and adolescents (American Academy of Child and Adolescent Psychiatry, 1997). Overall, for the industrialised West it is estimated that 5% to 10% of 6 to 18 year olds have significant and persistent oppositional, disruptive, and aggressive behaviour problems (Hill, 2002).

In relation to gender, conduct problems are more often exhibited by boys than girls. According to longitudinal data from the Dunedin Multidisciplinary Health and Development Study male-female ratio of early onset conduct problems was estimated to be 10:1 (Moffitt & Caspi, 2001). On the basis of the 1999 British Child Mental Health Survey the prevalence of boys and girls with a DSM-IV diagnosis of conduct disorder in the full sample was 2.1% and .8% respectively (Maughan, Rowe, Messer, Goodman, & Meltzer, 2004). However, as children grow older the discrepancy in prevalence rates

between boys and girls decreases (American Academy of Child and Adolescent Psychiatry, 1997; Maughan et al., 2004). Further, Loeber et al. (2000), resting on a summary of population-based prevalence studies, arrived at the conclusion that the diagnoses of ODD and CD are relatively common in girls, especially in clinical settings.

Regarding socioeconomic status, mental health diagnosis of ODD and CD among youths of low socioeconomic status is more common (American Psychiatric Association, 1994). Moreover, CD and delinquency is more prevalent in neighbourhoods characterized by social disorganisation and high levels of violence. Notwithstanding that, it is not clear whether conduct problems in general are more prevalent in disadvantaged neighbourhoods compared with advantaged inner-city neighbourhoods (Loeber et al., 2000).

Finally, prevalence rates of conduct problems vary according to cultural setting and ethnicity. According to practice parameters of the American Academy of Child and Adolescent Psychiatry (1997) African-American youths are more often diagnosed as conduct disordered. Additionally, referral rates of African-American child offenders to juvenile court were 3 times higher than for white child delinquents (Loeber et al., 2000).

As far as prognosis is concerned, it has been ascertained that 50% or more of 4 to 5 year old children with severe externalising problems from nonclinical populations will develop persistent psychosocial problems (Moffitt et al., 2002). Early emerging (year 7) conduct problems are predictive of violent crime, substance use, mental health problems

such as antisocial personality disorder and suicidal attempt, poor partner relationships, educational disadvantage, unemployment and welfare dependence in young adulthood (Fergusson, Horwood, & Ridder, 2005). Male early conduct problems seem to be more strongly related to later crime, substance use, partnerships problems and unemployment, whereas females with early conduct problems are at greater risk for depression/anxiety, suicide attempt, pregnancy, parenthood and welfare dependence (Fergusson et al., 2005).

1.4 Associated Features of Child Conduct Problems

Conduct problems often co-occur with other associated features. These features contribute to the composition of the overall picture of conduct problems in children. The term features refers to those vulnerabilities that are found to accompany conduct problems in children. These vulnerabilities are either other diagnoses that are found to co-occur with conduct problems or characteristics that are not disorders per se, but are very important in the progression and/or maintenance of child conduct problems. Attention Deficits/Hyperactivity Disorder (AD/HD) and poor reading are very commonly found to be associated with conduct problems. In this section only the association between AD/HD and conduct problems will be presented. The association between conduct problems and poor reading is presented in the second part of the literature review.

Claims for attention deficits and hyperactivity in conduct problem children are made on the basis of the above-chance co-occurrence of conduct problems and attention deficit and hyperactivity disorder (AD/HD) (Jensen, Martin, & Cantwell, 1997). The case of co-occurring diagnoses is often described by developmental psychopathologists as

comorbidity (Angold et al., 1999). Comorbidity is a term borrowed from medicine and refers to the co-occurrence of two or more distinctive disease entities.

AD/HD is one of the most prevalent childhood psychiatric diagnoses and is characterised by significant problems in the domains of sustained attention, impulsiveness and activity (American Academy of Child and Adolescent Psychiatry, 1997). DSM-IV recognises three types of attention and hyperactivity deficits: 1) AD/HD, combined type, 2) AD/HD, predominantly inattentive type, 3) AD/HD, predominantly hyperactive-impulsive type (American Psychiatric Association, 1994). AD/HD is highly associated with considerable dysfunction in several domains of functioning. Children with AD/HD are characterised by increased levels of off-task behaviour, distractibility, overactivity, lack of concentration (Goldstein & Goldstein, 1998), aversion to delay (Antrop et al., 2006; Kuntsi, Oosterlaan, & Stevenson, 2001), difficulty in inhibiting inappropriate responses (Barkley, 1997b; Quay, 1997; Schachar, Mota, Logan, Tannock, & Klim, 2000), academic underachievement (Hinshaw, 1992b; Spira Greenfield & Fischel, 2005), and peer rejection (Hinshaw & Melnick, 1995).

The prevalence of comorbidity between conduct problems and AD/HD ranges from 25% to 50% (Scottish Intercollegiate Guidelines Network, 2001). Using a semi-parametric mixture model, Shaw, Lacourse, & Nagin (2005) identified developmental trajectories of low and persistently high (chronic) levels of conduct problems and hyperactivity/attention problems (HAP) in children age 2 to 10. Results showed that around three quarters of the children following the low conduct problems trajectory also

followed a trajectory similar to the HAP. Moreover, 55% of the chronic conduct problems group showed a persistent chronic pattern of HAP. Children with comorbid conditions of conduct problems and AD/HD show greater reading difficulties (Hinshaw, 1992b), more severe conduct problems, more disrupted parent-child relationship, higher levels of peer rejection and worse outcomes than children with conduct problems only (Angold et al., 1999).

The fact that AD/HD children with co-occurring conduct problems are very seriously disturbed leads many investigators to believe that inattention-hyperactivity/conduct problems may compose a distinct category with a unique aetiology and developmental path. Angold and colleagues (1999), in their meta-analysis of the evidence for associations between the most common child and adolescent psychiatric disorders, propose that the hypothesis of the AD/HD-CD or ODD sub-type is supported by the fact that the co-occurrence of AD/HD with CD or ODD causes severe impairment compared to AD/HD or conduct problems alone. Moreover, they stress that antisocial, substance abuse, and depressive disorders are more common in the parents of AD/HD-CD or ODD than in parents of children with AD/HD only. An extensive review by Jensen, Martin, & Cantwell (1997) on the most prevalent patterns of comorbidity of AD/HD proposed that low IQ, increased learning/reading difficulties, and neuropsychological deficits underpin the links between the inattention-hyperactivity/conduct problems subclass.

Unlike the assertions for a distinct category of combined conduct problems and AD/HD, it has been suggested that the co-existence of the two conditions shows that AD/HD (in

particular its symptoms of inattention, overactivity, and poor organisation and planning) is rather an early marker of the emergence of early conduct problems. Moffitt (1993b) supported the above suggestion based on findings from the Dunedin longitudinal study. She indicated that combined attention deficit disorder-hyperactivity (ADD-H) and conduct problems was accompanied by low scores on neuropsychological measures and extreme antisocial behaviour that persisted from 3 to 15 years as opposed to pure ADD-H and conduct problem children who have neither neuropsychological deficits nor persistent antisocial behaviour. Likewise, Patterson et al. (2000) through structural equation modelling showed that there is a progression from hyperactivity to early conduct problems. However, more careful analysis demonstrated that disrupted parental discipline accounted for this progression.

1.5 Potential Risk Factors for Child Conduct Problems

Due to the failure of traditional linear frameworks to explain the origins of child psychopathology, the study of child mental health has reoriented towards more holistic explanatory models. Terms such as *multiple-risk model*, *ecological model* and *biopsychosocial perspective* reflect the shift in the conceptualisation of child psychopathology, which is now conceptualised as the product of the dynamic exchanges between the individual and the environment (Sameroff, 2000). One of the major characteristics of this integrational explanatory approach is its attempt to replace the traditional paradigm of cause-and-effect with the risk-and-outcome paradigm (Cooper, 1999; Cowan & Cowan, 2002). Actuated by this re-theorisation of child mental health, instead of presenting unilateral causal models, this section will highlight all the risk

factors that may contribute to the emergence of conduct problems in children. Three broad groups of risk factors are recognised: child factors, family factors and contextual factors. This distinction has been made according to which factor comprises the primary influence upon a child's behaviour.

1.5.1 Child Factors

Genetics: Behavioural genetics have shown that genetic differences account for a considerable portion of individual differences in many important behaviours including antisocial behaviour (Plomin, DeFries, McClearn, & Rutter, 1997). Results from twin studies have indicated that various forms of conduct problems are highly heritable. By using multi-informant data (mothers', teachers', independent observers' and children's self-reports) Arsenault et al., (2003) found an 82% heritability estimate for age 5 antisocial behaviour. Van der Valk, van den Oord, Verhulst, & Boomsma (2001) demonstrated that common genetic factors explained about 50% of the variance in externalising behaviour in 3 year old children. Dionne, Tremblay, Boivin, Laplante, & Perusse (2003) reported that 58% of physical aggression among 19 months infants was explained by common genetic influences.

Twin studies deal with the assessment of complex behavioural traits in humans and thus allow inferences to be made for the existence of genetic influences on a behavioural trait that runs in families without offering any information about candidate genes that may be implicated in those effects. Molecular genetics deals with the identification of specific genes involved in the pathway to the disorder (Plomin et al., 1997). Results from a birth

cohort study of 499 boys followed up from birth to age 26 that examined the relationship between specific genes and antisocial behaviour offer strong support for the mediating effect of genes in children's conduct problems. In particular, variability of transcriptional activity of the MAOA gene in maltreated boys was found to account for antisocial behaviour outcomes (Caspi et al., 2002). Antisocial behaviour was operationalised as conduct problems, antisocial personality disorder, convictions for violent crimes, and disposition toward violence.

The importance of genetic contribution in conduct problems has been replicated in different studies of various samples and informants. On the other hand heritability seems to vary as a function of age, measurement and comorbidity. Genetic etiological processes may contribute more to the forms of conduct problems that begin in childhood, than in adolescents (Arsenault et al., 2003). As opposed to the DSM-IV clinical diagnosis, when conduct problems are measured with the Child Behaviour Checklist, heritability estimates for aggressive symptoms of conduct problems have been reported to be significantly higher than for non-aggressive symptoms (Gelhorn et al., 2005).

Conduct problems appear to be highly heritable when they co-exist with AD/HD. There is considerable empirical evidence from twin studies that a common genetic liability underlies the comorbidity of conduct problems and AD/HD (Coolidge, Thede, & Young, 2000; Dick, Viken, Kaprio, Pulkkinen, & Rose, 2005; Nadder, Rutter, Silberg, Maes, & Eaves, 2002; Silberg et al., 1996; Thapar, Harrington, & McGuffin, 2001). On the contrary, it appears environmental influences play only a modest role in the covariation

of ADHD and CP in children. Despite that, Nadder et al., (2002) and Dick et al., (2005) note that the operation of indirect environmental influences operating through the direct genetic mechanisms that bring about the two disorders cannot be rejected as existing studies have not examined this hypothesis yet. In the case of indirect environmental influences, it is proposed that *ADHD behaviour provokes negative reactions from other people and that it is this negativity that predisposes to ODD/CD* (Nadder et al., 2002, p.40). Conduct problems are also comorbid with reading difficulties, but unlike the comorbidity with AD/HD, the comorbidity with reading problems is not attributed to shared genetic influences (Trzesniewski, Moffitt, Caspi, Taylor, & Maughan, 2006). Instead, there is evidence that raises the possibility that bivariate influences and common environmental factors mediate the relationship between conduct problems and poor reading (Trzesniewski et al., 2006).

What is the implication of the above findings? The debate about nature versus nature in respect to behavioural problems is a long-standing one. *It is now generally agreed that both nurture and nature play a role in determining behaviour* (Plomin, DeFries, & McClearn, 1990, p. 5). As Griffiths, Suzuki, Lewontin, & Gelbart (1993) explain with respect to the function of genes, the genetic material has a certain plan for the individual. However, environmental factors may alter this plan. Plomin and colleagues highlight that *unlike some physical characteristics behaviour is dynamic, changing in response to the environment* (Plomin et al., 1990, p.2). Indeed, as it will be illustrated in the following sections, there are a number of environmental factors mainly parent rearing practices that are likely to participate in the generative process of child conduct problems. Additionally,

there is growing evidence from the field of epigenetic research³ indicating that the environment can influence genetic expression at a molecular level and alter the course of inherited behavioural characteristics (Rutter et al., 2006).

In view of the above findings, it would be more appropriate to suggest that genetics account for an essential variation in the liability for conduct problems than accepting genes as the major factor in the etiology of conduct problems. Environmental contributions play a significant role in the processes that trigger conduct problems in children. As Moffitt eloquently commented about the positive relationship between intelligence and environment, it appears that *...in fact, nature works via nurture to create better health outcomes* (Comment: The College newsletter., 2007).

Gender: Gender is a factor that may play a major role in conduct problems. The prevalence of conduct problems in boys is considerably higher than in girls, but by mid-adolescence girls exceed boys in onset of conduct disorder (American Academy of Child and Adolescent Psychiatry, 1997). Large scale studies have shown that the developmental pathways of boys and girls with either physical aggression or conduct problems during childhood are similar (Broidy et al., 2003; Moffitt & Caspi, 2001). However, they have also indicated that in comparison to boys, very few girls exhibit early signs of aggression or conduct problems (Broidy et al., 2003; Moffitt & Caspi, 2001). Moreover, unlike male early aggression, female early aggression has not been found to predict female delinquency (Broidy et al., 2003).

³ Epigenetic research refers to the investigation of *epigenetic mechanisms by which environmental influences alter the effects of genes* (Rutter, Moffitt, & Caspi, 2006, p. 228)

Attempts to explain female-male differences in aggression and conduct have been made by theoretical models focused on hormonal differences, particularly in androgens such as testosterone. High levels of androgens are detected in boys during pregnancy and the early postnatal period (Hill, 2002). Androgens influence the organisation of the brain structure and are associated with aggression (Hill, 2002). Hormonal differences, through effects on brain structure or function, may account for increased indices of behavioural problems in males. Notwithstanding this, responses to androgens rely on the biochemical environmental and historical context of the individual (Rubinow & Schmidr, 1996).

Another explanation of gender differences in conduct problems comes from Keenan & Shaw (1997). After reviewing the published literature on socialising and developmental differences in boys and girls they concluded that gender differences in behaviour are likely to be due to the differential treatment girls receive during socialisation with parents, teachers and peers, but also due to girls' faster biological maturation and earlier language development. Parents, teachers, and the peer context encourage prosocial, overcontrolled and shy behaviour in girls. Moreover, due to biological maturation girls communicate more effectively, engage in more empathetic behaviour in an earlier age, and appear to internalise social standards. Keenan & Shaw (1997) hypothesise that externalising behaviour problems in girls may be the result of slower maturation and biological predisposition towards behaviour and emotional regulation difficulties. Maturation and biological complications are compounded by an environment of disapproval of the child's behavior as she is expected to be competent and empathetic like her female peers. The child is struggling for developmental progress within a context

of a frustrated caregiver. It is plausible that this context creates conflicts between child and caregiver and eventually leads to the escalation of behaviour problems.

Verbal deficits: Many studies have emphasized the likelihood that verbal deficits may constitute an important risk factor of conduct problems. Abilities such as verbal memory and verbal abstract reasoning are very important in the development of self-control and consequently in the development of adaptive behaviour (Hill, 2002). Moffitt's (1993b) review of empirical studies on the neuropsychology of conduct disorder clearly shows that delinquents score significantly lower than controls on verbal IQ tests from the Halsted-Reitan Neuropsychological Battery and abstract verbal concept formation tests. Furthermore, the Dunedin longitudinal studies reported verbal IQ impairments in the delinquent group (Moffitt & Henry, 1989). In particular, antisocial children exhibited deficits in verbal IQ and verbal memory skills assessed by the Wechsler Intelligence Scale for Children and Rey Auditory Verbal Learning Test respectively.

However, research findings from other studies dispute the assumption that verbal deficits might be a considerable risk factor for conduct problems. A prospective longitudinal study indicated that antisocial children assessed on measures of verbal abilities at 42 months and 64 months did not differ in these from their non-antisocial peers (Aguilar, Sroufe, Egeland, & Carlson, 2000). Moreover, Raine, Yaralian, Reynolds, Venables, & Mednick (2002) assessed verbal and spatial abilities at ages 3 and 11 years and antisocial behaviour at ages 8 and 17 years old. Their findings suggested that verbal deficits could be developmentally acquired without predicting antisocial behaviour.

Difficult temperament: Difficult temperament is characterised by irritability, resistance to control, temper tantrums and anger (Lahey, Waldman, & McBarnett, 1999). Longitudinal data suggested that difficult temperament during infancy may constitute a risk factor in the formation of conduct problems (Henry, Caspi, Moffitt, & Silva, 1996; Shaw, Owens, Vondra, Keenan, & Winslow, 1996). Nonetheless, available evidence refutes the predictive value of temperament in child conduct problems. Findings from a study which assessed infant negativity by utilizing highly objective and validated measures indicated that there is no association between conduct problems and temperament (Belsky, Hsieh, & Crnic, 1998). Apparently, the influence that difficult temperament exerts on antisocial predisposition is likely to operate in an accumulative way and is rather mediated by disrupted transactions with the environment. Some parents fail to cope effectively with a *hard-to-manage* infant. The successive failures in the interaction between the infant and the family may transfigure the difficult infant into an oppositional child at preschool and into a deviant child at school age respectively.

Social information processing deficits: A significant body of research supports the existence of social information processing deficits in socially unskilled and aggressive child populations. Children showing the above socio-cognitive dysfunctions appear to be more prone to attribute hostile intent to others' ambiguous behaviour, decode fewer social cues, and are less skillful in social problem solving than their socially competent peers (Dodge & Coie, 1987).

Social information processing impairment is significantly correlated with conduct problems. Indeed, Matthys, Cuperus, & Van Engeland (1999) found that conduct disordered children, in comparison with the control group, made use of less effective social coping strategies when faced with highly provoking situations. In particular, they encoded fewer social cues, were more confident in their ability to enact an aggressive response, and selected aggressive responses more often. Findings from a clinical study verify the above results. Coy et al. (2001) compared ODD and non-disruptive children on three measures of social cognition. They discovered that ODD clinic children were more likely to generate aggressive solutions, and they had lower rates of encoded relevant social information than nondisordered children.

Executive function deficits: The term *executive functions* (EFs) has been difficult to define. EF deficits are associated with brain frontal lobe deficits (Dencla, 1996). Pennington & Ozonoff (1996) distinguish the following cognitive abilities that reflect typical EFs: set-shifting, set maintenance, interference control, inhibition, integration across space and time, planning, and working memory. Dencla (1996) states that EFs involve inhibition, delayed responding, maintenance of set/preparedness to act, planning of sequences of selected actions, and working memory. According to Barkley (1997b), EFs refer to working memory, self-regulation of affect-motivation-arousal, internalisation of speech, and behavioural analysis-synthesis. In general, all the current conceptions about EFs are in line with the premise that EFs comprise all those mental abilities that are necessary for goal-directed responses in novel or difficult tasks (Seguin, Boulerice, Harden, Tremblay, & Pihl, 1999).

Although EF deficits have been found to be correlated with conduct problems, evidence of EF deficits in children with conduct problems is contradictory. A meta-analysis of eight studies using the Stop Task as a means of measuring response inhibition among children with developmental psychopathologies (AD/HD, CD, AD/HD-CD, anxiety) documented response inhibition deficits in conduct disordered children (Oosterlaan, Logan, & Sergeant, 1998). Equally, Seguin et al., (1999) showed that aggressive children scored significantly low on neuropsychological tests such as conditional association and subjective ordering after controlling for intelligence quotient (IQ), general memory and AD/HD.

On the other hand, Pennington & Ozonoff (1996) in their extensive review on the role of EF in developmental psychopathologies demonstrated that EF deficits are not specific to conduct problems. In particular, they showed that there are IQ-independent deficits on EF measures in both population and referred samples of individuals with CD, but only when comorbid AD/HD has not been removed. The samples with CD but not AD/HD did not exhibit any EF deficits. Furthermore, Scheres, Oosterlaan, & Sergeant (2001) by utilizing the stop task, found that response inhibition did not differ among children with CD/ODD, AD/HD, and CD/ODD-AD/HD.

Emotional regulation deficits: Relatively recent findings revealed that children with conduct problems display serious emotion regulation deficiencies. Emotion regulation refers to the *process of initiating, maintaining, modulating, or changing the occurrence, intensity, or duration of internal feeling states, emotion-related physiological processes,*

and the behavioural concomitants of emotion (e.g., facial expressions) in the service of accomplishing goals (Eisenberg et al., 2001, p. 1114).

Empirical data drawn from studies on externalising and aggressive children showed low scores on emotional competence and regulation measures and high emotionality (Bohnert, Crnic, & Lim, 2003; Eisenberg et al., 2001). Further, Calkins & Dedmon (2000) indicated that 2 to 3 year olds at high risk of destructive behaviour exhibited more problematic affect regulation in challenging tasks compared to a low risk group. The results of a recent study on externalising problems and emotional regulation showed that preschool chronic-clinical externalising problems could be predicted by emotional regulation difficulties in girls but not in boys (Hill, Degnan, Calkins, & Keane, 2006). According to the researchers of the study, emotion regulation may develop later in boys than in girls, as girls mature faster than boys and thus make use of negative emotion coping strategies at an earlier age than boys (Hill et al., 2006).

1.5.2 Family Factors

Ineffective parenting: As it has already been mentioned, there is a growing body of evidence that child-based factors such as genetic predisposition, temperament and psychological dysfunction including verbal, executive and social information processing deficits are likely to play a central role in the development of conduct problems in children. However, there is also a significant environmental contribution to the development of conduct problems. In fact, the major factor implicated in the generation

of conduct problems has been ineffective parenting characterised by negative aspects of parenting such as inconsistency, harshness and the enforcement of punitive discipline.

Patterson (1982) in his seminal work *Coercive Family Processes* revealed the detrimental effect of ineffective parenting on children's behaviour. Through his long-term research, he found that parents of antisocial children are more unstable and ineffective in their use of punishment, rule setting, and supervision and more permissive than parents of normal children. The central idea of his theoretical model of antisocial behaviour is that ineffective parenting practices such as lack of monitoring, discipline; positive reinforcement and problem solving evoke conduct problems by reinforcing the child's aversive behaviour. In short, parents utilize ineffective disciplinary practices and the child responds to these practices in an aversive way such as crying, yelling, and hitting until parents yield. This pattern of coercive exchanges escalates, reinforcing the child's disobedient behaviour, which in the end evolves into antisocial behaviour (Patterson, Reid, & Dishion, 1992).

Since Patterson's work the investigation of the relationship between ineffective parenting practices and conduct problems spans over two decades and evidence for a strong positive link has been offered by a big number of studies. A sample of early meta-analytical as well as recently published longitudinal studies on selected and un-selected populations that were judged to be indicative of the parenting and conduct problems research field is presented in the following paragraphs. These studies were selected on the

basis of their rigorous research design and statistical analysis as well as close focus on dimensions of ineffective parenting.

The early meta-analysis of Loeber & Stouthamer-Loeber (1986) based upon referred samples reported medium to high effect sizes (median $d = .5$) for comparisons between delinquent and/or aggressive and non-delinquent/aggressive populations on indicators of ineffective parenting; lack of parental involvement, lack of parental supervision and parental rejection were proved to be some of the most powerful predictors of delinquency and/or aggression.

Recent data obtained from an American community sample of low-income boys that aimed at tracing trajectories of conduct problems from 2 to 8 years of age through modeling analysis indicated maternal rejection significantly distinguishes children with persistent conduct problems from 2 to 8 years of age from children with high desister conduct problems, namely conduct problems that are initially somewhat high but decline steadily (Shaw, Gilliom, Ingoldsby, & Nagin, 2003). These findings were replicated some years later by Shaw et al., (2005) who drawing on data from the same sample found that children with conduct problems that persist from early toddlerhood to middle childhood were receiving significantly higher maternal rejecting caregiving by comparison with children with very low levels of conduct problems.

Additional longitudinal data indicated that negative mothering in the early years of a child's life is strongly associated with externalising problems at the pre-school years.

Specifically, hierarchical regression analysis demonstrated that negative mothering characterised by negative maternal control and hostile child-rearing attitude at age 2 significantly predicted externalising behaviour at age 4 (Rubin, Burgess, Dwyer, & Hastings, 2003).

Despite the bulk of naturalistic studies showing a strong relationship between parenting and child behaviour the most compelling evidence for the parental contribution in molding children's behaviour comes from experimental intervention studies. Altering parental behaviour by training parents in decreasing coercive parent-child interactions, increasing positive reinforcement and improving monitoring, discipline and problem solving can lead to significant and clinically meaningful increment in children's conduct problems (Patterson, Chamberlain, & Reid, 1982; Scott, Spender, Doolan, Jacobs, & Aspland, 2001; Scott & Sylva, 2004; Webster-Stratton & Hammond, 1997).

There is growing appreciation of genetic effects operating on parenting processes. Twin studies have demonstrated that the relationship between parenting and conduct problems is likely to be genetically mediated (Deater-Deckard, 2000; Knafo & Plomin, 2006). That is, children's genetic propensity towards antisocial behaviour may evoke harsh parenting as a reaction to their behaviour. These findings do not underpower the contribution of harsh parenting to the development of conduct problems in children. As Deater-Deckard (2000) notes

...it is important to emphasise that if genetic mediation of the correlations between child and parent behaviour is found, this does not imply a genetic deterministic process. Instead, it suggests that one way genetic factors operate on a behaviour is by probabilistically exposing individuals to experiences that contribute to growth and maintenance of that behaviour (p. 470).

Arguably, these findings highlight the complexity of the mechanisms involved in the generation of conduct problems and suggest further research in unraveling the interrelations between parenting and genetic effects that bring about children's conduct problems.

Marital discord: Another important family-related factor which child behaviour problems have been linked with is marital discord. It is hypothesized that children exposed to parental fights and ineffective conflict resolution will exhibit behaviour problems by observing and consequently learning their parents' disruptive communication patterns. Indeed, Webster-Stratton (1994), drawing on the findings from her studies, claimed that 75% of parents in more than 400 families with conduct-problem children have been divorced at least once or described their marriage as highly distressed. Moreover, a relatively recent cross-sectional study, based on a heterogeneous sample of referred and community children, demonstrated that the association between conduct problems and marital discord is direct (Webster-Stratton & Hammond, 1999). In particular, path analysis showed that the couples' negative conflict management skills (defined as

inability to collaborate and problem solve, to communicate positively about problems, and to regulate negative affect) were directly linked with child conduct problems.

1.5.3 Contextual Factors

Deviant peers: Antisocial children seem to have a tendency to develop friendships with other antisocial children (Fergusson, Woodward, & Horwood, 1999). Through the processes of *social homophily* (Kandel, Davies, & Baydar, 1990) *children tend to select peers on the basis of similarities in behavioural, personality, academic and dispositional characteristics* (Duck & Gilmour, 1981; Kandel, 1978; Kandel et al. 1990; Neimeyer & Mitchell, 1988) (Fergusson et al., 1999, p. 366).

Friendships with deviant peers have been proposed as a potential risk factor for the emergence of problems of conduct. Lahey et al. (1999), in their integrative causal model of antisocial behaviour in boys suggested that there is a strong effect of deviant peers on later-onset antisocial behaviour. Furthermore, Vitaro, Brendgen, & Tremblay (2000) found that deviant friends at early adolescence predicted delinquent behaviour even after controlling for earlier delinquency.

On the other hand, there is evidence supporting the presumption that involvement with antisocial peers is the consequence of conduct problems rather than the cause (Fergusson et al., 1999). Recent empirical findings also suggest that conduct problems in the early years put children at risk for affiliation with deviant peers and that deviant peers can exacerbate already existing conduct problems. In particular, it was found that conduct

problems prior to school entry predicted association with deviant peers and increments in conduct problems during kindergarten and grade one (Snyder et al., 2005). Interaction with deviant peers may be mostly predictive of adolescent rather than childhood conduct maladjustment. Apparently, there is an association between deviant peers and conduct problems. However, there has been less clarity regarding its nature.

Peer rejection: Another potential risk factor that is related to peers is peer rejection. Longitudinal data have shown that peer rejection is likely to put children at risk for conduct problems (Coie, Lochman, Terry, & Hyman, 1992). Miller-Johnson, Coie, Maumary-Gremaud, Bierman, & the Conduct Problems Prevention Research Group (2002) examined the predictive contribution of early peer rejection to the development of conduct problems. Indeed, it was indicated that peer rejection in the 1st grade predicts conduct problems in the 3rd and 4th grade independently of the effects of aggression. Dodge et al., (2003) found that rejection by peers at early elementary years predicted later antisocial behaviour even after controlling for previous antisocial behaviour. However, the effect of peer rejection was valid only for those children that were already exhibiting moderate aggressive behaviour.

Environmental stressors: Poverty and social disadvantage may comprise another risk factor for child conduct problems. Pagani, Boulerice, Vitaro, & Trembley (1999), using data from the Montreal Longitudinal-Experimental Study, investigated the link between poverty and delinquency at the age of 16. They concluded that poverty is directly associated with extreme delinquency. Nonetheless, the relation between socio-economic

disadvantage and conduct problems might not reflect causal links. The association might be mediated at least in part via family processes such as marital discord and parenting deficits. Socio-economic hardships such as poverty, financial insecurity, inadequate housing, and social isolation may raise family tension, marital conflicts and more negative parenting, which would provoke inappropriate parental care and supervision, leading children to develop disturbed behaviour (Fortin & Bigras, 1997).

On the basis of the findings presented with respect to the causes of conduct problems a considerable number of child, family and contextual variables have been identified as candidate risk factors for the development of conduct problems in children. Among all, ineffective parenting comprises the most outstanding factor. Environmental stressors and temperament mainly operate through their effect on parents. Less clarity exists with regards to the relationship with and contribution of child verbal, executive function and emotional characteristics to the emergence of childhood conduct problems. Finally, contemporary findings underscore the contribution of genetic liabilities on conduct problems. Arguably, the big number of both individual and environmental risk factors highlights the complexity and heterogeneity of conduct problems. It also emphasises the need to understand conduct problems through an ecological perspective where both child and environmental parameters operate together in order to bring about children's behaviour. The challenge for future research is to delineate the relationship between these factors and conduct problems, pull all the evidence together and eventually develop a conceptual map of the causes and nature of childhood conduct problems.

1.6 Effective and Promising Intervention Programmes for Children with Conduct Problems

The *Chambless criteria* represent the minimum standards for an intervention to be considered effective by the scientific community (Chambless & Hollon, 1998). These criteria were developed as part of a broader attempt to evaluate the psychological treatment literature and were based on the foundations provided by the Division 12 Task Force and the American Psychological Association Task Force on Psychological Intervention Guidelines. As claimed by Chambless and Hollon (1998) an effective intervention is synonymous with an *empirically supported* intervention which is mainly characterised by the following criteria: 1) evaluated in at least two randomised controlled studies by independent researchers, 2) proved to be significantly superior to no treatment, a placebo, or an alternative treatment, 3) include an intervention manual, 4) conducted with a population for whom inclusion criteria have been delineated in a reliable and valid manner, 5) outcome assessment measures, at minimum, tapping the problems targeted for change, 6) appropriate data analysis. Interventions that have been evaluated in a single controlled study only but satisfy the rest of the remaining criteria are considered to be *promising*.

In principle, it seems that most of the evaluation studies on the effectiveness of interventions for children with conduct problems attempt to apply the above criteria. However, in most cases, they are found to have been modified and adapted in view of the main purposes for which each evaluation is intended.

The purpose of this section is to give an overview of these intervention and prevention programmes that are considered to be either effective or promising for children with or at risk for conduct problems. The selection criteria of these programmes are either a) the application of the minimum *Chambless criteria* for empirically supported or promising interventions, b) the application of modified but legitimised versions of the *Chambless criteria* or, c) being recognised as effective by key evaluations of the field. On the basis of the above identification strategy, examples of the most highly recommended intervention programmes are also provided. Regarding the population for which this review is intended, emphasis is given to school-age children. Interventions for adolescents are not included.

Four groups of intervention programmes that are considered to be the most beneficial for the prevention and treatment of child conduct problems have been identified. The first group of effective interventions is Parent Management Training (PMT). According to the strategy employed in this thesis for intervention evaluation, PMT programmes appear to give the most consistent results regarding the amelioration of child conduct problems compared to all the existing single-focused intervention approaches. The significant change that PMT brings to the behaviour of conduct disordered children has been substantiated statistically and clinically and it remains one year after the intervention has been implemented. Additionally, effectiveness of the parent-focused approach has been proven not only in university clinics, but in public health care services (Scott, Spender et al., 2001) and voluntary-based services (Gardner, Burton, & Klimes, 2006) as well. Even so, problems of low parent participation, attrition, differential social uptake, and lack of

treatment fidelity due to inappropriate training of the therapist can counteract substantially its effect (Scott, Spender et al., 2001; Spencer, 2003). Moreover, as far as school behaviour adjustment is concerned, PMT is not considered to lead to significant improvement (Taylor & Biglan, 1998).

The second group is Social Problem Solving Skills Training (SPSST). SPSST comprises a relatively beneficial approach in tackling child conduct problems in the school environment. Its effects are long-lasting as has been established by 1-year follow-up assessment (Kazdin & Weisz, 1998). SPSST's most important asset is its contribution to child social problem solving skills, which is superior to PMT. Social adjustment gains were noted at school and during peer interaction. However, the impact of SPSST interventions on conduct problems reduction at home is not as effective as the impact of PMT (Webster-Stratton & Hammond, 1997; Webster-Stratton & Taylor, 2001). Further, family influences such as marital discord may considerably reduce treatment response (Webster-Stratton & Taylor, 2001). When SPSST is accompanied by other effective interventions its therapeutic contribution to conduct problem reduction becomes more meaningful (Webster-Stratton & Taylor, 2001).

Classroom interventions are the third group that the review's research strategy came up with. Classroom interventions were found to lead to some short- and long-term behaviour gains in the school setting, but results are mixed. Their impact on children that already exhibit serious disturbed behaviour and in particular conduct problems was not replicated in the long term (Shelton et al., 2000). Moreover, gains on child behaviour have not been

reported by teachers in most of the reviewed studies. Specifically, only one study has documented significant reductions of conduct problems on the basis of teacher reports (Ialongo, Poduska, Werthamer, & Kellam, 2001). Besides that, failure to find significant reductions in behaviour problems on the basis of parents' ratings (Frey, Hirschstein, & Guzzo, 2000) suggests that these gains may have not any value in settings different from those in which they were detected. Finally, teachers' unwillingness to accept the intervention's philosophy may result in low treatment fidelity (Chambless & Hollon, 1998).

Multi-focused interventions are the last of the interventions considered for which there is some evidence of effectiveness. In general, the review showed that multi-focused programmes can be significantly effective in reducing conduct problems in the school setting, in increasing academic, social and emotional competence, and in eliminating delinquency. Apart from the above documented effectiveness, their valuable contribution is also reflected by improvements in parenting, in teachers' perceptions and by the longevity of the beneficial changes detected in the behavioural functioning of the child. Nonetheless, long term findings showed that, although multi component interventions eliminate delinquency, they have not managed to fully prevent participants from committing delinquent acts (Eddy, Reid, & Fetrow, 2000; Tremblay, Pagani-Kurtsz, Masse, Vitaro, & Pihl, 1995). Moreover, they are expensive to implement. Despite these weaknesses they comprise a promising alternative in tackling conduct problems in children.

1.7 Summary

The purpose of this first chapter of the literature review was to give an insight into the nature of child conduct problems and their remediation. In the next paragraphs there will be an attempt to summarise what has been documented so far with relation to conduct problems in children.

The review began by introducing the terminology and classification matters of conduct problems. In short, it was illustrated that there are three most common terms that are more or less synonyms for the phrase *conduct problems*: externalising problems, conduct disorders, and delinquency. Regarding the classification systems utilised for the identification and diagnosis of conduct problems there are two alternatives; the dimensional approach and the categorical one. The first one conceptualises conduct problems as a continuum. In contrast, the categorical approach looks for discontinuities. With reference to the official classification of conduct problems, DSM-IV recognises two categories of conduct problems, CD and ODD respectively, whereas ICD-10 is limited to one category, namely CD. Apart from the official categories three sub-types of conduct children have been identified as possibly distinct from the general behavioural pattern of conduct problems: a) early versus late onset conduct problems, b) covert, overt and authority-conflict conduct problems, and c) reactive versus proactive aggression.

Evidence was presented concerning the prevalence and prognosis of child conduct problems. Generally, conduct problems affect 5% to 10% of 6-18 year olds in the industrialised West, with boys, children of low socioeconomic status, and African-

Americans being more frequently identified. Conduct problems can continue until adulthood, especially when they emerge very early in the child's life and they can evolve into serious offending.

Further to prognosis and prevalence, the associated features of conduct problems were highlighted. Conduct problems are often accompanied by attention deficits and hyperactivity.

Findings regarding the risk factors for conduct problems were also presented. Conduct problems may arise from factors in the child, the family, and from contextual factors or they may be the product of their combination. Child factors include gender, genetic and verbal, executive function, social information processing, emotional and temperamental complications, whereas family factors refer to disrupted parent-child and inter-parent relations and interactions, such as ineffective parenting and marital discord. Finally, contextual factors encompass the effects stemming from deviant peer friendships, peer rejection, poverty and social disadvantage.

The chapter closed by noting the most effective and promising intervention programmes in the remediation of conduct problems in children. Four programmes were identified: Parent Management Training, Social Problem Solving Skills Training, Classroom interventions, and Multi-focused interventions. Each of these approaches has important limitations, suggesting that no one approach is likely to prove effective in all cases.

Ultimately, it appears that the results of the literature review about the nature of child conduct problems are rather inconsistent. On one hand, it seems that progress has been made in revealing the heterogeneous nature of conduct problems in children. On the other hand, the plethora of terms for child conduct problems, as well as the disagreement in their classification, associated features, and risk factors cause substantial confusion in the conceptualisation and nature of conduct problems. Despite the inconsistency, the literature review has highlighted that children with conduct problems probably do comprise a heterogeneous group, with a variety of vulnerabilities detected not only at the behavioural, but at the psychological and family level as well; even though, this heterogeneity has not been fully clarified. On the basis of this conclusion it is proposed that further research is necessary in order to illuminate the heterogeneous disposition of children with conduct problems. Additionally, and most importantly, future interventions for children with conduct problems should recognize and make provision for their specific weaknesses, rather than attempting to deliver a single intervention which fits all cases.

LITERATURE REVIEW PART II

Conduct Problems and Associated Poor Reading

2.0 Introduction

This second part of the literature review attempts to offer an understanding of child conduct problems with associated poor reading. Sections one and two provide information around definition issues of reading problems and the prevalence and prognosis of conduct problems with associated poor reading respectively. Section three gives an insight into the association between conduct problems, poor reading and attention deficits and hyperactivity. Section four presents psychological and family complications that have been found to be associated with child conduct problems and poor reading. Section five offers a summary of the main issues which have emerged from the literature review of conduct problems with associated poor reading.

2.1 Definition of Poor Reading

The definition of poor reading varies across studies. Typically, poor reading is found to be operationalised as IQ-discrepant versus non IQ-discrepant reading disability (Fletcher et al., 1998). The former is also encountered in the literature as specific reading disability or dyslexia and is concerned with reading achievement significantly below the child's intellectual ability (Vellutino, Fletcher, Snowling, & Scanlon, 2004). The latter pertains to reading achievement that is not significantly discrepant from the child's intellectual level and often is operationalised as reading achievement significantly below the level expected for the child's age (Fletcher et al., 1998). In earlier studies the two terms were encountered as specific reading retardation and general reading backwardness respectively (Rutter & Yule, 1975).

An influential assumption in the field of reading problems is that there are fundamental cognitive differences between poor readers with and without IQ-discrepancy (Fletcher et al., 1998; Stanovich, 1994, 2000). Children with IQ-discrepant reading disability are believed to have specific deficits in phonological awareness (Stanovich, 2000; Vellutino et al., 2004). On the contrary, children with non IQ-discrepant reading disability are supposed to comprise a low achieving, slow learning group of children characterized by a more generalized dysfunction encountered in various domains of functioning not limited to phonological awareness (Stanovich, 2000). Nonetheless, the validity of the distinction between IQ and non-IQ discrepant poor readers has been questioned (Fletcher et al., 1998; Pennington, Gilger, Olson, & DeFries, 1992). A recent meta-analysis of studies examining the classification of poor reading indicated that the magnitude of the

differences between the cognitive skills of IQ and non IQ-discrepant poor readers were very small (Stuebing et al., 2002).

In this chapter the term *poor readers* will be used to refer to children with specific reading disability as well as low achieving readers. Where appropriate, the specific operationalisation of poor reading will be mentioned.

2.2 Prevalence and Prognosis of Children with Conduct Problems and Associated Poor Reading

The prevalence rates of poor reading depend on the stringency of the diagnostic criteria and on the definition adopted for poor reading. British epidemiologic data showed that the prevalence of general reading difficulty in school age boys was 7% in rural areas and 24% in inner London (Hinshaw, 1992a). The respective prevalence for specific (IQ-discrepant) reading disability was 4% and 10% (Hinshaw, 1992a).

The Isle of Wight, UK, epidemiologic study indicated that approximately 45% of boys and 25% of girls with antisocial behaviour displayed specific reading disability (Rutter & Yule, 1970). Relatively recent data indicated that 13% of school age children with specific literacy difficulty (Adams, Snowling, Hennessy, & Kind, 1999) and nearly 14% of 5-15 year olds with specific literacy difficulties exhibited conduct problems (Carroll, Maughan, Goodman, & Meltzer, 2005).

Boys outnumber girls in reading problems not only in referred, but in community samples as well (Rutter et al., 2004). However, there are findings supporting the assumption that poor reading occurs at more equal rates in males and females in community samples (Willcutt & Pennington, 2000a). The increased rate of reading disability in boys has been attributed to the bias of the referral procedures towards identifying males, because they more frequently display disruptive behaviours in association with reading difficulties (American Psychiatric Association, 2000; Willcutt & Pennington, 2000a).

Poor prognosis (mental-health problems, substance abuse, financial problems, drug related and violent crime) has been found to be associated with conduct disturbed children who exhibit poor reading attainment in their school years (Moffitt et al., 2002). Children with conduct problems and poor reading are at risk for low self-esteem, general academic failure, school drop out (Hinshaw et al., 1993), and future occupational disadvantage (Sanson, Smart, Prior, & Oberklaid, 1993). They are also more likely to experience restricted academic and employment opportunities than those with poor reading only (Maughan, Gray, & Rutter, 1985). Additionally, it has been suggested that children with combined problems of conduct and reading are more likely to be candidates for antisocial behaviour in adult life than their conduct disturbed, but typically reading achieving peers (Moffitt et al., 2002).

2.3 AD/HD in Children with Conduct Problems and Associated Poor Reading

The strong association between AD/HD and poor reading is well established (Adams et al., 1999; Carroll et al., 2005; Dykman & Ackerman, 1991; Maughan, Pickles, Hagell,

Rutter, & Yule, 1996; McGee, Prior, Williams, Smart, & Sanson, 2002; McGee, Williams, Share, Anderson, & Silva, 1986; Sanson, Prior, & Smart, 1996; Smart et al., 1996; Spira Greenfield & Fischel, 2005; Trzesniewski, Moffitt, Caspi, Taylor, & Maughan, 2006; Willcutt & Pennington, 2000b). The role of attention deficits in the comorbidity of conduct problems with reading difficulties has captured the interest of many scholars of the field. It appears that the predominant idea in the research field of reading and conduct problems is that poor reading is not specific to conduct problems, rather, it occurs as a result of associated attention deficit and hyperactivity disorder (Hinshaw, 1992b). On the grounds of this conjecture, a considerable number of studies investigating reading as well as literacy difficulties in children with conduct problems have replicated the AD/HD hypothesis in clinical and population samples.

Results from the Dunedin Multidisciplinary study support the non specificity assumption of poor reading in children with conduct problems. At the age of 7 years cohort children were categorised into aggressive and hyperactive on the basis of the Rutter Child Behaviour Scale for teachers (McGee et al., 1984b). It was demonstrated that the performance of aggressive-hyperactive children on the Burt Word Reading Test was significantly lower than the performance of non-disordered children. However, the reading performance of the *pure* aggressive children was equivalent to the non-disordered children. At the age of 11 years, children were again classified into diagnoses of conduct-oppositional deficit and attention-deficit on the basis of combined parent and teacher reports and child interviews (Anderson et al., 1989). Unlike conduct-oppositional only

children, those with accompanying attention-deficits displayed reading scores significantly below the scores of the comparison children.

Maughan et al., (1996) using longitudinal data obtained from an inner London community sample examined the relationship between antisocial behaviour and reading assessed at age 10. Poor readers were classified into backward readers defined on the basis of the discrepancy between their reading level and their age and retarded readers defined on the basis of the discrepancy between their reading level and both their age and IQ. Behaviour was assessed by the Rutter B (2) teacher behaviour rating scale and two additional sub-scales which derived from a factor analysis of the cohort's total behaviour ratings on the Rutter B scale. The sub-scales measured antisocial behaviour (opposition/conduct) and inattention/restlessness respectively. Log-linear models showed that there were significant relationships between antisocial behaviour and inattention and between reading group status and inattention. On the contrary no direct association was noted between reading group status and antisocial behaviour.

The above discoveries are supported by empirical data derived from a clinical population. Frick et al. (1991) investigated IQ discrepant academic achievement in four groups of 7 to 9 years old children with AD/HD and conduct disorder. Reading achievement was defined as the discrepancy between intellectual ability measured by the WISC-R and the performance on the reading section of the Basic Achievement Skills Individual Screener. After controlling for the co-occurrence of AD/HD and conduct disorder it was indicated that only AD/HD was associated with reading underachievement.

Results from two recent studies of large community samples are in agreement with the evidence provided by the previously reported investigations. However, it should be noted that these studies assessed academic attainment in literacy rather than reading difficulty per se, namely, the academic scores were obtained by composite scores of reading and spelling tests.

The first study investigated reading disability in a sample of 10-year-old twins drawn from the Colorado Learning Disabilities Research Center twin project (Willcutt & Pennington, 2000b). Reading disability was defined as the discrepancy between the child's age as well as intellectual ability identified by the WISC-R and the composite score of the Reading Recognition, Reading Comprehension and Spelling sub-tests of the Peabody Individual Achievement Test. Reading disability was found to be correlated with the Aggressive and Delinquent behaviour sub-scales of the Child Behaviour Checklist for parents. However, when stepwise logistic regression analyses were performed to investigate whether reading disability is independently associated with AD/HD, ODD, and CD, it was indicated that reading disability was not associated with ODD and CD, but only with AD/HD.

The second study involves data derived from a large-scale sample of 9-15 year old children drawn from the 1999 British Child and Adolescent Mental Health Survey (Carroll et al., 2005). Specific literacy difficulty was identified on the basis of the discrepancy between the child's vocabulary scores assessed by the British Picture Vocabulary Scales II and the scores of reading and spelling measured on the British

Ability Scales II. Scores on the SDQ (Strengths and Difficulties Questionnaire) parent and teacher scales of hyperactivity were divided into two sub-scales measuring inattention and over-activity respectively. DSM-IV diagnoses of AD/HD and conduct disorder were yielded by using the Development and Well-being Assessment. Logistic regression analysis demonstrated that the association between literacy difficulties and conduct disorder was not significant after ratings of inattention were controlled. Interestingly, the link between conduct disorder and literacy difficulties remained significant when AD/HD diagnosis was controlled.

The over-absorption of the field in establishing the AD/HD hypothesis has overshadowed the importance of other parameters that may play a determinative role in these children's functioning. Recent longitudinal data derived from a methodologically sophisticated twin study⁴ (Trzesniewski et al., 2006) demonstrated that the association between the problems under investigation is also environmentally mediated and less likely to be explained by overlapping AD/HD symptoms only. In particular, data derived from a boys' sample showed that reading level was still significantly correlated with antisocial behaviour after AD/HD was removed from the analysis. Despite the significant

⁴ The study utilised sample from two consecutive birth cohorts of the Environmental Risk (E-Risk) Longitudinal Twin Study. The cohorts were representative of the British (English and Wales) population. Participants were initially assessed at a very important stage of literacy tuition commencement: 5 years of age. Follow-up assessments were conducted when the participants were 7 years old. An important advance made by this study is that it included and controlled for relevant antecedent variables that have been hypothesised to impact on the relationship between externalising problems and reading achievement. An additional advance is that reading disability was defined such that results can be generalised both to those with specific as well those with non specific reading problems. Furthermore, inferential statistical analysis employed to assess the causal relationships between antisocial and reading problems controlled for initial (5 years of age) antisocial and reading levels so that the predictions were not contaminated with the presence of early antisocial or reading problems.

results, generally the correlation was of relatively small magnitude with ($r=-.21$) and without ($r=-0.27$) partialling out AD/HD.

To further elucidate the relationship between antisocial behaviour and reading achievement additional analysis and variables were included in the twin investigation. Results from bivariate genetic statistics showed that association of interest was due more to shared environmental than genetic influences. In order to examine the environmental influence hypothesis the correlation between antisocial behaviour and reading performance was assessed by partialling out a number of environmental variables. Living in a stimulating home environment (six item rating scale), although it did not fully explained the association, accounted for most of the variance in the correlation as compared to the other environmental variables included in the analysis. This finding was also replicated when girls were included in the analysis.

Structural equation modeling was used to examine whether antisocial behaviour predicts reading problems and vice versa at age 7 after controlling for initial levels (year 5) of antisocial and intellectual ability. The analysis showed that the problems were reciprocally related. However, it should be mentioned here that in this analysis, instead of controlling for age 5 reading achievement scores, intellectual ability (IQ) was controlled as it was used as a proxy for reading ability.

In light of these findings, Trzesniewski et al., (2006) have suggested that the relationship between conduct problems and reading difficulties is unlikely to be genetically mediated.

A bi-directional model of influence for the association between conduct problems and poor reading is more plausible (Trzesniewski et al., 2006). Furthermore, they also highlight that common not inherited neurobiological complications could possibly underlie the combination of these problems in children.

Hinshaw (1992b) in his attempt to identify the potential risk factors that underlie the relationship between behaviour problems and reading difficulties stressed that research is also suggestive of a psychological dysfunction in children exhibiting behaviour and reading problems. He proposed that these children may be inclined towards intelligence, phonological and linguistic difficulties as well as neurodevelopmental defects. It is credible that children with a combination of conduct and reading deficiencies could exhibit multiple complications not limited to attention deficits and a non stimulating home environment.

In investigating family background variables, as well as poor concentration, the investigators of the epidemiological study of the Isle of White suggested that boys with reading and conduct problems were more like those with reading problems only and unlike those with conduct problems only (Rutter & Yule, 1970). Subsequent findings, however, did not confirm these results (Sturge, 1982). The likelihood that children with conduct problems and poor reading do not resemble those with poor reading only and not those with conduct problems only, is of considerable theoretical and practical importance.

In the light of the issues covered in this section it appears that awareness of the vulnerabilities of children with conduct problems and poor reading would be advanced by the investigation of multiple variables that could possibly reveal weaknesses or strengths in domains other than AD/HD. These variables will be discussed later in this chapter.

2.4 The Investigation of Attention Deficits in Children with Conduct Problems and Associated Poor Reading

As AD/HD is a consistent correlate of poor reading in children with conduct problems, the definition of the nature of the attention deficits is important (Hinshaw, 1992b; Sanson et al., 1996). According to Barkley (1996) *attention refers to functional relationships between certain qualities of environmental events (objects, actions, and their properties) and the general forms of responses to them (initiation, sustainment, inhibition, and shift)* (p. 308). Presently, there is considerable consensus among theorists that attention comprises a multidimensional construct characterised by a rich diversity with regards to definition, nature and measurement (Halperin, 1996).

The most well researched models of attention come from the discipline of cognitive psychology and neuropsychology (Halperin, 1996). From a cognitive approach attention is considered as an active process with a dynamic management function that regulates the allocation of resources and plays a central role in determining what is selected for attention (Sergeant, 1996). From a neuropsychological perspective attention is seen as a complex process or set of processes distinguished by five distinct attentive functions including focus/execute, sustain, stabilise, shift, encode (Mirsky, 1996). Despite the

differences between the cognitive and neuropsychological approaches of attention, proponents of each of them acknowledge that attention is not effectively captured by a single concept or measure. Moreover, they distinguish between selective and sustained attention. Sustained attention refers to the ability of focusing attention/staying on task in a vigilant manner for an appreciable amount of time (Mirsky, 1996). Selective attention has been defined as the ability to *choose to notice a particular part of the environment* (Douglas & Kenneth, 1979, p. 174).

Typically, parent and teacher behaviour rating scales are used to assess attention deficits in children, particularly attention deficit disorder, but laboratory measures are also utilised (McGee, Clark, & Symons, 2000). The Continuous Performance Test (CPT) is the most widely used laboratory research tool to assess attention, particularly sustained attention and vigilance⁵ deficits (Corkum & Siegel, 1993; McGee et al., 2000). Studies of AD/HD (Barkley, 1991; Shallice, 1988) and epidemiological samples (Epstein et al., 2003) suggest that the CP test can discriminate between children with and without attention deficits.

The CPT requires participants to react to the presence or absence of a specific stimulus (targets) within a series of distracters (non-targets) presented separately on a computer screen (Conners, Epstein, Angold, & Klaric, 2003; Corkum & Siegel, 1993; McGee et al., 2000). Distinct versions of CPT include an A-X task where the participant should press a key to the target stimuli which is a sequence of the letters A-X; the CPT *Double* task

⁵ In line with Corkum & Siegel, (1993) vigilance is the *overall ability to identify targets correctly over the entire length of the task* (p. 1218).

where the target is the successive presentation of a letter e.g. S-S; and the *not X* CPT task in which the participant should respond by pressing a key to all letters except for the target letter *X* (Conners et al., 2003). A great deal of the earlier investigations of CPT tasks had been focused on two traditional indices of the CPT, the number of commission errors (response to non-target stimuli) and the number of omission errors (failure to respond to target stimuli) (Conners et al., 2003).

To date it seems that the investigation of the attention deficits in children with conduct problems in relation to their reading difficulties has been extensively examined at the level of the observed behaviour at school and/or at home on the basis of teachers and/or parents reports. Halperin states that the overuse of rating scales in assessing attention does not assist the task of unpacking the nature of the attention deficit (Halperin, 1996). Attention should be investigated as a cognitive variable and not only as a behavioural one (Sanson, Prior, & Smart, 1996). This investigation will increase understanding with regards to whether the inattentive behaviour of children with conduct and reading problems suggests higher order cognitive dysfunction.

Attention deficit in children with conduct problems and children with reading difficulties measured with laboratory research instruments assumed to measure attention has been assessed only sporadically in independent studies. With reference to children with conduct disturbances, Hurt & Naglieri (1992) investigated attention status between male delinquent and non delinquent groups. Between groups comparisons showed that delinquents had significantly worse performance from non delinquents on the laboratory

attention measures. It has also been demonstrated that one measurement (commission errors) of the CPT, was correlated with the Conduct Problems factor of the Conners' Teacher Rating Scale (Corkum & Siegel, 1993). Commission errors, however, have also been operationalised as a response inhibition measure (Quay, 1997; Willcutt et al., 2001) which is supposed to reflect executive function deficits.

As far as attention deficits in children with reading problems are concerned, after examining the performance of 6-11 year old clinic-referred children on the Conners' CPT-II, McGee, Clark, & Symons (2000) found that the reading disabled group scored significantly worse on the overall index measure of the Conners' CPT-II than the AD/HD, AD/HD-reading disabled and clinical control group. This result, however, should be interpreted with caution as it is based only on one measure (overall index) out of the fourteen measures that the Conners' CPT-II includes. Moreover, this result applies only to clinical and not to community samples.

It is hard to come to any conclusions on the basis of the above evidence with regards to laboratory-measured attention deficit of children with conduct problems and associated reading difficulties. AD/HD and poor reading are considered to significantly correlate in children with conduct problems, but chiefly when the attention measures are subjective ratings provided by teachers or parents. The strong relationship between poor reading and AD/HD is also established, but again dependent on rating measures. Therefore, it is likely, but not certain, that children exhibiting conduct problems as well as poor reading would show poor performance in objective, laboratory measures of attention.

2.5 Other Psychological and Family Vulnerabilities of Children with Conduct Problems and Associated Poor Reading

In this section a review of the literature on other (non-attention) psychological and family vulnerabilities of children with co-existing problems of reading and conduct takes place. The term *psychological vulnerabilities* refers to within-child complications detected at the individual level. The term *family vulnerabilities* refers to complications detected within the child's family environment.

2.5.1 Psychological Vulnerabilities

Verbal Deficits: Verbal deficits have been suggested to comprise an important risk factor for conduct problems in children (Hill, 2002). Findings from longitudinal studies investigating behaviour in large community samples imply that, unlike children with conduct problems and reading difficulties, those with conduct problems only do not experience verbal deficits.

Smart, Sanson, & Prior (1996) investigated the relationship between behaviour and reading by using a sample from the Australian Temperament Project, a large scale prospective longitudinal study. This study did not make use of IQ-discrepant methods for identifying reading difficulties. The authors found at follow-up that 9 to 10 year-old children with behaviour problems and reading difficulties scored significantly lower on the Wechsler Intelligence Scale-Revised (WISC-R) short form of verbal IQ than the comparison and behaviour problems-only group. The behaviour problems-only group did not differ from the comparison group on the verbal IQ measure.

A number of earlier studies designed within the bounds of the Dunedin Multidisciplinary Child Development Study ended-up with similar results. In the first study McGee, Williams, & Silva (1984b) demonstrated that at the age of 7 and 9 aggressive-hyperactive children scored significantly lower on measures of reading and verbal competence than children who exhibited aggressive behaviour only. The aggression-only children did not differ from the comparison group on any of the above measures. The Burt Word Reading and the WISC-R were utilised to assess reading and verbal IQ performance respectively.

In the second study, Moffitt & Silva (1988) assessed neuropsychological ability in 13 year old delinquents with histories of ADD. For neuropsychological ability assessment a battery of 17 verbal and perceptual tests was submitted to a principal components analysis, which yielded five neuropsychological dimensions: Verbal, Visual-Motor Integration, Visuospatial, Verbal Memory, and Mental Flexibility. The Verbal dimension was loaded on by the WISC-R Information, Vocabulary, Similarities and Arithmetic verbal sub-tests. Delinquents with accompanying ADD were found to score significantly lower than delinquents only and controls on the measures comprising the Verbal, and Visual-Motor Integration dimensions. As opposed to delinquents only and controls, the delinquents with combined ADD exhibited poorer reading as well. Reading achievement was assessed on the basis of the reader screening provided by the Self-Reported Early Delinquency Instrument.

In the third study Moffitt (1990) showed that 13 year old delinquents with comorbid attention deficit disorder (ADD) exhibited lower reading and verbal IQ scores compared

to the control and delinquency only group. In contrast, delinquents only did not differ from controls on reading and verbal IQ. The Burt Word Reading test and the WISC-R were utilised to measure reading and verbal IQ respectively.

The above findings suggest that verbal deficits in children with conduct problems are contingent upon the comorbidity of conduct problems with reading difficulties. Indeed, it has been demonstrated that weaknesses in verbal competence are associated with variations in reading skills (Stanovich, 2000). In particular, verbal IQ complications and deficits on verbal related abilities, such as verbal working memory and vocabulary, have been found in samples of children with specific reading disabilities (Ingesson, 2006) as well as in samples of children with general reading problems (Smart et al., 1996; Vellutino et al., 2004). Contemporary theoretical perspectives about the etiology and the nature of reading disability (Stanovich, 2000) propose that in children with non specific reading problems, verbal impairments comprise an indicator of a general developmental lag in cognitive functioning, which is considered to be responsible for setbacks in reading performance. On the contrary, verbal defects in children with specific reading disability are theorised as a consequence of the so called *Matthew effects* (Ingesson, 2006), namely, the synergistic effect of slow reading acquisition and lack of motivation due to reading failure on the development of cognitive functioning (Stanovich, 1986).

Despite the evidence from the Dunedin studies, methodological limitations do not allow conclusions to be drawn with respect to the association between child conduct problems, reading difficulties, and deficiencies on verbal skills. First, none of these studies

investigated conduct problems and reading difficulties in particular and, thus, their designs did not allow straightforward comparisons between conduct disordered, reading disabled and conduct disordered/reading disabled groups of children to be made. The available findings derived from examinations of aggressive/delinquent groups with comorbid attention deficits or more inclusive groups of behaviour problems where aggression was also accompanied by manifestations of hyperactivity and anxiety.

Secondly, two of the studies presented earlier involved pre-adolescent delinquents instead of children with conduct problems. Verbal skills as measured by intelligence tests reflect and can be further developed by learning that has been obtained through formal schooling (Kaufman, 1994). Moreover, competency in reading can also improve or conversely weaken those verbal abilities that are thought to be important in the reading process, such as vocabulary knowledge (Stanovich, 1986, 2000). It is plausible, therefore, that the verbal IQ performance of the delinquents with low reading scores was worse than the performance of delinquents-only due to general school failure and long-term reading problems and not because of a specific verbal deficit of the former. Consequently, the examination of verbal deficits in children with conduct problems will be better facilitated if future investigations take place in the early years before formal schooling and reading have started shaping children's verbal skills.

Speculating on the utility of the WISC-III sub-scales, Kaufman (1994) points out that an uneven verbal profile, characterised by fluctuations in the scores of the sub-tests that give the composite score of verbal IQ, can reveal assets and weaknesses that need to be

strengthened and alleviated respectively. A final point, therefore, in the investigation of verbal deficits in conduct disturbed children is related to the type of verbal deficits they have. In the studies reviewed here, the assessment of verbal ability was restricted to the verbal IQ score included in the various versions of the WISC intelligence test. For education and intervention planning, the investigation of the verbal profile tapped by the different sub-tests which assess the abilities that are presumed to make up the verbal IQ construct might be as meaningful as the total verbal IQ score. For example, verbal working memory is likely to be one of the determinants of performance on verbal IQ tests. Verbal working memory is a set of systems for temporary storage of information which can interfere in the execution of educational tasks, such as reading, reasoning and comprehending (Baddeley, 1990; Hulme & Mackenzie, 1992). The detection of a verbal memory deficit could be of importance for effective educational and therapeutic intervention planning.

Phonological Awareness Deficits: Phonological processing refers to the utilisation of phonological information in processing written and oral language (Wagner & Torgesen, 1987). It is widely accepted that deficits in phonological processing are the primary source of reading failure when reading in an alphabetic language (Stanovich, 2000; Vellutino et al., 2004; Wagner & Torgesen, 1987). Phonological processing complications are encountered in children with and without specific reading disability, with the exception that the latter are more likely to show additional deficits in other reading-related cognitive domains (Morris et al., 1998; Stanovich, 2000).

A great deal of the research on the phonological processing deficits of poor readers has focused on phonological awareness. Phonological awareness comprises a metalinguistic ability⁶ (Gombert, 1992) which refers to the knowledge that spoken words consist of individual speech sounds (phonemes) and combinations of speech sounds (syllables, onset-rime units) (Vellutino et al., 2004). Specifically, phonological awareness is the language skill that allows the individual to relate the letters with the sounds of the spoken language (Stanovich, 2000). Typically, phonological awareness is indicated by performance on tasks such as detecting the number of sounds in a word, reversing the order of sound in a word, putting together sounds presented in isolation to form a word (Wagner & Torgesen, 1987), deleting phonemes from words, identifying initial, middle or final sounds of spoken words, or counting the number of phonemes in an utterance (Yopp, 1988).

Phonological awareness is considered to be an essential prerequisite for early reading acquisition (Mutter, Hulme, Snowling, & Stevenson, 2004; Stanovich, 2000; Torgesen, Wagner, & Rashotte, 1994). Moreover, disruptions in phonological awareness are suggested to comprise a very important risk factor for reading difficulties in children (Snowling, 1991; Vellutino et al., 2004; Wagner & Torgesen, 1987). Children with poor reading ability have been consistently found to perform significantly worse than normal readers on tasks that are supposed to assess phonological awareness (Bruck, 1992;

⁶ In this thesis, the term metalinguistic ability is used from a psychological and not from a linguistic perspective. Speaking from a psychological point of view, metalinguistic ability refers to the conscious management of the language objects and implies a cognitive effort which goes beyond the boundaries of strictly linguistic ability (Gombert, 1992).

Goswami & Bryant, 1990; Stanovich, Cunningham, & Cramer, 1984; Wagner & Torgesen, 1987).

It has been suggested that phonological awareness appears to be a stronger predictor of reading in opaque orthographies, such as English, than in transparent⁷ languages. Nonetheless, there is some documented evidence that phonological awareness can significantly facilitate reading acquisition in transparent orthographies as well. Correlational data drawn from two different samples of beginning readers, each one learning to read in a transparent language, Czech and Greek respectively, indicated that performance on phonological awareness tasks comprised a unique predictor of reading variability (Caravolas, Volin, & Hulme, 2005; Nikolopoulos et al., 2006).

The investigation of the relationship between phonological awareness deficits and conduct problems has not received much attention by researchers. Given that phonological awareness deficits have been found to comprise a key candidate for reading failure, unlike children with conduct problems only, conduct disturbed children with poor reading may show phonological awareness impairments similar to poor readers. A recent intervention study provides some evidence for a phonological awareness deficit in children with conduct problems and reading underachievement (Lane, O'Shaughnessy, Lambros, Gresham, & Beebe-Frankenberger, 2001). In particular, seven children with externalising problems and poor reading skills received phonological awareness training. Post-intervention data indicated that all participants made progress in word attack skills

⁷ In a transparent language, typically, the grapheme-phoneme correspondences are consistent and thus, the pronunciation of words is highly predictable (Nikolopoulos, Goulondris, Hulme, & Snowling, 2006; Vellutino et al., 2004).

measured by the Dynamic Indicators of Basic Early Literacy Skills test. Despite the documented improvements in participants' reading scores, the study's small sample size makes the validity of the findings questionable. More research is needed in this area.

Executive Function Deficits: Hinshaw (1992b) in his extensive review on reading underachievement and externalizing disorders stressed that there is a need to investigate neuropsychological deficits in children that display problems of behaviour and reading. Findings from an early study of Moffitt & Silva (1988) seem to suggest that there is a relationship between conduct problems, associated poor reading and neuropsychological deficits of executive function. The findings also seem to suggest that conduct problems without associated poor reading are not related to executive function deficits.

Moffitt & Silva (1988) assessed neuropsychological ability in 13 year old delinquents. To assess neuropsychological ability a battery of 17 verbal and perceptual tests was submitted to a principal components analysis, which yielded five neuropsychological dimensions: Verbal, Visual-Motor Integration, Visuospatial, Verbal Memory, and Mental Flexibility. Three of the battery's tests that are supposed to tap executive function deficits (Pennington & Ozonoff, 1996) loaded on the Visual-Motor Integration, Visuospatial, and Mental Flexibility dimensions respectively. These tests are the Trail-Making Test, the Rey-Osterreith Complex Figure test, and the Wisconsin Card Sort Test. Delinquents with accompanying attention deficit disorder (ADD) were found to score significantly lower than delinquents only and controls on the measures comprising the Visual-Motor Integration dimension. There was no difference in the performance of the delinquent

groups on the visuospatial dimension. The delinquents with combined ADD had also poorer reading achievement than delinquents only and controls.

There are several reasons why these findings may not be applicable to children with conduct problems. Firstly, the Moffitt & Silva (1988) study involved pre-adolescent delinquents instead of children with conduct problems. Arguably, neuropsychological deficits in conduct disturbed individuals should be assessed at an early age. As Toupin, Dery, Pauze, Mercier, & Fortin (2000) stress, juvenile delinquents are more likely to engage in fights and suffer cerebral traumas, and to abuse drugs and alcohol. The assessment of adolescents is likely to reduce the possibility of discriminating between the vulnerabilities that emerge as a result of their lifestyle and the vulnerabilities that are exhibited early in their life, before such an activity occurs.

Secondly, and at least partly at odds with Moffitt & Silva's (1998) conclusions, Rucklidge & Tannock, (2002) and Condor, Anderson, & Saling (1995), did not find executive function deficits per se to be exhibited by poor readers. In both studies poor reading was defined as non-IQ discrepant reading performance below the 25th percentile. In the first study children with poor reading only did not differ from controls in response inhibition measures. In the second study, the researchers examined the ability to plan and execute a novel task in groups of children with and without poor reading. Results indicated that, although poor readers employed similar planning strategies with the average readers, they experienced difficulties in the rate (number of trials taken to reach successful solutions to each one of the five problems of the planning task) they developed

the planning strategies. Condor et al. (1995) stress that the delay in planning reflects a delay in processing information and not in executive functioning.

On the contrary, recent empirical data on the relationship between reading problems and executive function challenge this conclusion. Willcutt and colleagues (2005) found a significant main effect of non IQ-discrepant reading disability for two measures (Stop-signal Reaction Time and Commission errors) that are supposed to assess response inhibition when either AD/HD or IQ were controlled. It was also found that the performance of the poor reading group on the executive function measures did not differ from the respective performance of the AD/HD group and both groups showed significantly worse performance than the comparison group on the executive function measures.

These results should be interpreted cautiously. First, the main effect of reading for other measures of executive function (set shifting and interference control) was not significant. In addition to that, multiple regression showed that commission errors were no longer significantly related to poor reading when IQ was controlled. Secondly, the poor reading group may have been particularly deficient, since reading disability was operationalised as poor performance on reading as well as spelling tests; the definition that Willcutt et al., (2005) used involved the inclusion of children exhibiting deficits in literacy rather than deficits in reading per se. This operationalisation may have allowed the inclusion of cases with more global deficits that could have influence the performance on the executive function tasks. Furthermore, participants of the reading group were initially selected from

a sample of twins that were supposed to exhibit learning difficulties according to school records, teachers, or school psychologists. This selection procedure may have allowed selecting very poor students in terms of general academic attainment as screening was based on learning difficulties referral and not solely on the actual performance on the reading tests. Thirdly, the study covers a wide age range (8 to 15) but, as mentioned earlier, distinct developmental periods have distinct implications for children's mental health. The sample was not representative of young school-age children.

In summary, the limited and inconsistent data on the executive functioning of children with conduct problems and poor reading prevent any firm conclusions with regards to the relationship between executive function, conduct problems and poor reading. More research is required in order to elucidate these associations.

2.5.2 Family Vulnerabilities

Low parental involvement: In the recent years there has been a growing interest in the link between family factors such as family environment and children's mental health (Flouri, 2004; NICHD Early Child Care Research Network., 2005). Children's family environment has consistently been found to be significantly associated with children's behaviour and psychological well-being across cultures (Al Award & Sonuga-Barke, 1992; Hwang & St James-Roberts, 1998; Padeliadu, Botsas, & Sideridis, 2000) and across developmental periods (Alston & St James-Roberts, 2005; NICHD Early Child Care Research Network., 2005). Recent findings from the Effective Provision of Preschool Education (EPPE) project suggest that home learning environment has a strong

impact on children's cognitive attainment (Sammons et al., 2004). The EPPE project is the first British large scale longitudinal study that investigates the effectiveness of pre-school provision in promoting young children's attainment and social behavioural development at entry to primary school and at Key Stage 1 (Sylva et al., 2006). The EPPE results demonstrated that home environment activities such as teaching songs/nursery rhymes, reading to child, playing with letters and numbers and drawing and painting predicted cognitive attainment (Sammons et al., 2004). As it was previously mentioned in this chapter, factors related to home environment and in particular coercive parenting are considered to be one of the major generative sources of conduct problems in children.

Parental involvement is a parenting practice (Spera, 2005) that has been found to be associated with benefits in school readiness, academic attainment, school engagement, and emotional and behavioural adjustment (Reynolds, 2006). Parental involvement in children's' education and school life has attracted the attention of modern USA and UK educational policy (Reynolds, 2006; Thurston, 2005). A central target of these countries' educational policy initiatives is to increase the involvement of parents in children's education and in schools (Reynolds, 2006; Thurston, 2005).

Parental involvement in children's lives comprises a multidimensional construct that varies in definition across studies. Often, the definition of parental involvement has been approached by referring to what involvement behaviours parents exhibit. For instance, parental involvement has been operationalised either as school involvement, personal

involvement, and cognitive/intellectual stimulation (Grolnick & Slowiaczek, 1994), involvement in literacy activities (Senechal & LeFevre, 2002), involvement in school (Steinberg, Lamborn, Dornbusch, & Darling, 1992), or involvement in daily life and homework (Fehrmann, 1987). A relatively broad term that can incorporate all the above behaviours comes from Reynolds (1992), who defines parental involvement as *any interactions between a parent and a child that may contribute to the child's development or to direct parent participation in school activities* (p. 442).

There is evidence for proposing that parents of children with conduct problems may not be very much involved in the education and socialisation of their children. Such conjectures follow from research findings indicating that parental involvement practices are assumed to be shaped and reflected by parent rearing practices (Spera, 2005). By using path analysis, Steinberg and colleagues (1992) showed that authoritative parenting was a significant predictor of parental involvement in schooling. Steinberg et al. (1992) defined authoritativeness as acceptance/involvement, behavioural supervision/strictness, and psychological autonomy.

Child difficulty seems to be another predictor of parental involvement. Hierarchical linear modeling showed that parents who rated their children as more difficult were less interested in and had less knowledge about the child's school activities. Moreover, they were less engaged with their children in home-based cognitive-intellectual activities (Grolnick, Benjet, Kurowski, & Apostoleris, 1997).

As opposed to authoritative parenting, parents of conduct disturbed children tend to show an either neglectful or submissive parenting style characterised by lack of control and warmth, permissiveness towards aggression and use of physical punishment (Patterson, 1982). Moreover, children with conduct problems are by definition difficult to handle (Moffitt, 1993a). A child's negativity in combination with parent's neglectfulness or permissiveness is expected to reduce considerably the parental involvement that children with conduct problems receive.

In line with the conduct problems developmental model inspired by the CPPRG⁸ there are assumptions that parents of conduct disordered children provide poor support for academic performance (Conduct Problems Prevention Research Group, 1992). Likewise, Moffitt (1993a), in her developmental theory about early-onset conduct problems mentions that the mothers of hard to manage boys become increasingly less involved in teaching and socialising their children.

Similar to parents of children with conduct problems, parents of children with poor reading may not be adequately involved in their children's education. Correlational (Grolnick & Slowiaczek, 1994; Park & Bauer, 2002) and meta-analytical (Jeynes, 2005) data suggest that academic attainment in elementary school is positively related to parental involvement. Longitudinal findings have also showed that parental involvement in teaching children reading and writing words was related to the development of early literacy skills (Senechal & LeFevre, 2002). Moreover, findings from an intervention study demonstrated that parents' involvement in children's reading had a positive impact

⁸ Conduct Problems Prevention Research Group.

on children's word reading performance (Kelly-Vance & Schreck, 2002). Results from a recent intervention aimed at training parents in how to promote the reading skills of their children indicated that children who received the intervention programme gained seven months in reading skills (Scott & Sylva, 2004).

According to the above findings it can be hypothesised that children with conduct problems and children with poor reading may not grow up in family environments that foster the child's socialisation, learning and education. When conduct problems are compounded by poor reading the disruption in the parent's involvement may be more serious as the child's difficulty is greater. Sanson, Prior, & Smart (1996) claimed that mothers of children with behaviour problems and reading underachievement may tend to spend less time with their children in joint activities that encourage pre-literacy skills.

The emerging evidence, summarised above, suggests the existence of a relationship between parental involvement, conduct problems, and conduct problems with poor reading. These associations should be empirically verified and explicated.

2.6 Summary

The purpose of the second part of the literature review was to introduce the reader to the likely characteristics of children with conduct problems and associated poor reading. The review commenced with the definition of poor reading and the prevalence and prognosis of conduct problems and associated poor reading. Two terms appeared in the literature to be most commonly used: IQ-discrepant poor reading defined as reading significantly

below the child's intellectual ability and non IQ-discrepant poor reading defined as reading that is not significantly below the level expected for the child's intellectual ability. Epidemiological data showed that nearly half of the antisocial boys and one quarter of antisocial girls displayed specific reading problems. In specific reading and literacy disabled samples, the prevalence of conduct problems was found to be 13% and 14% respectively. Children with conduct problems and poor reading seem to have poorer prognosis than their reading disabled and conduct disturbed peers.

Following that, the relationship between AD/HD, conduct problems, and poor reading was discussed. The literature review showed that contrary to earlier assumptions, AD/HD is not the sole deficit that seems to accompany conduct problems and poor reading in children. It was hypothesised that multiple psychological as well as family complications are correlated with child conduct problems and associated poor reading.

Further to AD/HD and its link to conduct and poor reading, the investigation of attention deficits in children with conduct and poor reading problems was presented. It was shown that there is need to examine attention deficits in children with conduct problems and associated poor reading as an objectively measured cognitive variable. Such a study could provide evidence for a higher order cognitive dysfunction in these children.

The last section of the second part of the literature review considered the psychological and family vulnerabilities that are supposed to be associated with child conduct problems and poor reading. It was shown that these children are most likely characterised by

multiple vulnerabilities encountered at the psychological as well as the family level. With regards to psychological vulnerabilities, these children appear to suffer attention deficits, weaknesses in verbal ability, phonological processing difficulties and executive function deficits. Concerning the family vulnerabilities, low parental involvement in education and social life appears likely to be a characteristic of these children. The review also demonstrated that, as opposed to children with conduct and reading problems, those with conduct problems may be distinguished only by family disadvantage. That is, apart from low parental involvement, they do not seem to display comparable psychological vulnerabilities. Finally, as shown by the literature examined in this thesis, children with conduct and poor reading problems may not differ from children with poor reading in attention, verbal and phonological competency, but may be characterised by executive function deficits. Low parental involvement is rather more strongly associated with conduct problems and poor reading than with poor reading only.

The proposed distinctions between children with problems of conduct and reading and children with problems of conduct only possess some theoretical basis, but have not yet received adequate empirical verification. Altogether, there is a need to advance knowledge with regards to the psychological and family vulnerabilities related to conduct disturbed children with and without poor reading skills.

3. METHODOLOGY

3.0 Introduction

The purpose of this chapter is to present the methods that were employed to accomplish the aims of the thesis and address its research questions. The first part states the research aims and research questions, the second presents the research design. The third part refers to the data collection procedure. In particular, it documents the way access to the field was obtained, the procedure used to select participants, the selection of the research instruments, and the procedures used to administer the instruments. After that, two small sections about the ethics of the research and pilot study are presented. The summary of the methodology forms the last section.

3.1 The Thesis Research Aim, Research Questions and Research Hypotheses

Findings from the literature review suggest that children with conduct problems are characterised by a constellation of heterogeneous vulnerabilities detected not only at the behavioural, but at the psychological, academic, and family level as well. They also

suggest that intervention programmes for children with conduct problems have been mainly focused on managing their behaviour problems and less on their associated vulnerabilities.

Poor reading is one of the associated vulnerabilities of children with conduct problems (Hinshaw, 1992b; Trzesniewski et al., 2006). Compared to conduct disturbed children as well as to poor readers, those with conduct problems and accompanying poor reading seem to experience a unique pattern of maladjustment characterised not only by persistent conduct and reading difficulties, but also complications at the psychological and family level. This suggests, first, that these groups suffer distinct disabilities that call for differential intervention and, second, that they may be predisposed to distinct risk. This proposal has not been tested adequately by research to date.

The aim of this thesis is to investigate the differences between the psychological and family characteristics of children with conduct problems and poor reading (CP-PR) and with conduct problems only (CP), compared to those of children with poor reading only (PR) and children without conduct problems and poor reading (WCP-PR).

In addressing the research aim, two research questions were developed. The first refers to whether there are any differences between children with CP, CP-PR, PR and children WCP-PR in measures that assess psychological characteristics and, in particular, attention deficit and hyperactivity assessed by subjective measures (parent or teacher ratings), attention deficit measured by laboratory measures, verbal abilities, phonological

awareness, and executive function. The second refers to whether there are any differences between children with CP, CP-PR, PR and children WCP-PR in measures that assess family characteristics and, in particular, parental involvement in children's education and social life. The thesis research questions were formulated as follows:

1. *Do children with CP, CP-PR, PR and WCP-PR differ in attention deficit and hyperactivity measured by subjective ratings, attention deficit measured by laboratory tasks, verbal ability, phonological awareness and executive function?*
2. *Do children with CP, CP-PR, PR and WCP-PR differ in measures of parental involvement in their school and social life?*

Based on research presented in the literature review it was shown that CP-PR is associated with elevated subjective (parent or teacher) ratings of AD/HD (Anderson et al., 1989; Carroll et al., 2005; Frick et al., 1991; Maughan et al., 1996; McGee et al., 1984b; Willcutt & Pennington, 2000b). There are limited findings whether this result is replicated when attention is assessed through more objective means such as laboratory tests. However, because of the consistency with which parent or teacher rated AD/HD is associated with CP-PR and the evidence showing that AD/HD is associated with poor performance in objective measures of attention (Barkley, 1991; Shallice, 1988) it can be hypothesised that CP-PR will be related to attention deficits assessed by laboratory measures. Children with CP-PR also appear to exhibit weaknesses in verbal ability (McGee, Williams, & Silva, 1984a; Moffitt, 1990; Moffitt & Silva, 1988; Smart et al.,

1996). The importance of deficits in phonological coding ability as a cause of reading difficulties is well established (Bruck, 1992; Goswami & Bryant, 1990; Snowling, 1991; Stanovich et al., 1984; Vellutino et al., 2004; Wagner & Torgesen, 1987). It appears, therefore, that children with CP-PR are likely to suffer phonological awareness problems. Lastly, empirical findings suggest that CP-PR children experience difficulties with executive functioning as well (Moffitt & Silva, 1988). Consequently, it appears likely that CP-PR children will perform poorly on executive functions measures.

Concerning the family vulnerabilities, the significant relationship between children's behaviour and academic attainment and parental involvement practices (Grolnick & Slowiaczek, 1994; Jeynes, 2005; Park & Bauer, 2002; Steinberg et al., 1992) suggests that low parental involvement in education and social life appears likely to be a characteristic of children with CP-PR.

The literature review also demonstrated that, as opposed to children with CP-PR, those with CP do not seem to exhibit any psychological vulnerability. Past research suggested that the association between conduct problems and poor reading is specific to the association between parent and teacher-rated AD/HD and conduct problems (Anderson et al., 1989; Frick et al., 1991; Hinshaw, 1992b; McGee et al., 1984b). Moreover, AD/HD is associated to deficits in laboratory-measured attention (Barkley, 1991; Epstein et al., 2003; Shallice, 1988). In line with this evidence, children with CP only should neither exhibit any deficits in subjective measures of attention deficit and hyperactivity nor any attention deficit assessed through laboratory means. Furthermore, earlier empirical

findings suggest that CP only is not associated with verbal (McGee et al., 1984a; Moffitt, 1990; Moffitt & Silva, 1988; Smart et al., 1996) and executive function deficits (Moffitt & Silva, 1988). Finally, as phonological awareness is strongly associated with deficits in reading (Bruck, 1992; Goswami & Bryant, 1990; Snowling, 1991; Stanovich et al., 1984; Vellutino et al., 2004; Wagner & Torgesen, 1987), children with CP only should not have any phonological awareness problems.

The literature review also indicated that poor reading is strongly associated with AD/HD (Adams et al., 1999; Carroll et al., 2005; Dykman & Ackerman, 1991; Maughan et al., 1996; McGee et al., 2002; McGee et al., 1986; Sanson et al., 1996; Smart et al., 1996; Spira Greenfield & Fischel, 2005; Trzesniewski et al., 2006; Willcutt & Pennington, 2000b), phonological processing difficulties (Bruck, 1992; Goswami & Bryant, 1990; Snowling, 1991; Stanovich et al., 1984; Vellutino et al., 2004; Wagner & Torgesen, 1987), and verbal impairments (Ingesson, 2006; Stanovich, 2000). Empirical findings (Condor et al., 1995; Rucklidge & Tannock, 2002) suggest that poor reading is not related to executive function deficits. On the basis of this evidence, children with CP-PR may not differ from children with PR in subjective ratings of attention deficit and hyperactivity, laboratory-measured attention, verbal and phonological competency. However, they may not be characterised by complications in executive functioning. As it has already been mentioned, poor reading as well as behaviour problems are related to parental involvement. When conduct problems are coupled with additional reading problems the disruption in the parent's involvement may be more serious as the child's difficulty is greater. Therefore, it is plausible that low parental involvement is rather more

strongly associated with conduct problems and poor reading than with poor reading only or conduct problems alone.

In summary, it is expected that the groups will differ in psychological measures as follows:

- a) Children with CP-PR and PR will significantly differ from children with CP and WCP-PR in ratings of attention deficit and hyperactivity. Children with CP will not differ significantly in ratings of attention deficit and hyperactivity from children with WCP-PR.
- b) Children with CP-PR and PR will score significantly worse in laboratory measures of attention than children with CP and WCP-PR. Children with CP will not differ significantly in laboratory measures of attention from children WCP-PR.
- c) Children with CP-PR and PR will score significantly worse in verbal ability measures than children with CP and WCP-PR. Children with CP will not differ significantly in verbal ability measures from WCP-PR children.
- d) Children with CP-PR and PR will score significantly worse in phonological awareness measures than children with CP and WCP-PR. Children with CP will not differ significantly in phonological awareness measures from WCP-PR children.

- e) Children with CP-PR will score significantly worse in executive function measures than children with PR, CP, and WCP-PR. Children with PR, CP, and WCP-PR will not differ significantly in executive function measures.

With regards to family measures, it is expected that the groups will differ as follows:

- f) The parents of children with CP-PR will show significantly lower involvement in their children's education and social life than parents of children with CP, PR and WCP-PR. The parents of children with CP and PR will also show significantly lower involvement in their children's education and social life than the parents of children with WCP-PR.

3.2 The Thesis Context and Target Group

The research was carried out in a district of the western part of greater Thessaloniki (Picture 1). Thessaloniki is the second largest city of Greece after the capital Athens and it belongs to the prefecture of Macedonia. According to demographic data of 1991, part of this district (Municipality of Evosmos, Menemeni, Elefterio-Kordelio) included a predominantly working class community, living in highly polluted surroundings, and relatively poorly served in comparison to the privileged eastern part of Thessaloniki (POVERTY-3 Project, 1991). The district hosted three of the most vulnerable populations of western Thessaloniki, namely single-parent families, Romanies, and people repatriated from the USSR Greek-Pontians (POVERTY-3 Project, 1991). The district is located close to the industrial zone and seaport of Thessaloniki.

Picture 1. *Map of Greece* (Applied Language Solutions., 2007)



In recent years, antisocial behaviour has started forming an issue of concern among the educational and political circles of Greece. Currently, there are no published empirical investigations examining the psychological, academic and family characteristics of Greek children with conduct problems. A relatively recent survey on school violence reported in Artinopoulou (2001) has documented somewhat elevated rates of violent behaviour among Greek students. It was documented that 58.2% of students in Thessaloniki and 39% of students in Athens have witnessed violent incidents between Greek and migrant students. On average, 50.4% of the country's student population has witnessed assaults between members of youth gangs. The majority of violent instances refer to vandalism of school infrastructure, swearing, threats and beating, but not homicide (Artinopoulou, 2001). Unfortunately, the sample of the survey and other important information that would allow valid inferences to be made are not reported. The realisation of the present

study in Greece can offer valuable information about antisocial behaviour as well as identifying the strengths and weaknesses of Greek children with conduct problems.

With regards to the target region, the reason for its selection relies on findings indicating that environmental stressors, such as socio-economic and educational disadvantage predict antisocial behaviour in children (Hill, 2002). Because this district is likely to display the above characteristics, it was assumed that the incidence of conduct problems in the district's school population would be high. Targeting this district was deemed to be worthwhile due to the implications of the research for the prevention and intervention of child antisocial behaviour in this area of Greece in the longer term.

The participants come from the public elementary schools in this district. Special action was taken to ensure that participants speak Greek as their first language and do not belong to any special social groups such as Romanies.

Arguably, children offer a more reliable source for the examination of psychological and family dysfunction than adolescents. Certain psychological and family complications (e.g. verbal deficits and ineffective parenting respectively) are supposed to be characteristic of children with conduct problems and are assumed to be present early in their lives (Moffitt, 1993a; Moffitt & Caspi, 2001). During the course of time, these children's functioning is further moulded by their deviant lifestyle, academic disadvantage and through transactions between the child and the wider social environment. Deviant peers (Fergusson et al., 1999; Moffitt & Caspi, 2001), alcohol and

drug dependence (Moffitt et al., 2002), and generalized academic underachievement as a result of persistent reading failure (Stanovich, 2000) are some of the factors that are likely to occur later in these children's lives and impact on their development. The investigation of young children with behaviour and reading problems can increase the likelihood of identifying those vulnerabilities that are primary, rather than secondary vulnerabilities emerging as a result of cumulative disadvantage due to delinquency and academic underattainment. This approach can also help to identify these deficits that are mainly related to family dysfunction, rather than to exchanges with the wider community. Therefore, this thesis focuses on 2nd Grade children, between 7 to 8 years old. First (1st) Grade children did not participate in the study as there is no Greek standardised test designed to assess reading in the 1st grade. Investigation of younger children was not feasible as there is no standardized research instrument that allows the assessment of conduct problems in Greek preschool children.

The reading instruction strategy is uniform across all Greek public elementary schools and is heavily guided by literacy books used nationwide (Ministry of Education and Religious Affairs, 1986). Reading and spelling are taught together by the Modern Greek language course delivered in every class of the elementary school (Ministry of Education and Religious Affairs, 1986). Nikolopoulos et al., (2006) offer a short description of the Greek educational system as follows:

Compulsory education, in the strict sense, starts at 6½ years of age (maximum) when the official teaching of reading and spelling starts. Following the national curriculum

guidelines, all teachers during the first months of grade 1 teach their pupils the basic grapheme-phoneme correspondences or other letter combination patterns (e.g. digraphs). Within the first few weeks of reading instruction, children are introduced to the level of the syllable and phoneme at the same time, and they practice segmenting words at both levels and use these skills to decipher words (phonics). Certain aspects of grammar or syntax are introduced towards the end of Grade 1 or at the beginning of Grade 2 (e.g., basic gender inflections) (p. 5).

The literacy material that is taught is integrated in short reading passages included in the literacy books used. Typically, children are required to practice the passage at home and read it in the class the next day. This task is designed to be assisted by parents. Generally, parents' role during the early grades of the elementary school is considered to be critical in the development of children's reading skills, and in particular, when children lack the psychological competencies that reading is built on (Padeliadu et al., 2000).

3.3 The Thesis Research Design

The selection of the research design for the present thesis has been guided by the research aim and questions and by the different constraints that the conduct of real world research imposes. Consequently, the present thesis examines differences between groups defined by the presence or absence of pre-existing conditions. Active manipulation of the independent⁹ variable and random allocation of participants to groups was, therefore, not possible. Hence, the research design is a non-experimental comparative fixed design.

⁹ An independent variable is a variable which is manipulated by the experimenter and it is assumed to have a direct effect on the dependent variable (Coolican, 1999).

This design is considered to follow from the experimental tradition. However, in this thesis, it does not meet the criteria for a true experiment. A true experiment involves the investigation of possible causes for the occurrence of a certain phenomenon. In particular, it involves control over possible variables in order that changes in the dependent¹⁰ variable can be attributed confidently to the manipulation of the independent variable (Coolican, 1999). Control can be obtained by manipulating the independent variable and by randomly¹¹ allocating participants to experimental¹² and control¹³ groups (Cohen, Manion, & Morrison, 2000; Robson, 2002). Manipulation entails a change in the situation, circumstances or experience of the participants so that different groups receive different treatment (Robson, 2002).

Classification of the design employed by the present study varies from author to author and from discipline to discipline. According to Robson's (2002) classification, generally, in social science research, designs that derive from the experimental tradition, without, however, deliberate manipulation of variables are called non-experimental fixed designs. In such designs the independent variable is not controlled, but instead it is measured as it

¹⁰ A dependent variable is a variable which is assumed to be directly affected by changes in the independent variable (Coolican, 1999).

¹¹ Random allocation of participants into groups allows the researcher to even out all the possible extraneous differences between the participants and consequently, to suggest with more confidence that changes in the dependent variable can be attributed to the manipulation of the independent variable and not to participant variables such as gender or social class (Bryman, 2001).

¹² The experimental group represents different types or levels of the independent variable (Bryman, 2001).

¹³ The control group is used as a baseline measure against which the performance of the experimental groups is assessed (Coolican, 1999).

exists in people and society (Coolican, 1999). As Robson (2002) states, non-experimental fixed designs

...can be used when the interest is in explaining or understanding a phenomenon. ...they are useful in establishing cause in the sense of providing evidence for the operation of mechanisms and for teasing out the particular situations and groups of people where enabling or disabling mechanisms have come into play (p.155).

The term comparative design involves the examination of differences between two or more groups on one or more variables (Coolican, 1999; Robson, 2002). The groups are naturally occurring ones or may be created especially for the study (Robson, 2002). Based upon the comparative research paradigm, this thesis compared the performance of four groups of children (CP-PR, CP, PR, WCP-PR) on a range of measures that assess psychological deficits and parental involvement in the children's education and social life.

3.4 Data Collection

3.4.1 Access to the Field

Permission for access to the schools that hosted the empirical study of the thesis was obtained from the Pedagogical Institute of Greece which is the official body providing permission for educational research in Greece. Permission for access to the schools was authorised for three years (2003-2006). Schools appeared to be relatively reluctant to recognize permission from the Pedagogical Institute and more liable to accept permission

issued by the local educational administrative body that they belonged to. Therefore, research permission was also obtained by the Educational Administration of Western Thessaloniki which is equivalent to an English or Welsh LEA (Local Education Authority). These two formal state bodies approved the conduct of the study in 83 state primary schools.

The author visited the selected schools in order to explain the purposes of the study to head-teachers and teachers, and ask for their voluntary participation. Teachers of the 2nd Grade were informed either in person or in groups about their involvement. During these visits one of the main goals of the researcher was to establish rapport with the school and the teaching personnel in order to encourage them to collaborate in the study.

3.4.2 Sample

The sample of this thesis consisted of 123 2nd Grade Greek children recruited from a school population (n = 1354) derived from state primary schools located in west Thessaloniki.

The schools belong to the 1st and 2nd Office of Primary Education, which both are under the supervision of the Educational Administration of Western Thessaloniki. The Administration is comprised of four (4) offices. The reason for selecting the schools from these two offices was that they are located geographically in the same area which is identified by certain characteristics (for details see *The Thesis Context and Target Group*, section 3.2 in this Chapter) that make it relatively homogeneous. Thus, no significant

variation in socioeconomic position was expected to be found among participants. The candidate schools were listed randomly and selection of participants started from the first school that appeared in the list.

Sample Size

In the design of empirical investigations the determination of sample sizes is an important decision. According to Cohen (1992), the researcher needs to determine the necessary sample size to attain the desired power for the specified alpha (α) level and the hypothesized effect size desired. Sample size is related to the power of the statistical tests (or the conditional probability of rejecting the null hypothesis when the alternative hypothesis is true). More specifically, the relationship between statistical power and sample size is that as the sample size increases, the probability of rejecting a false null¹⁴ hypothesis also increases.

The calculation of the appropriate sample size requires a) the identification of the minimum size of the effect of the independent variable on the dependent variable that is considered to be significant, b) the probability of correctly rejecting a false null hypothesis (i.e., statistical power), and c) the probability level at which the effect of the independent on the dependent variable is accepted as less likely to have occurred by chance (i.e., significance level α) (Stangor, 2007; Wallnau & Gravetter, 2007).

¹⁴ *The hypothesis that the observed data would not differ from what it is expected on the basis of chance* (Stangor, 2007, p. 138)

By convention, a statistical power of .80¹⁵ and a significance level of $\alpha = .05$ constitute common choices in the behavioural sciences (Stangor, 2007). With respect to the determination of the effect size of the study, a literature review was conducted as a means of identifying the effect sizes that are reported in the published literature on psychological and family related characteristics of children with conduct problems. The effect sizes reported for psychological related characteristics ranged from $d = .31$ -.65. These effect sizes reflected the standardised difference between conduct problems and comparison groups on verbal intelligence and sustained attention assessed by the Wechsler Intelligence test (Moffitt & Caspi, 2001; Raine et al., 2005; Raine et al., 2002) and the continuous performance test (Raine et al., 2005), respectively. No effect sizes were found to be reported in the relevant literature on measures of executive function and phonological awareness. In view of this limitation, the estimation of the effect size of the study was guided by the most well-established effect size reported in the literature of the psychological characteristics of children with conduct problems, namely verbal intelligence. As already mentioned in this thesis, verbal dysfunction is considered to be a central characteristic of children with conduct problems and differences between children with conduct problems and comparison groups on verbal intelligence have been replicated in many studies. Therefore, on average, the effect size to be identified in this study with respect to psychological related variables is $d = .49$ ¹⁶.

¹⁵ Power is given by $1 - \beta$ (probability = $1 - \beta$), and the higher the statistical power, the lower the probability of committing a Type II (probability = β) error.

¹⁶ The effect size $d = .49$ is the averaged sum of the following reported effect sizes of verbal intelligence: $d = .31$ $d = .35$ (Moffitt & Caspi, 2001); $d = .65$ (Raine et al., 2002); $d = .65$ (Raine et al., 2005)

The effect sizes reported for family related characteristics ranged from $d = .41$ -.78. These effect sizes reflected the standardised difference between conduct problems and comparison groups on parenting assessed by measures of parental neglect (Raine et al., 2002), harsh discipline and inconsistent discipline (Moffitt & Caspi, 2001). Similar to verbal intelligence, ineffective parenting is one of the most well-established family vulnerability of children with conduct problems. Hence, on average, the effect size to be identified in this study with respect to family variables is $d = .53$ ¹⁷.

Cohen (1977, 1992) provided guidelines for operationally defining small, medium, and large effect size. The effect size for a test of the differences between independent means is as follows: a $d = .20$ corresponds to a small effect size, a $d = .50$ corresponds to a medium effect size and a $d = .80$ represents a large effect size. Consequently, and based on the literature findings, the effect size of the study is considered to be medium (i.e., $d = .50$).

Using Cohen's (1997) guidelines, the necessary size of each sample to detect a medium effect size at the $\alpha = .05$ with the desired power of .80 would be 50. In simple terms, the sample size for each one of the four groups of the study should be $n = 50$. Obtaining a sample size of 50 participants per group was very difficult based on the time and the resources available. Given these limitations, an attempt was made to collect data from at least 30 participants for each one of the four groups. In general, when a large sample size cannot be obtained, $n = 30+$ observations per group appears to be the rule of thumb as it

¹⁷ The effect size $d = .57$ is the averaged sum of the following reported effect sizes of parental neglect: $d = .78$ (Raine et al., 2002); harsh discipline: $d = .41$ and $d = .46$ (Moffitt & Caspi, 2001); inconsistent discipline $d = .45$ and $d = .58$ (Moffitt & Caspi, 2001)

increases the possibility of getting normally distributed data (Stuart, 1984) and, therefore, of obtaining more valid results. In line with Cohen (1977), with a sample size of $n = 30$ per group the probability of correctly rejecting a false null hypothesis was reduced to 61%.

Before data collection a rough estimation of the likely number of students that were required to be screened in order to achieve a minimum of thirty participants per group was made. The prevalence of conduct problems in children varies considerably from less than 1% to more than 10% according to the stringency of the identification criteria (American Psychiatric Association, 2000). There are no prevalence estimates of conduct problems reported in Greek children in the available published literature on behaviour problems in Greek children (Motti-Stefanidi, Tsiantis, & Richardson, 1993; Roussos, Karathanos et al., 1999; Roussos, Richardson et al., 1999). Hill, (2002) reports that for the industrialised West it is estimated that 5% to 10% of 6 to 18 year olds have significant and persistent oppositional, disruptive, and aggressive behaviour problems. Assuming that 5% is the minimum prevalence of conduct problems, it was estimated that a number of 1300 children should have been screened in order to acquire a minimum of 60 participants with conduct problems (minimum number per group = 30×2 groups of participants with conduct problems = 60 participants with conduct problems).

3.4.3 Participants

Selection of Participants

Teachers were asked whether there were any children in the classroom that exhibited conduct problems. In cases where teachers needed further explanations regarding what the term conduct problems refers to, a few indices included in the Conduct Problems dimension of the Conners' Teacher Rating Scale-28 (Conners' TRS-28) were provided as examples of indicative behavioural manifestations of children with conduct problems. Classes where teachers stated that they did not have any children with conduct problems did not participate in the study. Then, informed consent (Appendix A) was sought from parents and teachers were invited to complete the Greek version of the Conners' TRS-28 for each child that according to their opinion exhibited conduct problems and whose parents agreed to participate in the study. Following that, the Test of Reading Ability Detection was administered to all the children whose parents allowed participating. On the basis of reading scores and ratings on the Conners TRS-28 scale, the children with conduct problems were allocated to either the CP group or to the CP-PR group.

Following the identification of the conduct disturbed children, those with PR only and WCP-PR were identified. With regards to the poor reading group, teachers were asked to complete the Conners' TRS-28 for children who scored below the cutoff point (score>90) on the Test for Reading Ability Detection. As far as the WCP-PR children are concerned, a special method was applied for the detection of potential participants. Typically, boys significantly outnumber girls in conduct problems (for details see *Prevalence and Prognosis*, 1.3 section, Chapter 1). This could result in unequal number of boys and girls

in the CP, CP-PR as opposed to the WCP-PR groups. In order to reduce gender variability across these groups an attempt was made to match them in terms of gender. Matching children one by one would have resulted in a larger number of participants in the WCP-PR group as compared to the CP and CP-PR groups. In order to obtain similar numbers of children in the groups, matching was made for every other child. Teachers were asked to choose for every other child that exhibited conduct problems (irrespective of associated poor reading) the next child from the class register that fulfilled the following criteria:

- a) did not exhibit conduct problems;
- b) did not exhibit inattention and/or hyperactivity problems; the fulfillment of this criterion was considered important. Because WCP-PR children formed the normative group of the sample, it was attempted to approximate them as closely as possible to 2nd Grade Greek children that do not experience behavioural, psychological or academic difficulties;
- c) scored above the cutoff point (score>90) in the reading test;
- d) was of the same gender as their corresponding conduct disturbed classmate.

Then, teachers were asked to complete the Conners' TRS-28 for each one of them.

With regards to gender variation in PR and WCP-PR groups, no special action was taken to balance the group. The reduction of gender variability between CP and WCP-PR would also balance gender variation between PR and WCP-PR because, similar to the gender ratio in conduct problem, boys are supposed to outnumber girls in reading problems as well (Rutter et al., 2004).

The participants' selection procedure started in late November 2004 and was completed in February 2006. By the end of the academic year, June 2005, the desired numbers of students with conduct problems had not been collected as very few children were judged by teachers as conduct disturbed. Unlike conduct problems, the minimum number ($n=30$) of children with poor reading was identified and collected much sooner, before schools closed for the summer vacation. Moreover, contrary to expectations, there was not significant gender variation in the poor reading group and the percentage of girls (53.3%) happened to be relatively higher than the percentage of boys (46.7%). Based on the author's observation, there was a tendency for boys with poor reading to also qualify for conduct problems. As a result, in many classes fewer boys than girls were left to qualify for the poor readers group. This observation is in agreement with the notion that boys outnumber girls in poor reading samples because they more frequently display disruptive behaviour disorders (American Psychiatric Association, 1994; Willcutt & Pennington, 2000a). This observation, although not empirically proven in this study, is also in accordance with findings showing that the male to female ratio in population samples is much closer to unity than in clinical samples (Willcutt & Pennington, 2000a). In order to increase the number of participants with conduct problems and balance the reading group male-female ratio it was decided to collect more data. Data collection was interrupted for the period that schools were closed due to summer vacation. It re-started in October 2005 and was terminated in February 2006. During this period the aim was to identify more children with conduct problems and more boys with poor reading.

According to Conners (2000) teachers need to be familiar with their pupils for at least two months before completing the TRS-28 rating scale. Therefore, the identification of conduct disturbed children was initiated two months (November) after the academic year had started (September). Provided that the teacher was acquainted with the students from the previous academic year, the identification procedure started earlier (October). Identification was made by teachers who had working experience of more than two years.

All children were born in Greece and spoke Greek as a first language, did not exhibit any hearing, visual, or physical impairment and did not belong to any special social groups such as Romanies. According to the Diagnostic and Statistical Manual-IV-Text Revision (DSM-IV-TR) (American Psychiatric Association, 2000), an IQ score that falls two standard deviations below the mean (score < 70) can be an indicator of atypical mental ability. Thus, children who scored less than 70 in the verbal IQ measure, described later in this chapter, were excluded from the study.

Criteria for Inclusion in the Groups

The criteria for inclusion in the groups were defined as follows:

Group 1: Without Conduct Problems and Poor Reading group (WCP-PR): the child should receive ratings below the clinical cutoff point on the Conners' TRS-28 Conduct Problems (rating < 8), Inattention (rating < 11) and Hyperactivity (rating < 9) scale and score above the 25% percentile (T-score > 90) on the Test of Reading Ability Detection.

Group 2: Conduct Problems and Poor Reading group (CP-PR): the child should receive ratings at or above the clinical cutoff point (rating ≥ 8) on the Conners' TRS-28 Conduct Problems scale and score at or below the 25% percentile on the Test of Reading Ability Detection (T-score ≤ 90).

Group 3: Conduct Problems group (CP): the child should receive ratings at or above the clinical cutoff point (rating ≥ 8) on the Conners' TRS-28 Conduct Problems scale and score above the 25% percentile (T-score > 90) on the Test of Reading Ability Detection

Group 4: Poor Reading group (PR): the child should receive ratings below the clinical cutoff point (rating < 8) on the Conners' TRS-28 Conduct Problems scale and score at or below the 25% percentile (T-score ≤ 90) on the Test of Reading Ability Detection.

3.4.4 Description and Development of the Research Instruments

The characteristics of the research instruments along with the reasons that led to their selection are presented below. For instruments that had to be devised for this study, all the information regarding the development procedure is documented. The section starts with measures utilized to select participants and to obtain demographic information. It then introduces the measures used to assess the psychological and family characteristics of the participants.

Teacher-Rated Conduct Problems, Attention Deficit and Hyperactivity: Conners' Teacher Rating Scale – 28 (Conners' TRS-28) (Roussos, Richardson et al., 1999): The

Conners' TRS-28 is a child-behaviour assessment instrument for children aged 6 to 12 (Goyette, Conners, & Ulrich, 1978). In this thesis a Greek version of the Conners' TRS-28 (Roussos, Richardson et al., 1999) was utilised as a behavioural screening tool. The Conners' TRS-28 (Goyette et al., 1978) has been recently adapted and standardised in Greece as part of the European Network for the Study of the Hyperkinetic Disorder (Roussos, Richardson et al., 1999). It has been chosen over the Greek version of the Child Behaviour Checklist-Teachers' Report Form (Roussos, Karathanos et al., 1999). The major reasons for the selection of this scale are the briefness of its completion and the fact that it is the only scale of its kind in Greece that makes use of cutoffs derived from a child clinical population.

Teacher rating scales provide valuable information about behaviour at school and in the classroom (Koulakoglou, 1998). Theoretically, a teacher scale has the advantage of providing more objective judgments of child's behaviour than a parent scale (Conners, 2000). Parent scales are complementary to teacher scales (Conners, 2000; Koulakoglou, 1998). *While parents can observe the child in many situations and circumstances, teachers have a consistent normative framework for judging typical classroom behaviour* (Conners, 2000, p. 3).

The psychometric properties of the Greek Conners' TRS-28 were established through confirmatory factor analysis and internal consistency analysis (Roussos, Richardson et al., 1999). Confirmatory factor analysis showed that the factors of the US Conners' TRS-28 (Hyperactivity, Conduct problems, Inattentive-Passive, Other Factors) were similar to

the Greek factors. Internal consistency analyses (Cronbach's alpha) of the three sub-scales were: Hyperactivity, 0.90 for boys and 0.86 for girls; Conduct problems, 0.83 and 0.79 respectively; Inattentive-Passive, 0.86 and 0.84, respectively. The 90th percentile of the distribution in the general population sample was used to set cutoff points. The cutoffs, above which 10% of the nonclinical sample's scores lie, were defined by scores of 9 for Hyperactivity, 8 for Conduct Problems and 11 for Inattentive-Passive (Roussos, Richardson et al., 1999).

The Greek Conners' TRS-28 is comprised of 28 items and includes four behaviour scales. These scales are Conduct Problems (8 items), Inattentive-Passive (8), Hyperactive (7 items), and Other Items (5 items). Each item is rated on a 4-point scale: not at all (0), just a little (1), pretty much (2), very much (3). The teacher is required to rate the child's behaviour on the basis of the severity of certain behavioural manifestations in the past month. Classification of the child's behaviour is determined by the child's raw score on each sub-scale.

The Conduct Problems rating scale was utilised to classify the participants of the study in to the four groups on the basis of their conduct problems. Additionally, the Inattention-Passive and Hyperactivity teacher rating scales were also used in order to classify participants in to the normative group of the study; the group of children without Conduct Problems and without Poor Reading. Finally, the Inattention-Passive and Hyperactivity rating scales were used as a subjective measure of attention deficit and of hyperactivity,

respectively. The Other Items scale was not used as the Greek version does not include cutoffs.

After telephone communication, the Greek version of the Conners' TRS-28 form was provided to the author by the Child Medical Center of the Attiki Child Psychiatry Hospital in Athens. The author visited the center twice and discussed the properties of the Conners' TRS-28 scale to identify conduct problems, attention deficits, and hyperactivity in children with an educational psychologist working at the centre as well as with the director of the Center and coordinator of the project for the standardisation of the scale in Greece. Instructions for administering the form were offered by one of the members of the research group that was involved in the standardisation of the scale (Koumoula, 2003).

Three of the 28 items of the Conners' TRS-28 were reported as confusing by teachers because they were presented in a negative form and they required a response presented in negative form as well. These items were: item 21 *Can't complete things that he/she starts*, item 25 *He/she doesn't cooperate with classmates*, and item 27 *He/she doesn't cooperate with teacher*. To avoid confusion, the format of the items was modified as follows: item 21 *Fails to complete things that he/she starts*, item 25 *Uncooperative with classmates*, and item 27 *Uncooperative with teacher*. The modified Greek version of the Conners' TRS-28 is presented in Appendix B.

Reading: *Test of Reading Ability Detection* (Tafa, 1995): The Test of Reading Ability Detection (Tafa, 1995) is the only Greek standardised test for the assessment of reading ability in children aged 6 years and 9 months to 10 years and 1 month. The test offers normative data with a mean of 100 and a standard deviation of 15. The test's Guttman split-half and Chronbach alpha reliability coefficient are 0.93 and 0.94 respectively.

The student's task is to read silently a sentence that has a word missing and then find and underscore the correct word from a total of four words presented underneath the sentence. The test is comprised of 42 sentences that become progressively more difficult. The duration for completion of the test is forty minutes.

The Test of Reading Ability Detection was utilised in order to classify the participants of the study into the four groups on the basis of their reading performance. This test does not include any cutoff points for the identification of children with poor reading. In this thesis the term poor reading is operationalised as general reading failure rather than as IQ-discrepant reading failure. That is, the purpose was to identify children with poor reading skills rather than children with reading disability per se. A more inclusive definition would ensure that not only the very severe cases of reading problems are identified.

In this thesis the 25% of the distribution in the general population was used as a cutoff point for the identification of poor readers. The 25th percentile is a common choice of cutoff point for the identification of non-IQ discrepant low achieving readers (Condor et

al., 1995; Fletcher et al., 1998; Rucklidge & Tannock, 2002). The 25% equates to a typical score of 90. Therefore, those children that scored at or below the cutoff point score of 90 were assigned to the poor readers groups.

Marital Status, Family Occupation and Family Education: One dichotomous question was utilized to assess whether parents were single or not. The question was included at the end of the Parental Involvement Questionnaire that is described later in this section

Two open-ended questions were used in order to obtain the fathers' and mothers' occupation. Parents were asked to describe their current occupation and the occupation of their partner. A multiple choice question was developed to assess fathers' and mothers' education. These questions were also included in the end of the Parental Involvement Questionnaire. Parents were asked to circle the education level that applied to them and to their partner.

It was decided that the children's family education and occupation would be based either on father's or mother's education or occupation, whichever was the higher. This method of operationalising family education and occupation status has been used in Greek and British studies to define social class (Korilaki, 2005; Kuntsi et al., 2001). Korilaki (2005), discussing children's social class, notes:

It is suggested that each child be assigned to a class based on occupation of whichever person is considered dominant. Erikson takes the dominant person to be whichever

parent has the occupation that can have the greater impact on the family's life chances (p.137).

Laboratory-Measured Attention Deficit: Conners' Continuous Performance Test-II (*Conners' CPT-II*) (Conners & MHS Staff, 2000): The Continuous Performance (CP) test was utilised as an objective measure of attention deficits in the four groups of the study. The CP test is a neuropsychological assessment that has been proven to be sensitive to the measurement of attention and in particular of sustained attention (McGee et al., 2000). Studies of AD/HD populations have shown that the CP test can discriminate between children with and without attention deficits (Barkley, 1997a; Shallice, 1988).

The CP test exists in numerous versions which, although they have similar characteristics, vary in stimulus and response parameters. In this thesis the Conners' CPT-II (Conners & MHS Staff, 2000) for Windows was employed. The Conners' CPT-II is a computerised task for individuals aged 6 years and older. Accompanied by criterion-validity studies, split-half and test-retest reliability tests as well as normative data, the Conners' CPT-II was judged to be an appropriate instrument for assessing attention in children. This test does not involve any verbal demand, so it can be used with Greek children.

The Conners' CPT-II includes a practice and a main administration trial, which last 1 min and 10 sec and 14 min respectively. In each trial the child is required to respond as quickly as possible to the stimuli presented on the screen by pressing the spacebar for

every target-letter except the nontarget-letter X. The inter-stimulus intervals (ISIs) are 1, 2, and 4 sec, which are randomly interspersed, with a display time of 250 milliseconds. There are 6 blocks, with 3 sub-blocks, each containing 20-letter presentations for each ISI.

The CP task produces a wide range of performance measures. Typically, commission errors, omission errors, hit rate and hit rate variability, signal detectability (d) and response bias (b) are the most frequently CPT measures that have been used across studies examining attention in child populations with attention deficits and hyperactivity (Epstein et al., 2003)

In particular, commission errors that co-occur with slow reaction time are assumed to reflect inattention (Conners & MHS Staff, 2000). Omission errors are assumed to reflect inattention (Bor, Sanders, & Markie-Dadds, 2002; Fischer, Barkley, Smallish, & Fletcher, 2005; Mirsky, 1996; Richards, Samuels, Turnure, & Ysseldyke, 1990). Hit rate is also operationalised as a measure of inattention (Mirsky, 1996) as well as a speed of information processing measure (Sergeant, 1996). Hit rate variability is viewed as an indicator of reliability or stability of attention (Mirsky, 1996). Detectability and response bias/speed are considered to be determinants of the individual's ability to remain vigilant over the entire length of the task (Corkum & Siegel, 1993). The remaining measures that the Conners' CPT-II provides (Appendix C) are relatively understudied and there is a dearth of information across the published literature in relation to what aspects of attention they measure. The measures that this thesis employed to assess attention are

summarized and defined below in line with the definition provided in the Conners' CPT-II manual (Conners & MHS Staff, 2000):

- a) Omission errors: the number of times the child did not respond to a target (non X);
- b) Commission errors: the number of times the child responded to a non target (X);
- c) Hit reaction time (Hit RT): the mean response time for all targets (non X);
- d) Hit reaction time standard error (Hit RT SE): the variability of response time expressed in standard errors;
- e) Detectability (*d*): The difference between the signal (non-X) and noise (X) distributions;
- f) Response style (*b*): Speed/accuracy trade off.

The Conners' CPT-II employs standard T-scores for all measures: high T-scores indicate poor performance (Conners & MHS Staff, 2000). Both high and low Hit RT T-scores reflect poor performance (Conners & MHS Staff, 2000). Scores that fall between the range of 45-54 indicate typical performance, scores that fall between the range of 55-59 indicate mildly atypical performance, and scores between 60-64 indicate moderately atypical performance (Conners & MHS Staff, 2000).

Additionally, this thesis will also make use of the Clinical Confidence Index measure included in the Conners' CPT-II which indicates the probability that a clinically significant problem exists. Specifically, the Clinical Confidence Index measure provides a value of the degree of fit to the clinical profile of AD/HD. Values below 50% suggest a

closer match to non-clinical classification, while values above 60% offer stronger evidence of a clinical profile (Conners & MHS Staff, 2000).

Verbal Ability: *Greek Wechsler Intelligence Scale for Children-III (WISC-III)* (Georgas, Paraskevopoulos, Bezevegis, & Giannitsas, 1997): To assess the verbal ability of the study's participants the Greek version of WISC-III was used. The Greek version of the WISC-III has been developed for children aged 6 to 16 years old and is the product of a process involving the standardisation and adaptation into Greek of the 1992 UK version of the WISC-III (Georgas et al., 1997). For all three tests normative data and internal reliability measures are available.

The Greek version of WISC-III includes five verbal sub-tests that yield a composite verbal IQ score. These tests are: Information, Similarities, Comprehension, Arithmetic and Vocabulary. Any of the regular verbal sub-tests can be substituted by the Number Memory sub-test (Georgas et al., 1997). A full verbal IQ score can be prorated by using four of the five verbal sub-tests (Georgas et al., 1997). Due to time constraints, in this thesis four out of five sub-tests were used in order to obtain an estimation of verbal IQ. These tests are: Similarities, Vocabulary, Comprehension and Number Memory. Verbal ability was defined as the intelligence quotient measured by the prorated verbal IQ derived from the four verbal sub-tests of Similarities, Vocabulary, Comprehension and Number Memory that the Greek version of WISC-III assesses.

The selection of the four verbal sub-tests was based on the following rationale. The assessment of verbal short-term memory was judged to be of particular importance for this study. Verbal short term memory is thought to interfere with the children's academic (Gathercole & Pickering, 2000) and reading performance (Baddeley, 1990; Gathercole, Alloway, Willis, & Adams, 2006) respectively. The sub-test of Number Memory is assumed to assess verbal short term memory (Georgas et al., 1997; Kaufman, 1994). The sub-test of Number Memory is more related to the Arithmetic ($r=.43$) than to the other verbal sub-tests (Kaufman, 1994). Therefore, the Arithmetic sub-test was replaced by the Number Memory sub-test.

The Similarities and Vocabulary sub-tests of either the children's or adult Wechsler Intelligence Scale have been commonly used by numerous studies as a composite score of verbal IQ (Aguilar et al., 2000; Chadwick, Taylor, Taylor, Heptinstall, & Danckaerts, 1999; Kuntsi et al., 2001; Loizou & Stuart, 2003; Smart et al., 1996). Thus, the Similarities and Vocabulary sub-tests were assumed to provide a legitimate means for assessing verbal IQ.

The Comprehension sub-test was selected over the Information sub-test as the former is less culturally loaded. It reflects abilities such as verbal reasoning that are less curriculum related and less dependant on cultural opportunities at home, outside reading and the richness of the early environment (Kaufman, 1994). Therefore, it was assumed that the Comprehension sub-test would tap more reliably verbal mental abilities than the Information sub-test.

The Similarities sub-test is composed of 2 practice items and 19 test items. The items include pairs of words that represent different objects and concepts. The child is required to find the similarities between the two words of each pair. Item score ranges from 0 to 2. The sum of the item scores is the child's raw score. Administration is interrupted after 4 consecutive mistakes.

The Vocabulary sub-test comprises a list of 30 words and the child is asked to give verbally the definition of each word. Item score can range from 0 to 3. The sum of the item scores is the child's raw score. Administration is interrupted after 4 consecutive mistakes.

The Comprehension sub-test is comprised of 18 test items. The child is read questions that refer to the solution of every day problems and understanding of social conventions. The child is required to give an answer to each one of these questions. Scores range from 0 to 2. Administration stops after 3 consecutive mistakes.

Finally, the Number Memory sub-test consists of 30 rows of number digits that become progressively longer. The examiner reads each row to the child. The child's task is to repeat the digits of the first 16 rows starting from the first digit of the row and the digits of the next 14 rows starting from the last digit of the row. The test includes one practice item for the straight and for the reverse repetition. The score for each item is either 0 or 1. The sum of the item scores is the child's raw score. Raw scores can be converted to standardised scores.

Executive Function: Tower of London (TOL) (Anderson, Anderson, & Lajoie, 1996): The TOL (Shallice, 1982) is a neuropsychological instrument devised to assess the planning aspects of executive function. Planning is conceptualised to be one of the central dimensions of executive function (Pennington & Ozonoff, 1996). Planning has been defined as

...the dynamic, and transactional process involving the conscious or deliberate specification of a sequence of actions aimed at achieving some problem goal, emphasising the constantly changing relationship between plans and actions, particularly what effects completed actions have on subsequent plans, goals, and mental representation... (Borkowski & Burke, 1996, p. 257).

TOL tasks are viewed as planning tasks because they require the individual to “look ahead” and develop a mental visualisation of the solution path that will aid performance (Carlin et al., 2000; Riccio, Wolfe, Romine, Davis, & Sullivan, 2004). Studies of patients with frontal lobe¹⁸ impairments suggest that the TOL can tap the planning aspect of executive function (Carlin et al., 2000; Shallice, 1988). The TOL also has the advantage for present purposes of not being dependent on the use of linguistic stimuli.

This thesis made use of a child’s version of TOL devised for 7 to 17 year old children (Anderson et al., 1996). The advantage of this version is that it offers standardized scores with a mean of 100 and a standard deviation of 15. The apparatus for the TOL includes three different coloured wooden balls (green, blue, red) and three wooden sticks of

¹⁸ As noted in previous chapters, executive function deficits are associated with frontal lobe deficits.

different length positioned at equal intervals on a wooden pegboard. The first stick can carry three balls, the second stick can carry two balls, and finally, the third one can carry only one ball.

The present version of TOL involves the administration of 1 practice problem and 12 problems. For each problem the child is presented with the standard configuration of the coloured balls. Then he/she is presented with the new configuration, which is depicted on a plastic stimulus card placed before the child. The child is expected to achieve the new configuration by re-arranging the balls in a prescribed number of moves, which are presented on the stimulus card, in a prescribed time limit, and by following certain rules: the child a) can move only one ball at a time, b) can hold no more than one ball in his/her hands, c) cannot place balls on the table and only use one hand, d) cannot place more balls than the required number onto the sticks. The number of prescribed moves ranges from 2-5 and the time limit is 60 seconds per trial. The child is instructed that whenever he/she makes a mistake, he/she should let the researcher know and put the balls back to the starting point so that he/she can try again.

The following scores were employed in this thesis:

- a) Total TOL score: this was operationalised as planning ability. To obtain the total score, initially, the child's score on each problem is calculated by subtracting the number of failed attempts from the child's time score. Then, the sum of the child's score on each problem is calculated. This sum can be easily converted to a

standardised score and comprises the child's total score on the TOL tasks. Each time score corresponds to a solution time as presented below:

Solution time	Time score
Less than 5 sec	9
6-10 sec	8
11-20 sec	7
21-40 sec	6
41-60	5
greater than 60 sec	0

The ranks into which solution time is divided are not equal and rather arbitrary, but Anderson et al. (1996) provide no justification for the reasoning behind this division.

- b) **Solution Time:** is the time taken to complete each individual pattern in the correct number of moves, irrespective of the number of attempts made to achieve a correct solution. The maximum solution time is 60 seconds. However, the child is aware of no time limit. Normally, after 60 seconds have passed the child should move to the next problem. Nonetheless, the examiner can extend this time period where necessary to determine whether the child is able to complete the problem without time constraints. For the present study it was decided that there would be no time extension.
- c) **Mean Solution Time:** this is the mean time taken to complete each pattern. It is calculated by adding up the solution time for each pattern and dividing the sum by the total number of patterns.

- d) Total Number of Failed Attempts: although the number of failed attempts is a fundamental score of TOL, Anderson et al., (1996) do not offer a clear description of it. They rather give a description of what the number of attempts score is: the number of times the child needs to attempt the problem before he or she achieves the correct configuration in the prescribed number of moves. A failed attempt should be an attempt that does not lead the child to the solution of the problem. In order to achieve the solution the child needs to achieve the correct configuration and comply with certain rules including achieving the correct configuration in the prescribed number of moves. Therefore, the number of failed attempts was defined as follows: the number of times the child has failed to achieve the correct configuration in the prescribed number of moves and by complying with the rules of the task. Failed attempts have been operationalised by past research as accuracy/efficiency of planning strategy (Carlin et al., 2000; Condor et al., 1995).
- e) Number of Rule Violations: this score refers to the number of the rules that the child violates during the execution of the task. These rules are the following: the child a) can move only one ball at a time, b) can hold no more than one ball in his/her hands, c) cannot place balls on the table and only use one hand, d) cannot place more balls than the required number on to the sticks. Achieving the configuration with no more or fewer moves than the prescribed number was considered a rule and was thus included in the rule violations score. This score has been operationalised as accuracy/efficiency of planning strategy (Carlin et al., 2000)

Planning time is an additional score that is employed by Anderson et al., (1996). Planning time starts when the stimulus card is exposed to the child and ends when the first ball is moved from its place. This score was not used in this thesis as planning time was of very short duration and was hard to record accurately.

Although the task requires quite a lot of information to be remembered by the child, it includes only one practice item. Moreover, the scoring of the task is complex as quite a lot of scores should be recorded almost simultaneously in a very short period of time. In order to help children understand the instructions and assist the author with the scoring more elaborated instructions than offered by Anderson et al., (1996) were developed and are presented in the Appendix D.

Phonological Awareness: *Phonological Awareness Battery* (Loizou & Stuart, 2003): To the knowledge of the author of this thesis no validated standardised tests exist for the assessment of phonological awareness in Greek. The test that will be employed in this study is a Greek non standardised phonological awareness battery that has been used in published research with 5 to 6 years old Greek-Cypriot children (Loizou & Stuart, 2003). It incorporates six phonological sub-tests devised to assess two dimensions of phonological awareness, namely shallow and deep phonological awareness (Loizou & Stuart, 2003). Shallow phonological awareness refers to rhyming and syllabic skills, whereas deep phonological awareness embraces phoneme blending and segmenting skills (Loizou & Stuart, 2003). The battery sub-tests are: rhyme oddity, syllable completion,

onset oddity, initial phoneme identification, single phoneme onset oddity, and phoneme deletion. The tests have been validated with Guttman Split-half reliability tests.

The rhyme oddity test includes 2 practice and 12 test items. The child is required to select the non-rhyming member of each of the 12 three-words sets included in the task. The test's Guttman Split-half reliability coefficient is 0.64.

The syllable completion test has 2 practice and 10 test items. The child is presented with 10 toys and small objects with two-syllable names. The examiner pronounces the first syllable and the child is asked to supply the final syllable. The Guttman Split-half reliability coefficient is 0.71.

The onset oddity test contains 2 practice and 12 test items. The child has to select the member of each of the 12 three-word sets that begins with a different consonant cluster than the other two. The Guttman Split-half reliability coefficient for this test is 0.75. The initial phoneme identification test includes 2 practice items and involves the presentation of 22 picture-items. The child is asked to name each picture and then say the first sound of each name. The Guttman Split-half reliability coefficient for this test is 0.90.

The single phoneme onset oddity test contains 2 practice and 12 test items. The child should select the member of each of the 12 three-word sets that begins with a different consonant cluster than the other two. The Guttman Split-half reliability coefficient is 0.60.

In the phoneme deletion task the child is required to delete phonemes in initial, final and medial positions. The task includes 4 practice items and 13 test items. The Guttman Split-half reliability coefficient is 0.78.

Two tests of the phonological battery were slightly modified. One practice item (*lira*=pound) of the syllable completion test was replaced by another one more familiar to Greek children (*vida*=screw). In the initial phoneme identification test the items of the *rabbit* and *zebra* were removed, because most children could not figure out what kind of animals were portrayed in the pictures. In this test the instructions were also modified. This test requires that the child should recognise the initial sound of the object's word. Despite instructing children that they should identify the first sound, they were speaking out the syllable. Therefore, the difference between identifying the sound and the syllable was fully explained in the instructions.

In order to assess the child's total phonological awareness performance, the raw scores of the six sub-tests were summed for each child. The range of the total phonological awareness score ranged from 0 to 75. The child's raw score for each sub-test is extracted from the sum of the correct responses.

Parental Involvement:

1) *Parental Involvement Questionnaire (PIQ)*: This questionnaire is a 41-item measure developed for this research to assess parental involvement in the 2nd Grade of the Greek

elementary school (Appendix E). Its response format is a combination of dichotomous (Yes/No), open-ended, and 1-5 Likert-scale questions.

This questionnaire is designed to assess parents' attitudes towards parental involvement (question 1), and five dimensions of parental involvement: involvement in school (question 5), communication with school (questions 6-7), involvement in homework (question 11), involvement in reading (question 14), involvement in socio-educational activities (question 15). The first two dimensions are representative of school-based involvement and refer to the active participation of parents in their children's school and communication with school. The remaining three correspond to home-based involvement and include steps that parents take in order to promote a learning environment at home. These dimensions are in agreement with Epstein's (1995) most widely and empirically validated conceptual framework of parental involvement (Fantuzzo, Tighe, & Childs, 2000). Special action was taken to make the dimensions reflect developmentally and culturally appropriate parental involvement. That is, the dimensions are indicative of the parental involvement behaviours that are supposed to be exhibited at the target developmental period and context, namely 2nd Grade Greek children.

The development of the PIQ was completed in three phases. First, the dimensions and questions were selected. Three informative sources were utilised for this task. The first is Epstein's (1995) conceptual framework of parental involvement. Among the current frameworks Epstein's (1995) conceptual framework of parental involvement is thought to be the most promising (Fan, 2001). Epstein recognises six types of parental involvement

which have been validated through confirmatory factor analysis: a) involving parents in child rearing skills, b) school-parent communication, c) involving parents in school volunteer opportunities, d) involving parents in home-based learning, e) involving parents in school decision making, and f) involving parents in school-community collaborations (Fan, 2001).

A second and very important source comprised the parental involvement questionnaires used in two governmental projects launched by the US and UK Departments of Education in order to assess parental involvement in children's' education (US Department of Education., 1997; Williams, Williams, & Ullman, 2002). Finally, 2nd Grade Greek teachers comprised a third source from which information about the dimensions and questions was sought. Specifically, ten teachers were asked to indicate the involvement behaviours that are demonstrated by Greek parents with children in the 2nd Grade.

Next was the translation of the questionnaire into Greek. The questionnaire was first translated from English to Greek by the author. Then, it was translated again from Greek to English by a Greek psychologist, who had developed a similar questionnaire. The two translations were compared with each other and with the original English version in order to check the agreement between the different translations.

The final phase endeavoured to gather information about the wording, comprehensiveness, and length of the questionnaire. The translated questionnaire was

administered to ten Greek parents. After completing it, parents were asked to comment on the wording, length, comprehensiveness, and overall structure of the questionnaire.

2) *Parental Involvement Telephone Interviews (Spot-Checks)*: A telephone interview (Appendix F) was developed as a means of assessing parental involvement in a prospective way and in order to confirm the questionnaire measure of parental involvement. The interview assesses four dimensions of parental involvement derived from the PIQ: a) communication with school, b) parental involvement in homework, c) parental involvement in reading, d) parental involvement in socio-educational activities. The interview guide is structured in type and comprised of 14 short, closed, and open-ended questions that refer to the above dimensions. For the closed questions a Yes/No/I am not sure option was offered.

3.4.5 Procedure

Children were assessed individually in a quiet room at school during the ordinary school day. The child's teacher determined the day and time of test administration. The minimum duration of test administration was approximately 80 minutes. Consequently, test administration was completed in three sessions of approximately 30 minutes each. The three session decision was made in order to reduce the likelihood of children becoming tired and bored due to the long duration and repetitiveness of the administration procedure. The sessions and order of test administration are listed below:

- 1st session: WISC-III Similarities, Conners' CPT, WISC-III Number Memory
- 2nd session: Single Phoneme Onset Oddity, WISC-III Comprehension, Phoneme Identification, WISC-III Vocabulary
- 3rd session: Phoneme Deletion, Tower of London, Onset Oddity, Syllable, Rhyming

The order of the tests was organised in such a manner that would maintain children's interest undiminished for the duration of the administration procedure. Verbal tests were interchanged with tests that were more perceptual in nature. Such an interchange was intended to add a variety of stimuli and excitement to the test administration procedure. Moreover, provision was made so that hard tasks were followed by easier and/or more *relaxing* tests.

In order to motivate children better, a rewarding game was invented. At the first visit children were told that after the completion of each session a sticker would be given to those who *work well* and that those who collected a sticker for each one of the sessions would be given a present in the end.

Teachers were asked to give out the parental questionnaire to the parents and to remind them as necessary to complete it. After the administration of the questionnaires the telephone interviews were conducted.

3.5 Ethics

In the present study all possible efforts were made to protect the confidentiality and privacy of the data and to retain the anonymity of the participants. Confidentiality is synonymous with the authorisation of data access (Anastasi & Urbina, 1997). In order to preserve confidentiality no one except the research team was authorised to have access to the data. The protection of privacy involves the concept of informed consent (Anastasi & Urbina, 1997). Thus, all the likely participants, before taking part in the study, were asked to sign an informed consent form where all the conditions under which they would participate were fully articulated. For child participants, informed consent was obtained from their parents-guardians. Finally, as a means of preserving anonymity, the names of the participants did not appear on the response questionnaires.

The parents and teachers of the participants, as well as those with children in need of special care that were excluded from the study, were offered upon request educational material or information for the remediation of children's behaviour and academic difficulties. A list with all the local services for child mental health was also given to teachers and parents.

3.6 Pilot Study

The major reason for designing this pilot study was the need to ensure the feasibility of the main study. It was particularly important to establish the effectiveness of the participant selection procedures and the test administration procedures in the Greek

school setting. Similarly essential was the author's mastery of the tests' administration and scoring.

The tests were administered to 15 children identified with CP (n=5), PR (n=5) and WCP-PR (n=5) on the basis of the Conners' TRS-28 ratings and teacher judgments of reading performance. The pilot study revealed some complications regarding the conduct of the study. In view of these complications, the set up and execution of the main study were subject to a few changes. The participants' selection and tests' administration procedures were modified. In particular, the instructions given to the teachers for the identification of conduct-disturbed children were made more specific. The administration of the test sessions were expanded from two to three and the order of tests in each session was altered. Moreover, it was decided that the questionnaires would be collected through teachers rather than by post as had been planned at the outset.

As far as the research instruments are concerned, it was decided that the verbal IQ battery should include another verbal sub-test in order to obtain a full score of verbal IQ that can be easily converted into a standardised score. From the remaining verbal sub-tests of the Greek WISC-III, the Comprehension sub-test was selected to be included in the final verbal IQ battery. For the TOL several scoring instructions were invented anew. Assessment of reading was decided to be made on the basis of the standardised Test of Reading Ability Detection rather than on teachers' judgments of reading attainment. The Phonological battery was also subject to alterations. One item of the Syllable test was replaced by a more appropriate one. Moreover, two items of the Phoneme Identification

test were omitted and the number of practice items was increased to 4. The instructions for this test were also adapted.

3.7 Summary

The research design of the study is a non-experimental comparative design. Participant children's scores on assessments of AD/HD, attention, verbal ability, phonological awareness, executive function as well as their parents' answers to questions about parental involvement in children's education and social life were compared between four groups:

1. children without conduct problems and poor reading;
2. children with conduct problems only;
3. children with conduct problems and poor reading;
4. children with poor reading only.

The groups were formed on the basis of teachers' reports of behaviour and measures of children's reading attainment.

Participants were assessed individually on the Conners' TRS-28 behaviour rating scale, the Test of Reading Ability Detection, the Conners' CPT-II, a prorated verbal IQ of the Greek Version of WISC-III, a phonological awareness battery and the Tower of London. Their parents completed a parental involvement questionnaire and participated in a short telephone interview.

Participation in the study was conditional on informed consent. Access to the data was strictly restricted to the research team only. A small pilot feasibility study was conducted before main data collection to ensure the effectiveness of the planned procedures and assessments.

4. RESULTS

4.0 Introduction

This chapter considers the analysis of data and presents the empirical results of the thesis. The first and second sections describe the preparation of the data for the statistical analysis, and the statistical analytic techniques employed, respectively. The third section covers the group differences in participant selection and demographic variables. The fourth, fifth and sixth sections deal with the examination of group differences in psychological characteristics, the evaluation of the strength of these differences, and the non-parametric analyses, respectively. The seventh section presents the group differences after statistically controlling for certain psychological variables. Section eight and nine present the analysis of group differences in parental involvement in children's education and social life, and the summary of the results, respectively.

4.1 Data Preparation

The statistical techniques employed in this thesis are based upon certain theoretical assumptions about the distribution and the frequencies of the data. This section deals with the preparation of the data in such a way so as to fulfill the theoretical requirements of the statistical techniques employed. Given that preparation is conditional upon the type of variables, this section is divided in two parts; the first part describes the modification of continuous variables, while the second part refers to the modification of categorical variables.

Continuous Variables

Continuous variables refer to those variables where the distances between the categories are equivalent across the range of categories. They are also referred to as interval variables. All the variables used to select the participants and assess their psychological characteristics were measured on interval scales and, therefore, were treated as continuous variables.

Parametric statistics were used as they are considered to be especially powerful in detecting genuine differences and can be used with continuous variables (Coolican, 1999). The usage of parametric statistics is based on two major assumptions; that the data are normally distributed and that there is homogeneity of the variances of the groups, namely, that the variances are not significantly different (Pallant, 2004). In order to check whether the assumption of normally distributed data was satisfied, normality assessments were performed by assessing the skewness of the scores' distribution. Degree of

skewness comprises an indicator of the distribution's normality (Howitt & Cramer, 2002). According to Dancey & Reidy, (2004), skewness of about + or -1 suggests significant deviations from a normal distribution.

Before conducting the normality assessments, special treatment of the outliers was made. Outliers can considerably influence the normal distribution of scores by making it more skewed. Therefore, it was decided to make outliers less deviant and, consequently, reduce their impact on the distribution. The outliers were adjusted so that they were one unit larger or smaller than the next most extreme score in the distribution while maintaining their ranking (Dancey & Reidy, 2004; Tabachnick & Fidell, 1997). This method of adjustment was selected over the elimination of outliers, because elimination would reduce the sample size. The present study involves group data instead of correlational data. In line with the recommendations of Tabachnick & Fidell (1997) for outlier treatment, normality assessments, as well as outlier adjustment, were conducted groupwise.

The box-plots presented in Appendix G display the distribution of scores after adjusting the outliers. Generally, box-plots revealed that for the majority of the variables the distributions were not excessively skewed. Certain variables¹⁹ remained skewed for some of the groups, namely, skewness was 1 or more than 1. The box-plots (Appendix G) also showed that there was a clear ceiling effect for the phonological Syllable Oddity sub-test (Appendix C: Figure 6c). This sub-test was excluded from the analysis and subsequently,

¹⁹Variables with skewness of about 1 after adjustment of outliers: WISC-III Vocabulary: CP=1.418, PR=1.572; Phoneme Identification: WCP-PR=1.428, CP=1.079; Onset: WCP-PR=1.439; TOL Rule Violations: WCP-PR=1.055, PR=1.004; Conners' CPT-II Omissions: WCP-PR=1.006;

the phonological awareness composite score was composed of five instead of six sub-tests. All the phonological sub-tests were relatively skewed as they were rather easy for the participants given that even the scores of the less competent children were quite high.

With reference to the assumption of homogeneity of variance, Levene's tests were performed for each variable after outliers were adjusted. The tests were significant for all the phonological awareness scores ($p=0.00$) and for the Conners' CPT-II test Omissions ($p=0.001$) and Response Style ($p=0.00$) variables. The tests were also significant for the majority of the TOL scores: TOL Total Score ($p=0.012$), No. of Failed Attempts ($p=0.016$) and No. of Rule Violations ($p=0.032$). No test was significant for the verbal measures ($p>.05$).

Based on the above findings, satisfactory normality and homogeneity of variance could not be assumed for some variables. Parametric tests can be sensitive to excessive skewness and lack of homogeneity of variance (Howitt & Cramer, 2002). Non-parametric test usage does not depend on the assumption that the population under investigation is homogeneous and normally distributed (Coolican, 1999). Therefore, the non-normally distributed variables as well as the variables without homogeneity of variance that were subject to parametric analyses were also subjected to non-parametric analyses. If the results of the parametric analyses are shown to be in agreement with results of the non parametric analyses, this would suggest that the former results have a reasonable degree of validity.

Nearly full data were obtained for all the measures that were used to assess psychological variables (only two cases did not have complete data on the Conners' CPT-II measure). Thus, no special treatment for handling missing data was required.

Nominal/Ordinal Variables

Nominal variables refer to variables that cannot be rank ordered and they comprise named categories (Howitt & Cramer, 2002). Ordinal variables are variables that can be rank ordered but the distances between the categories are not equal across the range (Bryman, 2001). The majority of the parental involvement variables assessed by the questionnaire are ordinal variables. The parental involvement variables measured by the telephone interviews as well as the demographic variables of gender, family education and family occupation are nominal variables.

Twenty-six questionnaires and 31 telephone interviews were missing out of a total of 123 cases. The missing and non-missing cases per group are presented in Table 1. Chi-square analysis was run in order to examine the differences between participants with and without missing data on behaviour ratings and reading scores. No significant group differences were detected for number of missing questionnaires ($\chi^2(3, N=97)=2.82, p=.42$) and number missing interviews ($\chi^2(3, N=92)=3.32, p=.34$). Thus, it was assumed that missing cases occurred uniformly and, therefore, that further analysis would not be affected by the amount of missing data.

Table 1. *Frequencies and Percentages of Missing and Non-Missing Cases*

Measure	WCP-PR		CP		CP-PR		PR		Total	
	f	%	f	%	f	%	f	%	f	%
Questionnaire										
Missing	5	16.7	8	28.6	8	26.7	5	14.3	26	21.0
Non-Missing	25	83.3	20	71.4	22	73.3	30	85.7	97	79.0
Total	30	100	28	100	30	100	35	100	123	100
Telephone Interviews										
Missing	4	13.3	9	32.0	9	30.0	9	25.7	31	25.2
Non-Missing	26	86.7	19	68.0	21	70.0	26	74.3	92	74.8
Total	30	100	28	100	30	100	35	100	123	100

The parental involvement variables were analysed with chi-square tests. The chi-square test assumes that there should be no more than 25% of cells with an expected frequency of less than five (5) (Reid, Eddy, Fetrow, & Stoolmiller, 1999). Expected frequency is the frequency that would be expected if there was no association between the variables (Howitt & Cramer, 2002). The chi-square contingency table revealed too many cells (more than 25%) with expected frequency less than the rule-of-thumb value five (5). Moreover, because the questionnaire's variables were composed of too many categories, the contingency tables were hard to interpret. Category reduction is a common strategy adopted as a means of minimising the problem of empty cells and interpretation (Howell, 2002; Howitt & Cramer, 2002). Where it was possible and meaningful, the number of categories was reduced. In particular, the *Don't know* and *I am not sure* responses were treated as missing and were eliminated from the analysis of both the questionnaires and telephone interviews. The elimination did not result in great loss of sample size as very few participants chose these responses. It was also observed that very few cases fell in the

extreme categories e.g. strongly disagree or 5 or more times of the questionnaire's responses. Because of that, these categories offered very little information and they comprised the major source of empty cells. It was decided to reduce them and create broader categories by combining the existing categories. The four response categories of

- a) 1. *Strongly disagree*, 2. *Disagree*, 3. *Agree*, 4. *Strongly disagree*;
- b) 1. *Strongly dissatisfied*, 2. *Dissatisfied*, 3. *Satisfied*, 4. *Strongly satisfied*; and
- c) 1. *Not at all*, 2. *1-2- times*, 3. *3-4 times*, 4. *5 or more times*

were reduced to a two response categories respectively:

- a) 1. *Agree*, 2. *Disagree*;
- b) 1. *Satisfied*, 2. *Dissatisfied*;
- c) 1. *Not at all to 2 times*, 2. *3 or more times*.

The five response categories of

- a) 1. *Not at all*, 2. *Not very much*, 3. *Pretty much*, 4. *Very much*,
5. *Extremely much*; and
- d) 1. *Not at all confident*, 2. *Not very confident*, 3. *Fairly confident*, 4. *Very confident*, 5. *Extremely confident*

were reduced to a three response categories respectively:

- a) 1. *Not very much*, 2. *Pretty much*, 3. *Very much*;
- b) 1. *Not very confident*, 2. *Fairly confident*, 3. *Very confident*.

The above solution minimised the number of insufficient cell numbers for each variable of the questionnaire. Out of a total of 51 parental involvement variables, 12 only had more than 25% cells with expected frequency less than 5.

4.2 Statistical Analyses Employed

This thesis seeks to investigate differences between groups on a wide range of measures. The statistical techniques employed are directed towards revealing these differences. In this thesis both univariate and multivariate analysis were employed. Univariate analysis refers to the analysis of one variable at a time (Bryman, 2001), whereas multivariate analysis refers to the simultaneous analysis of three or more variables (Bryman, 2001). One of the major differences between univariate and multivariate analysis is that *...the computation of multivariate tests takes into account the correlation among the variables, whereas univariate tests ignore this information in the data* (Sharma, 1996, p. 355). Initially, analysis of the data was carried out by utilising univariate methods. Following the univariate analysis, multivariate analysis was carried out in order to examine how the different variables behaved in combination. On the basis of whether the variables are categorical or continuous, distinct univariate and multivariate statistical analyses were employed. These analyses are described in the following sections.

4.2.1 Univariate Analysis

Continuous Variables

Analysis of variance (ANOVA) comprises a powerful parametric statistical method for examining differences between groups and can be used with continuous variables

(Coolican, 1999). This thesis examines differences between four groups in several measures that assess psychological characteristics. Univariate (one-way) between groups analysis of variance (ANOVA) compares two or more groups in terms of their mean score on a dependent variable. Psychological characteristics comprised the dependent variables. Therefore, one-way ANOVA was used to examine for group differences. The p-value of the analysis was set at .05.

Certain variables (verbal ability, attention, executive function) were assessed with more than one measure. When multiple tests are carried out to measure one variable there is an increasing likelihood for making a Type I error (Howitt & Cramer, 2002). That is, some of the statistical analysis will give results with a low probability level by sampling error alone (Dancey & Reidy, 2004) and they will increase the likelihood of getting significant group differences, when in fact, the groups do not differ. Multivariate analysis of variance (MANOVA) comprises a good solution when many comparisons are to be made and therefore minimises type I error (Dancey & Reidy, 2004; Sharma, 1996; Tabachnick & Fidell, 1997). MANOVA makes more restrictive assumptions than ANOVA about the characteristics of the data that were not met in this study. The assumptions involve multivariate normality and homogeneity of variance-covariance matrices (Sharma, 1996).

For the variables where multiple testing was required, it was decided to use one-way between-groups ANOVA and control for inflated Type I error by utilising the Bonferroni adjustment of the p-value for multiple comparisons (Dancey & Reidy, 2004; Sharma,

1996; Tabachnick & Fidell, 1997). To achieve this, the p-value is divided by the number of comparisons that are to be made, and then this new value is used as the required p-value.

When a significant difference was detected by ANOVA tests, pairwise post-hoc comparisons were conducted to investigate specific differences between the groups. Post-hoc comparisons were performed by employing Tukey Honestly Significant Different (HSD) tests. The Tukey HSD test is commonly used for pairwise group comparisons (Dancey & Reidy, 2004). It was selected over the Scheffé test, because the latter is very conservative and appropriate only when the focus of interest is the evaluation of all possible comparisons and not of pairwise contrasts (Howell, 2002).

Although the above statistical tests indicate whether there is a statistically significant group difference they do not indicate the size of the difference. It is recommended that in order for the results to be meaningful effect sizes should be calculated (Dancey & Reidy, 2004). Effect size shows the degree to which groups differ. This thesis makes use of the effect size statistic d . The d statistic measures the difference between two means in terms of standard deviations. The d formula ($d = (M1 - M2) / ((SD1 + SD2) / 2)$) for non-markedly unequal variances was used (Cohen, 1977). Cohen's guidelines for interpretation of the strength of the d values (small: $d = .20$; medium: $d = .50$; large $d = .80$.) were used.

Analysis of covariance (ANCOVA) was used when it was judged essential to control statistically for variables that were suspected to be influencing the results. The Kruskal-

Wallis test is the non-parametric equivalent to one-way between-groups ANOVA. It was used in order to assess group differences in variables that were significantly skewed and/or were lacking satisfactory homogeneity of variance.

Nominal/Ordinal Variables

The primary goal of the parental involvement questions was to gather data for measuring different aspects of parental involvement. The approach employed for investigating between group differences in parental involvement (see questionnaire in Appendix E) involved the calculation of the participants' total score on each dimension of parental involvement. The dimensions were: involvement in school (question 5), communication with school (question 6-7), involvement in homework (question 11), involvement in reading (question 14), involvement in socio-educational activities (question 15). The total score for each dimension was the averaged sum of the scores. A Likert-scale response format ranging from 1-5 was used for the questions measuring parental involvement dimensions. The Kruskal-Wallis test can be used to compare rank ordered scores between three or more groups (Pallant, 2004). Hence, Kruskal-Wallis tests were employed for the analysis of between group differences on the parental involvement dimensions. The p-value of the Kruskal-Wallis analysis was set at .05. The tests did not show any significant differences between the groups. The results of the Kruskal-Wallis tests can be found in Appendix H.

Following the analysis of the parental involvement dimensions, the questions referred to attitudes towards parental involvement, child's difficulty in doing homework and parental

confidence in helping with child's homework were analysed. The results for the Kruskal-Wallis tests showed that there were no significant group differences. The results are presented in Appendix H.

In the absence of significant differences in parental involvement after treating the variables as ranked-ordered, an alternative approach was used which was considered to be more likely to capture significant differences. Instead of analysing participants' scores on each dimension, each item of the questionnaire was separately analysed as an independent parental involvement variable. This method would assure that response variations on individual variables that would have been lost if a dimensional approach was used would be revealed. In addition, the parental involvement variables were treated as more global categories of parental involvement with fewer response levels in an attempt to capture parental involvement in a more categorical fashion. It was assumed that by clustering the variables in few categories the likelihood of getting a difference would be higher than using many different levels where the distinction between them is very subtle, especially in a small sample where participants' responses do not spread evenly across the whole range of possible responses. The categorical variables (resulting from collapsing the initial responses in few categories) were analysed using chi-square tests. Chi-square tests can be utilised in the assessment of differences between groups when nominal/ordinal data are used (Dancey & Reidy, 2004). The procedure that was followed for the reduction of the response level of parental involvement variables has been already mentioned in section 4.1 in this Chapter. The parental involvement questions of the telephone interviews were categorical in nature; consequently, these

were also analysed with chi-square tests. The p-value of the chi-square analysis was set at .05.

The chi-square analysis of the parental involvement variables produced contingency tables that had several rows and columns, because the majority of the pairs of variables that were compared had more than two levels (e.g., Group: CD, WCP-PR, CP, CP-PR x Confidence in helping with homework: Not very confident, Fairly confident, Very confident). When the interest is in the association between two variables that have more than two levels, RxC (row X column) chi-squares are utilised. RxC instead of 2x2 chi-squares were performed.

Due to multiple rows and columns, the interpretation of RxC chi-square contingency tables is quite complicated. They do not offer adequate information with regards to where exactly the significant difference lies. A legitimate method for obtaining a precise estimate of the direction of the difference is to partition the RxC contingency tables into several 2x2 tables and calculate separate chi-squares for each one them (Howitt & Cramer, 2002). The chi-square calculation of the partitioned contingency tables requires the division of the desired significance level by the number of the separate chi-squares that will be carried out. Upon detecting significant differences and wherever possible, subsequent 2x2 chi-squares were run after adjusting for the significance level. Where separate 2x2 chi-squares were run and violated the expected cell frequencies, the Fisher exact probability value was utilised as it is not sensitive to small expected frequencies (Howitt & Cramer, 2002).

4.2.2 Multivariate Analysis

The univariate analyses indicated several psychological (continuous and categorical variables) that were likely to distinguish between the groups. In order to further investigate the potential of these variables to distinguish between the groups when considered as a set but also independently, logistic regression was utilised. This statistical method is *...a form of multiple regression in which a number of predictors are used to predict values of a single nominal dependent or criterion variable* (Howitt & Cramer, 2002, p. 419). It is utilised when the interest is in predicting category membership (Howitt & Cramer, 2002). In particular, it establishes whether a set of predictor variables can distinguish between the groups as well as the extent to which each predictor variable uniquely predicts the groups. One of the advantages of multinomial logistic regression is that both continuous and dichotomous variables can be used in the same analysis as predictor variables. When the categories that are to be predicted are more than two the procedure is called multinomial logistic regression. In the present study the categories (groups: CP, CP-PR, PR, WCP-PR) for prediction are more than two and thus, multinomial regression was utilised.

Discriminant function analysis is another statistical method that is employed for group membership prediction. Discriminant function analysis is a demanding method as it makes many restrictive assumptions about the characteristics of the data (for a discussion see Brace, Kemp, & Snelgar, 2000; Howitt & Cramer, 2002). Both logistic and discriminant function analysis can be used for predicting group membership (Brace et al., 2000; Clark-Carter, 2004; Howitt & Cramer, 2002). Clark-Carter (2004) notes that

Logistic regression can also be used in a similar to way to discriminant in that it can attempt to classify participants into their original categories to see how accurate it is at predicting group membership (p. 346). Because logistic regression makes less restrictive assumptions its use is more strongly recommended than discriminant functions analysis (Howitt & Cramer, 2002). Therefore, the present thesis employed multinomial logistic regression discriminate function analysis.

4.3 Participants' Characteristics

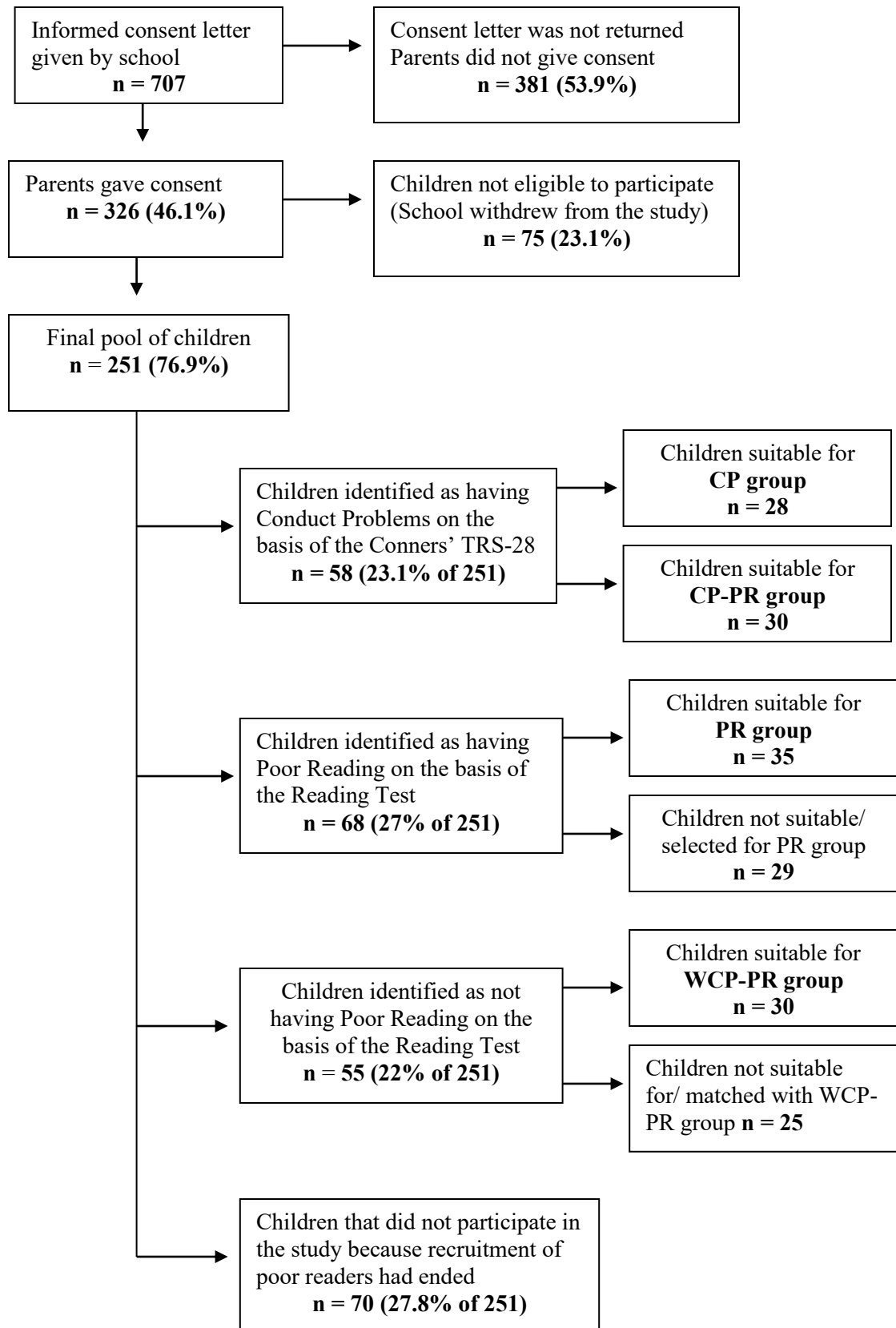
The sample consisted of 123 children that were recruited from a school population (n=1354) of 2nd Grade Greek children. Of the 123 in total, 30 comprised the WCP-PR group, 28 the CP group, 30 the CP-PR group, and finally, 35 the PR group.

The ethnic composition of the sample was 96.74% (n=119) of Greek students and 3.25% (n=4) was of Greek nationality but of foreign (Albanian, Georgian) or of repatriated former USSR Greek origin.

Participant Selection Flow

The participant selection flow is shown in the flow chart in Figure 1. Out of a total of 34 schools that were approached, two schools did not agree to participate in the study. The 32 schools that agreed to participate contained a total of 1354 children in the target age-range. Of the 32 schools that accepted to participate, there were 22 schools where teachers identified children with conduct problems. Informed consent letters were given

Figure 1. Participant Flow Chart



to the children (n=707) of all the schools where teachers identified children with conduct problems.

Out of the 707 children given informed consent letters, 326 children (46.1%) returned back positive consent letters to the teachers. That is, nearly half of the children that were given informed consent letters did not participate in the study. That was either because they never returned the consent letter to the school or their parents did not agree to participate. However, it should be highlighted that the majority of the students identified by teachers as having conduct problems were recruited into the study. In particular, of the 70 children that were identified by teachers as exhibiting conduct problems, teacher ratings on the Conners' TRS-28 were obtained for 55 children, which is a 78.5 % of the total number of children identified with conduct problems in the original pool of 707 children.

Seventy-five (75) of the 326 children with consent were not eligible to participate, as their school subsequently decided to withdraw from the study. The final pool of eligible children was 251, (76.9% of the children with consent). Out of these children, 58 (23.1% of the final pool) met the Conners' TRS-28 criteria for conduct problems. Of those children, 30 had also poor reading so they formed the CP-PR group and 28 did not exhibit poor reading so they formed the CP group.

From the remaining 193 children without teacher-nominated conduct problems, 68 (27% of the final pool) were found to exhibit poor reading according to the reading test. Of

those 68 children, 35 were selected to form the PR group. The other 29 children that were also judged to do poorly in reading did not participate in the study because

- a) they did not speak Greek as a first language,
- b) they had additional special needs or
- c) they were not selected. In school classes where children with poor reading outnumbered those with conduct problems, only the same number of children with poor reading as the number of children with conduct problems were selected.

Of the 193 children without teacher-nominated conduct problems, 55 (22% of the final pool) children were not found to exhibit poor reading according to the reading test. Thirty (30) of those children were matched and selected to form the WCP-PR group. The remaining 25 did not participate in the study because

- a) they met the Conners' TRS-28 for attention deficits and/or hyperactivity or
- b) they could not be matched with a child with conduct problems.

The remaining 70 children (36.2% of the final pool) were not selected as the study was at the stage that the selection of children showing poor reading had stopped therefore only those children that were identified as having conduct problems and their respective matched controls were recruited.

4.3.1 Age and Gender

The sample of the present thesis consists of 87 boys and 36 girls with mean age 7 years and 2 months (Standard Deviation= 0.3 months, Range = 1.06 years). The age means

(M), standard deviations (SD), and gender distribution of each one of the four groups are presented in Table 2 and 3 respectively. Figures 2 and 3 depict graphically the distribution of age and gender.

Table 2. *Group Means and Standard Deviations of Age*

	WCP-PR		CP		CP-PR		PR	
	M	SD	M	SD	M	SD	M	SD
Age	7.30	0.30	7.2	0.40	7.20	0.60	7.10	0.30

Figure 2. *Mean Age*

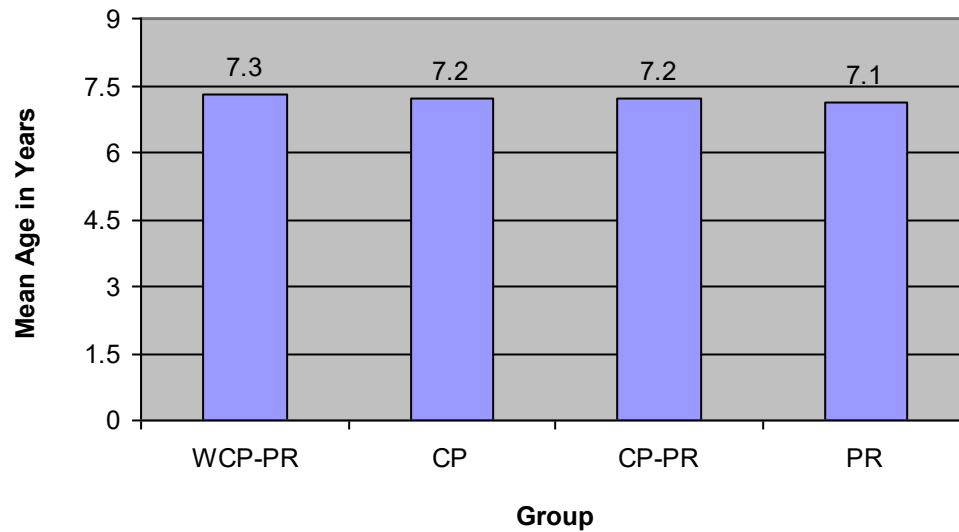
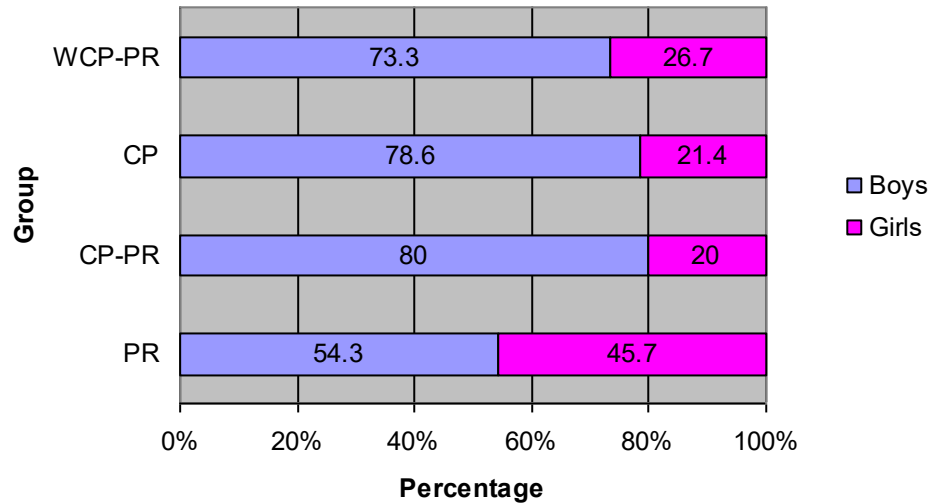


Table 3. *Distribution of Gender*

Gender	WCP-PR		CP		CP-PR		PR	
	f	%	f	%	f	%	f	%
Boys	22	73.3	22	78.6	24	80.0	19	54.3
Girls	8	26.7	6	21.4	6	20.0	16	45.7
Total	30	100	28	100	30	100	36	100

Figure 3. Distribution of Gender



As far as the age of the groups is concerned, analysis of variance showed no significant age differences ($F(3, 119) = .36, p = .78$). On the basis of this result, similar distribution of age between the groups was assumed and, therefore, control of age effects on the results was not required. With regards to gender, chi-square analysis yielded non significant gender differences ($\chi^2(3, N=123) = 6.74, p = .08$). However, the figures in Table 3 show a tendency of males to be overrepresented in the sample. Hence, in the analysis to follow, the likelihood of gender differences influencing the results will be examined.

4.3.2 Conduct Problems and Reading

The criterion for inclusion in the groups had been defined as follows (for details see *Participants*, 3.4.3 section, Chapter 3):

WCP-PR group: the child should receive ratings below the clinical cutoff point on the Conners' TRS-28 Conduct Problems (rating < 8), Inattention (rating < 11) and Hyperactivity (rating < 9) scale and score above the 25% percentile (T-score > 90) on the Test for Reading Ability Detection.

CP-PR group: the child should receive ratings at or above the clinical cutoff point (score ≥ 8) on the Conners' TRS-28 Conduct Problems scale and score at or below the 25% percentile on the Test for Reading Ability Detection (T-score ≤ 90).

CP group: the child should receive ratings at or above the clinical cutoff point (score ≥ 8) on the Conners' TRS-28 Conduct Problems scale and score above the 25% percentile (T-score > 90) on the Test for Reading Ability Detection.

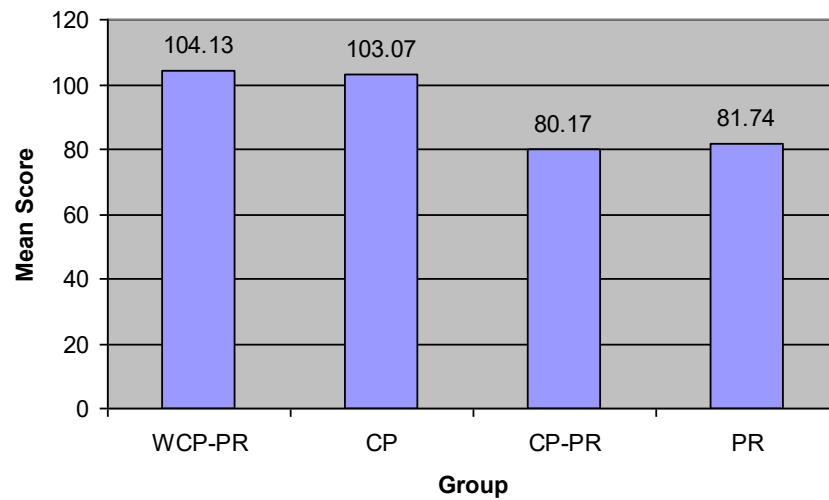
PR group: the child should receive ratings below the clinical cutoff point (score < 8) on the Conners' TRS-28 Conduct Problems scale and score at or below the 25% percentile (T-score ≤ 90) on the Test for Reading Ability Detection.

The groups' means and standard deviations in the Test of Reading Ability Detection scores are presented in Table 4. Frequency graphs for the groups' reading scores can be found in Figure 4.

Table 4. *Group Means and Standard Deviations in the Test for Reading Ability Detection*

Measures	WCP-PR		CP		CP-PR		PR	
	M	SD	M	SD	M	SD	M	SD
Reading	104.13	11.59	103.07	9.28	80.17	5.67	81.74	4.37

Figure 4. *Group Mean Scores in the Test of Reading Ability Detection*



Differences in the level of conduct problems between the groups that met criteria for conduct problems (CP, CP-PR) were examined. The two groups' mean ratings in conduct problems were analysed by using independent samples t-tests. The results (Table 5) showed that there was not any significant difference in the level of conduct problems between the CP and CP-PR groups. T-tests were also performed to examine the reading level of the poor reading groups of the study (CP-PR, PR). As expected, the results (Table 5) demonstrated that the reading level of these groups did not differ.

Table 5. *Between Group Differences in the Conners' TRS-28 Conduct Problems Ratings and in the Test for Reading Ability Detection*

Measures	Independent Samples t-tests	
	t df (56)	p
Conduct Problems	.57	.56
Measures	Independent Samples t-tests	
	t df (63)	p
Reading	-1.26	.21

4.3.3 Marital Status, Family Education and Family Occupation

Marital status was defined as married or single on the basis of whether parents were married or not at the time that the study took place. With regards to family education as well as occupation three (3) categories for education and three (3) for occupation were identified.

The education categories are:

- a) Basic education or less: This category includes parents with either primary or primary and the first 3 years of high-school education, which is called Gymnasium. It comprises the basic education that a person can get and is considered to be compulsory;
- b) Secondary or Post-Secondary Education: Secondary education refers to the completion of the education offered by the Gymnasium plus three years in the Lyceum or in the Technical secondary school. Instead of the Lyceum some students choose Technical schools where they can receive training in certain professions. Post-Secondary Education

involves all the private or public schools where registration requires a secondary school diploma. Usually the course of study ranges from one (1) to two (2) years;

c) Higher Education: this includes undergraduate or postgraduate studies.

The occupation categories are:

a) Highly skilled: This includes all the occupations either in the public or private sector that occur mainly in an office environment and usually require a higher education degree e.g. bank clerks, civil servants, accountants, economists, teachers;

b) Skilled: This category concentrates all the occupations that require some level of expertise, do not usually occur in an office environment and they can be either manual or non manual e.g. farmers, cattle-breeders, fishermen, builders, drivers, bakers, sound technicians, blacksmiths, shop owners, secretaries. The cases that fall in this category do not possess a higher education diploma. The education of members of this category typically varies from basic to secondary/post secondary;

c) Semi-skilled/ unskilled: This category includes occupations that are largely manual and usually require no expertise e.g. laborers in industry, cleaners, shop assistants. The cases that fall in this category typically do not possess a higher education diploma. The education of members of this category usually varies from basic to secondary/post secondary.

The children's family education and occupation was based either on father's or mother's education or occupation, whichever was the higher (for details see *Description and Development of the Research Instruments*, 3.4.4 section, Chapter 3). The frequency and

percentage of the groups' parents classified in each of the marital status, education and occupation categories are presented in Table 6. Frequency graphs of Marital Status, Family Education and Family Occupation are presented in Figures 5a-5c.

RxC chi-square tests were carried out as a means of detecting differences between the parent marital, education, and occupation status of the four groups. No significant group differences were observed in the marital status ($\chi^2(3, N=105)=4.42, p=.21$), education ($\chi^2(6, N=93)=9.76, p=.14$) or occupation ($\chi^2(6, N=92)=10.58, p=.10$) frequencies.

Table 6. *Distribution of Family Education and Family Occupation*

	WCP-PR		CP		CP-PR		PR	
	f	%	f	%	f	%	f	%
Marital Status								
Married	26	100	22	100	21	91.3	31	91.2
Single	0	.00	0	.00	2	8.7	3	8.8
Total	26	100	22	100	23	100	34	100
Family Education								
Basic	2	8.3	3	15.0	6	30.0	7	24.1
Secondary/ Post-Secondary	11	45.8	9	45.0	11	55.0	17	58.6
Higher	11	45.8	8	40.0	3	15.0	5	17.20
Total	24	100	20	100	20	100	29	100
Family Occupation								
Semi-skilled/ Unskilled	1	4.2	4	20.0	4	21.1	7	24.1
Skilled	13	54.2	8	40.0	12	63.2	18	62.1
Highly Skilled	10	41.7	8	40.0	3	15.8	4	13.8
Total	24	100	20	100	19	100	29	100

Figure 5a. Distribution of Marital Status

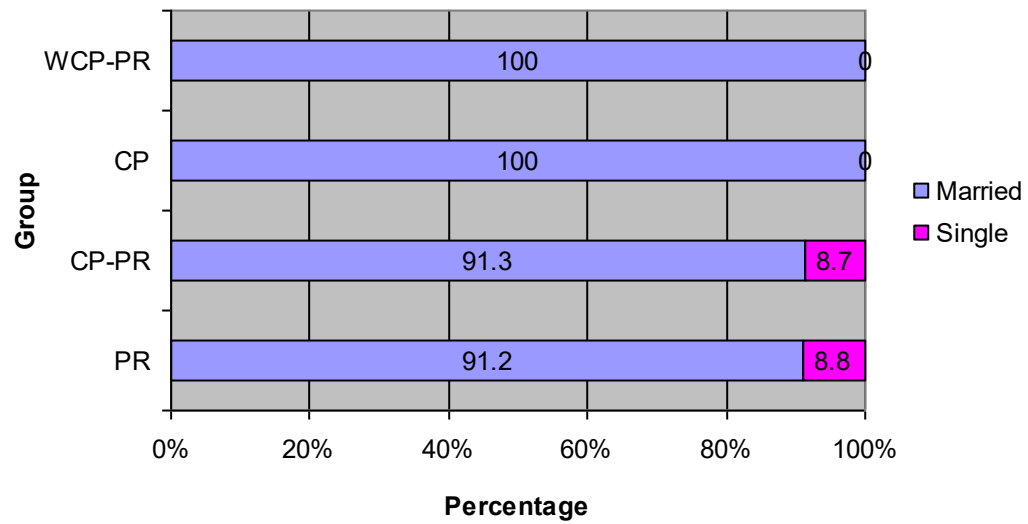


Figure 5b. Distribution of Family Education

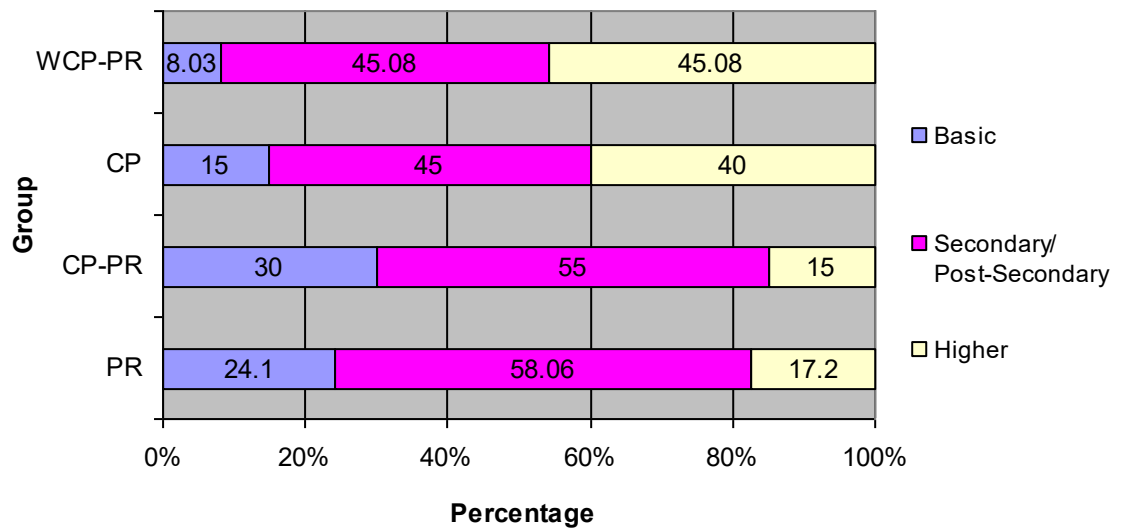
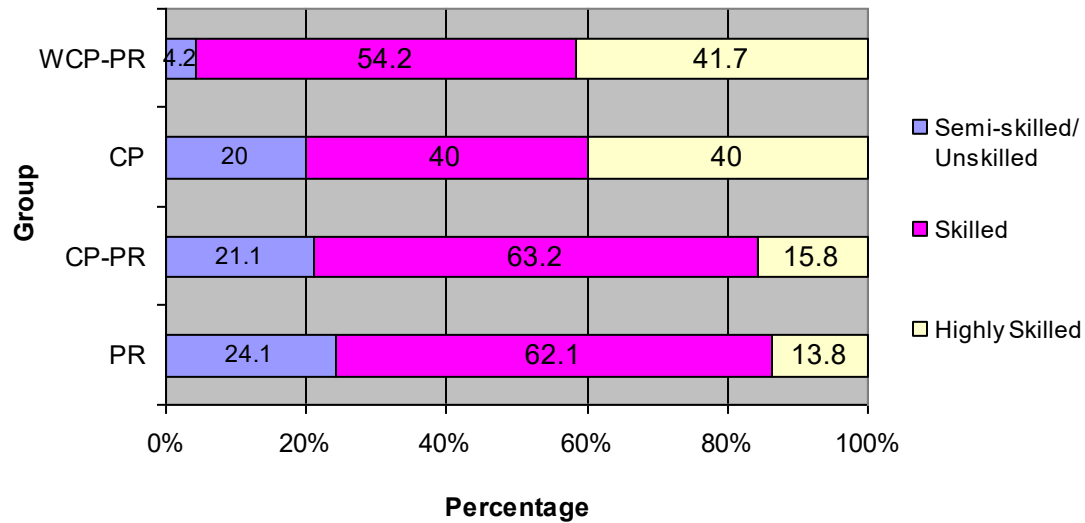


Figure 5c. Distribution of Family Occupation



According to this analysis, there were no significant group differences for these variables, but the graphs in Figures 5b and 5c suggest that the parents of WCP-PR children have better education and higher status occupations. The CP group also has a high proportion of highly educated and skilled parents similar to the WCP-PR group. This will be revisited in the *Discussion* chapter. Because these non significant fluctuations of education and occupation are just descriptors of parents and not group differences in children, adjustment for these variables is not required.

4.4 Group Differences in Measures of Psychological Characteristics

The aim of this section is to present the results to the first research question of the thesis:

Do children with CP, CP-PR, PR and WCP-PR differ in attention deficit and hyperactivity measured by subjective ratings, attention deficit measured by laboratory tasks, verbal ability, phonological awareness and executive function?

Group differences were investigated in a range of teacher ratings and objective psychological measures using one-way between groups ANOVA accompanied by post-hoc Tukey HSD tests. The results are presented separately for each measure.

Prior to the presentation of the ANOVA and post-hoc results, group means and standard deviations for each measure are provided. Line graphs are also provided to graphically illustrate the differences between the group means. The groups' means have been plotted as z scores with a mean of 0 and a standard deviation of 1. In order to illustrate differences more effectively the scores were standardised on the WCP-PR group. The zero value in the line graphs represents the mean score of the WCP-PR group. This mean can be interpreted as the sample's approximate normative standard for 2nd Grade Greek children with no conduct problems, inattention, hyperactivity and poor reading. Each of the other group's mean z score indicates how far that group deviates from the mean z score of the WCP-PR group.

4.4.1 Teacher-Rated Attention Deficit and Hyperactivity and Laboratory-Measured Attention Deficit

Teacher-rated attention deficit and hyperactivity were assessed by using teacher ratings of Inattention-Passive and Hyperactivity scales of the Conners' TRS-28, respectively. Table 7 presents the frequencies and percentages of the Conners' TRS-28 Inattention and Hyperactivity for each one of the four groups. The graphs in Figures 5a and 5b illustrate the distribution of Inattention and Hyperactivity.

Table 7. *Distribution of the Proportion of Children With¹ and Without² Conners' TRS-28 Inattention and Hyperactivity*

	WCP-PR		CP		CP-PR		PR	
	f	%	f	%	f	%	f	%
Inattention								
With	0	.00	5	18.0	21	70.0	10	28.6
Without	30	100	23	82.0	9	30.0	25	71.4
Total	30	100	28	100	28	100	35	100
Hyperactivity								
With	0	.00	16	57.1	26	86.7	6	17.0
Without	30	100	12	42.9	4	13.3	29	83.0
Total	0	100	28	100	30	100	35	100

¹Children that meet the Conners' TRS-28 clinical cutoff for Inattention and Hyperactivity

²Children that do not meet the Conners' TRS-28 clinical cutoff for Inattention and Hyperactivity

Chi-square analysis demonstrated that there was a significant difference between the groups' Inattentive ($\chi^2(3, N=123)=38.22, p=.00$) and Hyperactivity ($\chi^2(3, N=123)=58.72, p=.00$) ratings. Nearly one third of the participants with PR and one fifth of the participants with CP met also the criteria for inattention. With regards to hyperactivity, as expected, there were not any participants with WCP-PR meeting the Conner's TRS-28 cutoff point for Hyperactivity. In contrast, according to the teacher ratings, the majority of the CP-PR group and more than the half of the CP group exhibited hyperactivity. Nearly one fifth of the PR group also displayed hyperactivity. In terms of attention deficit, the participants of the WCP-PR group did not meet the Conners' TRS-28 cutoff for Inattention. The majority of the CP-PR group met the criteria for inattention (although they were selected for poor reading and conduct, not attention problems).

Figure 6a. *Distribution of the Proportion of Children With and Without Conners' TRS-28 Inattention*

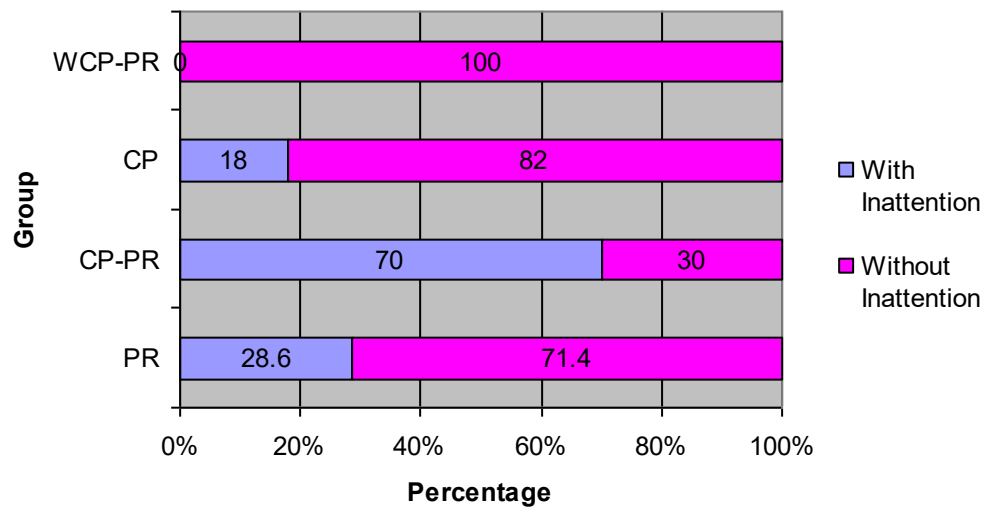
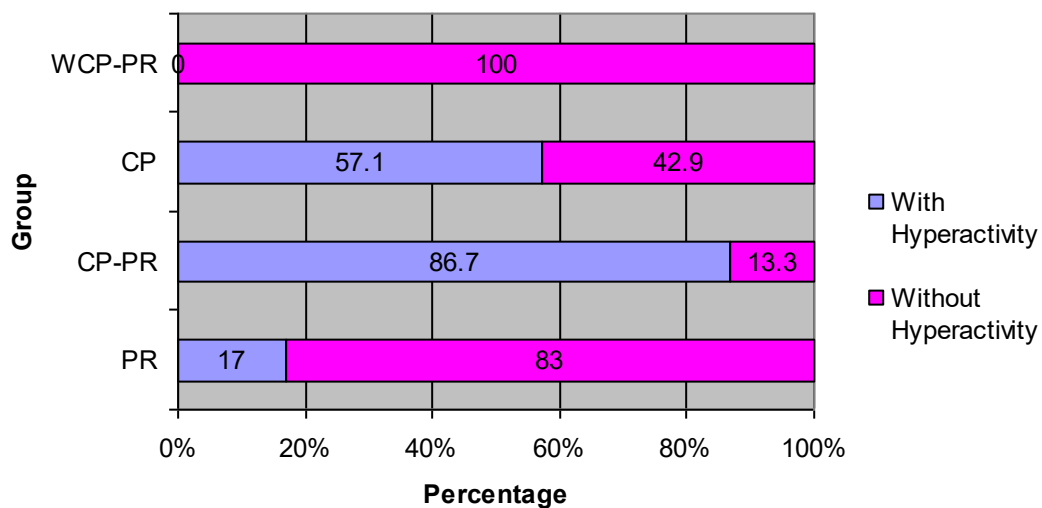


Figure 6b. *Distribution of the Proportion of Children With and Without Conners' TRS-28 Hyperactivity*



In order to assess attention as an objectively measured cognitive variable, participants were individually administered the Conners' CPT-II (Conners & MHS Staff, 2000). This standardized test includes measures that are supposed to assess attention. These measures

are: Commission errors, Omission errors, Hit RT, Hit RT SE, Detectability (d), Response style (b), Clinical Confidence Index. Because multiple ANOVA tests were run a Bonferroni adjustment of the p-value for multiple comparisons was used. The adjusted p-value was $p < .007$. Table 8 displays the group means and standard deviations for the Conners' CPT-II measures.

Table 8. Means and Standard Deviations of Scores in the Conners' CPT-II Measures

Measures	WCP-PR		CP		CP-PR		PR	
	M	SD	M	SD	M	SD	M	SD
Omissions ^a	47.47	6.90	51.57	8.54	57.52	13.27	52.50	8.09
Commissions ^b	47.86	11.64	52.34	8.37	49.34	7.21	46.62	9.71
Hit RT ^c	50.68	10.89	52.54	8.62	60.51	9.97	53.32	11.73
Hit RT SE ^d	48.79	8.80	54.93	8.56	60.64	9.15	54.09	7.36
Detectability ^f	51.08	8.39	51.20	6.34	49.56	8.49	48.69	8.90
Response Style ^g	54.53	12.39	48.99	3.56	49.46	4.77	50.34	4.52
Clinical Confidence Index	43.19	14.52	51.35	18.25	64.45	19.21	52.53	16.55

^a The number of times the child did not respond to a target (non X)

^b The number of times the child responded to a non target (X)

^c The mean response time for all targets (non X)

^d The consistency of response time expressed in standard errors

^e The difference between the signal (non-X) and noise (X) distributions

^f Speed/accuracy trade-off

To illustrate the group contrasts more efficiently, the z scores were plotted in an augmentative manner based on the significant differences that the ANOVA tests revealed. The line graph (Figure 6) starts with the most significant difference and continues to the least significant. High scores indicate poor performance for most

measures (Conners & MHS Staff, 2000). For Hit RT scores, both high and low scores indicated poor performance (Conners & MHS Staff, 2000). Low scores show unusually fast Hit RT, while high scores show unusually slow Hit RT. For Response Style (b) lower scores indicate a response style of a participant who responds rather freely and who is rather less concerned about giving a wrong response (Conners & MHS Staff, 2000). Higher values show that the participant is cautious and that he/she chooses not to respond very often so that he/she can make sure that a correct response was given (Conners & MHS Staff, 2000).

Figure 7. *Group Mean Z Scores for the Conners' CPT-II Measures (the zero z score value represents the WCP-PR group mean score)*

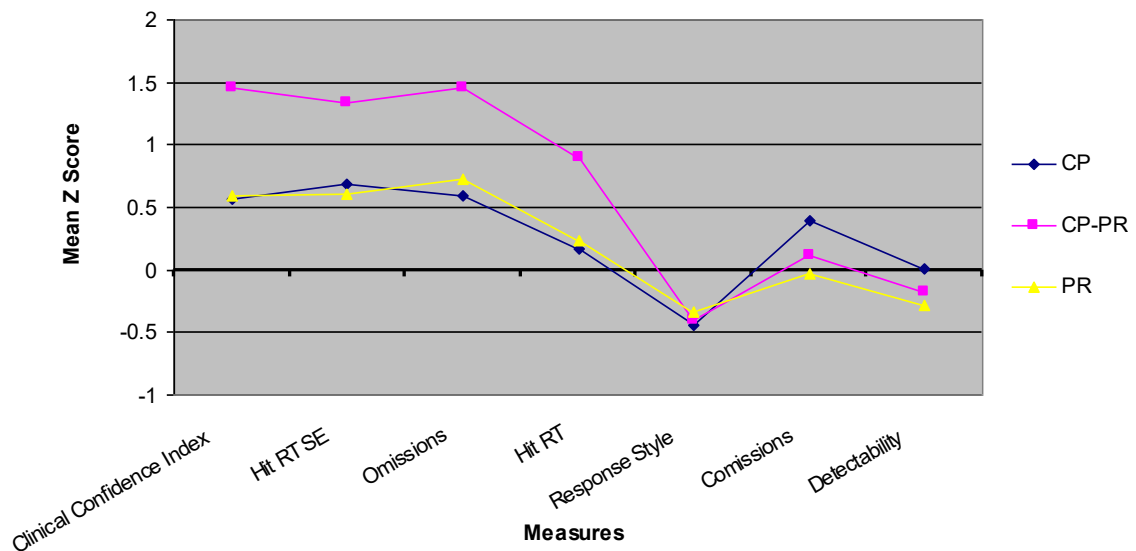


Table 8 and Figure 6 show that the CP-PR group appears to have worse performance than the WCP-PR as well as the CP and PR groups. Based on the Conners' classification of scores (Conners & MHS Staff, 2000), the scores of the WCP-PR, CP, and PR groups for

all the Conners' CPT-II measures fall within the average range (45-55). Contrary to the above groups, the CP-PR group was the only one that exhibited atypical performance. In particular, the CP-PR Omissions score is considered mildly atypical (55-59), while the scores on the Hit RT and Hit RT SE are classified as moderately atypical (60-64). Regarding the Conner's Clinical Confidence Index measure (Conners & MHS Staff, 2000), in opposition to the mean score of the WCP-PR, CP, and PR children, the mean score of the CP-PR children suggests that their profile matches closely to the clinical profile of AD/HD.

ANOVA tests (Table 9) revealed significant group differences in the following measures: Omissions, Hit RT, Hit RT SE, and Clinical Confidence Index. Following on from ANOVA tests, post-hoc Tukey comparisons (Table 9) were run. Post-hoc results exhibited that the CP-PR group had significantly worse performance than the WCP-PR group in all the measure where a significant difference was indicated by ANOVA. The CP and PR groups differed significantly from the WCP-PR group in the Hit RT SE measure. The line graph in Figure 6 shows a tendency for children with CP and PR to make more omission errors and to score worse in the Clinical Confidence Index than the WCP-PR children. However, no significant group differences were detected in their scores. As opposed to the CP-PR group, the CP and PR groups had significantly better performance in the Hit RT, Hit RT SE, and Clinical Confidence Index measures. All groups scored slightly lower in the Response Style measure than the WCP-PR, however, no significant group differences were detected. These findings will be further examined in the effect size section.

Table 9. *Between Group Differences in the Conners' CPT-II Measures*

Measures	One-Way Between Groups ANOVA		Post-hoc Tukey HSD
	F	P	
	df=3,117		Contrasts of Mean Scores
Clinical Confidence Index	7.79	.00	WCP-PR(43.19), CP(51.35), PR(52.53)< CP-PR(64.45)
Hit RT SE	9.86	.00	WCP-PR(48.79)<CP(54.93), PR(54.09)< CP-PR(60.64)
Omissions	5.66	.00	WCP-PR(47.47) < CP-PR(57.50)
Hit RT	5.07	.00	WCP-PR(50.68), CP(52.54), PR(53.32)< CP-PR(60.51)
Response Style	3.71	.01	n.s
Commissions	2.00	.11	n.s
Detectability	.68	.56	n.s

Note. n.s = non-significant

4.4.2 Verbal Ability

Verbal ability was measured by using a short form of the verbal IQ test that the Greek version of WISC-III (Georgas et al., 1997) provides. To shed more light on the group's verbal competence and discover areas of strengths and difficulties, group differences in the verbal sub-tests that make up the Verbal IQ score were also examined. Because multiple ANOVA tests were run to assess verbal ability, a Bonferroni adjustment of the p-value for multiple comparisons was used. The adjusted p-value was $p < .01$

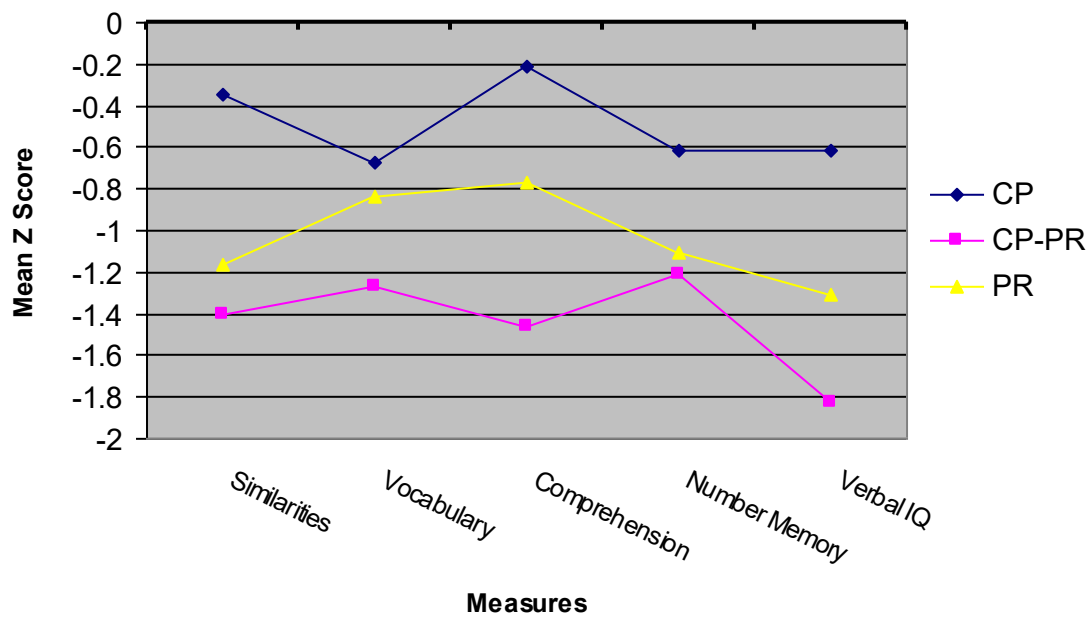
The z scores in Figure 7 are plotted in such a way that negative scores indicate worse performance. The group means (Table 10) and z scores (Figure 7) suggest that the CP-PR group had the poorest performance on all verbal measures. The CP group appeared to

have scored slightly better than the PR group and not very different from the WCP-PR group.

Table 10. Means and Standard Deviations of Scores in the WISC-III Verbal Measures

Measures	WCP-PR		CP		CP-PR		PR	
	M	SD	M	SD	M	SD	M	SD
Similarities	11.43	1.71	10.82	2.85	9.03	2.77	9.43	2.58
Vocabulary	10.60	2.48	8.93	1.99	7.43	1.85	8.49	2.02
Comprehension	10.63	1.99	10.21	1.89	7.70	2.07	9.09	1.93
Number Memory	12.30	2.96	10.46	2.00	8.70	2.43	9.00	2.33
Verbal IQ	107.67	10.89	100.82	8.05	87.67	10.87	93.03	10.40

Figure 8. Group Mean Z Scores for the WISC-III Verbal Measures (the zero z score value represents the WCP-PR group mean score)



ANOVA results (Table 11) showed that there were significant differences for all the WISC-III Verbal measures. With regards to verbal IQ, subsequent post-hoc Tukey tests (Table 11) demonstrated that the PR and CP-PR groups both had significantly lower verbal IQ scores than the WCP-PR and CP groups.

Table 11. *Between Group Differences in the WISC-III Verbal Measures*

Measures	One-Way Between Groups ANOVA		Post-hoc Tukey HSD
	F df=3,119	p	Contrasts of Mean Scores
Similarities	6.18	.00	WCP-PR(11.43) > PR(9.43), CP-PR(9.03) CP(10.82) > CP-PR(7.70)
Vocabulary	11.85	.00	WCP-PR(10.60) > CP(8.93), PR(8.49), CP-PR(7.43)
Comprehension	13.22	.00	WCP-PR(10.63) > PR(8.49), CP-PR(7.70) CP(10.21) > CP-PR(7.70) PR(8.49) > CP-PR(7.70)
Number Memory	13.97	.00	WCP-PR(12.30) > CP(10.46), PR(9.00), CP-PR(8.70) CP(10.46) > CP-PR(8.70)
Verbal IQ	22.53	.00	WCP-PR(107.67), CP(100.82)>PR(93.03), CP-PR(87.67)

Concerning the verbal sub-tests, the performance of the CP-PR and PR groups in all sub-tests was significantly worse than the performance of the WCP-PR group. Apart from the Comprehension measure, the poor reading groups (CP-PR and PR) did not differ in any of the other sub-measures. With regards to the performance of the CP group, despite exhibiting comparable verbal IQ with the WCP-PR group, the sub-test scores showed a different pattern of differences, that is, significantly poorer CP group performance than the WCP-PR group in the Vocabulary, and Number Memory measures. Despite showing

significantly superior verbal IQ from the PR group, sub-test analysis showed that the two groups did not differ significantly in any sub-test measure. These findings are incongruous and puzzling.

Kaufman argues that, due to significant fluctuation in sub-tests scores which is not attributable to chance error, verbal IQ scores might not reflect the sub-test scores (Kaufman, 1994). Therefore, an assessment pertaining to whether the verbal IQ of the groups was not representative of the sub-test scores was performed. This assessment involves the calculation of the group's mean sub-tests score and the comparison of each sub-test score to the group's relevant mean sub-test score. Any sub-test score that deviates from the group's mean sub-tests score by three points should be regarded as an indication of non chance-error fluctuation (Kaufman, 1994). None of the groups' sub-test scores deviated more than the cutoff point of three from the average score of the sub-tests (Table 12). The verbal IQ score of each one of the groups is representative of their global verbal ability. In keeping with these results, the incongruous contrasts between the CP group and the WCP-PR and PR groups cannot be explained by lack of agreement between the groups' verbal IQ and sub-test scores. These contrasts will be reconsidered in the effect sizes section.

Table 12. *Group Mean Sub-test Scores*

Group	Mean Sub-test Score
WCP-PR	11.24
CP	10.10
PR	9.00
CP	8.21

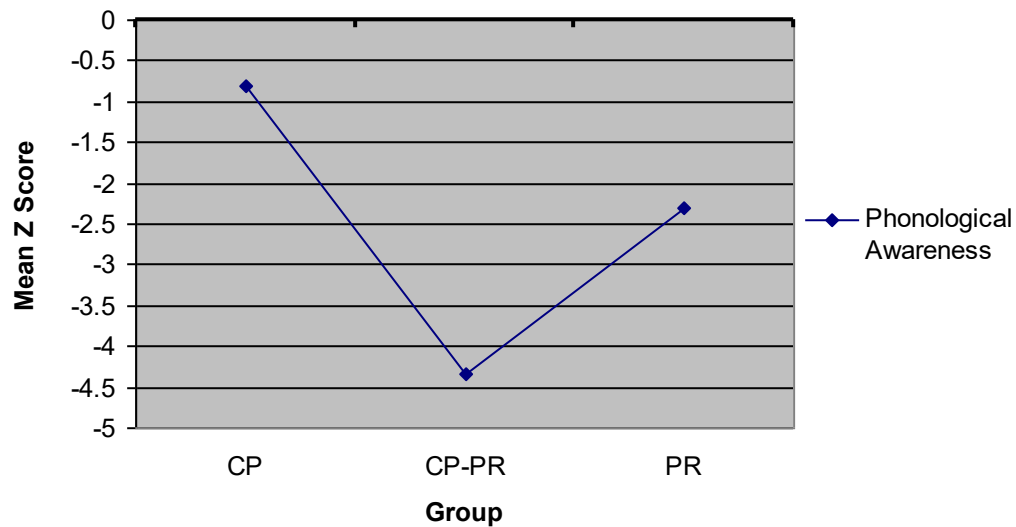
4.4.3 Phonological Awareness

The phonological awareness score comprised a composite raw score obtained by the sum of five measures assumed to tap phonological abilities. The z scores are plotted in such a way that negative scores indicate worse performance. Table 13 and Figure 8 show that the CP-PR group had the poorest performance on all phonological measures as compared to the other three groups. The CP group appears to have scored similarly to the WCP-PR group. The PR group had inferior scores to both the WCP-PR and CP groups' scores.

Table 13. Means and Standard Deviations of Scores in the Phonological Awareness Measure

Measures	WCP-PR		CP		CP-PR		PR	
	M	SD	M	SD	M	SD	M	SD
Phonological Awareness	63.63	3.66	60.64	5.49	47.77	10.72	55.14	8.24

Figure 9. Group Mean Z Scores for the Phonological Awareness Measure (the zero z score value represents the WCP-PR group mean score)



One way analysis of variance (Table 14) indicated that there were significant group differences in phonological awareness. Post-hoc Tukey tests (Table 14) demonstrated that the CP-PR group had a significantly lower phonological awareness score than the WCP-PR and the CP groups. Unlike the CP-PR group, the CP group did not differ essentially from the WCP-PR group. In relation to the differences with the PR group, the CP group scored significantly higher than the PR group while the CP-PR scored significantly lower.

Table 14. *Between Group Differences in the Phonological Awareness Measure*

Measures	One-Way Between Groups ANOVA		Post-hoc Tukey HSD
	F df=3,119	p	Contrasts of Mean Scores
Phonological Awareness	25.24	.00	WCP-PR(63.63), CP(60.64) > PR(55.14) > CP-PR(47.77)

4.4.4 Executive Function

The Tower of London (TOL) was employed to examine the planning aspect of child executive functioning (Anderson et al., 1996). The TOL²⁰ version utilized in this thesis yields the following scores: TOL Total Score, Mean Solution Time, number of Failed Attempts and number of Rule Violations. Because multiple ANOVA tests were run to assess executive function, a Bonferroni adjustment of the p-value for multiple comparisons was used. The adjusted p-value was $p < .01$.

²⁰ The TOL task offers standardised scores with a mean of 100 and a SD of 15. Scores around 100 indicate average performance. The scores of Failed Attempts and Rule Violations comprise raw scores.

Table 15 summarises the group means and standard deviation of the scores in the TOL measures. Z scores (Figure 9) have been plotted such that the most significant difference is presented first followed by the second most significant and so forth. Negative z scores indicate worse performance. As illustrated both in Table 15 and Figure 9, the performance of the CP-PR group was worse than the respective performance of the other three groups. Although somewhat lower, the performance of the CP and PR groups was relatively similar to the performance of the WCP-PR group. In respect to the errors (Failed Attempts and Rule Violations) that the participants made during the execution of the TOL task, the CP-PR group committed more errors than the other three groups. On the contrary, those with PR and CP committed nearly the same number of errors as the WCP-PR group did. The similarity of the PR score with the WCP-PR score on this measure of executive function is particularly striking, in view of the phonological ability differences reported above.

Table 15. Means and Standard Deviations of Scores in the TOL Measures

Measures	WCP-PR		CP		CP-PR		PR	
	M	SD	M	SD	M	SD	M	SD
TOL Total Score ^a	104.17	12.04	99.82	12.20	92.83	12.29	102.37	19.13
Mean Solution Time ^b	27.35	5.17	29.03	6.12	31.81	5.42	28.20	5.39
No. of Failed Attempts ^c	7.50	2.11	7.93	3.19	9.40	3.47	7.60	3.98
No. of Rule Violations ^d	2.17	2.37	2.93	2.38	5.77	3.54	3.17	2.95

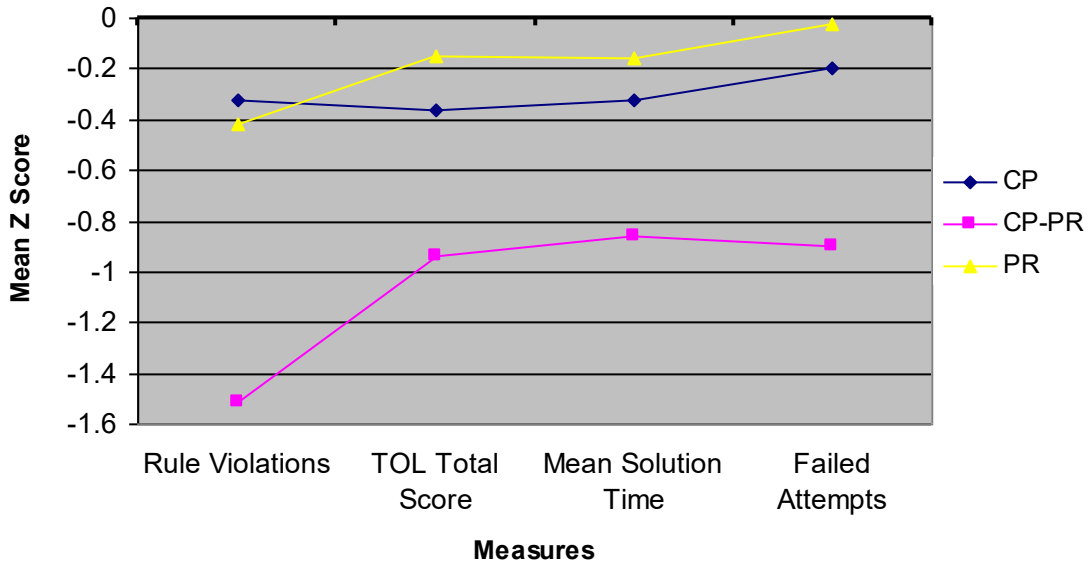
^aThe sum of the participant's score on each of the twelve items that the task is comprised of

^bThe sum of the solution time (expressed in seconds) of each problem divided by the total number of problems

^cThe number of times the participant fails to achieve the correct configuration in the prescribed number of moves or without any rule violations

^dThe number of times the participant violates any of the task's rules.

Figure 10. Group Mean Z Scores for the TOL Measures (the zero z score value represents the WCP-PR group mean score)



Follow-up ANOVAs (Table 16) showed that there was a marginally significant group difference in the overall performance on the task and in the mean time of problem solution and a significant group difference in the mean number of Rule Violations.

Table 16. Between Group Differences in the TOL Measures

Measures	One-Way Between Groups ANOVA		Post-Hoc Tukey HSD
	F df=3,119	p	Contrasts of Mean Scores
No. of Rule Violations	8.91	.00	WCP-PR(2.17), CP(2.93), PR(3.57) < CP-R(5.77)
TOL Total Score	3.57	.01	WCP-PR(104.17) < CP-PR (92.83)
Mean Solution Time	3.72	.01	WCP-PR(27.35), PR(28.20) < CP-PR (31.81)
No. of Failed Attempts	2.17	.09	n.s

Note. n.s = non-significant

Post-hoc tests (Table 16) indicated that the CP-PR group had significantly lower overall performance than the WCP-PR group. It was also shown that the WCP-PR and the PR group had significantly faster solution time than the CP-PR group. Finally, the CP-PR group violated significantly more rules during the execution of the task than the remaining groups.

To recapitulate, on the grounds of the analysis of variance the following results were found. According to teachers' ratings, all the groups were more likely than the WCP-PR group to exhibit inattention and hyperactivity. The CP-PR group had the highest number of children that exhibited inattention or hyperactivity ratings. A small percentage of children with CP and PR met criteria for inattention. The CP group seemed to be at risk in manifesting hyperactivity. The results from the Conners' CPT-II measures confirmed that the CP-PR group had worse performance than the other three groups. The CPT-II also showed that the CP and PR groups did not seem to be greatly different in their performance from the WCP-PR children. Only one measure (Hit RT SE) differentiated significantly these two groups from the WCP-PR.

For the verbal measures it was found that the CP-PR group had greater verbal difficulty than CP and WCP-PR group, but was similar to the PR group. The CP group seems to be less competent in certain areas of verbal functioning (Vocabulary and Number Memory) as well as somewhat, but not significantly, lower in general verbal intellectual ability. The verbal intellectual ability sub-test scores do not appear to be greatly different from

the PR group's scores. When it comes to overall verbal intellectual ability, the CP group appears to be superior to the PR group.

Regarding phonological awareness, it was found that the CP-PR group was the least competent in phonological ability than any other of the three groups. On the contrary, the CP group was similar to the WCP-PR and better than the PR group.

As far as executive functioning and, in particular, planning are concerned, results from the TOL task showed that the overall performance of the CP-PR group on the task was worse than the performance of the other groups. The CP-PR children found it harder than the other children to comply with the rules of the task as they made significantly more rule violations.

4.5 Effect Size Analysis

Effect size analysis was conducted in order to evaluate the strength of the significant group differences that the analysis of variance identified. The d^{21} statistic was utilized as an indicator of effect size.

Table 17 outlines the effect sizes for the group differences in the Conners' CPT-II measure. Presentation of differences starts from the most significant and continues to the least significant in a descending order.

²¹ d = difference between two means expressed in standard deviations; small: $d=.20$; medium: $d=.50$; large $=.80$ (Cohen, 1977)

Table 17. *Effect Sizes (d) of the Group Differences in the Conners' CPT-II Measures*

Measures	CP-PR vs			CP vs		PR vs
	WCP-PR	CP	PR	WCP-PR	PR	WCP-PR
Clinical Confidence Index	1.26	.69	.66	.49	.06	.58
Hit RT SE	1.32	.64	.79	.70	.10	.65
Omissions	.99	.54	.47	.52	.11	.67
Hit RT	.94	.85	.66	.19	.07	.23
Response Style	.59	.11	.18	.69	.33	.62
Commissions	.15	.38	.32	.22	.63	.11
Detectability	.18	.22	.10	.01	.32	.27

As specified by the effect size analysis, for all the significant group comparisons, the magnitude of the differences between the CP-PR as opposed to the WCP-PR group were all large. The differences between the CP-PR as opposed to the CP and PR groups varied from large to small. Small to medium effect sizes were noted for the differences of the CP and PR groups with the WCP-PR group respectively. The ANOVA results indicated that the CP and PR children had significantly worse performance than the WCP-PR children in the Hit RT SE measure. Effect size analysis showed that the magnitude of this difference was medium. The magnitude of the difference in the Omissions and Clinical Confidence Index measure was of medium magnitude as well, but unlike the difference in Hit RT SE, did not reach significance. Further consideration of these differences takes place in the *Discussion* chapter.

With reference to verbal measures, the effect sizes (Table 18) showed that the majority of the differences between the WCP-PR groups, as contrasted to the two poor reading groups (CP-PR and PR), were large. Table 18 shows that the differences between the two

conduct disturbed groups (CP and CP-PR) were also relatively large. Analysis of variance showed that all the above group differences were significant, except for the difference between the two conduct problems groups in the Vocabulary measure. However, the effect size for this difference was relatively large. The differences between the two poor reading groups (CP-PR and PR) were not large.

Table 18. *Effect Sizes (d) of the Group Differences in the WISC-III Verbal Measures*

Measures	CP-PR vs			CP vs		PR vs
	WCP-PR	CP	PR	WCP-PR	PR	WCP-PR
Similarities	1.07	.63	.14	.61	.51	.93
Vocabulary	1.46	.78	.54	.74	.22	.93
Comprehension	1.44	1.26	.69	.21	.58	.78
Number Memory	1.33	.79	.79	.74	.67	1.24
Verbal IQ	1.83	1.39	.50	.72	.84	1.00

The results of the analysis of variance indicated that there was a significant difference between the CP and WCP-PR group in two sub-test scores (Vocabulary and Number Memory). The effect size analysis revealed that these differences were of medium size. In the absence of additional significant differences between these two groups, this finding alone is not suggestive of a significant difference between the CP and WCP-PR groups in verbal ability. However, it should be also noted that statistical power issues may not have allowed the statistical analysis to genuinely discriminate the CP from the WCP-PR group.

The analysis of variance did not show any significant variation between the CP and PR groups' verbal sub-test scores, yet, their verbal IQ differed considerably. The effect size analyses indicated that on average, the majority of the differences in the sub-test scores of

the CP and PR group were of medium magnitude. Lack of statistical power may have not allowed more differences to be revealed between these groups.

The effect sizes (Table 19) of the group differences in phonological awareness indicate that both poor reading groups differed largely from the CP and WCP-PR groups. The two poor reading groups also differed considerably, with the PR group scoring significantly better than the CP-PR group as the analysis of variance showed. On the contrary, the non-reading-problem groups did not differ significantly.

Table 19. *Effect Sizes (d) of the Group Difference in the Phonological Awareness Measure*

Measures	CP-PR vs			CP vs		PR vs
	WCP-PR	CP	PR	WCP-PR	PR	WCP-PR
Phonological Awareness	2.20	1.58	.77	.65	.80	1.42

With reference to the TOL task, large differences were detected between the WCP-PR and the CP-PR groups comparisons for the Rule Violations, the TOL Total Score and the Mean Solution Time measure. Analysis of variance indicated that these were all significant. Table 20 shows large differences between the CP-PR group and the CP and PR groups in the Rule Violations scores. The difference between the CP-PR group and the CP and PR groups in the TOL Total Score and Mean Solution Time score was medium. The magnitude of the differences for the remaining group comparisons was small as indicated by small effect sizes. In line with analysis of variance, the differences for the remaining group comparisons were non-significant.

Table 20. *Effect Sizes (d) of the Group Differences in the TOL Measures*

Measures	CP-PR vs			CP vs		PR vs
	WCP-PR	CP	PR	WCP-PR	PR	WCP-PR
TOL Total Score	.93	.57	.60	.35	.16	.11
Mean Solution Time	.84	.48	.66	.29	.14	.08
No. of Failed Attempts	.68	.44	.48	.16	.09	.03
No. of Rule Violations	1.22	.95	.85	.32	.09	.37

The majority of the results from the effect size analysis are in agreement with the results from the analysis of variance. This finding shows that the analysis has sufficient power to detect true differences between the groups.

4.6 Non-parametric Kruskal-Wallis Tests

The Kruskal-Wallis test is the non-parametric equivalent of one-way between-groups ANOVA. This test was used in order to validate the results derived from the parametric analysis of those variables that were essentially skewed and/or their variances were not homogeneous according to Levene's test. The variables that were subject to one-way between groups ANOVA comparisons and were skewed were the following: WISC-III Vocabulary: CP=1.418, PR=1.572; TOL No. Rule Violations: WCP-PR=1.055, PR=1.004; Conners' CPT-II Omissions: WCP-PR=1.006. The variables that were subject to one-way between groups ANOVA comparisons and did not meet the homogeneity of variance assumptions were the following: Phonological Awareness score ($p=0.00$), Conners' CPT-II Omissions ($p=0.001$), Conners' CPT-II Response Style ($p=0.00$), TOL Total Score ($p=0.012$), TOL No. of Failed Attempts ($p=0.016$), TOL No. of Rule Violations ($p=0.032$).

Kruskal-Wallis tests (Table 21) demonstrated that there were significant differences across the four groups in Vocabulary, Omissions, Phonological Awareness, TOL Total Score and No. of Rule Violations. It was also indicated that there were no significant differences across the groups in Response Style and No. of Failed Attempts. These results are in agreement with the results of analysis of variance.

Table 21. *Between Group Differences in the WISC-III Vocabulary, Phonological Awareness, Conners' CPT-II Omissions, Conners' CPT-II Response Style, TOL Total Score, TOL No. of Failed Attempts, TOL No. of Rule Violations Measures*

Measures	Kruskal-Wallis		Mean Ranked Scores
WISC-III Vocabulary	$\chi^2(3)=26.40$	$p=.00$	WCP-PR(86.52), CP(66.66), PR(54.39), CP-PR(42.02)
Conners' CPT-II			
Omissions	$\chi^2(3)=13.80$	$p=.00$	WCP-PR(42.57), CP(60.09), PR(65.40), CP-PR(75.27)
Response Style	$\chi^2(3)=2.11$	$p=.55$	WCP-PR(66.68), CP(56.19), PR(52.53), CP-PR(56.20)
Phonological Awareness	$\chi^2(3)=47.85$	$p=.00$	WCP-PR(90.98), CP(75.27), PR(52.40), CP-PR(31.83)
TOL			
TOL Total Score	$\chi^2(3)=12.23$	$p=.00$	WCP-PR(72.95), CP(60.55), PR(69.30), CP-PR(43.88)
No. of Failed Attempts	$\chi^2(3)=7.13$	$p=.07$	WCP-PR(56.72), CP(58.91), PR(56.21), CP-PR(76.92)
No. of Rule Violations	$\chi^2(3)=20.00$	$p=.00$	WCP-PR(46.17), CP(57.79), PR(58.77), CP-PR(85.53)

4.7 Influences of Associated Teacher-Rated Attention Deficit and Hyperactivity, Verbal IQ, and Verbal Short-term Memory

In this section, statistical control of variables that could possibly influence the pattern of the significant group differences revealed by the analysis of variance takes place. Statistical control was carried out by analysis of covariance (ANCOVA). The results of analysis of covariance are summarized in Table 22 to 24. Results are presented separately

for each covariate. Because multiple ANCOVA tests were run for the verbal WISC-III, Conners' CPT-II, and TOL measures, a Bonferroni adjustment of the p-value for multiple comparisons was used. The adjusted p-value was $p < .01$, $p < .001$, and $p < .02$ respectively.

Prior studies have reported that conduct problems and accompanying AD/HD are associated with worse outcomes than conduct problems alone (Angold, 1999). AD/HD has also been found to mediate executive function and reading deficits in children with conduct problems (Hill, 2002; Willcutt & Pennington, 2000a). To assess whether group differences in verbal ability, phonological awareness, attention and executive functioning could be accounted for by associated attention deficit and hyperactivity, the analyses were re-run using the Conners' TRS-28 ratings of Inattention and Hyperactivity as covariates. Results in Table 22 show that the pattern of differences remained significant for all the WISC-III verbal measures, except for the Similarities measure which became marginally significant. The group difference in phonological processing also remained significant. The significant group differences detected in the Conners' CPT-II and the TOL scores stopped being significant after controlling for teacher rated attention deficit and hyperactivity.

Analysis of variance also showed that the groups differ in verbal intellectual ability as indicated by their scores on the WISC-III Verbal IQ composite score. To assess whether group differences in phonological awareness, attention and executive functioning could be accounted for by group differences in verbal intellectual ability analyses were re-run using verbal IQ as a covariate. Results (Table 23) indicated that group differences in

phonological awareness remained significant. Group differences in Omission, Hit RT, TOL total score and Mean Solution Time were not any longer significant (Table 23).

Table 22. *Analysis of Covariance with Teacher Ratings of the Conners' TRS-28 Inattention and Hyperactivity as Covariates*

Measures	F df (3,117)	p
Verbal WISC-III Measures		
Similarities	3.88	.01
Vocabulary	6.49	.00
Comprehension	7.95	.00
Number Memory	7.76	.00
Verbal IQ	12.46	.00
Phonological Awareness	9.67	.00
TOL		
No. of Rule Violations	2.33	.07
TOL Total Score	.95	.41
Mean Solution Time	2.34	.07
Conners' CPT-II		
Clinical Confidence Index	1.77	.15
Hit RT SE	2.38	.07
Omissions	1.52	.21
Hit RT	2.01	.11

Assessments controlling for short-term memory were also performed. Both the phonological awareness and the TOL tasks required quite a lot of verbal information to be memorised and processed by the children, such as string of words and complex instructions. Therefore, it was considered important to assess whether group differences in phonological awareness and executive functioning could be accounted for by group differences in short-term memory. As indicated by the analysis of variance, there were

significant group differences in the WISC-III Number Memory test. This test is assumed to assess short-term verbal memory (Kaufman, 1994). The analysis was carried out using the WISC-III Number Memory test as a covariate. Analysis of covariance did not show any changes in the pattern of differences in the phonological awareness and the Rule Violations scores after short-term memory was partialled out (Table 24). Group differences in the TOL Total Score and Mean Solution Time stopped being significant when short-memory was statistically controlled, but the groups remained different in the measure of rule violations.

Table 23. *Analysis of Covariance with WISC-III Verbal IQ as a Covariate*

Measures	F df (3,118)	p
Phonological Awareness	7.76	.00
Conners' CPT-II		
Clinical Confidence Index	4.01	.00
Hit RT SE	4.50	.00
Omissions	2.47	.06
Hit RT	2.40	.11
TOL		
No. of Rule Violations	5.29	.00
TOL Total Score	2.42	.69
Mean Solution Time	2.23	.08

Table 24. *Analysis of Covariance with Number Memory as a Covariate*

Measures	F df (3,118)	p
Phonological Awareness	13.86	.00
TOL		
No. of Rule Violations	5.98	.00
TOL Total Score	2.67	.05
Mean Solution Time	2.34	.07

4.8 Influences of Gender

In this section the likely differences between boys and girls in the psychological measures on which the groups differ significantly are examined. The gender distribution of Inattention and Hyperactivity is displayed in Table 25.

Table 25. *Distribution of Conners' TRS-28 Inattention and Hyperactivity in Boys and Girls*

	Boys		Girls	
	f	%	f	%
Inattention				
With	28	32.2	8	22.2
Without	59	67.8	28	77.8
Total	87	100	36	100
Hyperactivity				
With	40	34.0	8	77.8
Without	47	53.0	28	22.2
Total	87	100	36	100

Chi-squares showed that there was a significant difference between girls and boys in the number of children that reached the Conners' TRS-28 cutoff for Hyperactivity ($\chi^2(1, N=123) = 6.03, p=.01$). According to teachers' perceptions boys appeared to be significantly more Hyperactive than girls. Table 26 presents the means and standard deviations of the scores of boys and girls in the remaining psychological measures which significantly differentiate the four groups of the study.

Table 26. Means and Standard Deviations of Scores in the WISC-III Verbal, Phonological, Conners' CPT-II and TOL Measures

Measures	Boys		Girls	
	M	SD	M	SD
WISC-III				
Similarities	10.36	2.77	9.61	2.37
Vocabulary	8.95	2.49	8.58	2.03
Comprehension	9.45	2.31	9.22	2.09
Number Memory	9.97	2.70	10.33	3.14
Verbal IQ	97.68	12.44	95.58	12.94
Phonological Awareness	56.18	9.71	57.83	9.28
Conners' CPT-II				
Clinical Confidence Index	57.37	16.57	42.37	19.01
Omissions	52.60	10.60	51.55	8.63
Hit RT	54.69	10.95	53.29	11.13
Hit RT SE	55.76	9.06	51.81	9.56
TOL				
TOL Total Score	99.93	14.66	99.83	15.87
Mean Solution Time	28.82	5.51	29.64	6.19
No. of Rule Violations	4.00	3.31	2.5	3.17

Independent sample t-tests (Table 27) were utilised to analyse the differences between boys and girls in the psychological measures where analysis of variance found significant group differences. Because multiple t-tests were run for the verbal WISC-III, Conners' CPT-II, and TOL measures, a Bonferroni adjustment of the p-value for multiple comparisons was used. The adjusted p-value was $p < .01$, $p < .01$, and $p < .02$ respectively. The results from the t-tests indicated that the only significant difference detected between boys and girls was in the Clinical Confidence Index. Boys appear to be more likely to be classified as AD/HD than girls on the basis of the Conners' CPT-II. There was also a

tendency for boys to score worse in the number of Rule Violations and in the Hit Rate SE measures than girls. However, these differences were only marginally significant.

Table 27. *Gender Differences in the Psychological Measures that Significantly Differentiate between the Groups*

Measures	Independent Samples t-tests	
	t df (121)	p
WISC-III		
Similarities	1.41	.16
Vocabulary	.79	.43
Comprehension	.50	.61
Number Memory	-.65	.51
Verbal IQ	.84	.40
Phonological Awareness	-.86	.38
TOL		
TOL Total Score	.03	.97
Mean Solution Time	1.24	.26
No. of Rule Violations	2.39	.02
Conners' CPT-II		
	df (119)	
Clinical Confidence Index	4.35	.00
Omissions	.52	.60
Hit RT	.64	.52
Hit RT SE	2.15	.03

4.9 Stepwise Multinomial Logistic Regression

The previous statistical analysis indicated a wide range of psychological (categorical and continuous) variables that are likely to differentiate between the groups. It also showed that the magnitude of the group differences across the psychological measures varied considerably. Additionally, it illustrated that certain variables do not differ across groups

once the influence of other variables is removed. This set of results makes it hard to estimate the significance of the group differences detected by the univariate analysis.

In order to more robustly establish the psychological group differences of the study, it was considered important to replicate the univariate differences in a multivariate model. This method would allow estimating the significant contribution of each one of the variables in the pattern of group differences detected by univariate methods. Furthermore, it was also decided to investigate what patterns of psychological vulnerability predict conduct and academic measurements. This analysis involved the prediction of the groups of the study by the psychological variables that were found to differ across groups.

The prediction of group membership is considered to be of special importance for this thesis. First, it is ascertained that if the variables can confirm the groups, then the results will be more ecologically valid. Particularly, this will show that the results are likely to be applicable to natural settings that share common characteristics with the original setting that they emerged from, namely the school.

Secondly, this analysis will allow inferences about the vulnerabilities that are exhibited by certain groups of students encountered in a certain setting where intervention is to be delivered. Rather than revealing who is likely to suffer psychological vulnerabilities in relation to the child's position on the teacher rating scale, this analysis is more likely to indicate who has what. This research objective is central in this thesis and is of considerable importance for successful educational policy making and the development

of effective interventions. As indicated by the literature review, the heterogeneity of conduct problems creates complications in planning effective differential interventions. As a result, among the immediate interests of the present thesis is to tease out the specific problems of the groups under investigation. The specificity of the findings could possibly offer a guide for intervention planning that educators and practitioners could use as a reference point in coping with conduct problems in the school setting.

Lastly, this analysis will specify clusters of psychological characteristics that predict the groups of the study. These clusters of psychological characteristics can assist in developing a comprehensive theoretical framework about the risk factors that contribute to the generation of conduct problems. In line with the literature review, it was theorised that children with conduct problems have distinct needs which might originate from different causes. Therefore, the second objective of this thesis was to examine the differential nature of conduct problems. The prediction of the groups of the study will serve as a means of identifying some of the likely factors that are involved in the generative process of conduct problems in children. Furthermore, it will give an insight into the operation of systems of psychological factors that the distinct facets of conduct problems emerge from.

It could be argued that the groups to be predicted are not *true*, namely, they do not comprise disorders per se nor are there any clear boundaries distinguishing them. Rather, they are clusters of individuals constructed by subjective judgments of child behaviour as well as by a subjective *threshold of tolerance* of troublesome behaviour that occurs in a

certain context. Consequently, there will be no value added in the results by predicting the subjectively defined groups of the study. Instead, it could be more helpful to approach the data the other way around, by using teacher ratings and other less robust measures to predict the children's scores on the, more objective, psychological tests.

From the point of view of this thesis, child behaviour should not be investigated in isolation from its context. Talking about the nuances of employing a strictly positivist approach in social research Robson (2000) underscores that *...knowledge is a historical and social product that can be specific to a particular time, culture or situation* (p. 34). It is now accepted by contemporary theorists that there is a significant influence of context in psychological as well as in biological processes that determine psychopathology (Cicchetti & Aber, 1998). Furthermore, variations in conceptions of normality across cultures determine the definition, identification and explanation of child mental disorders (Coll, Akerman, & Cicchetti, 2000). As a Greek teacher characteristically said *If, for example, a way of behaving isn't defined as a problem, it stops being a problem* (Bouldadaki, 1997, p. 142). Consequently, behaviour is context-bound (Bouldadaki, 1997).

Children spend a considerable amount of their life at school with their teachers and peers. The context that is deemed to exert some influence on child behaviour is school. Within the school setting, the identification of the behaviour as disruptive is determined by the teacher. This judgment is specific to a certain context that the child is requested to thrive in. The same behaviour may not constitute a problem in a different situation by another

teacher. Therefore, teachers' perceptions reflect a certain reality about what troublesome behaviour is. On the basis of these perceptions, decisions are made about who will receive special intervention and the needs that intervention should address in order to be effective. This thesis therefore holds an interest in investigating and accumulating knowledge for conduct problems as they emerge in this reality.

Multinomial logistic regression was selected as the most appropriate statistical method for predicting group membership. In multinomial regression all the variables under investigation (dichotomous and/or continuous) are used simultaneously in the same analysis to predict group membership (for details on logistic regression see *Statistical Analysis Employed*, 4.2 section in this Chapter). This analysis allows the investigation of the unique importance of each one of the variables to predict group membership. Additionally, it assists the examination of the contribution of each variable, after the contribution of the other variables used in the analysis has been taken in to account.

In logistic regression, the group variable is called the *criterion variable*, whereas the variables that are used to predict the group variable are called *predictor variables*. (Howitt & Cramer, 2002). It should be mentioned here that the term *predictor* does not imply any causal relationships (Howitt & Cramer, 2002). The group variable (criterion) was composed of four categories that represent the four groups of the study: CP-PR, CP, PR, WCP-PR. The categories were defined as follows:

CP-PR: the child should receive ratings at or above the clinical cutoff point (rating ≥ 8) on the Conners' TRS-28 Conduct Problems scale and score at or below the 25% percentile on the Test of Reading Ability Detection (T-score ≤ 90).

CP: the child should receive ratings at or above the clinical cutoff point (rating ≥ 8) on the Conners' TRS-28 Conduct Problems scale and score above the 25% percentile (T-score > 90) on the Test of Reading Ability Detection

PR: the child should receive ratings below the clinical cutoff point (rating < 8) on the Conners' TRS-28 Conduct Problems scale and score at or below the 25% percentile (T-score ≤ 90) on the Test of Reading Ability Detection.

WCP-PR: the child should receive ratings below the clinical cutoff point on the Conners' TRS-28 Conduct Problems (rating < 8), Inattention (rating < 11) and Hyperactivity (rating < 9) scale and score above the 25% percentile (T-score > 90) on the Test of Reading Ability Detection.

The categories of the group (criterion) variable in logistic regression should be dichotomous (Howitt & Cramer, 2002). Therefore, when the group variable is comprised of more than two categories it should be converted in to several dichotomous variables on the basis of the number of categories it comprises. The additional variables are called *dummy variables*. In this analysis three dummy variables were created: CP vs not CP; CP-PR vs not CP-PR; PR vs not PR.

Initially, in the present analysis, the variables that were found to significantly discriminate the groups in the univariate analyses were utilised as predictor variables. These variables are the following: Conners' TRS-28 Inattentiveness and Hyperactivity, Conners' CPT-II: Clinical Confidence Index, Hit RT, Hit RT SE, WISC-III: Similarities, Vocabulary, Comprehension, Number Memory, Verbal IQ composite score, Phonological Awareness composite score, No. of Rule Violations. On the basis of the Conners' TRS-28 cutoffs for Inattention and Hyperactivity, the variables of Inattentiveness and Hyperactivity were used as dichotomous variables and not as ratings. The Conners' CPT-II Omission was not included in the analysis as it did not differ considerably among groups. Group differences in the TOL Total Score and Mean Solution time were only marginally significant. Moreover, the magnitude of most of these differences ranged from small to medium. Hence, the TOL Total Score and Mean Solution Time measures were not included in the analysis. Analysis of variance did not show any significant group differences in the Conners' CPT-II Response Style scores. Nonetheless, effect size analysis suggested that the difference may have been of importance that the analysis of variance did not detect. Consequently, Response Style was also utilised in the multinomial logistic regression analysis.

Logistic regression does not make restrictive assumptions about the predictor variables. However, multicollinearity²² and singularity²³ should be avoided (Dewberry, 2004). In case of a high bivariate correlation it is suggested that one of the variables should be omitted or a composite variable should be formed from the scores of the two highly

²² When one or more predictor variables are highly correlated (Pallant, 2004)

²³ When predictor variables are perfectly correlated with each other (Dewberry, 2004)

correlated variables (Dewberry, 2004). It seems that there is not as single standard correlation cutoff which indicates multicollinearity, as various correlation cutoffs have been proposed in the published literature ranging from .7 (Tabachnick & Fidell, 1997) to .9 (Dewberry, 2004).

Correlation analysis was carried out for all the predictor variables in order to check their appropriateness for the multinomial logistic regression analysis. Inattention and Hyperactivity variables were not intended to be used as continuous, but rather as dichotomous variables. However, because being dichotomous they could not be entered in to the correlation analysis they were entered as continuous variables. That is, the ratings on the Conners' TRS-28 for Inattention and Hyperactivity were used instead of group membership in the Inattention or Hyperactivity group defined by the Conners' TRS-28 cutoff.

Table 28 shows that all the WISC-III sub-tests measures were highly correlated with the Verbal IQ composite score. This was expected as these tests make up the Verbal IQ composite score. Therefore, it was decided to remove all the sub-test variables from the logistic regression analysis and keep only the Verbal IQ composite score. Conners' Clinical Confidence Index was also highly correlated with the Conners' Hit RT and Hit RT SE measure. The former was removed from the analysis first, because, analysis of variance indicated that Hit RT SE scores significantly distinguish the groups better than the Clinical Confidence Index measure. Secondly, the Clinical Confidence Index was considered redundant as classification of attention deficit and hyperactivity is also offered

by the Conners' TRS-28 teacher ratings of Inattention and Hyperactivity. Finally, a high correlation between the Hit RT and Hit RT SE measures was detected. It was decided to remove the Hit RT measure from the analysis as the Hit RT SE was found to distinguish better between the four groups of the study.

Table 28. *Correlations among the Measures Selected for the Multinomial Logistic Regression Analysis*

Measures	1	2	3	4	5	6	7	8	9	10	11	12	13
Conners' TRS-28													
1. Inattentive	-	.46	-.08	-.29	-.25	-.12	-.25	-.33	.34	.31	-.26	.32	-.13
2. Hyperactive		-	-.24	-.26	-.28	-.38	-.40	-.57	.34	.33	-.21	.36	-.10
WISC-III													
3. Similarities			-	.42	.35	.38	.70	.38	-.17	-.06	-.10	-.16	.00
4. Vocabulary				-	.50	.38	.75	.48	-.21	-.17	-.10	-.26	.22
5. Comprehension					-	.38	.73	.49	-.19	-.25	-.32	-.28	.16
6. Number Memory						-	.72	.55	-.29	-.29	-.30	-.28	.03
7. Verbal IQ							-	.64	-.28	-.29	-.32	-.36	.12
8. Phonological Awareness								-	-.36	-.35	-.27	-.38	.05
9. No. of Rule Violations									-	.33	.19	.32	-.09
Conners' CPT-II													
10. Clinical Confidence Index										-	.56	.80	.18
11. Hit RT											-	.55	.12
12. Hit RT SE												-	.01
13. Response Style													-

The variables used in the final multinomial logistic regression analysis as predictor variables were: Conners' TRS-28 Inattentiveness and Hyperactivity, Conners' CPT-II: Hit RT SE, Response Style, WISC-III Verbal IQ composite score, Phonological Awareness composite score, No. of Rule Violations. The predictor variables were entered in a stepwise mode. In stepwise selection, the sequence that the variables are entered in to the analysis is based on their predictive power (Howitt & Cramer, 2002). That is, initially the variable that is considered to be the best predictor on the basis of certain statistical criteria is entered in to the analysis. Following that, the predictor that has the second best predictive power is entered. The entering process stops when there are not more group predictors to be identified (Howitt & Cramer, 2002).

The stepwise analysis demonstrated that out of the seven predictor variables, four were found to best differentiate the four groups of the study. These variables were: Conners' TRS-28 Inattention and Hyperactivity classification; Verbal IQ composite score; Phonological Awareness composite score. The value of the pseudo- r^{224} (Cox and Snell) was .71 indicating that, when considered together, the associations between the groups and the variables are statistically significant.

The Pearson goodness-of-fit statistic ($\chi^2(348)=243.70$, $p=1.00$) was not significant. This result suggests that there was not any significant difference between the actual group membership and the predicted one.

²⁴ Analogous to the r^2 statistic utilised in linear and multiple regression analysis (Howitt & Cramer, 2002)

In line with model fitting analysis the model fit improved significantly when the variables were entered in to the analysis ($\chi^2(12)=14.84$, $p=.00$). The likelihood ratio tests presented in Table 29 illustrate the impact on the model's ability to predict group membership after removing one predictor at a time from the model. Almost all predictors make a significant contribution to the predicted model as indicated by the significance of the change caused in the model when each one of them is removed. The Phonological Awareness predictor makes only a marginally significant contribution to the model's ability to predict the groups of the study.

Table 29. *Likelihood Ratio Tests*

Predictors	-2 Log Likelihood of Reduced Model	χ^2 (df=3)	p
Intercept	184.82	(df=0) .00	.
Conners' TRS-28			
Inattention	196.34	11.52	.00
Hyperactivity	236.08	51.26	.00
WISC-III Verbal IQ	202.16	17.34	.00
Phonological Awareness	192.49	7.67	.05

The variables that were identified as good predictors of group membership classified correctly 73.3% of cases with CP-PR and 86.7% of cases with WCP-PR. However, PR was identified only in 58.8% cases and CP only in 55.6% cases.

As expected, the results in Table 30 show that in comparison to the WCP-PR the CP-PR and PR groups were more likely to be predicted by classification of Inattention and

Hyperactivity on the basis of teacher ratings on the Conners' TRS-28 and by low scores in Verbal IQ and Phonological Awareness. The CP group was significantly more likely than the WCP-PR group to be also predicted by classification of Inattention and Hyperactivity. Nonetheless, low scores in Verbal IQ and Phonological Awareness were not likely to predict CP group membership as opposed to WCP-PR group membership. All the reported predictions were significant at the .05 level.

With reference to the comparison between the CP-PR and the CP groups the results in Table 31 indicate that the CP-PR group was significantly more likely to be predicted by Inattention according to teachers and by low scores in Verbal IQ than was the case with the CP group. There was also a marginally significant tendency for the CP-PR group to be more likely to be predicted by Hyperactivity than the CP group. In relation to the comparison between the CP-PR and the PR group, the former was significantly more likely to be predicted by Hyperactivity than the latter. Lastly, regarding the CP vs PR contrast presented in Table 32, children with CP were more likely to be predicted by Hyperactivity than the PR children. There was also a marginally non significant tendency for the CP group to be more likely predicted by better scores in Verbal IQ than the PR group. Low scores in Phonological Awareness did not differentiate the CP group from the PR group. All the reported predictions were significant at the .05 level.

These results verify the results obtained from the univariate contrasts between the CP, PR and CP-PR groups against the WCP-P; all the groups selected for conduct or reading

Table 30

difficulties (CP-PR, CP, PR) met criteria for Inattention and Hyperactivity problems as identified by teachers and only the CP-PR and PR groups were distinguished by low Verbal IQ and Phonological Awareness scores.

Table 31. *Predictors of the CP and PR Groups as Opposed to the CP-PR Group*

Predictors	CP-PR vs CP				CP-PR vs PR			
	B	Std. Error	Wald	p df=1	B	Std. Error	Wald	p df=1
Conners' TRS-28								
Inattention	-1.87	.85	4.79	.02	-1.11	.79	1.98	.15
Hyperactivity	-1.72	.88	3.78	.05	-3.50	.81	18.27	.00
WISC-III Verbal IQ	.13	.04	7.25	.00	.06	.04	2.07	.15
Phonological Awareness	.10	.05	3.28	.07	.03	.04	.68	.40

Table 32. *Predictors of the CP Group as Opposed to the PR Group*

Predictors	CP vs PR			
	B	Std. Error	Wald	p df=1
Conners' TRS-28				
Inattention	-.75	.77	.96	.32
Hyperactivity	1.77	.64	7.52	.00
WISC-III Verbal IQ	.06	.03	3.27	.07
Phonological Awareness	.06	.05	1.53	.21

As far as the contrast with the remaining groups is concerned, similar to univariate results the PR group is more likely to meet criteria for Inattention than Hyperactivity according to teachers' judgments. On the contrary, the CP group is more likely to meet criteria for Hyperactivity than Inattention. The CP-PR group tends to have a high frequency of both Inattention and Hyperactivity. Verbal IQ and Phonological Awareness do not seem to

predict the groups of the study as effectively as Inattention and Hyperactivity. Nonetheless, in agreement with the model fitting results, their contribution to the model is significant.

The laboratory measures of attention and the executive function measures of planning were not found to significantly predict group membership. This finding should be interpreted in relation to the ANCOVA results which demonstrated that the differences in the Conners' CPT-II and TOL measures were conditional upon the presence of teacher rated Inattention and Hyperactivity.

4.10 Group Differences in Measures of Parental Involvement

The purpose of this section is present the results concerning the second research question of the thesis:

Do children with CP, CP-PR, PR and WCP-PR differ in measures of parental involvement in their school and social life?

Parental involvement was measured by utilising questionnaires and telephone interviews. The results are shown separately for each measure. Chi-square analysis was used to detect group differences.

4.10.1 Questionnaire

Tables 33 to 38c summarise the findings for the questionnaire measures of parents' involvement in their children's education-related activities. There were no significant differences between the groups in any of the questionnaire measures of parents' involvement in their children's education-related activities. In particular, there were no significant group differences in parents' attitudes towards parental involvement (Table 33) or in parental involvement in schooling (Table 34). There was no significant group difference in parents' communication with school (Table 35) or in parents' involvement in homework (Table 36). There were no significant group differences in parental involvement in reading (Table 37) or in socio-educational activities (Table 38a, 38b, 38c).

Although the Chi-square analyses did not reveal any differences in parents' involvement with their children, the contingency tables suggested a number of relationships which are worth pointing out. Starting with the "involvement in homework" items, the questionnaire showed that most parents of each group did not find it difficult to get their children to do their homework. However, the percentage of the CP-PR group parents who judged their children as very difficult to involve in homework seems to be higher than the respective percentages of parents of WCP-PR and CP children (Figure 10).

Another noteworthy result concerns the distribution of the parents' personal judgments on confidence in helping with homework. In comparison to the parents of the WCP-PR

group, more parents of CP and CP-PR group children consider themselves *not very confident* in providing their children with assistance in homework (Figure 11).

Figure 11. *Percentage of parents' judgments on child difficulty in doing homework*

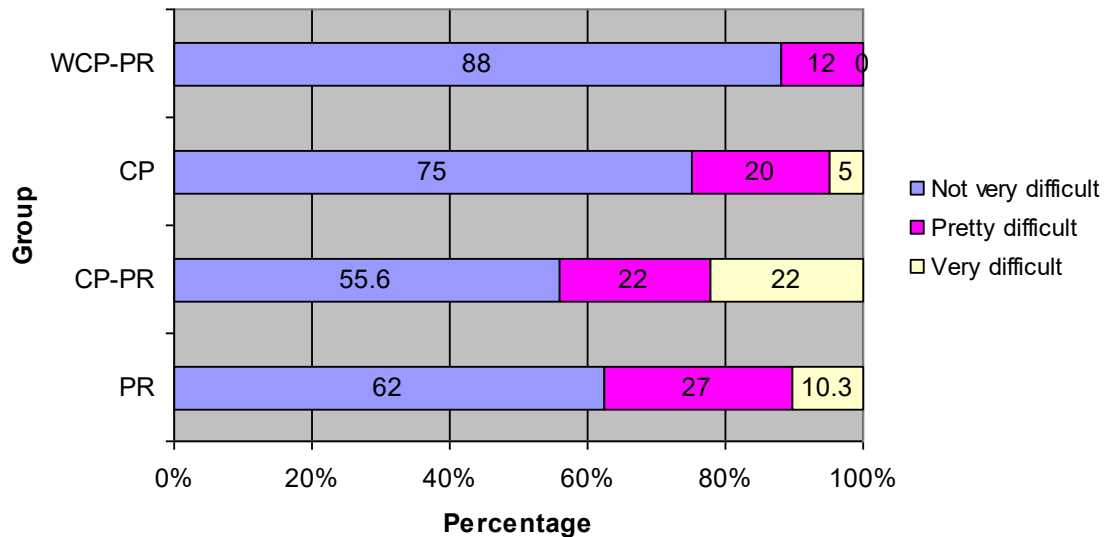
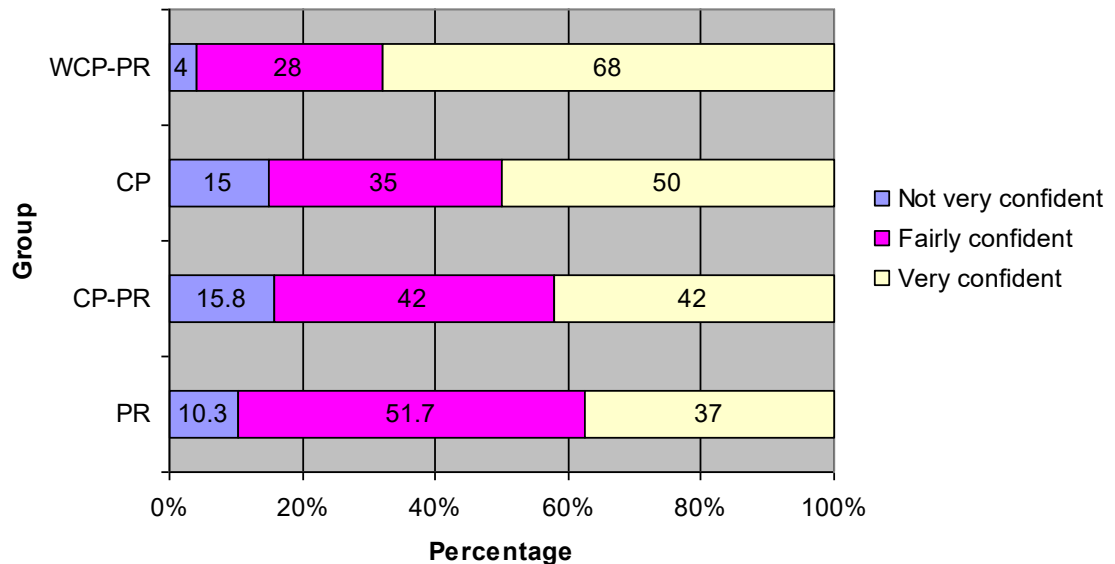


Figure 12. *Percentage of parents' judgments on their confidence in helping with homework*



4.10.2 Telephone Interviews

The telephone interviews showed that there was a significant difference across the four groups in help provided with homework (Table 40) and reading homework (Table 41). The relevant percentages are presented in Figures 12 and 13 respectively.

Subsequent partitioned 2x2 chi-squares with an adjusted p-value of .008, indicated that the significant difference was valid for the CP-PR vs WCP-PR group comparison. These analyses confirmed that the parents of CP-PR children were more likely to help with homework ($\chi^2 (1, N=39)=7.43$ $p=.006$) and reading homework (Fisher, $p=.006$) than the parents of the WCP-PR group.

The rest of the groups did not differ significantly in the amount of help provided with homework and reading homework by parents. With reference to parental involvement in checking homework (Table 40) and reading homework in particular (Table 41), chi-squares indicated that there were not significant differences between the groups in the frequency with which parents checked the children's homework and reading homework.

With regards to the other items of the telephone interviews, the analysis showed that there were no group differences in how often parents approached teachers to ask about their child's academic performance and behaviour at school (Table 39), how often parents read books with their child, how often they involved their child in family chores, or in how often they shared activities with their children (Table 42).

Figure 13. *Percentage of parents that offered help with homework*

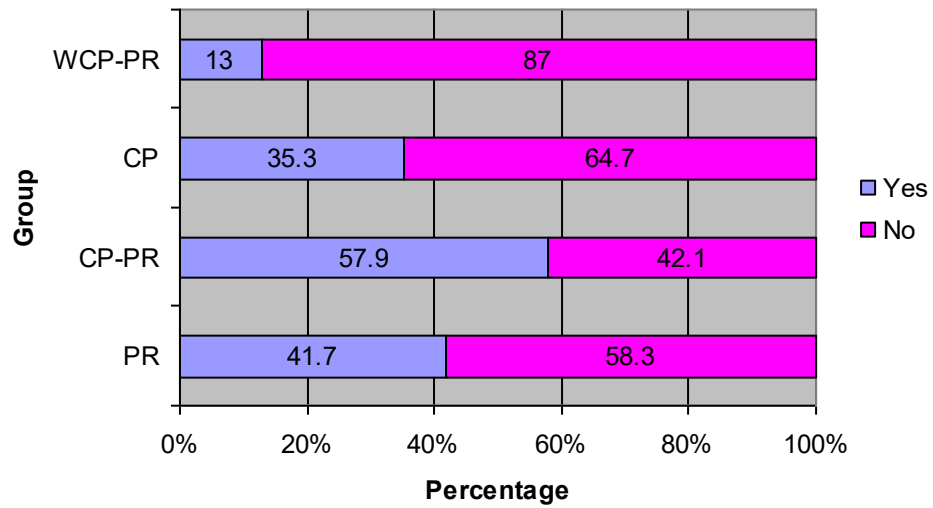
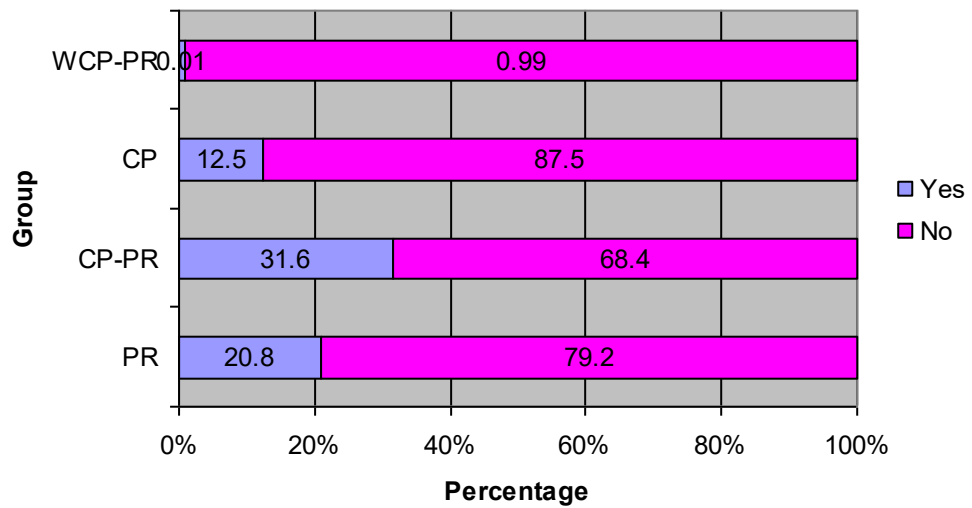


Figure 14. *Percentage of parents that offered help with reading homework*



It was also found that the parents in the CP group did not talk at all to the teacher (Figure 14). However, it should be noted that the sample size of CP and WCP-PR group parents involved in this analysis was particularly small (CP, n=4; WCP-PR, n=9), while this finding applies only to the particular day on which the telephone interview occurred and is probably unreliable as a result.

Figure 15. *Percentage of parents that talked to teachers the day they were interviewed*

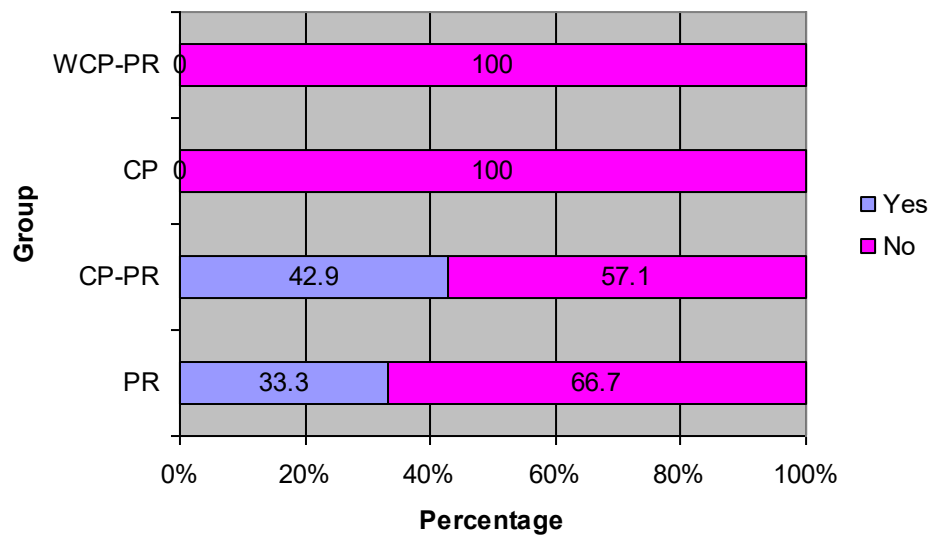


TABLE 33

TABLE 34

TABLE 35-36

TABLE 37-38a

Table 38b-38c

TABLE 39-40

TABLE 41-42

4.11 Summary

The statistical analysis of variance and effect size verified the hypothesized differences between the psychological characteristics of children with conduct problems and children with conduct problems and poor reading. The latter were found to have poorer functioning than the former in all the psychological domains investigated (that is, attention, verbal ability, phonological processing, executive function). The children with conduct problems only were not found to differ significantly from the WCP-PR group on these measures. However, their performance in some of the verbal measures showed that they may experience weaknesses in certain verbal skills (vocabulary and verbal short memory). The analysis revealed that children with problems both of conduct and reading are less competent in more domains of psychological functioning than children with poor reading only, such as attention, phonological awareness and executive function. In a nutshell, the findings demonstrated that children with conduct problems and accompanied poor reading are likely to be different in their psychological functioning from children with the single conditions of conduct problems or poor reading.

Analysis of covariance illustrated that some of the detected group differences are likely to be influenced by the vulnerabilities that children with reading and conduct problems possess. Group differences in attention and executive function tasks were contingent upon the presence of Inattention and Hyperactivity deficits in teacher ratings, testifying to the accuracy of the teacher measures. Gender was also found to be a determinant of group differences in measures of attention. The statistical control of verbal intelligence and

verbal short-term memory variables did not cause significant changes in the pattern of group differences.

To further analyse the univariate significant differences, multinomial stepwise logistic regression was employed. The analysis showed that only inattention, hyperactivity, verbal and phonological ability can significantly predict group membership. Membership for the CP and PR groups was not as correctly predicted as for the CP-PR group. The CP-PR, CP, and PR groups were likely to meet criteria for teacher rated Inattention and Hyperactivity. Children with CP-PR and PR were more likely than CP to have worse verbal IQ and phonological awareness.

The findings from the questionnaire and telephone interview measures of parents' involvement in their children's education-related activities did not reveal many group differences. Neither the questionnaires nor the interviews showed that the CP-PR and PR children receive less attention from their parents in their educational and social life than WCP-PR and PR children. On the contrary, it was found that the parents of the CP-PR group, the most vulnerable group in the study, tend to offer significantly more help than the parents of the WCP-PR group in overall homework and reading homework.

The questionnaire results suggest a tendency of the parents with children with conduct problems to face more problems educating their children, but these differences did not reach statistical significance. It seems that the parents of the CP-PR group found it harder than the parents of the other groups to get their child do homework. The parents of CP

and CP-PR children considered themselves less confident than the parents of the WCP-PR children in offering assistance with homework.

5. DISCUSSION

5.0 Introduction

This chapter will discuss all the findings in relation to the psychological and family characteristics of children with conduct problems examined in this thesis. The chapter is divided in eleven sections. In the first five sections the findings with regards to teacher-rated attention deficit and hyperactivity, laboratory-measured attention deficit, and verbal, phonological and executive function deficits of children with conduct problems are discussed. In sections six and seven the findings about the family characteristics of children with conduct problems are discussed. In sections eight and nine the theoretical and practical implications of the findings are presented. The chapter ends with a summary of the main discussion points.

5.1 The Relationship between Teacher-Rated Attention Deficit and Hyperactivity and Poor Reading in Children with Conduct Problems

The literature review suggested that AD/HD is an important determinant of the co-occurrence of conduct problems and reading difficulties in children (Anderson et al., 1989; Carroll et al., 2005; Frick et al., 1991; Hinshaw, 1992b; Maughan et al., 1996; Willcutt & Pennington, 2000a, 2000b). On the basis of this evidence, it was hypothesised that children with a combination of conduct and reading problems (CP-PR) would experience significantly more attention deficit and hyperactive than conduct disturbed children without reading difficulties (CP). This hypothesis was supported. The analysis demonstrated that according to teachers perceptions the CP-PR children were more likely to display attention deficit and hyperactivity at school, than their CP peers; the CP-only children were found to be less likely to meet the Conners' TRS-28 criteria for teacher rated inattention (18% of CP children) and hyperactivity (57.10% of CP children) than the children with CP-PR (70% with inattention and 86.70% with hyperactivity).

These results provide further support for the hypothesis that attention deficit and hyperactivity are particularly significantly related to the co-existence of reading difficulties and conduct problems in children. On the other hand, recent twin data extracted from the study of Trzesniewski et al., (2006) found that additional factors detected in the environment may also play a role in the association between conduct problems and reading failure. Indeed, the present study found that apart from teacher rated attention deficit and hyperactivity, children with CP-PR experience additional psychological difficulties (verbal, phonological and executive). These findings suggest

that attention deficit and hyperactivity may not be the sole factor involved in the explanation of the relationship between conduct and reading problems. It could be that attention deficit and hyperactivity are not related to reading conduct problems in a linear fashion, but rather synergistically through their interaction with other components of the system that triggers reading complications and conduct problems in children.

In line with the literature review, the positive relationship between AD/HD and reading difficulties is well-established (Adams et al., 1999; Carroll et al., 2005; Dykman & Ackerman, 1991; Frick et al., 1991; Maughan et al., 1996; McGee et al., 2002; McGee et al., 1986; Sanson et al., 1996; Spira Greenfield & Fischel, 2005; Trzesniewski et al., 2006; Willcutt et al., 2001; Willcutt & Pennington, 2000a, 2000b; Willcutt, Pennington, & DeFries, 2000). It was therefore expected that the CP-PR and PR groups would not differ significantly in teacher rated attention deficit and hyperactivity. Contrary to expectations, the analysis indicated that the PR group had a considerably smaller number of children reaching the Conners' TRS-28 cutoff point for either inattention (28.9%) or hyperactivity (17%) compared to the CP-PR group. This unexpected finding cannot be attributed to the severity of the reading problems of the CP-PR group. Comparisons of the mean reading scores indicated that there were not any significant differences between the CP-PR and the PR group.

Since the CP-PR group does not, in the above sense, include more severe cases than the PR group and the association between AD/HD and poor reading is well established, then why was the PR group not as inattentive and hyperactive as the CP-PR group? It could be

that reading problems and AD/HD are comorbid in certain cases only. The nature of the association between problems of AD/HD and reading difficulties is still controversial. It has been suggested that common genetic influences underlie the association (Spira Greenfield & Fischel, 2005; Trzesniewski et al., 2006; Willcutt et al., 2000; Willcutt et al., 2005). Willcutt & Pennington (2000a) note that the nature of these influences is not known. However, they also underscore the possibility that genetic influences are reflected as a shared predisposition towards difficulties in auditory processing, verbal working memory or language development. Willcutt & Pennington (2000b) have extended this hypothesis to the emergence of conduct problems. They argue, that

Twin results have also shown that RD and CP are not attributable to common genes suggesting that the common genetic influences that contribute to RD and AD/HD may not be associated directly with other externalising psychopathology. Instead, it is possible that the common genetic influences associated with RD and AD/HD may interact with the social environment, leading to a higher risk for aggressive or conduct disordered behaviours (p. 146).

In agreement to the speculation of Willcutt & Pennington (2000b), developmental accounts on conduct problems have supported the notion that AD/HD may progress to conduct problems (Moffitt, 1993a; Patterson et al., 2000). On the other hand, there is evidence showing that conduct problems could not have occurred as a result of comorbid AD/HD and poor reading. That is, because distinct liabilities predispose to comorbid AD/HD and poor reading and comorbid conduct problems and poor reading respectively;

as mentioned previously, ADHD and poor reading are unlikely to occur as a result of common genetic influences. On the contrary, Trzesniewski et al., (2006) offer evidence which indicates that the relationship between conduct problems and poor reading is not genetically mediated, but rather reciprocal. Although there is no particular set of etiological factors implicated by Trzesniewski and colleagues (2006), they suggest that non inherited neurobiological complications could underlie the association (Trzesniewski et al., 2006).

How do the findings from the present thesis apply to the above evidence? A psychological dysfunction reflected as inattention, language related difficulties and executive dysfunction, in particular rule-breaking behaviour, was found to characterise children with conduct problems and poor reading. In agreement with Trzesniewski and colleagues (2006) it is possible that a neuropsychological dysfunction due to prenatal and/or antenatal injuries has led to maladaptive functioning in children. Consequently, attention, behavioural regulation and language could be affected as a result. A child's maladaptive functioning can make rearing challenging for parents as the child becomes hard to manage and less receptive to learning, possibly evoking coercive child-parental interactions that ultimately lead to conduct problems. Additionally, children's attention and language difficulties can put the child at risk for learning difficulties and poor reading. Once established, conduct problems and reading difficulties will eventually exert influence on each other in a reciprocal fashion.

5.2 The Nature of Attention Deficit in Children with Conduct Problems

In order to examine the nature of the attention deficit of children with conduct problems, additional examinations of attention were carried out by using a more objective measure of attention; the Conners' CPT-II. The literature review indicated that on the basis of teacher and/or parent reports, children with CP-PR exhibit elevated AD/HD (Anderson et al., 1989; Carroll et al., 2005; Frick et al., 1991; Maughan et al., 1996; McGee et al., 1984b; Willcutt & Pennington, 2000b). On the other hand, it was found that there was limited evidence as to whether this result is replicated when attention is assessed through more objective means such as laboratory tests. Due to the consistency with which AD/HD is associated with conduct problems and poor reading and the evidence showing that AD/HD is associated with poor performance in objective measures of attention (Barkley, 1991; Epstein et al., 2003; Shallice, 1988) it was hypothesised that the CP-PR group would score significantly worse than the CP and WCP-PR groups in attention assessed by the Conners' CPT-II measures: Commission errors²⁵, Omission errors²⁶, Hit Reaction Time (RT)²⁷, Hit RT Standard Error (SE)²⁸, Clinical Confidence Index, Detectability (*d*)²⁹, Response Style (*b*)³⁰, Clinical Confidence Index³¹.

Univariate analysis of variance of the objective measures of attention mirrored the teachers' reports in inattention. In particular, it was established that CP-PR children had a significantly slower and variable hit reaction time to targets and were significantly more

²⁵ Omission errors: the number of times the child did not respond to a target (non X)

²⁶ Commission errors: the number of times the child responded to a non target (X)

²⁷ Hit reaction time (Hit RT): the mean response time for all targets (non X)

²⁸ Hit reaction time standard error (Hit RT SE): the variability of response time expressed in standard errors

²⁹ Detectability (*d*): The difference between the signal (non-X) and noise (X) distributions

³⁰ Response style (*b*): Speed/accuracy trade off

³¹ Clinical Confidence Index: indicates the probability that a clinically significant problem exists.

likely to be classified as AD/HD according to the Clinical Confidence Index than the children in the CP and WCP-PR groups. They were also more inaccurate in their responses by committing more omission errors (failure to respond to targets).

Because of the documented strong relationship between AD/HD and poor reading, it was also hypothesized that the PR children would score worse in the Conners' CPT-II measures than the CP children, but not different from the CP-PR children. It was hypothesized that children with CP only would not differ significantly in these measures from the normative group (WCP-PR). The univariate statistical analysis did not confirm these hypotheses. The performances of the PR and CP groups were almost identical and significantly better than the performance of the CP-PR group in speed and variability of hit reaction time as well as in AD/HD classification. Apart from exhibiting a significantly more variable pattern of reaction time to the stimuli compared to the WCP-PR group, they did not differ in any other measure from this group.

A possible explanation of these unexpected findings could be that the performance on laboratory measures of attention is conditional upon the co-existence of attention deficit and hyperactivity. The statistical analysis showed that all the significant group differences detected in the Conners' CPT-II measures stopped being significant after teacher rated attention deficit and hyperactivity were statistically controlled. The analysis also demonstrated that the CP-PR group was characterised by teachers as significantly more inattentive and hyperactive than the other groups. On the basis of this evidence, it is probable that the CP-PR children scored worse than the PR children in the measures of

the Conners' CPT-II because they were more likely to have attention deficit and hyperactivity. Despite the fact that the PR and CP children were also inclined towards attention deficit and hyperactivity, this inclination was not so strong so as to be captured by the measures used in this study, except for the variability of hit rate, namely the Hit RT SE measure. It appears that Hit RT SE is a very sensitive measure of teacher rated attention deficit and hyperactivity. This finding is in agreement with data from studies which discovered that variability of Hit RT as measured by the stop-task (Kuntsi et al., 2001; Rucklidge & Tannock, 2002) and the continuous performance test (Epstein et al., 2003) is a stronger correlate of AD/HD than Hit RT.

Stepwise multivariate logistic regression showed that the Conners' CPT-II measures were not significant predictors of group membership after teacher rated attention deficit and hyperactivity, Verbal IQ and phonological awareness were entered into the model. This result indicates that problems with laboratory tasks of attention do not specifically characterise children with conduct problems when the influence of other variables is taken into account. Because statistical controls of teacher ratings of attention deficit and hyperactivity were powerful enough to convert significant group differences to non significant differences, and due to the relationship that has been found between AD/HD symptoms and the continuous performance test (Barkley 1991; Corkum and Siegel 1993; Conners', Epstein et al. 2003), teacher rated attention deficit and hyperactivity are likely to be some of these factors.

A final point of discussion is related to the pattern of responding of children with conduct problems and associated poor reading and its implication for the explanation of the nature of attention deficits in children with conduct problems. The CP-PR group was characterised by a significantly slow, variable and inaccurate responding style, as indicated by slow and variable hit reaction time and a high number of omission errors. This pattern of responding matches the pattern of responding of AD/HD children when performing similar laboratory tasks that involve measures of speed of reaction and accuracy (Kuntsi et al., 2001; Oosterlaan et al., 1998; Scheres et al., 2001b). This pattern of responding in AD/HD children is related to the idea that slow speed and variability of hit rate as well as high rate of omissions betray a generalized behaviour regulation deficit, rather than a specific cognitive dysfunction of attention. This idea stems from theories that see AD/HD as a state-regulation deficit that results from an unusual sensitivity to reward or reinforcement. According to the state-regulation theoretical framework, the core problem in AD/HD children is related to a non-optimal activation/effort state that is located at the output stage of information processing (Luman, Oosterlaan, & Sergeant, 2005; Oosterlaan et al., 1998; Scheres et al., 2001b; Sergeant, 1996). This state is influenced by effort allocation which is influenced by reinforcement. Children with AD/HD exhibit an unusual sensitivity to reinforcement that makes their performance variable. Such children are acting as stimulus seekers when the test becomes boring. In contrast, when the test is appealing and interesting (fast presentation rate stimuli) they become engaged in the activity (Van der Meer, Marzocchi, & De Meo, 2005). With reference to children with conduct problems and poor reading, this pattern of responding may reflect an underlying behavioural regulation dysfunction rather than a cognitive

dysfunction in attention. This dysfunction is likely to be mediated by teacher rated attention deficit and hyperactivity.

5.3 Verbal Deficits of Children with Conduct Problems

Following the thesis hypotheses it was expected that children with CP-PR would be significantly poorer in verbal abilities than children with CP. On the contrary, children with CP were not assumed to display any difficulties in verbal tasks.

The results supported this hypothesis. In line with univariate and multivariate analyses, children with CP-PR scored significantly worse than children with CP in the WISC-III measures of verbal reasoning (Comprehension & Similarities), vocabulary, verbal short term memory (Number Memory), and Verbal IQ. The analyses also demonstrated that, despite fluctuations in the sub-test scores of the groups, CP children were more likely to have verbal ability similar to WCP-PR children and significantly better than the children with PR.

A final point of discussion regarding the verbal capacity of children with conduct problems is related to the specificity of verbal dysfunction in children with conduct problems and poor reading. The results showed that the CP-PR group had similar verbal intelligence to the PR group. In the absence of conduct problems in children with PR this finding may support the hypothesis that verbal deficits are not likely to be causally related to conduct problems. This point is relevant to Patterson's (1990) conclusion that the association between antisocial behaviour and intelligence was correlational rather

than causal. Attention deficit and hyperactivity do not seem to be responsible for the verbal delays of the CP-PR group as group differences in the WISC-III verbal sub-tests and Verbal IQ score did not change as a result of statistical control of teacher rated attention deficit and hyperactivity. Therefore, it is plausible that verbal difficulties of children with conduct problems are attributable to their comorbidity with poor reading.

5.4 Phonological Awareness Deficits of Children with Conduct Problems

Based on the results of the literature review, it was hypothesised that children with CP-PR would be more likely to manifest phonological awareness difficulties than children with CP and WCP-PR. Unlike children with CP-PR, those with CP were not expected to differ significantly from the WCP-PR children in phonological awareness. Analysis of variance showed that the CP-PR children had significantly worse phonological awareness than the WCP-PR and the CP children, who did not differ in this respect. The results from the multinomial logistic regression were less clear. It was found that, when the CP-PR and CP groups were compared with each other, the CP-PR group was not distinguished by lower phonological scores when the other variables of the model were taken into account.

In keeping with the thesis literature review, it was assumed that the PR and CP-PR children would show similar phonological ability. Contrary to expectations, univariate analysis showed that the children with CP-PR performed significantly worse than the PR children in the phonological awareness measure. On the other hand, multivariate logistic regression showed that the phonological awareness measure did not differentiate the CP-

PR group from the PR group when the effect of the other variables of the model was taken into account.

The mixed findings with regards to the phonological awareness differences between the groups raise two issues for discussion. The first one refers to the weakness of the phonological awareness measure to successfully predict the PR and the CP-PR groups when other variables (teacher rated attention deficit and hyperactivity and Verbal IQ) were taken into account. The second refers to the unexpected difference between the CP-PR and PR groups.

With reference to the first issue, a possible explanation could be that phonological awareness difficulties in children with conduct problems and poor reading are conditional upon the co-occurrence of multiple factors and not just upon reading level. Due to the strong relationship between reading problems and phonological processing dysfunction (Mutter et al., 2004; Stanovich, 2000; Torgesen et al., 1994; Vellutino et al., 2004), poor reading was expected to be the only factor that would determine the direction of the differences between the groups of the study, but this proved to be over-simple and other factors were found to be involved. The same explanation could apply to the second issue. It is plausible that the CP-PR group scored significantly worse than the PR group, because factors beyond reading are related to the performance of children with conduct problems in phonological awareness tasks.

Regarding the additional factors that could impact on the phonological function of children with conduct problems, the analysis demonstrated that neither teacher rated attention deficit and hyperactivity nor Verbal IQ alone could constitute likely candidates. Despite the fact that no single variable can explain the phonological awareness impairment of children with conduct problems, the possibility for a combined effect of variables cannot be ruled out. Indeed, there is evidence supporting an underlying language deficit shared by children with comorbid reading disability and AD/HD. Hinshaw (1992), in his influential review on externalising problems and underachievement, pointed out that common phonological and linguistic processing difficulty may predate both behavioural and reading problems in children. Recently, Spira Greenfield & Fischel (2005), in their up-dated review on the relationship between reading problems and attention deficit, supported the notion of language malfunction underlying reading and attention deficit in children. Consistent with this evidence, the worse phonological impairment of the CP-PR group is likely to be associated with the combination of reading problems and associated attention deficit and hyperactivity. This evidence may also reflect a deeper linguistic deficiency that exists beyond phonological processing and may represent a global language impairment.

5.5 Executive Function Deficits of Children with Conduct Problems

The differences revealed by Moffitt & Silva (1988) between delinquents with and without attention deficit led to the hypothesis that executive function impairments is related to conduct problems and reading but not to conduct problems only. The literature also proposed that poor reading is less likely to be related to deficits in executive function

(Condor et al., 1995). Accordingly, it was hypothesized that only children with CP-PR would manifest executive function complications rather than children with PR, CP and WCP-PR. The children with PR and CP and WCP-PR were not expected to differ.

The Tower of London (TOL) task was utilized to assess the planning aspect of executive functioning. Consistent with the hypotheses, the analysis of variance confirmed that there were no significant differences in TOL measures between the WCP-PR, CP and PR groups. The three groups solved the TOL problems in a similar number of attempts³², with similar speed³³ and without frequent rule violations³⁴. The CP-PR children differed only marginally from the WCP-PR in the total mean planning score³⁵ and mean solution time. Nonetheless, they made significantly more mistakes during the execution of the task by violating more rules than the other three groups of the study.

Unlike univariate analysis, multivariate logistic regression showed that the measure of rule violations did not predict group membership when the teacher rated attention deficit and hyperactivity, verbal intelligence and phonological awareness scores were taken into account. This finding suggests that factors beyond conduct and reading problems are responsible for the planning deficits of children with conduct problems and poor reading.

³² The number of failed attempts was employed as indicative of accuracy of performance.

³³ Solution time was considered as a measure of speed of planning.

³⁴ The number of rule violations was employed as indicative of accuracy of performance.

³⁵ The total planning score of the TOL was used as the major planning measure. This is a mixed measure of speed (solution time) and accuracy (failed attempts) of planning.

Several cognitive factors could possibly contribute to TOL performance ...*working memory being the most obvious because of the necessity to store and retain elements of sequential planning* (Bull, Espy, & Senn, 2004, p. 744). Analysis of covariance showed that verbal short-term memory, measured by the WISC-III Number Memory test, could not explain group differences in TOL. Another factor that has been proposed to be linked with performance in executive function tests is intelligence (Riccio et al., 2004). The results of this thesis demonstrated that group differences were not altered when Verbal IQ was statistically controlled. A third factor that has been found to be related to impaired performance in executive function tasks is AD/HD (Barkley, 1997b; Fischer et al., 2005; Oosterlaan et al., 1998; Pennington & Ozonoff, 1996; Schachar et al., 2000). Influences of associated attention deficits and hyperactivity on the groups' performance in the TOL measures were also examined by statistically controlling for teacher ratings on the Conners' TRS-28 inattention and hyperactivity scales. Results demonstrated that all the group differences in the TOL task stopped being significant after teacher rated attention deficit and hyperactivity were statistically controlled.

In view of the above findings, it appears that the performance of children with conduct and reading problems in the TOL is likely to be affected by associated teacher rated attention deficit and hyperactivity. This study is not the first to suggest that difficulties with executive function tasks in children with conduct problems may not be specific to conduct problems. Earlier studies have proposed that executive function impairment in children with conduct problems is determined by comorbid AD/HD (Fischer et al., 2005; Pennington & Ozonoff, 1996). The findings here are consistent with that interpretation.

A last point of discussion involves the nature of the executive function identified in children with conduct problems and poor reading. Executive function deficit in children with CP-PR was reflected as rule breaking behaviour during the execution of the TOL planning task. A possible explanation to the rule breaking behaviour of children with conduct problems and poor reading could come from the behavioural perspective of executive function. According to the behavioural theoretical framework, executive function is conceptualised as rule governed behaviour and is determined by the individual's capacity for verbal regulation (Hayes, Gifford, & Ruckstuhl, 1996). Verbal regulation is the process of developing verbal rules for regulating behaviour (Hayes et al., 1996). On the basis of the behavioural theoretical model, language is particularly important for behavioural regulation.

The role of language in behavioural regulation has also been emphasised by the neuropsychological perspective on executive function. Dencla (1996) postulated that regulation of action is determined by verbally formulated rules. A weakness in language can affect formulation of verbal rules which in turn can affect regulation of behaviour. Additionally, drawing upon the behavioural theoretical framework on behaviour regulation, Barkley (1997b) in his hybrid theory of AD/HD highlights that internalization of language is considered to be *...communication with the self that permits the creation of self-directed instructions, thereby, becomes a fundamental tool for self-control* (p. 70).

In keeping with the behavioural regulation theory, the high number of rule violations committed by the CP-PR children may reflect a problem with rule governed behaviour that is due to a weakness in using language to effectively guide behaviour. Language as a whole was not the subject of investigation in this thesis. Nonetheless, the findings suggested that the significantly worse performance of the CP-PR group in the phonological processing task compared to the other three groups may indicate a language deficit in children with conduct problems and associated reading difficulties. It should be also noted, here, however, that non cognitive factors have also been found to influence behaviour. According to the information processing perspective on self-regulation, motivation could constitute another possible underlying component of behavioural regulation problems (Sergeant, 1996).

5.6 Influences of Family Education and Family Occupation

Although family education and occupation was not analysed beyond the descriptive level, some interesting findings were detected. There is evidence showing low parent education and socio-economic disadvantage to be strongly associated with conduct problems (Farrington, 1995; Moffitt & Caspi, 2001; Toupin et al., 2000). However, the analyses here did not find any significant relationships between family education and occupation and group membership. One explanation for this result is that the sample came from a socio-economically homogeneous area (for details see *The Thesis Context and Target Group*, 3.2 section, Chapter 3). Half of the participants' parents fell in one education and occupation category; 51.60% of parents were secondary/post-secondary education

graduates and 55.40% had skilled professions. On the other hand, lack of power may have not allowed the socio-economic differences to reach statistical significance.

5.7 Family Characteristics of Children with Conduct Problems

One of the central aims of this thesis was to investigate the family characteristics of children with conduct problems and in particular parental involvement in children's education and social life. Based on literature documenting a significant relationship between children's behaviour, academic attainment and parental involvement practices (Grolnick & Slowiaczek, 1994; Jeynes, 2005; Park & Bauer, 2002; Steinberg et al., 1992) it was expected that low parental involvement would characterise children with CP-PR, CP and PR. On that account, it was hypothesized that the parents of children with CP, PR and CP-PR would also show significantly lower involvement in their children's education and social life than the parents of children with WCP-PR. However, it was argued that when conduct problems are coupled with additional reading problems, the disruption in the parent's involvement may be more serious as the child's difficulty is greater. Therefore, it was expected that low parental involvement would be rather more strongly associated with conduct problems and poor reading than with poor reading only or conduct problems.

The findings did not verify these hypotheses. The statistical analysis did not show that the CP-PR and CP children receive less attention from their parents in their educational and social life than the WCP-PR children. On the contrary, it was found that the parents of the

CP-PR group, the most vulnerable group in the study, tend to offer significantly more help than the parents of the WCP-PR group in homework.

Studies of parental involvement and parenting have found that parent education is positively associated with increased parental involvement (Fantuzzo et al., 2000). Furthermore, Hinshaw (1992) when speculating on the antecedents of reading difficulties in children with externalising problems concluded that parental involvement is most likely to impact academic achievement indirectly, through the influence of socioeconomic status (SES). In this study the statistical analysis did not reveal any significant group differences in family education and occupation. It could be argued that since SES is likely to mediate the relationship between parental involvement and academic achievement, lack of group differences in parental involvement could be explained by lack of family differences in education and/or occupation background.

Another viable explanation of the absence of parental involvement differences between the groups could be the context of the present study. Education is highly valued by Greek society (Theodore, Bray, Kehle, & Dioguardi, 2002). Psacharopoulos & Papakonstantinou (2005), after surveying a random sample of 3000 students attending universities across Greece, found that education in Greece appears to be a ticket for social mobility. Thus, pursuing educational excellence is of paramount interest in Greece. Parental interest in children's education is also high. Psacharopoulos & Papakonstantinou (2005), using data from the same survey reported above, found that parents with low

earnings tend to offer to their children the same opportunities required for university preparation as parents with high earnings.

The central role of family in the Greek society can possibly constitute another reason for the lack of group differences in parental involvement in children's education and social life. It has been argued that Greece, similar to other Southern European countries, is characterised by what is called *familialism* (Guillen & Alvarez, 2001). That is, the family is the provider of care to its members. The influence of family is so powerful that it significantly defines the social and economic policy of the country (Guillen & Alvarez, 2001). An evaluation of the state support provided to families in European Union countries as well as Australia, Norway and the USA revealed that the Greek welfare state offers limited support to families with children (Papadopoulos, 1996). Consequently, children's well-being is heavily dependant on the provision offered by the family. Therefore, it is plausible that due to the country's characteristics the parents of the study's participants were similarly involved in their children's education and social life irrespective of differences in SES and child behaviour and/or learning difficulties. Due to the central importance of the family for children's well-being, the parents' of the more vulnerable children were even more involved in their education by closely supervising their homework.

Taken into account the context where the study took place, another explanation of the lack of differences in parental involvement could be the way parental involvement was defined and measured. An operationalisation of parental involvement as quality rather

than quantity of involvement may have captured group differences more effectively in a context where education is highly valued. Parental involvement is reflected and shaped by parenting style (Spera, 2005; Steinberg et al., 1992) and ineffective parenting is considered to be one of the most powerful risk factors for the development of conduct problems in children (Hill, 2002; Patterson, 1982; Patterson et al., 1992). In conjunction with these assertions, it is possible that the parents of the children with conduct problems in this study are involved in their children's education and social life, but not effectively.

That involvement of parents with children with conduct problems might be ineffective may be partly due to the children's difficulty. These parents were found to experience difficulty in educating their children. The results showed that the parents of the CP-PR group found it harder than the parents of the other groups to get their child to do their homework. Moreover, the parents of the CP and CP-PR children considered themselves less confident than the parents of the WCP-PR children in offering assistance with homework. It is plausible, therefore, that the children's learning difficulties contribute to the quality of the parental involvement offered to the child. The children's conduct problems and associated psychological difficulties may have impeded the interaction between the child and the parent on activities that promote academic success, such as homework.

5.8 Implications for Theories of Conduct Problems

The findings from the thesis have implications for explanatory theories of conduct problems in children. The results indicated that children with conduct problems and poor

reading are characterised by psychological features that significantly differentiate them from children with conduct problems only and children with poor reading only. Specifically, it was shown that the CP-PR group had additional problems in attention deficit assessed with both subjective (teacher ratings) and objective (continuous performance test) means and executive function as compared to the CP and PR groups. Additionally, there were no impairments exhibited by the pure groups which were not shown by the combined group. These findings raise the possibility that children with conduct problems and associated poor reading are characterised by a different pattern of psychological difficulties that would be expected based on the additive combination of the difficulties related to conduct problems and poor reading alone. Further to that, they suggest that the co-occurrence of conduct problems and poor reading in children may be partly due to factors that are distinct from those that increase susceptibility to conduct problems only and poor reading only in children.

What are the factors that are likely to underlie the combination of conduct problems and reading difficulties in children? The significantly elevated rates of teacher rated inattention and hyperactivity in children with CP-PR suggest the existence of associated AD/HD in children with conduct problems and poor reading. This finding replicates the bulk of research placing a central role of AD/HD in the generation of comorbid conduct problems and poor reading in children. The evidence obtained from the performance tests of sustained attention and executive function revealed, however additional psychological problems that shed light to the nature of the deficits that are likely to underlie the combination of conduct problems and poor reading in children. The assessment of

attention with the continuous performance test reflected a likely behavioural regulation dysfunction in the CP-PR group attributed to an unusual sensitivity to reinforcement. This deficit is considered to be the result of motivational problems, rather than a cognitive dysfunction of attention (Kuntsi et al., 2001). The executive function measures reflected a rule breaking behaviour in the CP-PR group that was considered to be due to a weakness in using language to effectively guide behaviour.

Altogether, it can be assumed that children with conduct problems and associated poor reading may be more vulnerable than children with conduct problems and poor reading alone as they seem to experience additional deficits in attention and executive function. These deficits are likely to reflect a generalised behavioural regulation dysfunction that may underlie the association between conduct and reading problems in children. The origin of the dysfunction is controversial. It can be either a complication in language or a problem with the individual's motivation system.

It should be highlighted here that the above findings bear some limitations. First, the results cannot claim with certainty that the CP-PR group is more than the additive combination of CP and PR alone. This hypothesis was not tested in this study. In line with methodological approaches in the investigation of comorbid disorders, the investigation of this hypothesis involves the establishment of the separability of the pure disorders by proving that they are *associated with opposite patterns of impairment in two different cognitive domains* (Willcutt et al., 2005, p. 158). That is, it involves establishing that the pure groups are distinguished by core deficits in different domains of functioning,

each one considered to be central to one disorder and not to the other. This is the so called *double dissociation hypothesis* (Pennington, Groisser, & Welsh, 1993; Shallice, 1988). Then, inferences can be made about whether the comorbid group resembles the pure groups with regards to their core deficits. The present study did not assess the separability of conduct problems and reading difficulties and the methods employed are not capable of making this distinction clear. However, there is evidence that, unlike children with CP-only and PR-only, children with CP-PR were likely to experience additional problems of attention assessed with both subjective (teacher ratings) and objective (continuous performance test) measures and executive function. Therefore, children with conduct problems and associated poor reading have a distinct psychological profile from children who have conduct problems only or poor reading only. Additionally, it is plausible that factors other than those triggering conduct problems or poor reading alone are involved in the generation of combined conduct problems and poor reading in children.

Secondly, the differences between the CP-PR and PR groups in attention and executive function deficit may be subject to sampling bias. Due to the very well-established relationship between PR and AD/HD, no differences were expected to be found between the CP-PR and PR groups in attention measures. On the contrary, the CP-PR group was found to have significantly more children with teacher rated inattention than the PR group. The findings indicated that this cannot have happened due to severity of reading difficulties in the CP-PR group. On the other hand, the study showed that measures of attention were influenced by being a boy. Although the analyses showed that there were

not statistically significant group differences in gender, the PR group had more girls (47.5%) than the CP-PR group (20%). Given that the sample was small, this difference may have been significant if a larger sample had been used. Equally, the PR group may have had less inattentive cases than the CP-PR group and no significant problems in the Conners' CPT-II and the executive function measures due to gender inequalities. This issue should be addressed in future research with a larger sample that has gender equally distributed within and between groups.

The findings also have implications for developmental theories of conduct problems. According to the literature review, conduct problems are officially divided into childhood-onset versus adolescent-onset conduct problems (American Psychiatric Association, 1994). Although relatively understudied (Raine et al., 2005), it appears that childhood-limited conduct problems have started to form a growing research area. The term *childhood-limited* is also encountered in the published literature as *recoveries* (Moffitt, Caspi, Dickson, Silva, & Stanton, 1996; Moffitt et al., 2002). Currently there are mixed results concerned with the cognitive functioning of this group. Raine, Yaralian, Reynolds, Venables, & Mednick (2002) found that the cognitive performance of children with childhood limited conduct problems assessed at age 3 and age 11 was between that of the comparison group and the early-onset group. On the contrary, Raine and colleagues (2005) demonstrated that children with childhood-limited conduct problems may not be free from neurocognitive impairment. (Moffitt et al., 2002) found that males on the childhood-limited path did not fully desist from all forms of antisocial behaviour in early adulthood and they manifested low-level offending and psychosocial impairment.

The design of this thesis did not allow the investigation of the groups' trajectories in time and no claims can be made about the course of the antisocial behaviour in the two conduct disorder groups. However, the results showed that the CP group had superior psychological functioning compared to the CP-PR group. If cognitive superiority can operate as a protective factor against antisocial behaviour then the children with conduct problems and associated poor reading are more at risk for developing chronic antisocial behaviour than the children with conduct problems only. This is a worthwhile hypothesis for further study.

5.9 Implications for Intervention for Child Conduct Problems

The present study has contributed to the knowledge about the heterogeneous nature of child conduct problems by documenting the psychological and family characteristics of such children. The findings about the heterogeneity of child conduct problems have implications for intervention planning.

As far as children with conduct problems only are concerned, despite being relatively hyperactive, findings from the present thesis indicate that they are not likely to manifest additional psychological problems and in particular verbal, phonological and executive function complications. Therefore, it appears that conduct problems without associated poor reading could be treated by tackling the behavioural problems in these children. The literature review on effective interventions for children with conduct problems found that behaviour modification through parent training has been established as the most powerful method in reducing child conduct problems. Parent training has been also found to be

helpful in diminishing symptoms of hyperactivity (Scott & Sylva, 2004). Because research has shown that the benefits from parent training for child behaviour may not be generalised to school (Taylor & Biglan, 1998), classroom behavioural management or social skills training may be used as a complementary treatment to parent training.

With regards to children with conduct and reading problems, the findings showed that these children experience multiple difficulties that call for a combination of treatments. In compliance with the literature review on effective intervention programmes for conduct problems, the multimodal approach is employed as a means of modifying as many as possible of the individual and contextual parameters that may impact on the child's functioning. The *High/Scope Preschool Curriculum* (Schweinhart & Weikart, 1997) and the *Chicago Child-Parent Center Programme* (Reynolds, Temple, Robertson, & Man, 2001) are well-implemented multifocused community programmes for children of low-income families designed to improve behaviour and reading skills while supporting families in promoting children's well-being. These interventions have been found to improve academic attainment and prevent children from felony and juvenile arrest in the long-term (Reynolds et al., 2001; Schweinhart & Weikart, 1997).

The *SPOKES* (Supporting Parents On Kids Education) project is another multifocused intervention programme that it is the first in the UK and Europe to tackle behaviour and reading difficulties by combining a parent training programme with a parent literacy programme (Scott & Sylva, 2004). This project was part of a larger initiative launched by the UK Department of Health in an attempt to support families to look after their children

(Scott & Sylva, 2004). The programme involved the delivery of the Webster-Stratton parent training package and a parent programme for addressing literacy difficulties in five to six year old children. In particular, Baillie, Sylva, & Evans (2000) note:

...parents are taught and practise techniques to help prepare their child emotionally and socially for learning. These include how to enhance their child's ability to concentrate and attend during activities and play, how to enable them to become more self-sufficient and constructively in control of situations, and how to develop their child's impulse control and reduce aggressive outbursts...the programme helps parents develop their child's literacy skills. They learn specific methods to encourage their child to identify written material in the environment as well as in books, and how to foster their child's interest and skills-be it at their cereal packet in the morning, the road signs on the way to school, or a book in the evening (p. 156-157).

Post-treatment results indicated significant reduction in children's antisocial and hyperactive behaviour and seven months gains in reading skills (Scott & Sylva, 2004). The above mentioned multifocused interventions were not designed specifically for treating children identified for conduct problems and reading difficulties. Despite this, they are effective paradigms of preventing antisocial behaviour and academic failure in the community and may be suitable for children with both vulnerabilities of the sort assessed here.

Baillie et al. (2000) point out that the parents of children with poor language skills *may need guidance in how to listen and respond to their children's reading* (p. 151). The group differences in phonological processing suggested underlying language impairment in children with conduct problems and reading difficulties. Further to this, the parents of the CP-PR children expressed feelings of inadequacy in supporting their children with homework. On that account, the parents of children with conduct problems and poor reading may require further support in participating in the intervention programme effectively.

5.10 Limitations and Recommendations for Future Research

The results of the present study should be considered after certain limitations are taken into account. Due to limited resources and time the sample size was relatively small. The small sample size may have weakened the power of the statistical analysis which may have not allowed some group differences to be revealed. An attempt, however, was made in order to tackle this problem by calculating effect sizes.

Another limitation is related to the generalisability of the findings. The participants of the study derived from a school population and they were not diagnosed with conduct problems, so the results cannot be generalised in clinical populations. Despite this limitation, from an educational point of view this result is of value as it offers useful information about the predispositions of the typical antisocial child that a teacher is more likely to encounter in the classroom. The identification of the participants was based only on teachers' reports so the results apply only to the school setting. The generalisability of

the findings is confined only to other areas in Greece that share similarities with the area that the sample of the study came from, namely highly industrialized urban areas. The majority of the participants were boys. Although statistical analysis indicated that only one measure (Conners' TRS-28 Hyperactivity scale) was significantly influenced by gender, future investigations should include more gender balanced samples.

Limitations with regards to the research instruments employed in this thesis should be taken into account. The skewness of the phonological awareness sub-scores that comprised the phonological awareness composite score indicated a trend towards a ceiling effect. Skewed distributions of phonological tasks have been reported consistently in the published literature (Caravolas et al., 2005; McDougall, Hulme, Ellis A., & Monk, 1994; Mutter et al., 2004; Nikolopoulos et al., 2006). In order to reduce the influence of the skewness on the results, reduction of outliers was carried out. Additionally, the scores of the Syllable Oddity test were removed from the analysis as it demonstrated a clear ceiling effect. Executive function deficits were only assessed in terms of their planning aspect. The existence of deficits in other aspects of executive functioning cannot be therefore overruled. The present thesis attempted to assess attention deficit and hyperactivity in the participants without, however, employing a diagnosis of AD/HD.

Limitations with regards to the measurement of family variables should also be acknowledged. The present study did not find major differences in parental involvement measurements. This finding cannot reject the possibility that there were group differences in other familial factors. Socio-economic status was not assessed on the basis of any

formal classification system, so lack of validity of the measurement may have affected the results. There was insufficient data on additional familial risk factors that have been found to be related to conduct problems such as maternal age, maternal mental health, (Shaw et al., 2005), caregiver changes (Moffitt & Caspi, 2001). and parenting style (Hill, 2002; Patterson et al., 1982; Patterson et al., 2000).

Recently, a significant association between anxiety and literacy difficulties has been reported (Carroll et al., 2005). Nonetheless, findings regarding the status of reading problems in children with depression are equivocal (Carroll et al., 2005). Potentially confounding internalising disorders, such as depression and anxiety may have significantly impacted on the results of the thesis.

This study is only a step towards disentangling the heterogeneity of conduct problems. Further work is required to replicate the reported findings after a few methodological improvements are taken into account; a larger and a more representative sample of the Greek child population is required. Participants should be assessed on the basis of parents' reports as well. The non significant trend for a difference in family education between the CP-PR group and the other three groups emphasises the need for a more comprehensive instrument for SES examination in future investigations. Moreover, a broader range of executive functions measures should be included. If possible, a follow-up in early adolescence could be carried out in order to trace developmental trajectories. This follow-up will show whether children with conduct problems only abstain from

antisocial behaviour, and whether normative psychological functioning can operate as a resilient factor in preventing delinquency.

Further work is also required for the clarification of the role of AD/HD in the comorbidity of conduct and reading problems. After taking into consideration theoretical work proposing a) a common etiological association between AD/HD and reading difficulties, b) a progression from AD/HD to conduct problems through the influence of family factors and c) the present thesis results that support the existence of a specific relationship between attention deficit and hyperactivity and conduct problems with associated poor reading, it can be hypothesised that the cases of children with conduct and reading problems identified at the early years of school are the end product of an interactive process among attention deficit and hyperactivity as well as additional psychological difficulties that have been triggered in a younger age.

Lastly, another area of investigation concerns the nature of executive function deficits in children with conduct problems. The results suggested the children exhibiting conduct problems and poor reading at school may have deficits in aspects of executive functioning that are related to the capacity for behavioural regulation in situations where planning is required. Nonetheless, the nature of behavioural regulation deficit is not clear. According to the theoretical framework of information processing, deficits in state-regulation are more likely to be related to a generalised behavioural malfunction than a cognitive deficit (Sergeant, 1996). The underlying cause is believed to be the result of differential sensitivity to motivation (Sergeant, 1996). On the other hand, theoretical

contributions from the behavioural and neuropsychological perspective have proposed that behavioural regulation impairments are of a cognitive nature and language is an important determinant (Dencla, 1996; Hayes et al., 1996). Additionally, state-regulation impairments have been consistently identified in children with AD/HD (Antrop et al., 2006; Berwid et al., 2005; Kuntsi et al., 2001; Oosterlaan et al., 1998; Scheres, Oosterlaan, & Sergeant, 2001a; Scheres et al., 2001b; Sergeant, 2000). In light of these findings, there is an impetus to clarify the nature of executive functions in children with conduct and reading problems while taking into consideration the contributions of motivational, language and attention factors.

5.11 Summary

In this chapter the major discussion issues are summarised in the following paragraphs. Regardless of the additional difficulties that were found to be associated to the co-occurrence of conduct problems and poor reading, teacher rated attention deficit and hyperactivity constitutes an essential parameter of the association of conduct problems and reading failure in children.

As the teacher reports and laboratory measures of attention showed, children with conduct problems and poor reading are more likely to encounter attention deficits in the classroom as well as in continuous tasks that require sustaining attention for long periods of time, than their peers with either conduct problems or poor reading. The poor performance of conduct disturbed children either with or without poor reading in continuous performance tasks appears to be accounted for by associated attention deficits

and hyperactivity. The pattern of responding of the CP-PR group on the Conners' CPT-II suggests that the poor performance of children with conduct and reading problems in continuous performance tasks may reflect a behavioural regulation deficit, rather than a cognitive deficit in attention.

The findings of the thesis suggest that theories of verbal deficits in children with conduct problems apply only to certain cases of conduct problems. Conduct disturbed children free from reading difficulties do not seem to have defected verbal ability. It is suggested that the verbal complications of children with conduct problems may be partly due to their comorbidity with poor reading.

The results demonstrated that children who display problems of conduct at school but otherwise do well in reading are not likely to exhibit difficulties in phonological processing as reflected by phonological awareness tasks. Phonological awareness difficulties in children with conduct problems seem to occur when difficulties in reading are also experienced by such children. It is assumed that phonological impairment in children with conduct and reading problems is not only associated with reading difficulties, but also with elevated inattentive and hyperactive behaviour. Phonological awareness deficit in children with conduct problems and reading difficulties may reflect a deeper language dysfunction.

The findings provide evidence that children with conduct problems only are not likely to exhibit difficulties with tasks involving executive function skills. When conduct

problems are associated with academic problems expressed as poor reading, the child tends to manifest some difficulty with tasks that require executive function and, in particular, planning. This difficulty is assumed to reflect problems with rule-governed behaviour. This deficit could imply a generalised impairment in the child's regulatory system of behaviour. The nature of this impairment is not clear. It appears to be mediated through associated attention deficit and hyperactivity. Moreover, it is suggested that the underlying factors that trigger the behaviour regulation impairment could be detected at the level of motivation that is necessary to meet the demands of the task or in the usage of language for goal-directed behaviour.

As far as the family characteristics are concerned, the parents of children with conduct problems and poor reading appeared to be particularly interested in the child's progress at school by offering significant help with homework. This finding was not expected. It was argued that in a context where education is highly valued and provision of child's well-being heavily depends on family, the investigation of quality rather than quantity of parental involvement may have been more fruitful. Furthermore, it was assumed that child difficulty may impact on the quality of the parental involvement that is offered to the child.

CONCLUSION

The purpose of this thesis was to investigate the psychological and family characteristics of children with conduct problems in an attempt to contribute to the research towards illuminating the heterogeneous nature of conduct problems in children. The findings of the thesis showed that children with conduct problems and poor reading are likely to be characterised by a constellation of significantly different psychological vulnerabilities from children with either conduct problems only or children with poor reading only. The psychological vulnerabilities likely to characterise children with conduct problems and poor reading are the following: attention deficit as assessed by subjective (teacher ratings) as well as objective (continuous performance test) measures, teacher rated hyperactivity, poor verbal skills, poor phonological awareness processing and finally executive function deficits involving failure to follow rules.

With regards to family characteristics, it seems that the parents of Greek school children with conduct problems instead of being neglectful are particularly interested in their children's education and social life. Despite their interest, they experience problems educating their children, probably due to child difficulty. These problems may have a negative impact on the quality of parental involvement offered to the child.

The unique psychological characteristics of children with conduct problems and poor reading raise the hypothesis that the co-occurrence of conduct problems and poor reading in children in the early years of primary school is likely to be caused by factors different

from those that lead to conduct problems only or poor reading only in children. The combination of associated attention deficits and hyperactivity appear to constitute one of the factors that significantly influence the predisposition of children with conduct problems and poor reading. However, it is still not clear how this influence is exerted. Further research is required in order to uncover the role of attention deficit and hyperactivity in the generative process of early conduct and reading problems in children.

The heterogeneity of the psychological characteristics of children with conduct problems shows that when it comes to intervention *one size does not fit all*. It also underscores the necessity to consider offering differential treatment to school children with conduct problems on the basis of whether the child experiences additional academic difficulties. Interventions aimed at the alleviation of behaviour problems should suffice for children with conduct problems only. Interventions for children who suffer problems of conduct and reading should address more areas of functioning.

References

- Achenbach, T. M., & Edelbrock, C. (1978). The classification of child psychopathology: A review and analysis of empirical efforts. *Psychological Bulletin*, 85, 1275-1301.
- Adams, J. W., Snowling, M. J., Hennesy, S. M., & Kind, P. (1999). Problems of behaviour, reading and arithmetic: Assessments of comorbidity using the Strengths and Difficulties Questionnaire. *British Journal of Educational Psychology*, 69(4), 571-585.
- Aguilar, B., Sroufe, A., Egeland, B., & Carlson, E. (2000). Distinguishing the early-onset/persistent and adolescence-onset antisocial behaviour types: From birth to 16 years. *Development and Psychopathology*, 12, 109-132.
- Al Award, A. M. E. H., & Sonuga-Barke, E. J. S. (1992). Childhood problems in a Sudanese city: A comparison of extended and nuclear families. *Child Development*, 63, 906-914.
- Allen, R. (2006). *From punishment to problem solving: A new approach to children in trouble*. London: Centre for Crime and Justice Studies.
- Alston, E., & St James-Roberts, I. (2005). Home environments of 10-month-old infants selected by the WILSTAAR screen for pre-language difficulties. *International Journal of Language and Communication Disorders*, 40(2), 123-136.
- American Academy of Child and Adolescent Psychiatry. (1997). Practice parameters for the assessment and treatment of children and adolescents with conduct disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36:10 Supplement, 122-137.
- American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.). Washington: American Psychiatric Association.
- American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders: Text Revision* (4th ed.). Washington: American Psychiatric Association.
- Anastasi, A., & Urbina, S. (1997). *Psychological Testing* (7th ed.). Upper Saddle River, New Jersey: Prentice Hall.

- Anderson, J., Williams, S., McGee, R., & Silva, P. (1989). Cognitive and social correlates of DSM-III disorders in preadolescent children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 28(66), 842-846.
- Anderson, P., Anderson, V., & Lajoie, G. (1996). The Tower of London test: Validation and standardisation for pediatric populations. *The Clinical Neuropsychologist*, 10(1), 54-65.
- Angold, A., Costello, J. E., & Erkanli, A. (1999). Comorbidity. *Journal of Child Psychology and Psychiatry*, 40(1), 57-87.
- Antrop, I., Stock, P., Verte S., Wiersema, J., Baeyens, D., & Roeyers, H. (2006). ADHD and delay aversion: the influence of non-temporal stimulation on choice for delayed rewards. *Journal of Child Psychology and Psychiatry*, 47(11), 1152-1158.
- Applied Language Solutions. (2007). *Map of Greece*. Applied Language Solutions. Available:http://www.appliedlanguage.com/maps_of_the_world/map_link.shtml?referer=Greece&adj=Greek&page=Greece [2007].
- Arsenault, L., Moffitt, E. T., Caspi, A., Taylor, A., Rijdsdijk, F. V., Jaffee, S. R., Ablow, J. C., & Measelle, J. R. (2003). Strong genetic effects on cross-situational antisocial behaviour among 5-year-old children according to mothers, teachers, examiner-observers, and twins' self-reports. *Journal of Child Psychology and Psychiatry*, 44(6), 832-848.
- Artinopoulou, V. (2001). *Violence in School: Research and Policies in Europe (Via sto Scholio: Erevnes kai Politikes stin Evropi)*. Athens: Metechmio.
- Audit Commission. (2004). *Youth Justice 2004: A Review of the Reformed Youth Justice System*. Audit Commission. Available: <http://www.audit-commission.gov.uk/reports/NATIONAL-REPORT.asp?CategoryID=&ProdID=7C75C6C3-DFAE-472d-A820-262DD49580BF> [2007, November].
- Baddeley, A. D. (1990). *Human Memory: Theory and Practice*. Hove: Lawrence Erlbaum Associates Ltd.
- Baillie, C., Sylva, K., & Evans, E. (2000). Do intervention programmes for parents, aimed at improving children's literacy, really work? In A. Buchanan & B. L.

- Hudson (Eds.), *Promoting Children's Emotional Well-Being: messages from research* (pp. 145-160). Oxford: Oxford University Press.
- Barker, E. D., Tremblay, R. E., Nagin, D. S., Vitaro, F., & Lacourse, E. (2006). Development of male proactive and reactive physical aggression during adolescence. *Journal of Child Psychology and Psychiatry*, 47(8), 783-790.
- Barkley, R. A. (1991). The ecological validity of laboratory and analogue assessment methods of ADHD symptoms. *Journal of Abnormal Child Psychology*, 19(2), 149-174.
- Barkley, R. A. (1996). Linkages between attention and executive functions. In G. R. Lyon & N. A. Krasnegor (Eds.), *Attention, Memory and Executive Function* (pp. 307-325). Baltimore: Brookes.
- Barkley, R. A. (1997a). *ADHD and the Nature of Self-Control*. New York, London: The Guilford Press.
- Barkley, R. A. (1997b). Behavioural inhibition, sustained attention, and executive functions: Constructing a unifying theory of ADHD. *Psychological Bulletin*, 121(1), 65-94.
- Beauchaine, T. P. (2003). Taxometrics and developmental psychopathology. *Development and Psychopathology*, 15 (1), 501-527.
- Belsky, J., Hsieh, K., & Crnic, K. (1998). Mothering, fathering, and infant negativity as antecedents of boys' externalizing problems and inhibition at age 3 years: Differential susceptibility to rearing experience? *Development and Psychopathology*, 10(2), 301-319.
- Berwid, O. G., Kera Curko, E. A., Marks, D. J., Santra, A., Bender, H. A., & Halperin, J. M. (2005). Sustained attention and response inhibition in young children at risk for Attention Deficit/Hyperactivity Disorder. *Journal of Child Psychology and Psychiatry*, 46(11), 1219-1229.
- Bohnert, A. M., Crnic, K. A., & Lim, K. G. (2003). Emotional competence and aggressive behaviour in school-age children. *Journal of Abnormal Child Psychology*, 31(1), 79-91.
- Bor, W., Sanders, M., & Markie-Dadds, C. (2002). The effects of the Triple P-Positive parenting programme on preschool children with co-occurring disruptive

- behaviour and attentional/hyperactive difficulties. *Journal of Abnormal Child Psychology*, 30(6), 571-587.
- Borkowski, J. G., & Burke, J. E. (1996). Theories, models, and measurements of executive functioning: An information processing perspective. In G. R. Lyon & N. A. Krasnegor (Eds.), *Attention, Memory and Executive Function* (pp. 235-261). Baltimore: Brookes.
- Bouldadaki, P. (1997). *Teachers' perceptions of troublesome behaviour in Greek primary schools*. Unpublished Dissertation, Institute of Education, University of London.
- Brace, N., Kemp, R., & Snelgar, R. (2006). *SPSS for Psychologists: a guide to data analysis using SPSS for Windows (versions 12 and 13)* (3rd ed.). Basingstoke; New York: Palgrave Macmillan.
- Brestan, E. V., & Eyberg, S. M. (1998). Effective psychosocial treatments of conduct-disordered children and adolescents: 29 years, 82 studies, and 5,272 kids. *Journal of Clinical Child Psychology*, 27(2), 180-189.
- Broidy, L. M., Tremblay, R. E., Brame, B., Fergusson, D., Horwood, J. L., Laird, R., Moffitt, T. E., Nagin, D. S., Bates, J. E., Dodge, K. A., Loeber, R., Lyman, D. R., Pettit, G. S., & Vitaro, F. (2003). Developmental trajectories of childhood disruptive behaviours and adolescent delinquency: A six-site, cross-national study. *Developmental Psychology*, 39(2), 225-245.
- Bruck, M. (1992). Persistence of dyslexics' phonological awareness deficits. *Developmental Psychology*, 28(5), 874-886.
- Bryman, A. (2001). *Social Research Methods*. New York: Oxford University Press.
- Bull, R., Espy, K. A., & Senn, T. E. (2004). A comparison of performance on the Towers of London and Hanoi in young children. *Journal of Child Psychology and Psychiatry*, 45(4), 743-754.
- Calkins, S., & Dedmon, S. E. (2000). Physiological and behavioural regulation in two-year-old children with aggressive/destructive behaviour problems. *Journal of Abnormal Child Psychology*, 28(2), 103-118.
- Caravolas, M., Volin, J., & Hulme, C. (2005). Phoneme awareness is a key component of alphabetic literacy skills in consistent and inconsistent orthographies: Evidence

- from Czech and English children. *Journal of Experimental Child Psychology*, 92(2), 107-139.
- Caraway, K., Tucker, C. M., Reinke, W. M., & Hall, C. (2003). Self-efficacy, goal orientation, and fear of failure as predictors of school engagement in high school students. *Psychology in the Schools*, 40(4), 417-427.
- Carlin, D., Bonerba, J., Phipps, M., Alexander, G., Shaphiro, M., & Grafman, J. (2000). Planning impairments in frontal lobe dementia and frontal lobe lesion patients. *Neuropsychologia*, 38(5), 655-665.
- Carroll, M. J., Maughan, B., Goodman, R., & Meltzer, H. (2005). Literacy difficulties and psychiatric disorders: evidence for comorbidity. *Journal of Child Psychology and Psychiatry*, 46(5), 524-532.
- Caspi, A., McClay, J., Moffitt, E. T., Mill, J., Martin, J., Craig, I. W., & al., e. (2002). Role of genotype in the cycle of violence in maltreated children. *Science*, 297, 851-854.
- Chadwick, O., Taylor, E., Taylor, A., Heptinstall, E., & Danckaerts, M. (1999). Hyperactivity and reading disability: A longitudinal study of the nature of the association. *Journal of Child Psychology and Psychiatry*, 40(7), 1039-1050.
- Chambless, L. D., & Hollon, D. S. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology*, 66(1), 7-18.
- Cicchetti, D., & Aber, L. (1998). Contextualism and developmental psychopathology. *Development and Psychopathology*, 10(2), 137-141.
- Clark-Carter, D. (2004). *Quantitative psychological research: a student's handbook* (2nd ed.). East Sussex: Taylor & Francis Group.
- Cohen, J. (1977). *Statistical Power Analysis for the Behavioural Sciences*. London: Academic Press.
- Cohen, J. (1992). A Power Primer. *Psychological Bulletin*, 112(1), 155-159.
- Cohen, L., Manion, L., & Morrison, K. (2000). *Research Methods in Education* (5th ed.). London: RoutledgeFalmer.
- Coie, J. D., Lochman, J. E., Terry, R., & Hyman, C. (1992). Predicting adolescent disorder from childhood aggression and peer rejection. *Journal of Consulting and Clinical Psychology*, 60(5), 783-779.

- Coll, G., Akerman, A., & Cicchetti, D. (2000). Cultural influences on developmental processes and outcomes: Implications for the study of development and psychopathology. *Development and Psychopathology*, 12(3), 333-356.
- Collishaw, S., Maughan, B., Goodman, R., & Pickles, A. (2004). Time trends in adolescent mental health. *Journal of Child Psychology and Psychiatry*, 45(8), 1350-1362.
- Comment: The College newsletter. (2007). Genes, feeding and IQ. *Comment: The College newsletter*, 20.
- Condor, A., Anderson, V., & Saling, M. (1995). Do reading disabled children have planning problems? *Developmental Neuropsychology*, 11(4), 485-502.
- Conduct Problems Prevention Research Group. (1992). A developmental and clinical model for the prevention of conduct disorder: The FAST Track programme. *Development and Psychopathology*, 4, 509-527.
- Conners, K. (2000). *Conners' Rating Scales-Revised Technical Manual*. New York: Multi-Health Systems.
- Conners, K., Epstein, J. N., Angold, A., & Klaric, J. (2003). Continuous Performance Test performance in a normative epidemiological sample. *Journal of Child Psychology and Psychiatry*, 31(5), 55-562.
- Conners, K., & MHS Staff. (2000). *Conners' Continuous Performance Test-II (Version 5th)*. Toronto: Multi-Health Systems.
- Connor, M. (1994). Emotional and behavioural disorders: Classification and provision. *Emotional and Behavioural Difficulties*, 4(1), 3-11.
- Coolican, H. (1999). *Research Methods and Statistics in Psychology* (2nd ed.). London: Hodder & Stoughton.
- Coolidge, F. L., Thede, L. L., & Young, S. E. (2000). Heritability and the comorbidity of attention deficit hyperactivity disorder with behavioural disorders and executive function deficits: A preliminary investigation. *Developmental Neuropsychology*, 17(3), 273-278.
- Cooper, P. (1999). Changing perceptions of EBD: Maladjustment, EBD and beyond. *Emotional and Behavioural Difficulties*, 4(1), 3-11.

- Corkum, P. V., & Siegel, L. S. (1993). Is the Continuous Performance Task a valuable research tool for use with children with attention-deficit-hyperactivity disorder? *Journal of Child Psychology and Psychiatry*, 34(7), 1217-1239.
- Cowan, P. A., & Cowan, C. P. (2002). Interventions as tests of family systems theories: Marital and family relationships in children's development and psychopathology. *Development and Psychopathology*, 14(4), 731-759.
- Coy, K., Speltz, M. L., DeKlyen, M., & Jones, K. (2001). Social-cognitive processes in preschool boys with and without oppositional defiant disorder. *Journal of Abnormal Child Psychology*, 29(2), 107-119.
- Dancey, P. C., & Reidy, J. (2004). *Statistics Without Maths for Psychology: Using SPSS for Windows* (3rd ed.). London: Prentice Hall.
- Deater-Deckard, K. (2000). Parenting and child behaviour adjustment in early childhood: A quantitative genetic approach to studying family processes. *Child Development*, 71(2), 468-484.
- Dencla, M. B. (1996). A theory and model of executive function: A neuropsychological perspective. In G. R. Lyon & N. A. Krasnegor (Eds.), *Attention, Memory and Executive Function* (pp. 263-278). Baltimore: Brookes.
- Dewberry, C. (2004). *Statistical Methods for Organisational Research: theory and practice*. London: Routledge.
- Dick, D. M., Viken, R. J., Kaprio, J., Pulkkinen, L., & Rose, J. R. (2005). Understanding the covariation among childhood externalising symptoms: genetic and environmental influences on conduct disorder, attention deficit hyperactivity disorder, and oppositional defiant disorder symptoms. *Journal of Abnormal Child Psychology*, 33(2), 219-229.
- Dionne, G., Tremblay, R. E., Boivin, M., Laplante, D., & Perusse, D. (2003). Physical aggression and expressive vocabulary in 19-month-old twins. *Developmental Psychology*, 37, 261-273.
- Dodge, K. A., & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology*, 53(6), 1146-1158.

- Dodge, K. A., Lansford, J. E., Burkes Salzer, V., Bates, J. E., Pettit, G. S., Fontaine, R., & Price, J. M. (2003). Peer rejection and social information-processing factors in the development of aggressive behaviour problems in children. *Child Development, 74*(2), 374-393.
- Douglas, I. V., & Kenneth, G. P. (1979). Toward a clearer definition of the attention deficit of hyperactive children. In A. G. Hale & M. Lewis (Eds.), *Attention and Cognitive Development* (pp. 173-237). New York: Plenum Press.
- Dykman, R. A., & Ackerman, P. T. (1991). Attention deficit disorder and specific reading disability: Separate but often overlapping disorders. *Journal of Learning Disabilities, 24*(2), 96-103.
- Eddy, M. J., Reid, J. B., & Fetrow, R. A. (2000). An elementary school-based prevention programme targeting modifiable antecedents of youth delinquency and violence: Linking the interests of families and teachers (LIFT). *Journal of Emotional and Behavioural Disorders, 8*(3), 165-176.
- Egger, H. L., & Angold, A. (2006). Common emotional and behavioural disorders in preschool children: presentation, nosology, and epidemiology. *Journal of Child Psychology and Psychiatry, 47*(3), 313-337.
- Eisenberg, N., Cumberland, A., Spinrad, T. L., Fabes, R. A., Shepard, S. A., Reiser, M., Murphy, B. C., Losoya, S. H., & Guthrie, I. K. (2001). The relations of regulation and emotionality to children's externalising and internalising problem behaviour. *Child Development, 72*(4), 1112-1134.
- Epstein, J. L. (1995). School/family/community partnerships: Caring for the children we share. *Phi Delta Kappan, 76*, 701-712.
- Epstein, J. N., Erkanli, A., Conners, K., Klaric, J., Costello, J. E., & Angold, A. (2003). Relations between Continuous Performance Test performance measures and ADHD behaviours. *Journal of Abnormal Child Psychology, 31*(5), 543-554.
- Fan, X. (2001). Parental involvement and student's academic achievement: A growth modelling analysis. *The Journal of Experimental Education, 70*(1), 27-61.
- Fantuzzo, J., Tighe, E., & Childs, S. (2000). Family involvement questionnaire: A multivariate assessment of family participation in early childhood education. *Journal of Educational Psychology, 92*(2), 367-376.

- Farrington, P. D. (1995). The Twelfth Jack Tizard Memorial Lecture: The development of offending and antisocial behaviour from Childhood: Key findings from the Cambridge Study in Delinquent Development. *Journal of Child Psychology and Psychiatry*, 36(6), 929-964.
- Fergusson, D. M., Horwood, L. J., & Ridder, E. M. (2005). Show me the child at seven: the consequences of conduct problems in childhood for psychosocial functioning in adulthood. *Journal of Child Psychology and Psychiatry*, 46(8), 837-849.
- Fergusson, D. M., Woodward, L. J., & Horwood, L. J. (1999). Childhood peer relationship problems and young people's involvement with deviant peers in adolescence. *Journal of Abnormal Child Psychology*, 27(5), 357-370.
- Fischer, M., Barkley, R. A., Smallish, L., & Fletcher, K. (2005). Executive functioning in hyperactive children as young adults: Attention, inhibition, response perseveration, and the impact of comorbidity. *Developmental Neuropsychology*, 27(1), 107-133.
- Fletcher, M. J., Francis, J. D., Shaywitz, E. S., Lyon, G. R., Foorman, R. B., Stuebing, K. K., & Shaywitz, A. B. (1998). Intelligent testing and the discrepancy model for children with learning disabilities. *Learning Disabilities Research and Practice*, 13(4), 186-203.
- Flouri, E. (2004). Psychological outcomes in midadulthood associated with mother's child-rearing attitudes in early childhood. *European Child and Adolescent Psychiatry*, 13(1), 35-41.
- Fortin, L., & Bigras, M. (1997). Risk factors exposing young children to behavioural problems. *Emotional and Behavioural Difficulties*, 2(1), 3-14.
- Foster, M. E., Jones, D. E., & Conduct Problems Prevention Research Group. (2005). The high costs of aggression: Public expenditures resulting from conduct disorder. *American Journal of Public Health*, 95(10), 1767-1772.
- Frey, K. S., Hirschstein, M. K., & Guzzo, B. A. (2000). Second Step: Preventing aggression by promoting social competence. *Journal of Emotional and Behavioural Disorders*, 8(2), 102-112.
- Frick, P. J., Kamphaus, R. W., Lahey, B. B., Loeber, R., Crist, M. G., Hart, E. L., & Tannenbaum, L. E. (1991). Academic underachievement and the disruptive

- behaviour disorders. *Journal of Consulting and Clinical Psychology*, 59(2), 289-294.
- Gardner, F., Burton, J., & Klimes, I. (2006). Randomised controlled trial of a parenting intervention in the voluntary sector for reducing child conduct problems: Outcomes and mechanisms of change. *Journal of Child Psychology and Psychiatry*, 47(11), 1123-1132.
- Gathercole, S. E., Alloway, T. P., Willis, C., & Adams, A. (2006). Working memory in children with reading disabilities. *Journal of Experimental Child Psychology*, 93(3), 265-281.
- Gathercole, S. E., & Pickering, S. J. (2000). Working memory deficits in children with low achievements in the national curriculum at 7 years of age. *British Journal of Educational Psychology*, 70(2), 177-194.
- Gelhorn, H. L., Stallings, M. C., Young, S. E., Corley, R. P., Rhee, H. S., & Hewitt, J. K. (2005). Genetic and environmental influences on conduct disorder: Symptom, domain and full-scale analyses. *Journal of Child Psychology and Psychiatry*, 46(6), 580-591.
- Georgas, D. D., Paraskevopoulos, I. N., Bezevegis, I. G., & Giannitsas, N. D. (1997). *Greek WISC-III*. Athens: Hellenic Letters.
- Goldstein, S., & Goldstein, M. (1998). *Managing Attention Deficit Hyperactivity Disorder in Children: A guide for practitioners* (2nd ed.). New York: John Wiley & Sons.
- Gombert, E. J. (1992). *Metalinguistic Development*. New York: Harvester, Wheatsheaf.
- Goswami, U., & Bryant, P. (1990). *Phonological Skills and Learning to Read*. Hove: Lawrence Erlbaum Associates Ltd.
- Goyette, C. H., Conners, C. K., & Ulrich, R. F. (1978). Normative data on revised Conners parent and teacher rating scales. *Journal of Abnormal Child Psychology*, 6(2), 221-236.
- Griffiths, A. J. F., Suzuki, D. T., Lewontin, R. G., & Gelbart, W. M. (1993). *An Introduction to Genetic Analysis*. New York: Freeman & Company.

- Grolnick, W. S., Benjet, C., Kurowski, C. O., & Apostoleris, N. H. (1997). Predictors of parent involvement in children's schooling. *Journal of Educational Psychology*, 89(3), 538-548.
- Grolnick, W. S., & Slowiaczek, M. L. (1994). Parent's involvement in children's schooling: A multidimensional conceptualization and motivational model. *Child Development*, 65, 237-252.
- Guillen, A. M., & Alvarez, S. Globalisation and the Southern Welfare States. In R. Sykes, B. Palier & P. M. Prior (Eds.), *Globalisation and European Welfare States: Challenges and Change* (pp. 103-126): Palgrave
- Halperin, J. M. (1996). Conceptualising, describing, and measuring components of attention: A summary. In G. R. Lyon & N. A. Krasnegor (Eds.), *Attention, Memory and Executive Function* (pp. 119-136). Baltimore: Brooks.
- Hayes, S. C., Gifford, E. V., & Ruckstuhl, J., L.E., (1996). Relational frame theory and executive function: A behavioural approach. In G. R. Lyon & N. A. Krasnegor (Eds.), *Attention, Memory and Executive Function* (pp. 279-305). Baltimore: Brookes.
- Henry, B., Caspi, A., Moffitt, T. E., & Silva, P. (1996). Temperamental and familial predictors of violent and non-violent criminal convictions: From age 3 to age 18. *Developmental Psychopathology*, 32(4), 614-623.
- Hill, A. L., Degnan, K. A., Calkins, S. D., & Keane, S. P. (2006). Profiles of externalising behaviour problems for boys and girls across preschool: The roles of emotion regulation and inattention. *Developmental Psychology*, 42(5), 913-928.
- Hill, J. (2002). Biological, psychological and social processes in the conduct disorders. *Journal of Child Psychology and Psychiatry*, 43(1), 133-164.
- Hinshaw, S., Lahey, B., & Hart, E. (1993). Issues of taxonomy and comorbidity in the development of conduct disorder. *Development and Psychopathology*, 5(1-2), 31-49.
- Hinshaw, S. P. (1992a). Academic underachievement, attention deficits, and aggression: Comorbidity and implications for intervention. *Journal of Consulting and Clinical Psychology*, 60(6), 893-803.

- Hinshaw, S. P. (1992b). Externalising behaviour problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin*, 111(1), 127-155.
- Hinshaw, S. P. (2002). Process, mechanism, and explanation related to externalising behaviour in developmental psychopathology. *Journal of Abnormal Child Psychology*, 30(5), 431-446.
- Hinshaw, S. P., & Melnick, S. (1995). Peer relationships in boys with attention-deficit hyperactivity disorder with and without comorbid aggression. *Development and Psychopathology*, 7(4), 627-647.
- Howell, D. C. (2002). *Statistical Methods for Psychology* (5th ed.): Duxbury, Thomson Learning.
- Howitt, D., & Cramer, D. (2002). *An Introduction to Statistics in Psychology* (3rd ed.). London: Prentice Hall.
- Hulme, C., & Mackenzie, S. (1992). *Working Memory and Severe Learning Difficulties*. Hove: Lawrence Erlbaum Associates Ltd.
- Hurt, J., & Naglieri, J. A. (1992). Performance of delinquent males on planning, attention, simultaneous, and successive cognitive processing tasks. *Journal of Clinical Psychology*, 48, 120-128.
- Hwang, H., & St James-Roberts, I. (1998). Emotional and behavioural problems in primary school children from nuclear and extended families in Korea. *Journal of Child Psychology and Psychiatry*, 39(7), 973-979.
- Ialongo, N., Poduska, J., Werthamer, L., & Kellam, S. (2001). The distal impact of two first-grade preventive interventions on conduct problems and disorder in early adolescence. *Journal of Emotional and Behavioural Disorders*, 9(3), 146-160.
- Ingesson, G. S. (2006). Stability of IQ measures in teenagers and young adults with developmental dyslexia. *Dyslexia*, 12, 81-95.
- Jensen, P. S., Martin, D., & Cantwell, D. P. (1997). Comorbidity and ADHD: Implications for research, practice, and DSM-V. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36(8), 1065-1079.

- Jeynes, H. W. (2005). A meta-analysis of the relation of parental involvement to urban elementary school student academic achievement. *Urban Education*, 40(3), 237-269.
- Kaufman, S. A. (1994). *Intelligent Testing with the WISC-III*. New York: John Wiley & Sons.
- Kazdin, A. E., & Weisz, R. J. (1998). Identifying and developing empirically supported child and adolescent treatments. *Journal of Consulting and Clinical Psychology*, 66(1), 19-36.
- Keenan, K., & Shaw, D. (1997). Developmental and social influences on young girls' early problem behaviour. *Psychological Bulletin*, 121(1), 95-113.
- Kelly-Vance, L., & Schreck, D. (2002). The impact of a collaborative family/school reading programme on student reading rate. *Journal of Research in Reading*, 25(1), 43-53.
- Knafo, A., & Plomin, R. (2006). Parental discipline and affection and children's prosocial behaviour: genetic and environmental links. *Journal of Personality and Social Psychology*, 90(1), 147-164.
- Korilaki, P. (2005). *Attainment and progress differences associated with ethnicity, social class and gender throughout the 6th grade of primary school in Greece and ways to alleviate them: a study of primary school effectiveness*. Unpublished PhD, Institute of Education, University of London.
- Koulakoglou, K. (1998). *Psychometrics and Psychological Assessment (Psychometria kai Psychologiki Aksiologisi)*. Athens: Papazisis.
- Koumoula, A. (2003). Administration Instructions of the Conners' Teacher Report Form-28. Athens.
- Kuntsi, J., Oosterlaan, J., & Stevenson, J. (2001). Psychological mechanisms in hyperactivity: I Response inhibition deficit, working memory impairment, delay aversion, or something else? *Journal of Child Psychology and Psychiatry*, 42(2), 199-210.
- Lahey, B. B., Waldman, I. D., & McBarnett, K. (1999). Annotation: The development of antisocial behaviour: An integrative causal model. *Journal of Child Psychology and Psychiatry*, 40(5), 669-682.

- Lane, K. L., O'Shaughnessy, T. E., Lambros, K. M., Gresham, F. M., & Beebe-Frankenberger, M. E. (2001). The efficacy of phonological awareness training with first-grade students who have behaviour problems and reading difficulties. *Journal of Emotional and Behavioural Disorders*, 9(4), 219-231.
- Loeber, R., Burke, D. J., Lahey, B., Winters, A., & Zera, M. (2000). Oppositional defiant and conduct disorder: A review of the past 10 years, Part I. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(12), 1468-1484.
- Loeber, R., & Farrington, D. P. (2000). Young children who commit crime: Epidemiology, developmental origins, risk factors, early interventions, and policy implications. *Development and Psychopathology*, 12, 737-762.
- Loeber, R., & Stouthamer-Loeber, M. (1986). Family factors as correlates and predictors of juvenile conduct problems and delinquency. In M. Tonry & M. Morris (Eds.), *Crime and justice: an annual review of research* (Vol. 7, pp. 219-339). Chicago: University of Chicago Press.
- Loeber, R., Wung, P., Keenan, K., Giroux, B., Stouthamer-Loeber, M., Van Kammen, W. B., & Maughan, B. (1993). Developmental pathways in disruptive child behaviour. *Development and Psychopathology*, 5, 103-133.
- Loizou, M., & Stuart, M. (2003). Phonological awareness in monolingual and bilingual English and Greek five-year-olds. *Journal of Research in Reading*, 26(1), 3-18.
- Luman, M., Oosterlaan, J., & Sergeant, J. A. (2005). The impact of reinforcement contingencies on AD/HD: A review and theoretical appraisal. *Clinical Psychology Review*, 25(4), 183-213.
- Matthys, W., Cuperus, J. M., & Van Engeland, M. (1999). Deficient social problem-solving in boys with ODD/CD, with ADHD, and with both disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38(3), 311-321.
- Maughan, B., Gray, G., & Rutter, M. (1985). Reading retardation and antisocial behaviour: A follow-up into employment. *Journal of Child Psychology and Psychiatry*, 26(5), 741-758.
- Maughan, B., Pickles, A., Hagell, A., Rutter, M., & Yule, W. (1996). Reading problems and antisocial behaviour: Developmental trends in comorbidity. *Journal of Child Psychology and Psychiatry*, 37(4), 405-418.

- Maughan, B., Rowe, R., Messer, J., Goodman, R., & Meltzer, H. (2004). Conduct disorder and oppositional defiant disorder in a national sample: Developmental epidemiology. *Journal of Child Psychology and Psychiatry*, 45(3), 609-621.
- McDougall, S., Hulme, C., Ellis A., & Monk, A. (1994). Learning to read: The role of short-term memory and phonological skills. *Journal of Experimental Child Psychology*, 58(1), 112-133.
- McGee, R., Prior, M., Williams, S., Smart, D., & Sanson, A. (2002). The long-term significance of teacher-rated hyperactivity and reading ability in childhood: Findings from two longitudinal studies. *Journal of Child Psychology and Psychiatry*, 43(8), 1004-1017.
- McGee, R., Williams, S., Share, D., Anderson, J., & Silva, P. A. (1986). The relationship between specific reading retardation, general reading backwardness, and behavioural problems in a large sample of Dunedin boys: A longitudinal study from five to eleven years. *Journal of Child Psychology and Psychiatry*, 27, 597-610.
- McGee, R., Williams, S., & Silva, P. A. (1984a). Background characteristics of aggressive, hyperactive, and aggressive-hyperactive boys. *Journal of the American Academy of Child Psychiatry*, 23(3), 280-284.
- McGee, R., Williams, S., & Silva, P. A. (1984b). Behavioural and developmental characteristics of aggressive, hyperactive, and aggressive-hyperactive boys. *Journal of the American Academy of Child Psychiatry*, 23(4), 270-279.
- McGee, R. A., Clark, S. E., & Symons, D. K. (2000). Does the Conners' Continuous Performance Test aid in ADHD diagnosis? *Journal of Child Psychology and Psychiatry*, 28(5), 415-424.
- Miller-Johnson, S., Coie, J. D., Maumary-Gremaud, A., Bierman, K., & Conduct Problems Prevention Research Group. (2002). Peer rejection and aggression and early starter models of conduct disorder. *Journal of Abnormal Child Psychology*, 30(3), 217-230.
- Ministry of Education and Religious Affairs. (1986). The Aim of the Curriculum: P.D. 583/1982 - S.O.O.G 107 A'. Athens: Ministry of Education and Religious Affairs.

- Mirsky, A. F. (1996). Disorders of Attention: A neuropsychological perspective. In G. R. Lyon & N. A. Krasnegor (Eds.), *Attention, Memory, and Executive Function* (pp. 71-95). Baltimore: Brookes.
- Moffitt, T. E. (1990). Juvenile delinquency and attention deficit disorder: Boys' developmental trajectories from age 3 to age 15. *Child Development*, 61, 893-810.
- Moffitt, T. E. (1993a). Adolescence-limited and life-course-persistent antisocial behaviour: A developmental taxonomy. *Psychological Review*, 100(3), 674-701.
- Moffitt, T. E. (1993b). The neuropsychology of conduct disorder. *Development and Psychopathology*, 5, 135-151.
- Moffitt, T. E., & Caspi, A. (2001). Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. *Development and Psychopathology*, 13(2), 355-375.
- Moffitt, T. E., Caspi, A., Dickson, N., Silva, P., & Stanton, W. (1996). Childhood-onset versus adolescent-onset antisocial conduct problems in males: Natural history from ages 3-18 years. *Development and Psychopathology*, 8, 399-424.
- Moffitt, T. E., Caspi, A., Harrington, H., & Milne, B. J. (2002). Males on the life-course-persistent and adolescence-limited antisocial pathways: Follow-up at age 26 years. *Development and Psychopathology*, 14(1), 179-207.
- Moffitt, T. E., & Henry, B. (1989). Neuropsychological assessment of executive functions in self-reported delinquents. *Development and Psychopathology*, 1(2), 105-118.
- Moffitt, T. E., & Silva, P. A. (1988). Self-reported delinquency, neuropsychological deficit, and history of attention deficit disorder. *Journal of Abnormal Child Psychology*, 16(5), 553-569.
- Morris, R. D., Stuebing, K., Fletcher, J. M., Shaywitz, S. E., Lyon, G. R., Shankweiler, D., Katz, L., Francis, D. J., & Shaywitz, B. A. (1998). Subtypes of reading disability: Variability around a phonological core. *Journal of Educational Psychology*, 90(3), 347-373.
- Motti-Stefanidi, F., Tsiantis, J., & Richardson, S. C. (1993). Epidemiology of behavioural problems and emotional problems of primary school children in Greece. *European Child and Adolescent Psychiatry*, 2(2), 11-118.

- Mutter, V., Hulme, C., Snowling, M. J., & Stevenson, J. (2004). Phonemes, rimes, vocabulary, and grammatical skills as foundations of early reading development: evidence from a longitudinal study. *Developmental Psychology, 40*(5), 665-681.
- Nadder, T. S., Rutter, M., Silberg, J. L., Maes, H. H., & Eaves, L. J. (2002). Genetic effects on the variation and covariation of attention deficit-hyperactivity disorder (ADHD) and oppositional-defiant disorder/conduct disorder (ODD/CD) symptomatologies across informant and occasion of measurement. *Psychological Medicine, 32*, 39-53.
- NICHD Early Child Care Research Network. (2005). Predicting individual differences in attention, memory, and planning in first graders from experiences at home, child care, and school. *Developmental Psychology, 41*(1), 99-114.
- Nikolopoulos, D., Goulondris, N., Hulme, C., & Snowling, M. J. (2006). The cognitive bases of learning to read and spell in Greek: Evidence from a longitudinal study. *Journal of Experimental Child Psychology, 94*(1), 1-17.
- Oosterlaan, J., Logan, G. D., & Sergeant, J. A. (1998). Response inhibition in AD/HD, CD, comorbid AD/HD+CD, anxious, and control children: A meta-analysis of studies with the stop task. *Journal of Child Psychology and Psychiatry, 39*(3), 411-425.
- Padeliadu, S., Botsas, G., & Sideridis, G. (2000). The explanation of reading underachievement on the basis of phonemic awareness, family environment and socio-economic status: A preliminary study with 1st grade children. *O.M.E.R.: Investigating Child's World, 4*, 53-65.
- Pagani, L., Boulerice, B., Vitaro, F., & Trembley, R. E. (1999). Effects of poverty on academic failure and delinquency in boys: A change and process model approach. *Journal of Child Psychology and Psychiatry, 40*(8), 1209-1219.
- Pallant, J. (2004). *SPSS Survival Guide: A step by step guide to data analysis using SPSS for Windows (Versions 10 and 11)*. Glasgow: Open University Press.
- Papadopoulos, T. N. (1996). Family, State and Social Policies for Children in Greece. In J. Brannen & M. O' Brien (Eds.), *Children and Families: Research and Policy* (pp. 171-188). London: Falmer Press.

- Park, H., & Bauer, S. (2002). Parenting practices, ethnicity, socioeconomic status, and academic achievement in adolescents. *School Psychology International*, 23(4), 386-396.
- Patterson, G. R. (1982). *Coercive Family Process*. Eugene OR: Castalia.
- Patterson, G. R. (1990). Some comments about cognitions as causal variables. *American Psychologist*, 45, 984-985.
- Patterson, G. R., Chamberlain, P., & Reid, J. B. (1982). A comparative evaluation of a parent-training programme. *Behaviour Therapy*, 13(5), 638-650.
- Patterson, G. R., DeGarmo, D. S., & Knutson, N. (2000). Hyperactive and antisocial behaviours: Comorbid or two points in the same process? *Development and Psychopathology*, 12(1), 91-106.
- Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Antisocial Boys*. Eugene, OR: Castalia.
- Pennington, B., & Ozonoff, S. (1996). Executive functions and developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 37(1), 51-87.
- Pennington, B. F., Gilger, J. W., Olson, R. K., & DeFries, J. C. (1992). The external validity of age-versus IQ-discrepancy definitions of reading disability: Lessons from a twin study. *Journal of Learning Disabilities*, 25(9), 562-573.
- Pennington, B. F., Groisser, D., & Welsh, M. C. (1993). Contrasting cognitive deficits in Attention Deficit Hyperactivity Disorder versus Reading Disability. *Developmental Psychology*, 29(3), 511-523.
- Plomin, R., DeFries, J. C., & McClearn, G. E. (1990). *Behavioural Genetics: A Primer* (2nd ed.). New York: W.H. Freeman and Company.
- Plomin, R., DeFries, J. C., McClearn, G. E., & Rutter, M. (1997). *Behavioural Genetics* (3rd ed.). New York: W.H. Freeman and Company.
- POVERTY-3 Project. (1991). *Model action for the economic and social integration of the least privileged groups in the district of Eleftherio/Kordelio-Evosmos-Menemeni(E./K.EM.)*. Available: <http://www.eled.auth.gr/reds/p3/p3keimena/description.htm> [2004, July 17th].
- Psacharopoulos, G., & Papakonstantinou, G., (2005). The real university cost in a "free" higher education country. *Economics of Education*, 24(1), 103-108

- Quay, C. H. (1997). Inhibition and attention deficit hyperactivity disorder. *Journal of Abnormal Child Psychology*, 25(1), 7-13.
- Raine, A., Moffitt, E. T., Caspi, A., Loeber, R., Stouthamer-Loeber, M., & Lyman, D. (2005). Neurocognitive impairments in boys on the life-course persistent antisocial path. *Journal of Abnormal Psychology*, 114(1), 38-49.
- Raine, A., Yaralian, P., Reynolds, C., Venables, P., & Mednick, S. (2002). Spatial but not verbal cognitive deficits at age 3 years in persistently antisocial individuals. *Development and Psychopathology*, 14(1), 25-44.
- Reid, J. B., Eddy, M. J., Fetrow, R. A., & Stoolmiller, M. (1999). Description and immediate impacts of a preventive intervention for conduct problems. *American Journal of Community Psychology*, 27(4), 483-517.
- Reynolds, A. J. (1992). Comparing measures of parental involvement and their effects on academic achievement. *Early Childhood Research Quarterly*, 7, 441-462.
- Reynolds, A. J., Temple, J. A., Robertson, D. L., & Man, E. A. (2001). Long-term effects of an early childhood intervention on educational achievement and juvenile arrest: A 15-year follow-up of low-income children in public schools. *Journal of the American Medical Association*, 285(18), 2339-2346.
- Reynolds, J. (2006). *Parents' involvement in their children's learning and schools: How should their responsibilities relate to the role of the state?* London: National Family & Parenting Institute.
- Riccio, C. A., Wolfe, M. E., Romine, C., Davis, B., & Sullivan, J. R. (2004). The Tower of London and neuropsychological assessment of ADHD in adults. *Archives of Clinical Neuropsychology*, 19, 661-671.
- Richards, G. P., Samuels, J., Turnure, J. E., & Ysseldyke, J. E. (1990). Sustained and selective attention in children with learning disabilities. *Journal of Learning Disabilities*, 23(2), 129-136.
- Robson, C. (2002). *Real World Research* (2nd ed.). Oxford: Blackwell Publishers.
- Roussos, A., Karathanos, G., Richardson, C., Hartman, C., Karajiannis, D., Kyprianos, S., Lazaratou, H., Mahaira, O., Tassi, M., & Zoubou, V. (1999). Achenbach's Child Behaviour Checklist and Teachers' Report Form in a normative sample of

- Greek children 6-12 years old. *European Child and Adolescent Psychiatry*, 8(3), 165-172.
- Roussos, A., Richardson, C., Politikou, K., Marketos, S., Kyprianos, S., Karajianni, S., Koumoula, A., Lazaratou, H., Marketos, N., Zoubou, V., Nicolara, R., & Mahera, O. (1999). The Conners-28 teacher questionnaire in clinical and nonclinical samples of Greek children 6-12 years old. *European Child and Adolescent Psychiatry*, 8(4), 260-267.
- Rubin, K. H., Burgess, K. B., Dwyer, K. M., & Hastings, P. D. (2003). Predicting preschoolers' externalising behaviours from toddler temperament, conflict, and maternal negativity. *Developmental Psychology*, 39(1), 164-176.
- Rubinow, D., & Schmidr, P. (1996). Androgens, brain and behaviour. *American Journal of Psychiatry*, 153, 974-984.
- Rucklidge, J. J., & Tannock, R. (2002). Neuropsychological profiles of adolescents with ADHD: Effects of reading difficulties and gender. *Journal of Child Psychology and Psychiatry*, 43(8), 988-1003.
- Rutter, M., Caspi, A., Fergusson, D., Horwood, J. L., Goodman, R., Maughan, B., Moffitt, T. E., Meltzer, H., & Carroll, J. (2004). Sex differences in developmental reading disability: New findings from 4 epidemiological studies. *Journal of the American Medical Association*, 291(16), 2007-2012.
- Rutter, M., Moffitt, E. T., & Caspi, A. (2006). Gene-environment interplay and psychopathology: Multiple varieties but real effects. *Journal of Child Psychology and Psychiatry*, 47(3/4), 226-261.
- Rutter, M., & Yule, B. (1975). The concept of specific reading retardation. *Journal of Child Psychology and Psychiatry*, 29(3), 181-197.
- Rutter, M., & Yule, W. (1970). Reading retardation and antisocial behaviour-the nature of the association. In M. Rutter & J. Tizard & K. Whitmore (Eds.), *Education, Health and Behaviour*. London: Longman.
- Sameroff, A. J. (2000). Developmental systems and psychopathology. *Development and Psychopathology*, 12(3), 2997-2312.

- Sammons, P., Elliot, K., Sylva, K., Melhuish, E., Siraj-Blatchford, I., & Taggart, B. (2004). The impact of preschool on young children's cognitive attainments at entry to reception. *British Educational Research Journal*, 30(5), 691-712.
- Sanson, A., Prior, M., & Smart, D. (1996). Reading disabilities with and without behaviour problems at 7-8 years: Prediction from longitudinal data from infancy to 6 years. *Journal of Child Psychology and Psychiatry*, 37(5), 529-541.
- Sanson, A., Smart, D., Prior, M., & Oberklaid, F. (1993). Precursors of hyperactivity and aggression. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32, 1207-1216.
- Schachar, R., Mota, V. L., Logan, G. D., Tannock, R., & Klim, P. (2000). Confirmation of an inhibitory control deficit in attention-deficit/hyperactivity disorder. *Journal of Abnormal Child Psychology*, 28(3), 227-235.
- Scheres, A., Oosterlaan, J., & Sergeant, J. (2001a). Response execution and inhibition in children with AD/HD and other disruptive disorders: The role of behavioural activation. *Journal of Child Psychology and Psychiatry*, 42(3), 347-357.
- Scheres, A., Oosterlaan, J., & Sergeant, J. A. (2001b). Response inhibition in children with DSM-IV subtypes of AD/HD and related disruptive disorders: The role of reward. *Child Neuropsychology*, 7(3), 172-189.
- Schweinhart, L. J., & Weikart, D. P. (1997). The High/Scope preschool curriculum comparison study through age 23. *Early Childhood Research Quarterly*, 12(2), 117-143.
- Scott, S., Knapp, M., Henderson, M. K., & Maughan, B. (2001). Financial cost of social exclusion: Follow up study of antisocial children into adulthood. *British Medical Journal*, 323, 1-5.
- Scott, S., Spender, Q., Doolan, M., Jacobs, B., & Aspland, H. (2001). Multicentre controlled trial of parenting groups for childhood antisocial behaviour in clinical practice. *British Medical Journal*, 323, 1-7.
- Scott, S., & Sylva, K. (2004). The SPOKES Project: Supporting parents on kids' education. In D. Quinton (Ed.), *Supporting Parents: messages from research* (pp. 219-224). London: Jessica Kingsley Publishers.

- Scottish Intercollegiate Guidelines Network. (2001). *Attention Deficit and Hyperkinetic Disorders in Children and Young People* (52). Edinburgh: Scottish Intercollegiate Guidelines Network.
- Seguin, J. R., Boulerice, B., Harden, P., Tremblay, R., & Pihl, R. (1999). Executive functions and physical aggression after controlling for attention deficit hyperactivity disorder, general memory, and IQ. *Journal of Child Psychology and Psychiatry*, 40(8), 1197-1208.
- Senechal, M., & LeFevre, J. A. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development*, 73(2), 445-460.
- Sergeant, J. (1996). A theory of attention: An information processing perspective. In G. R. Lyon & N. A. Krasnegor (Eds.), *Attention, Memory and Executive Function* (pp. 57-69). Baltimore: Brookes.
- Sergeant, J. (2000). The cognitive-energetic model: An empirical approach to attention-deficit hyperactivity disorder. *Neuroscience and Biobehavioural Reviews*, 24(1), 7-12.
- Shallice, T. (1982). Specific impairments of planning. *Philosophical Transactions of the Royal Society of London*, 298, 199-209.
- Shallice, T. (1988). *From Neuropsychology to Mental Structure*. Cambridge: Cambridge University Press.
- Sharma, S. (1996). *Applied Multivariate Techniques*. New York; Chichester: John Wiley.
- Shaw, D. S., Gilliom, M., Ingoldsby, E. M., & Nagin, D. S. (2003). Trajectories leading to school-age conduct problems. *Developmental Psychology*, 39(2), 189-200.
- Shaw, D. S., Lacourse, E., & Nagin, D. S. (2005). Developmental trajectories of conduct problems and hyperactivity from ages 2 to 10. *Journal of Child Psychology and Psychiatry*, 46(9), 931-942.
- Shaw, D. S., Owens, E. B., Vondra, J. I., Keenan, K., & Winslow, E. B. (1996). Early risk factors and pathways in the development of early disruptive behavioural problems. *Development and Psychopathology*, 8, 679-700.
- Shelton, T. L., Barkley, R. A., Crosswait, C., Moorehouse, M., Fletcher, K., Barrett, S., Jenkins, L., & Metevia, L. (2000). Multimethod psychoeducational intervention

- for preschool children with disruptive behaviour: Two-year post-treatment follow-up. *Journal of Abnormal Child Psychology*, 28(3), 253-266.
- Silberg, J., Rutter, M., Meyer, J., Maes, H., Hewitt, J., Simonoff, E., Pickles, A., Loeber, R., & Eaves, L. (1996). Genetic and environmental influences on the covariation between hyperactivity and conduct disturbance in juvenile twins. *Journal of Child Psychology and Psychiatry*, 37(7), 803-816.
- Smart, D., Sanson, A., & Prior, M. (1996). Connections between reading disability and behaviour problems: Testing temporal and causal hypothesis. *Journal of Abnormal Child Psychology*, 24(3), 363-383.
- Snowling, M. J. (1991). Developmental reading disorders. *Journal of Child Psychology and Psychiatry*, 32(1), 49-77.
- Snyder, J., Schrepferman L., Oeser, J., Patterson, G. R., Stoolmiller, M., Johnson, K., & Snyder, A. (2005). Deviancy training and association with deviant peers in young children: Occurrence and contribution to early-onset conduct problems. *Development and Psychopathology*, 17(2), 397-413.
- Spencer, N. (2003). Parenting programmes: What is the likely impact of child mental health? *Archives of Disease in Children*, 88, 99-100.
- Spera, C. (2005). A review of the relationship among parenting practices, parenting styles, and adolescent school achievement. *Educational Psychology Review*, 17(2), 125-146.
- Spira Greenfield, E., & Fischel, J. E. (2005). The impact of preschool inattention, hyperactivity, and impulsivity on social and academic development: A review. *Journal of Child Psychology and Psychiatry*, 46(7), 755-773.
- Stangor, C. (2007). *Research Methods for the Behavioural Sciences*. Boston: Houghton Millfin.
- Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, 21(4), 360-407.
- Stanovich, K. E. (1994). Annotation: Does dyslexia exist? *Journal of Child Psychology and Psychiatry*, 35(4), 579-595.

- Stanovich, K. E. (2000). *Progress in Understanding Reading: Scientific foundations and new frontiers*. New York: The Guilford Press.
- Stanovich, K. E., Cunningham, A. E., & Cramer, B. (1984). Assessing phonological awareness in kindergarten children: Issues of task comparability. *Journal of Experimental Child Psychology*, 38(2), 175-190.
- Steinberg, L., Lamborn, S. D., Dornbusch, S. M., & Darling, N. (1992). Impact of parenting practices on adolescent achievement: Authoritative parenting, school involvement, and encouragement to succeed. *Child Development*, 63, 1266-1281.
- Stuart, A. (1984). *The ideas of sampling*. London: Charles Griffin and Company.
- Stuebing, K. K., Fletcher, J. M., LeDoux, J. M., Lyon, G. R., Shaywitz, S. E., & Shaywitz, B. A. (2002). Validity of IQ-discrepancy classifications of reading disabilities: A meta-analysis. *American Educational Research Journal*, 39(2), 469-318.
- Sturge, C. (1982). Reading retardation and antisocial behaviour. *Journal of Child Psychology and Psychiatry*, 23, 21-31.
- Sylva, K., & Hurry, J. (1995). *The effectiveness of reading recovery and phonological training for children with reading problems*. London: Thomas Coram Research Unit.
- Sylva, K., Siraj-Blatchford, I., Taggart, B., Sammons, P., Melhuish, E., Elliot, K., & Totsika, V. (2006). Capturing quality in early childhood through environmental rating scales. *Early Childhood Research Quarterly*, 21(1), 76-92.
- Tabachnick, B. G., & Fidell, L. S. (1997). *Using Multivariate Statistics* (3rd ed.). New York: HarperCollins.
- Tafa, E. (1995). *Detection Test of Reading Ability*. Athens: Hellenic Letters.
- Taylor, T. K., & Biglan, A. (1998). Behavioural family interventions for improving child-rearing: A review of the literature for clinicians and policy makers. *Clinical Child and Family Psychology Review*, 1(1), 41-60.
- Theodore, L.A., Bray, M.A., Kehle, T.J., & Dioguardi, R. J. (2002). School Psychology in Greece: A system of change. *School Psychology International*, 23, 148-154

- Thapar, A., Harrington, R., & McGuffin, P. (2001). Examining the comorbidity of ADHD-related behaviours and conduct problems using a twin study design. *British Journal of Psychiatry*, 179, 224-229.
- Thurston, D. (2005). Levelling the home advantage: Assessing the effectiveness of parental involvement in elementary school. *Sociology of Education*, 78(3), 233-249.
- Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (1994). Longitudinal studies of phonological processing and reading. *Journal of Learning Disabilities*, 27(5), 276-286.
- Toupin, J., Dery, M., Pauze, R., Mercier, H., & Fortin, L. (2000). Cognitive and familial contributions to conduct disorder in children. *Journal of Child Psychology and Psychiatry*, 41(3), 333-334.
- Tremblay, R. E., Pagani-Kurtsz, L., Masse, L. C., Vitaro, F., & Pihl, R. O. (1995). A bimodal preventive intervention for disruptive kindergarten boys: Its impact through mid-adolescents. *Journal of Consulting and Clinical Psychology*, 63(4), 560-568.
- Trzesniewski, K. H., Moffitt, E. T., Caspi, A., Taylor, A., & Maughan, B. (2006). Revisiting the association between reading achievement and antisocial behaviour: New evidence of an environmental explanation from a twin study. *Child Development*, 77(1), 72-88.
- US Department of Education. (1997). *1996 National Household Education Survey (NHES:96) Questionnaires: Screener/Household Library, Parent and Family Involvement in Education and Civic Involvement, Youth Civic Involvement, and Adult Civic Involvement*. Washington: U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics.
- Van der Meer, J., Marzocchi, G. M., & De Meo, T. (2005). Response inhibition and Attention Deficit Hyperactivity Disorder with and without Oppositional Defiant Disorder screened from a community sample. *Developmental Neuropsychology*, 28(1), 459-472.
- Van der Valk, J. C., van den Oord, E. C. G., Verhulst, F. C., & Boomsma, D. I. (2001). Using parental ratings to study the etiology of 3-year-old twins' problem

- behaviours: Different views or rater bias? *Journal of Child Psychology and Psychiatry*, 42, 921-931.
- Vellutino, F. R., Fletcher, J. M., Snowling, M. J., & Scanlon, D. M. (2004). Specific reading disability (dyslexia): What have we learned in the past four decades? *Journal of Child Psychology and Psychiatry*, 45(1), 2-40.
- Vitaro, F., Brendgen, M., & Tremblay, R. E. (2000). Influence of deviant friends on delinquency: Searching for moderator variables. *Journal of Abnormal Child Psychology*, 28(4), 313-325.
- Vitaro, F., Brendgen, M., & Tremblay, R. E. (2002). Reactively and proactively aggressive children: Antecedent and subsequent characteristics. *Journal of Child Psychology and Psychiatry*, 43(4), 495-505.
- Vitaro, F., Gendreau, P. L., Tremblay, R. E., & Oligny, P. (1998). Reactive and proactive aggression differentially predict later conduct problems. *Journal of Child Psychology and Psychiatry*, 39(3), 377-385.
- Wagner, R. K., & Torgesen, J. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. *Psychological Bulletin*, 101(2), 192-212.
- Walker-Hall, J., & Sylva, K. (2001). What works for families with children with behaviour problems? Evidence from research. In G. Pugh (Ed.), *Contemporary Issues in the Early Years* (3rd ed., pp. 161-176). London: Sage.
- Wallnau, L. B., & Gravetter, F. J. (2007). *Statistics for the Behavioural Sciences* (International Student Edition 7th ed.). London: Thomson Wadsworth.
- Waschbusch, D. A. (2002). A meta-analytic examination of combined hyperactive-impulsive-attention problems and conduct problems. *Psychological Bulletin*, 128(1), 118-150.
- Webster-Stratton, C. (1994). Advancing videotape parent training: A comparison study. *Journal of Consulting and Clinical Psychology*, 62(3), 583-593.
- Webster-Stratton, C., & Hammond, M. (1997). Treating children with early-onset conduct problems: A comparison of child and parent training interventions. *Journal of Consulting and Clinical Psychology*, 65(1), 93-109.

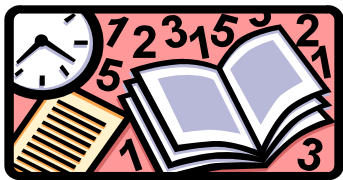
- Webster-Stratton, C., & Hammond, M. (1999). Marital conflict management skills, parenting style, and early-onset conduct problems: Processes and pathways. *Journal of Child Psychology and Psychiatry*, 40(6), 917-927.
- Webster-Stratton, C., & Taylor, T. (2001). Nipping early risk factors in the bud: Preventing substance abuse, delinquency, and violence in adolescence through interventions targeted at young children (0-8 years). *Prevention Science*, 2(3), 165-192.
- Willcutt, E. G., Pennington, B., Boada, R., Ogline, S. J., Tunick, A. R., Chhabilas, A., & Olson, K. R. (2001). A comparison of the cognitive deficits in reading disability and attention-deficit/hyperactivity disorder. *Journal of Abnormal Psychology*, 110(1), 157-172.
- Willcutt, E. G., & Pennington, B. F. (2000a). Comorbidity of reading disability and attention/deficit disorder: Differences by gender and subtype. *Journal of Learning Disabilities*, 33(2), 179-191.
- Willcutt, E. G., & Pennington, B. F. (2000b). Psychiatric comorbidity in children and adolescents with reading disability. *Journal of Child Psychology and Psychiatry*, 41(8), 1039-1048.
- Willcutt, E. G., Pennington, B. F., & DeFries, J. C. (2000). Twin study of the etiology of comorbidity between reading disability and attention-deficit/hyperactivity disorder. *American Journal of Medical Genetics*, 96(3), 293-301.
- Willcutt, E. G., Pennington, B. F., Olson, R. K., Chhabilas, N., & Hulslander, J. (2005). Neuropsychological analyses of comorbidity between reading disability and Attention Deficit Hyperactivity Disorder: In search of the common deficit. *Developmental Neuropsychology*, 27(1), 35-78.
- Williams, B., Williams, J., & Ullman, A. (2002). *Research report No332: Parental Involvement in Education*. BMRB Social Research. Available: <http://www.dfes.gov.uk/research/data/uploadfiles/RR332.doc> [2003, November 10th].
- World Health Organisation. (1992). *The ICD-10 Classification of Mental and Behaviour Disorders*. Geneva: World Health Organisation.

Yopp, H. (1988). The validity and reliability of phonemic awareness tests. *Reading Research Quarterly*, 23(2), 159-177.

APPENDIX A

Informed Consent

A1. Greek Version



Άδεια Συμμετοχής από το Γονέα-Κηδεμόνα

Αγαπητέ Γονέα/Κηδεμόνα

Ονομάζομαι Αγγελική Καλλιτίσογλου και ερευνώ τη συμπεριφορά και τις ψυχολογικές δεξιότητες των μαθητών της Β' τάξης του Δημοτικού σχολείου για τους σκοπούς της διδακτορικής μου διατριβής που πραγματοποιώ στο Ινστιτούτο Εκπαίδευσης του Πανεπιστημίου του Λονδίνου. Η έρευνα αυτή έχει εγκριθεί από το Παιδαγωγικό Ινστιτούτο της Ελλάδος και από το Υπουργείο Παιδείας και Θρησκευμάτων και χρηματοδοτείται από το Ίδρυμα Κρατικών Υποτροφιών. Τα αποτελέσματα θα χρησιμοποιηθούν έτσι ώστε να αναπτυχθούν σχολικά προγράμματα τα οποία θα ικανοποιούν καλύτερα τις ανάγκες των μαθητών στο σχολείο

Προκειμένου να υλοποιηθεί η παρούσα έρευνα οι μαθητές θα συμμετέχουν σε μια σειρά φωνολογικών, αναγνωστικών, συμπεριφορικών και γνωστικών ασκήσεων που θα πραγματοποιηθούν στο χώρο του σχολείου. Οι γονείς των παιδιών που θα συμμετέχουν έχουν το δικαίωμα να ενημερωθούν για την επίδοση του παιδιού τους στις παραπάνω ασκήσεις.

Το σχολείο του παιδιού σας έχει εγκριθεί κατάλληλο για τη διεξαγωγή της παρούσας έρευνας από το Παιδαγωγικό Ινστιτούτο της Ελλάδος. Η συμμετοχή των παιδιών είναι εθελοντική και ανώνυμη. Αν επιθυμείτε το παιδί σας να συμμετέχει στην έρευνα, παρακαλώ σημειώστε ένα ✓ στο κατάλληλο κουτάκι και γράψτε το ονοματεπώνυμό σας. Αν δεν επιθυμείτε τη συμμετοχή του παιδιού σας, παρακαλώ σημειώστε ένα ✗ στο κατάλληλο κουτάκι και γράψτε το ονοματεπώνυμό σας. **Παρακαλείστε να επιστρέψετε το παρόν φυλλάδιο σε μία εβδομάδα το αργότερο από τη μέρα που το παραλάβετε.**

Ναι, επιθυμώ το παιδί μου να συμμετέχει στην παρούσα έρευνα ☐

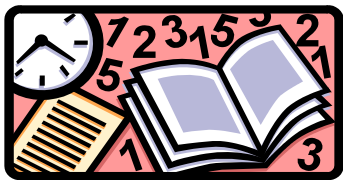
Όχι, δεν επιθυμώ το παιδί μου να συμμετέχει στην παρούσα έρευνα ☐

Ονοματεπώνυμο.....

Ευχαριστούμε πολύ για τη συνεργασία σας!

Για περισσότερες πληροφορίες, παρακαλώ, μη διστάσετε να τηλεφωνήσετε στα παρακάτω
νούμερα: 23910-43016, 6945676167

A2. English Version



Informed Consent

Dear Parent/Guardian

My name is Angeliki Kallitsoglou and I am investigating the behavioural and psychological competencies of children in the second Grade of the Primary School for the purposes of my Doctoral Studies at the Institute of Education, University of London. This study has been approved by the Pedagogical Institute of Greece and the Ministry of Education and Religious Affairs and is funded by the States Scholarships Foundation. The results will be used as a means of helping in the development of educational programmes that will meet the needs of children at school.

In order to accomplish the present study the students will participate in a wide range of phonological, reading, behavioural and cognitive tasks that will take place within the school premises. The parents of the students that will participate in the study will be notified upon request about their child's attainment on the above tasks.

Your child's school has been approved by the Pedagogical Institute of Greece as an appropriate one for the conduct of this study. The participation of the children is voluntary and anonymous. If you wish you child to participate in the study please mark a ✓ in the right box and write down your first name and family name. If you do not wish your child to participate in the study, please mark a ✓ in the right box and write down your first name and family name. **Please return the present leaflet within a week from the day you have received it.**

Yes, I wish my child to participate in the present study ☐

No, I do not wish my child to participate in the present study ☐

First and Family Name.....

Thank you very much for your cooperation!

For more information, please, do not hesitate to call to the following numbers:
23910-43016, 6945676167

APPENDIX B

Conners' Teacher Rating Scale-28

B1. Greek Version

Conners' Teacher Rating Scale-28 - Κλίμακα Αξιολόγησης της Συμπεριφοράς

Μαθητής/Μαθήτρια..... Ημερομηνία γέννησης.....

Σχολείο..... Τάξη..... Ημερομηνία.....

Οδηγίες: Παρακάτω παρουσιάζονται μερικά προβλήματα που συχνά εμφανίζουν τα παιδιά στο σχολείο. Παρακαλώ, υποδείξτε για κάθε πρόβλημα που παρουσιάζεται στην παρακάτω λίστα πόσο σοβαρό έχει υπάρξει τον τελευταίο μήνα. Για παράδειγμα, φέρτε στο νου σας τη συμπεριφορά του μαθητή τον τελευταίο μήνα και σκεφτείτε αν έχει παρουσιάσει κάθε ένα από τα παρακάτω προβλήματα και πόσο σοβαρό είναι το κάθε πρόβλημα. Παρακαλώ, υποδείξτε την απάντησή σας σημειώνοντας ένα ✓ στο κατάλληλο κουτάκι.

	Καθόλου	Πολύ λίγο	Αρκετά	Πάρα Πολύ
1. Είναι ανήσυχος, διαρκώς στριφογυρίζει	☐	☐	☐	☐
2. Κάνει ακατάλληλους θορύβους σε ακατάλληλες ώρες	☐	☐	☐	☐
3. Οι απαιτήσεις του πρέπει να ικανοποιούνται αμέσως	☐	☐	☐	☐
4. «Κάνει τον έξυπνο»(αναιδής και αυθάδης)	☐	☐	☐	☐
5. Εμφανίζει εκρήξεις οργής και απρόβλεπτη συμπεριφορά	☐	☐	☐	☐
6. Είναι υπερβολικά ευαίσθητος στην κριτική	☐	☐	☐	☐
7. Η προσοχή του διασπάται ή δε συγκεντρώνεται	☐	☐	☐	☐
8. Ενοχλεί τα άλλα παιδιά	☐	☐	☐	☐
9. Ονειροπολεί	☐	☐	☐	☐
10. Κατσουφιάζει και κατεβάζει μούτρα	☐	☐	☐	☐
11. Η διάθεση του αλλάζει γρήγορα και πολύ έντονα	☐	☐	☐	☐
12. Είναι εριστικός	☐	☐	☐	☐
13. Υποτάσσεται στην εξουσία	☐	☐	☐	☐
14. Είναι ανήσυχος, μόνιμα υπ'ατμόν	☐	☐	☐	☐
15. Αντιδρά έντονα στο παραμικρό ερέθισμα, είναι παρορμητικός	☐	☐	☐	☐
16. Απαιτεί με υπερβολικό τρόπο την προσοχή του/της δασκάλας	☐	☐	☐	☐
17. Φαίνεται να μην είναι αποδεκτός από την ομάδα	☐	☐	☐	☐
18. Φαίνεται να παρασύρεται εύκολα από τα άλλα παιδιά	☐	☐	☐	☐
19. Δείχνει έλλειψη σεβασμού στους κανόνες του παιχνιδιού	☐	☐	☐	☐
20. Φαίνεται να μην έχει ηγετικές ικανότητες	☐	☐	☐	☐
21. Αποτυχαίνει να τελειώσει ότι αρχίζει	☐	☐	☐	☐
22. Έχει παιδιάστική και ανώριμη συμπεριφορά	☐	☐	☐	☐
23. Αρνείται τα λάθη του ή κατηγορεί τους άλλους	☐	☐	☐	☐
24. Δεν τα πάει καλά με τα άλλα παιδιά	☐	☐	☐	☐
25. Μη συνεργάσιμος με τους συμμαθητές του	☐	☐	☐	☐
26. Απελπίζεται εύκολα στις προσπάθειές του	☐	☐	☐	☐
27. Μη συνεργάσιμος με το δάσκαλο	☐	☐	☐	☐
28. Έχει δυσκολία στη μάθηση	☐	☐	☐	☐

B2. English Version

Conners' Teacher Rating Scale-28 - Behaviour Rating Scale

Student..... Birth Day

School..... Class..... Date.....

Instructions: Some of the problems that children often exhibit at school are presented in the following list. Please, indicate for each one of the problems that is presented below how serious has been during the last month. For instance, bring in mind the student's behaviour and think if he/she has exhibited each one of the following problems and how serious the problem was. Please, indicate your answer by marking a *J* in the right box.

	Not at all	Just a little present	Pretty much present	Very much present
1. Restless in the squirmy sense	☐	☐	☐	☐
2. Makes inappropriate noises when he shouldn't	☐	☐	☐	☐
3. Demands must be met immediately	☐	☐	☐	☐
4. Acts smart (impudent or sassy)	☐	☐	☐	☐
5. Temper outbursts and unpredictable behaviour	☐	☐	☐	☐
6. Overly sensitive to criticism	☐	☐	☐	☐
7. Distractibility or attention span problem	☐	☐	☐	☐
8. Disturbs other children	☐	☐	☐	☐
9. Daydreams	☐	☐	☐	☐
10. Pouts and sulks	☐	☐	☐	☐
11. Mood changes quickly and drastically	☐	☐	☐	☐
12. Quarrelsome	☐	☐	☐	☐
13. Submissive attitude toward authority	☐	☐	☐	☐
14. Restless, always on the go	☐	☐	☐	☐
15. Excitable, impulsive	☐	☐	☐	☐
16. Excessive demands for teacher's attention	☐	☐	☐	☐
17. Appears to be unaccepted by group	☐	☐	☐	☐
18. Appears to be easily led by the other children	☐	☐	☐	☐
19. No sense of fair play	☐	☐	☐	☐
20. Appears to lack leadership	☐	☐	☐	☐
21. Fails to finish things that he starts	☐	☐	☐	☐
22. Childish and immature	☐	☐	☐	☐
23. Denies mistakes or blames others	☐	☐	☐	☐
24. Does not get along well with other children	☐	☐	☐	☐
25. Uncooperative with classmates	☐	☐	☐	☐
26. Easily frustrated in efforts	☐	☐	☐	☐
27. Uncooperative with teacher	☐	☐	☐	☐
28. Difficulty in learning	☐	☐	☐	☐

APPENDIX C

Conners' Continuous Performance Test-II Measures

- a) Omission errors: the number of times the child did not respond to a target (non X)
- b) Commission errors: the number of times the child responded to a non target (X)
- c) Hit reaction time (Hit RT): the mean response time for all targets (non X).
- d) Hit reaction time standard error (Hit RT SE): the consistency of response time expressed in standard errors.
- e) Detectability: The difference between the signal (non-X) and noise (X) distributions
- f) Response style: Speed/accuracy trade off
- g) Variability: The within respondent consistency of response time
- h) Perseverations: the mean of number of perseverative responses. A perseverative response is any reaction time less than 100 ms.
- i) Hit reaction time by block change (Hit RT Block): the mean of change in response time over the duration of the test
- j) Hit standard error by block change (Hit RT SE by Block): the mean of change in response time consistency over the duration of the test
- k) Hit reaction time by inter-stimulus interval change: (Hit RT by ISI): the mean of change in response time over the three ISIs
- l) Hit standard error by inter-stimulus interval change (Hit RT SE by ISI): the mean of change in response time consistency over the three ISIs

APPENDIX D

Scoring Instructions for the Tower of London Task

A) Some children completed the pattern:

1. within the prescribed time limit and with the correct configuration, however with the wrong number of moves. Some were finishing the pattern;
2. within the prescribed time limit and with the correct number of moves, but with the wrong configuration. Finally, some completed the pattern;
3. within the prescribed time limit and with the correct configuration and correct number of moves, however, by violating rules such as using of both hands.

In all the above cases the examiner should tell the child about the mistake he/she made, remind him/her that whenever he/she realises that he/she has made a mistake he/she can put the balls back to the starting point, and give to the child another chance. The child's failure to complete the pattern either in the prescribed number of moves, in the correct configuration or without any rule violations such as use of one hand only, is recorded as a failed attempt.

B) Despite instructing children that whenever they made a mistake they should let the examiner know about it and put the balls back to the initial post and start again, most children did not stop. Rather they would stop, try to think for a little while about the correct configuration, and then carry on thus achieving the correct configuration within the prescribed time limits, but by violating the rules, usually by making more moves. Instead of interrupting the child, the examiner should let the child finish, let him/her know that he/she did a mistake, and remind him/her that whenever he/she realises that

he/she made a mistake he/she can put the balls back. Then the examiner should put the balls back and let the child try again.

C) Some children, after having made a wrong move, were stopping for quite a long time without doing anything. However, time was running out and they were losing points, not because they could not solve the problem, but because they were becoming frustrated, anxious or they were ashamed of admitting that they had made a mistake. The first time that something similar happens the examiner should give a prompt to re-start, like *Shall we go for it again?*. After finishing the item the examiner should remind the child that whenever he/she realises that he/she has made a mistake he/she can put the balls back.

APPENDIX E

Questionnaire

E1. Greek Version



Ερωτηματολόγιο για Γονείς με Παιδιά στις Πρώτες Τάξεις του Δημοτικού Σχολείου

Αγαπητέ γονέα

Το παρόν ερωτηματολόγιο αποτελεί μέρος του ερευνητικού προγράμματος στο οποίο συμμετείχε το παιδί σας. Σκοπός του ερωτηματολογίου είναι η συγκέντρωση πληροφοριών σχετικά με τον τρόπο ενασχόλησης των γονέων στη σχολική και κοινωνική ζωή των παιδιών. Μέχρι τώρα, δεν έχουν υπάρξει παρόμοιες έρευνες στην Ελλάδα. Όλες οι πληροφορίες που θα συγκεντρωθούν θα χρησιμοποιηθούν προκειμένου να βοηθήσουν στην ανάπτυξη εκπαιδευτικών προγραμμάτων τα οποία θα στηρίξουν τους γονείς στην ενασχόλησή τους με την εκπαίδευση των παιδιών τους. Επομένως, θα θέλαμε να ζητήσουμε την εθελοντική σας συνεργασία και λίγα λεπτά από το χρόνο σας για να συμπληρώσετε το παρόν ερωτηματολόγιο. Παρακαλώ, απαντήστε όσο το δυνατό πιο ειλικρινά. Η συμπλήρωση του ερωτηματολογίου είναι ανώνυμη και κανείς δε θα έχει πρόσβαση στις απαντήσεις σας. Η συμβολή σας στην απόκτηση γνώσης σχετικά με τη γονική ενασχόληση είναι πολύτιμη.

Οδηγίες συμπλήρωσης του ερωτηματολογίου

Το ερωτηματολόγιο πρέπει να συμπληρωθεί από την μητέρα ή τον πατέρα του παιδιού. Κανένα άλλο μέλος της οικογένειας δε πρέπει να συμπληρώσει το ερωτηματολόγιο. Παρακαλώ, συμπληρώστε το ερωτηματολόγιο σημειώνοντας ένα ✓ στο κουτί που ταιριάζει καλύτερα στην απάντησή σας. Παρακαλώ απαντήστε σε όλες τις ερωτήσεις ακόμα και αν κάποιες από αυτές σας φανούν αστειές. Μετά τη συμπλήρωση του ερωτηματολογίου, παρακαλώ, σφραγίστε το στον επισυναπτόμενο φάκελο και επιστρέψτε το στο/στη δάσκαλο/α, ο/η οποίος/α δε θα επιτρέπεται να ανοίξει το φάκελο. Σε περίπτωση που χρειάζεστε κάποια βοήθεια στη συμπλήρωση του ερωτηματολογίου, παρακαλώ, μη διστάσετε να τηλεφωνήσετε στα παρακάτω νούμερα: 23910-43016, 6945676167

1) Στην παρακάτω λίστα παρουσιάζονται μερικές δηλώσεις που έχουν γίνει από τους γονείς και για την εκπαίδευση των παιδιών. Παρακαλώ, υποδείξτε αν συμφωνείται ή όχι με κάθε μία από αυτές τις δηλώσεις.

	Διαφωνώ απόλυτα	Διαφωνώ	Δεν ξέρω	Συμφωνώ	Συμφωνώ απόλυτα
α) Το σχολείο του παιδιού μου, έχει κάνει ξεκάθαρο το πόσο θα πρέπει να ασχολούμαι με τη σχολική ζωή του παιδιού μου.	☐	☐	☐	☐	☐
β) Το σχολείο του παιδιού μου, μου δίνει ξεκάθαρες πληροφορίες για το πώς τα πάει το παιδί μου στο σχολείο.	☐	☐	☐	☐	☐
γ) Θα ήθελα να ασχολούμαι περισσότερο με τη σχολική ζωή του παιδιού μου.	☐	☐	☐	☐	☐
δ) Στο σχολείο του παιδιού μου, εάν μιλώ πολύ συχνά στους δασκάλους θα χαρακτηριστώ «μπελάς».	☐	☐	☐	☐	☐

2) Υπάρχουν δύο δηλώσεις που έχουν γίνει από γονείς σχετικά με το ποιανού ευθύνη είναι η εκπαίδευση των παιδιών. Παρακαλώ, υποδείξτε αν συμφωνείται ή όχι με **κάθε μία** από αυτές τις δηλώσεις.

	Διαφωνώ απόλυτα	Διαφωνώ	Δεν ξέρω	Συμφωνώ	Συμφωνώ απόλυτα
α) Η εκπαίδευση των παιδιών είναι ευθύνη των γονέων.	☐	☐	☐	☐	☐
β) Η εκπαίδευση των παιδιών είναι ευθύνη του σχολείου.	☐	☐	☐	☐	☐

3) Από τότε που ξεκίνησε η σχολική χρονιά,

πόσες φορές το παιδί σας συμμετείχε σε σχολικές εκδηλώσεις, όπως αθλητικές εκδηλώσεις, απαγγελία ποιημάτων, θεατρική παράσταση, συναυλία, χορωδία, έκθεση ζωγραφικής ή άλλη εκδήλωση σχετική με τέχνες, χορευτική παράσταση, γιορτή;

Καθόλου	1-2 φορές	3-4 φορές	5 ή περισσότερες φορές	Δεν ξέρω
☐	☐	☐	☐	☐

4) Από τότε που ξεκίνησε η σχολική χρονιά, πόσες φορές οργάνωσε το σχολείο του παιδιού σας δραστηριότητες, όπως αυτές που παρουσιάζονται παρακάτω;

α) Αθλητικές εκδηλώσεις, απαγγελία ποιημάτων, θεατρική παράσταση, συναυλία, χορωδία, έκθεση ζωγραφικής ή άλλη εκδήλωση σχετική με τέχνες, χορευτική παράσταση, γιορτή?	Καθόλου	1-2 φορές	3-4 φορές	5 ή περισσότερες φορές	Δεν ξέρω
☐	☐	☐	☐	☐	☐
β) Συναντήσεις για γονείς.	☐	☐	☐	☐	☐

5) Από τότε που ξεκίνησε η σχολική χρονιά, πόσες φορές εσείς ή ο/η σύντροφός σας ασχοληθήκατε με τις παρακάτω δραστηριότητες;

	Καθόλου	1-2 φορές	3-4 φορές	5 ή περισσότερες φορές	Δεν ξέρω
α) Να παρακολουθήσετε τις συναντήσεις γονέων	☐	☐	☐	☐	☐
β) Να προσφέρετε τη βοήθειά σας στο σχολείο του παιδιού σας, για παράδειγμα, να βοηθήσετε στην οργάνωση σχολικών εκδρομών, στην προετοιμασία σχολικών εορτών, να βοηθήσετε στην θεατρική ή χορευτική ομάδα του σχολείου κ.τ.λ.	☐	☐	☐	☐	☐
γ) Να προσφέρετε τη βοήθειά σας στο/στη δάσκαλο/α του παιδιού σας.	☐	☐	☐	☐	☐
δ) Να παρακολουθήσετε σχολικές εκδηλώσεις όπως, αθλητικές εκδηλώσεις, απαγγελία ποιημάτων, θεατρική παράσταση, συναυλία, χορωδία, έκθεση ζωγραφικής ή άλλη εκδήλωση σχετική με τέχνες, χορευτική παράσταση, γιορτή.	☐	☐	☐	☐	☐

6) Από τότε που ξεκίνησε η σχολική χρονιά, πόσες φορές ζήτησε ο/η δάσκαλος από εσάς ή από τον/την σύντροφό σας να σας μιλήσει για τα παρακάτω θέματα;

	Καθόλου	1-2 φορές	3-4 φορές	5 ή περισσότερες φορές	Δεν ξέρω
α) Για το πως τα πάει τα παιδί σας στα μαθήματα	☐	☐	☐	☐	☐
β) Για τη συμπεριφορά του παιδιού σας στο σχολείο	☐	☐	☐	☐	☐

7) Από τότε που ξεκίνησε η σχολική χρονιά, πόσες φορές εσείς ή ο/η σύντροφός σας ζητήσατε να μιλήσετε στο/στη δάσκαλο/α του παιδιού σας για τα παρακάτω θέματα;

	Καθόλου	1-2 φορές	3-4 φορές	5 ή περισσότερες φορές	Δεν ξέρω
α) Πως τα πάει τα παιδί σας στα μαθήματα.	☐	☐	☐	☐	☐
β) Για τη συμπεριφορά του παιδιού σας στο σχολείο	☐	☐	☐	☐	☐

8) Σας παρέχει το σχολείο του παιδιού σας πληροφορίες για το πώς να βοηθάτε το παιδί σας με τα μαθήματά του;

Όχι	Ναι	Δεν ξέρω
☐	☐	☐

9) Θα λέγατε ότι είστε ικανοποιημένος/η με τις πληροφορίες που παρέχονται;

Εξαιρετικά ανικανοποίητος/η	Ανικανοποίητος/η	Δεν ξέρω	Ικανοποιημένος/η	Εξαιρετικά ικανοποιημένος/η
☐	☐	☐	☐	☐

10) Πόσο συχνά το παιδί σας έχει μαθήματά για την επόμενη μέρα;

Καθόλου	1-2 φορές την εβδομάδα	3-4 φορές την εβδομάδα	5 ή περισσότερες φορές την εβδομάδα	Δεν ξέρω
☐	☐	☐	☐	☐

11) Πόσες φορές την περασμένη εβδομάδα εσείς ή ο/η σύντροφός σας βοηθήσατε το παιδί σας με τα μαθήματά του;

Καθόλου	1-2 φορές	3-4 φορές	5 ή περισσότερες φορές	Δεν ξέρω
☐	☐	☐	☐	☐

12) Γενικά, σας δυσκολεύει το παιδί σας για να κάνει το καθημερινό διάβασμα;

Καθόλου	Όχι πολύ	Αρκετά	Πολύ	Εξαιρετικά
☐	☐	☐	☐	☐

13) Πόσο σίγουρος/η νιώθετε στο να βοηθήσετε το παιδί σας με τα μαθήματά του;

Καθόλου σίγουρος/η	Όχι πολύ σίγουρος/η	Αρκετά σίγουρος/η	Πολύ σίγουρος/η	Εξαιρετικά σίγουρος/η
☐	☐	☐	☐	☐

14) Πόσες φορές εσείς ή ο/η σύντροφός σας ασχολείστε με τις παρακάτω δραστηριότητες;

	Καθόλου	1-2 φορές	3-4 φορές	5 ή περισσότερες φορές	Δεν ξέρω
α) Πόσες φορές τον <u>περασμένο μήνα</u> διαβάσατε βιβλία στο παιδί σας;	☐	☐	☐	☐	☐
β) Πόσες φορές την <u>περασμένη εβδομάδα</u> βοηθήσατε το παιδί σας στο μάθημα της ανάγνωσης;	☐	☐	☐	☐	☐
γ) Πόσες φορές την <u>περασμένη εβδομάδα</u> ελέγξατε εάν το παιδί σας μπορεί να διαβάσει το μάθημα της ανάγνωσης;	☐	☐	☐	☐	☐

15) Πόσες φορές εσείς ή ο/η σύντροφός σας κάνατε κάποια από τις παρακάτω δραστηριότητες με το παιδί σας;

	Καθόλου	1-2 φορές	3-4 φορές	5 ή περισσότερες φορές	Δεν ξέρω
Πόσες φορές την <u>περασμένη εβδομάδα</u>					
α) Είπατε μια ιστορία στο παιδί σας;	☐	☐	☐	☐	☐
β) Αναμίξατε το παιδί σας σε δουλειές του νοικοκυριού, όπως καθάρισμα, τακτοποίηση;	☐	☐	☐	☐	☐
γ) Πήρατε το παιδί σας μαζί σε δουλειές όπως, να πάτε στο σούπερ-μάρκετ, στην αγορά, στην τράπεζα;	☐	☐	☐	☐	☐

	Καθόλου	1-2 φορές	3-4 φορές	5 ή περισσότερες φορές	Δεν ξέρω
Πόσες φορές τον <u>περασμένο μήνα</u>					
α) Επισκέφτηκε το παιδί σας κάποιος φίλος του στο σπίτι;	☐	☐	☐	☐	☐
β) Παίξατε με το παιδί σας κάποιο παιχνίδι ή σπορ;	☐	☐	☐	☐	☐
γ) Κάνατε με το παιδί σας μια χειροτεχνία, μια κατασκευή, ένα παζλ, μια ζωγραφιά ή άλλες σχετικές με τέχνη δραστηριότητες;	☐	☐	☐	☐	☐
δ) Μάθατε στο παιδί σας μουσική ή τραγούδια;	☐	☐	☐	☐	☐
ε) Αναμίξατε, το παιδί σας σε δουλειές όπως χτίσιμο, βάψιμο, να βοηθήσει στον κήπο, να βοηθήσει να φτιαχτεί κάτι;	☐	☐	☐	☐	☐

	Καθόλου	1-2 φορές	3-4 φορές	5 ή περισσότερες φορές	Δεν ξέρω
Πόσες φορές τους <u>περασμένους 3 μήνες</u>					
α) Πήγατε με το παιδί σας σε ένα θεατρικό έργο, σε συναυλία, στο σινεμά, ή σε κάποια τοπική εκδήλωση, όπως χορευτική παράσταση, πανηγύρι, τοπική γιορτή;	☐	☐	☐	☐	☐
β) Επισκεφτήκατε με το παιδί σας ένα μουσείο, ένα αρχαιολογικό χώρο, μια έκθεση τέχνης;	☐	☐	☐	☐	☐
γ) Πήγατε μαζί μια μονοήμερη ή διήμερη εκδρομή;	☐	☐	☐	☐	☐
δ) Επισκεφτήκατε ή δεχτήκατε στο σπίτι τους φίλους σας μαζί με το παιδί σας για καφέ ή φαγητό;	☐	☐	☐	☐	☐

16) Υπάρχουν άλλες δραστηριότητες που κάνετε εσείς ή ο/η σύντροφος σας μαζί με το παιδί σας και που δεν έχουν αναφερθεί στην παραπάνω λίστα; Αν ναι, παρακαλώ, γράψτε ποιες είναι οι δραστηριότητες αυτές και πόσες φορές εσείς ή ο/η σύντροφός σας τις κάνετε μαζί με το παιδί σας την περασμένη εβδομάδα, μήνα, ή τους περασμένους 3 μήνες. Αν δεν κάνετε άλλες δραστηριότητες εκτός από αυτές που παρουσιάστηκαν στην παραπάνω λίστα, απλά γράψτε Όχι.

α) Περσμένη Εβδομάδα

.....

β) Περσμένο Μήνα

.....

γ) Περσμένοι 3 Μήνες

.....

17) Είστε του παιδιού α) η μητέρα ☐ β) ο πατέρας ☐

18) Παρακαλώ, περιγράψτε όσο πιο προσεκτικά μπορείτε το επάγγελμά σας

.....

19) Είστε ελεύθερος/η; Ναι ☐ Όχι ☐

20) Παρακαλώ, περιγράψτε όσο πιο προσεκτικά μπορείτε το επάγγελμα του συντρόφου σας

.....

21) Παρακαλώ, υποδείξτε την εκπαίδευσή σας.

Δημοτικό ☐	Γυμνάσιο ☐	Λύκειο ☐	Τ.Ε.Λ. ☐	Τ.Ε.Σ. ☐	Τ.Ε.Ε. ☐	Ι.Ε.Κ ☐	Τ.Ε.Ι ☐
Α.Ε.Ι ☐	Άλλο						

22) Παρακαλώ, υποδείξτε την εκπαίδευση του/της συντρόφου σας.

Δημοτικό ☐	Γυμνάσιο ☐	Λύκειο ☐	Τ.Ε.Λ. ☐	Τ.Ε.Σ. ☐	Τ.Ε.Ε. ☐	Ι.Ε.Κ ☐	Τ.Ε.Ι ☐
Α.Ε.Ι ☐	Άλλο						

Παρακαλώ, σιγουρέψτε ότι απαντήσατε σε όλες τις ερωτήσεις

Ευχαριστούμε πολύ για τη συνεργασία σας!

E2. English Version



Questionnaire For Parents With Children At the Elementary School

Dear parent

The present questionnaire is part of the research project that your child has participated in. The main aim of this questionnaire is to acquire knowledge around the area of parental involvement, since, so far, there haven't been such studies in Greece. All the information gathered will be used as a means of helping in the development of educational programmes that will support parents in their involvement in their children's education. Therefore, we would like to ask for your voluntary cooperation and just for a few minutes from your time to fill in this questionnaire. Please, answer as honestly as possible. The completion of the questionnaire is anonymous and no one will have access to your answers. Your contribution to the acquisition of knowledge regarding parental involvement is precious.

Instructions

The questionnaire should be completed by either the child's mother or father. No other member of the family should complete this questionnaire. Please, complete the questionnaire by marking a ✓ to the box that best fits to your answer or by writing on the dotted lines. After completing the questionnaire, please, seal it in the attached envelop and return it to the researcher or to the teacher. In case you need any help completing the questionnaire, please, don't hesitate to call to the following number: 23910-43016, 6945676167

1) In the following list there are a few statements presented about parents and children's education. Please, indicate whether you agree or not with **each** of these statements.

	Definitely disagree	Disagree	I don't know	Agree	Definitely agree
a) My child's school has made clear of how much I should be involved in my child's school life	☐	☐	☐	☐	☐
b) My child's school gives me clear information on how my child is getting on at school	☐	☐	☐	☐	☐
c) I would like to be more involved in my child's school life	☐	☐	☐	☐	☐
d) If I talk too often to teachers at my child's school, I will be labeled as a trouble maker	☐	☐	☐	☐	☐

2) There are two statements made by parents about whose responsibility is children's education. Please, indicate whether you agree or not with **each** of these statements.

	Definitely disagree	Disagree	I don't know	Agree	Definitely agree
a) Children's education is the parent's responsibility	☐	☐	☐	☐	☐
b) Children's education is the school's responsibility	☐	☐	☐	☐	☐

3) **Since the school year started**, how many times has your child participated in any school activities, for instance sports exhibition, poem recitation, theatrical play, school-choir, concert, painting or other art-relevant exhibition, dance performance, festivity?

Not at all	1-2 times	3-4 times	5 or more times	I don't know
☐	☐	☐	☐	☐

4) **Since the school year started**, how many times did your child's school organise any of the activities presented below?

	Not at all	1-2 times	3-4 times	5 or more times	I don't know
a) Sports exhibition, poem recitation, theatrical play, choir, concert, painting or other art-relevant exhibition, dance performance, festivity	☐	☐	☐	☐	☐
b) Meetings for parents	☐	☐	☐	☐	☐

5) **Since the school year started**, how many times did you or your partner get involved in the following activities?

	Not at all	1-2 times	3-4 times	5 or more times	I don't know
a) Attend the parents' meetings	☐	☐	☐	☐	☐
b) Offer your help at your child's school, for instance, help in the organisation of school-trips, in the preparation of school festivities, help the school's theatrical team, etc.	☐	☐	☐	☐	☐
c) Offer your help to the teacher	☐	☐	☐	☐	☐
d) Attend a school event like sports exhibition, poem recitation, theatrical play, school-choir, concert, painting or other art-relevant exhibition, dance performance, festivity	☐	☐	☐	☐	☐

6) **Since the school year started**, how many times did you or your partner talk to your child's teacher about the following issues.

	Not at all	1-2 times	3-4 times	5 or more times	I don't know
a) How your child is doing at the school's lessons	☐	☐	☐	☐	☐
b) About your child's behaviour at school	☐	☐	☐	☐	☐

7) Since the school year started, how many times did the teacher asked to talk to you or to your partner about the following issues?

	Not at all	1-2 times	3-4 times	5 or more times	I don't know
a) How your child is doing at the school's lessons	☐	☐	☐	☐	☐
b) About your child's behaviour at school	☐	☐	☐	☐	☐

8) Does your child's school provide you with any information about how to help your child with his/her homework?

No	Yes	I don't know
☐	☐	☐

9) Would you say that you are satisfied with the information provided?

Extremely dissatisfied	Dissatisfied	I don't know	Satisfied	Extremely satisfied
☐	☐	☐	☐	☐

10) How often does your child get homework?

Not at All	1-2 times a week	3-4 times a week	5 or more times a week	I don't know
☐	☐	☐	☐	☐

11) How many times in the past week did you or your partner help your child with his/her homework?

Not at all	1-2 times	3-4 times	5 times or more	I don't know
☐	☐	☐	☐	☐

12) Generally, does your child give you a hard time with doing his/her daily homework?

Not at all	Not very much	Pretty much	Very much	Extremely much
☐	☐	☐	☐	☐

13) How confident do you feel helping your child with his/her homework?

Not at all confident	Not very confident	Fairly Confident	Very confident	Extremely confident
☐	☐	☐	☐	☐

14) How many times did you or your partner get involved in the following activities?

	Not at all	1-2 times	3-4 times	5 or more times	I don't know
a) How many times in the <u>past month</u> did you read books to your child?	☐	☐	☐	☐	☐
b) How many times in the <u>past week</u> did you help your child with the reading lesson?	☐	☐	☐	☐	☐
c) How many times in the <u>past week</u> did you check if your child can read the reading lesson?	☐	☐	☐	☐	☐

15) How many times did you or your partner do any the following activities with your child?

	Not at all	1-2 times	3-4 times	5 or more times	I don't know
How many times in the past week did you:					
a) Tell a story to your child?	☐	☐	☐	☐	☐
b) Involve your child in household cores like cleaning, tiding up?	☐	☐	☐	☐	☐
c) Took your child along while doing errands like going to the supermarket, the bank, to the market?	☐	☐	☐	☐	☐

How many times in the **past month** did you:

a) Have a friend of your child to visit?	☐	☐	☐	☐	☐
b) Play with your child a game or a sport?	☐	☐	☐	☐	☐
c) Make with your child a craft, a construction, a puzzle, a painting, or other relevant activities?	☐	☐	☐	☐	☐
d) Teach your child music or songs?	☐	☐	☐	☐	☐
e) Involve your child in chores like fixing something, building, painting, helping in the garden?	☐	☐	☐	☐	☐

How many times in the **past 3 months** did you:

a) Go with your child to a play, concert, cinema, or a local event like dance performance, funfair, local festivity?	☐	☐	☐	☐	☐
b) Visit with your child a museum, a historical site, an arts exhibition?	☐	☐	☐	☐	☐
c) Go together on a 1 or two 2 day excursion?	☐	☐	☐	☐	☐
d) Visit your friends with your child for coffee or dinner?	☐	☐	☐	☐	☐

16) Are there any other activities that you or your partner do with your child, but we didn't mention them?

If yes, please write what these activities are and how many times did you or your partner do them in the last week, month, or in the last 3 months. **If you didn't do any other activities than those presented in the previous list, just write No.**

a) Last Week

.....

.....

.....

b) Last Month

.....

.....

.....

c) Last 3 months

.....

.....

.....

17) Are you the child's a) mother ☐ b) father ☐

18) Please, describe as carefully as possible your profession

.....
.....

19) Are you single? Yes ☐ No ☐

20) Please, describe as carefully as possible your partner's profession

.....
.....

21) Please, indicate your education

Elementary ☐	Gymnasium ☐	Lyceum ☐	T.E.L ☐	T.E.S ☐	T.E.E ☐	I.E.K ☐
T.E.I ☐	University ☐	Other.....				

22) Please, indicate your partner's education

Elementary ☐	Gymnasium ☐	Lyceum ☐	T.E.L ☐	T.E.S ☐	T.E.E ☐	I.E.K ☐
T.E.I ☐	University ☐	Other.....				

Please make sure that you have answered all the questions

Thank you very much for your cooperation!

APPENDIX F

Telephone Interview

F1. Greek Version

1.	Πήγατε καθόλου στο σχολείο σήμερα;	NAI	OXI	
2.	Μήπως έτυχε να ρωτήσετε τον δάσκαλο πώς τα πήγε το παιδί στα μαθήματα, πως ήταν η συμπεριφορά του στο σχολείο κ.τ.λ.;	NAI	OXI	
3.	Έχει το παιδί μαθήματα για αύριο;	NAI	OXI	ΔΕΝ ΕΙΜΑΙ ΣΙΓΟΥΡΟΣ/Η
4.	Τα έχει κάνει;	NAI	OXI	ΔΕΝ ΕΙΜΑΙ ΣΙΓΟΥΡΟΣ/Η
5.	Έλεγξε κανείς αν τα έχει κάνει;	NAI	OXI	ΔΕΝ ΕΙΜΑΙ ΣΙΓΟΥΡΟΣ/Η
6.	Το βοήθησε κανείς;	NAI	OXI	ΔΕΝ ΕΙΜΑΙ ΣΙΓΟΥΡΟΣ/Η
7.	Έχει το παιδί ανάγνωση για αύριο;	NAI	OXI	ΔΕΝ ΕΙΜΑΙ ΣΙΓΟΥΡΟΣ/Η
8.	Την έχει τελειώσει;	NAI	OXI	ΔΕΝ ΕΙΜΑΙ ΣΙΓΟΥΡΟΣ/Η
9.	Έλεγξε κανείς αν την έχει τελειώσει;	NAI	OXI	ΔΕΝ ΕΙΜΑΙ ΣΙΓΟΥΡΟΣ/Η
10.	Το βοήθησε κανείς;	NAI	OXI	ΔΕΝ ΕΙΜΑΙ ΣΙΓΟΥΡΟΣ/Η
11.	Μήπως έτυχε εχθές να διαβάσατε κάποιο βιβλίο στο παιδί σας;	NAI	OXI	ΔΕ ΘΥΜΑΜΑΙ
12.	Μήπως έτυχε να αναμείξετε το παιδί σε κάποια δουλειά όπως νοικοκυριό, ψώνια ή κάτι άλλο ;	NAI	OXI	ΔΕ ΘΥΜΑΜΑΙ
13.	Μήπως έτυχε να κάνετε κάτι άλλο μαζί όπως να παίζετε, να ζωγραφίζετε, να πάτε κάπου μαζί;	NAI	OXI	ΔΕ ΘΥΜΑΜΑΙ
14.	Σκοπεύετε να κάνετε κάτι μαζί αύριο;	NAI	OXI	ΔΕΝ ΕΙΜΑΙ ΣΙΓΟΥΡΟΣ/Η

F2. English Version

1.	Did you go to the school today?	YES	NO
.....			
2.	Did you happen to ask the teacher about your child's behaviour or about how did he/she do with the lessons?	YES	NO
.....			
.....			
3.	Does your child have homework to do for tomorrow?	YES	NO I'M NOT SURE
.....			
4.	Has the child finished his/her homework?	YES	NO I'M NOT SURE
.....			
5.	Has anyone checked if the child finished his/her homework?	YES	NO I'M NOT SURE
.....			
6.	Has anyone helped him/her?	YES	NO I'M NOT SURE
.....			
.....			
7.	Does your child have reading homework to do for tomorrow?	YES	NO I'M NOT SURE
.....			
8.	Has the child finished his/her reading homework?	YES	NO I'M NOT SURE
.....			
9.	Has anyone checked if the child finished his/her reading homework?	YES	NO I'M NOT SURE
.....			
10.	Has anyone helped him/her?	YES	NO I'M NOT SURE
.....			
.....			
11.	Did you happen to read any book to your child yesterday?	YES	NO I'M NOT SURE
.....			
12.	Did you involve your child to any chores like household, shopping or anything else?	YES	NO I'M NOT SURE
.....			
13.	Did you do anything else with your child like play a game, paint, go out together?	YES	NO I'M NOT SURE
.....			
14.	Are you planning to do anything with your child tomorrow?	YES	NO I'M NOT SURE
.....			
.....			

APPENDIX G

Box-Plots

Figure 1. *Box-plots of the Groups' Mean Performance in the Conners' TRS-28 Hyperactivity Measure*

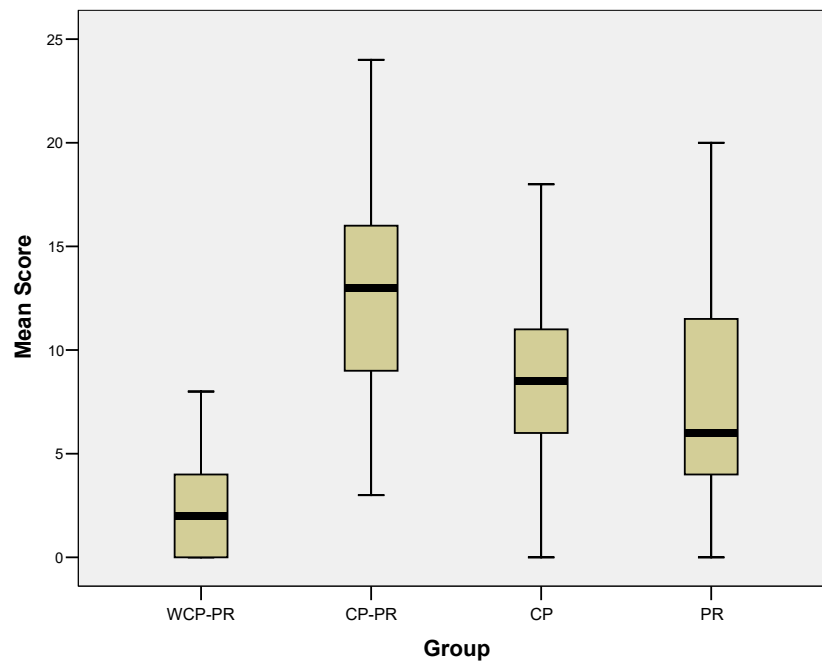


Figure 2. *Box-plots of the Groups' Mean Performance in the Conners' TRS-28 Inattentive-Passive Measure*

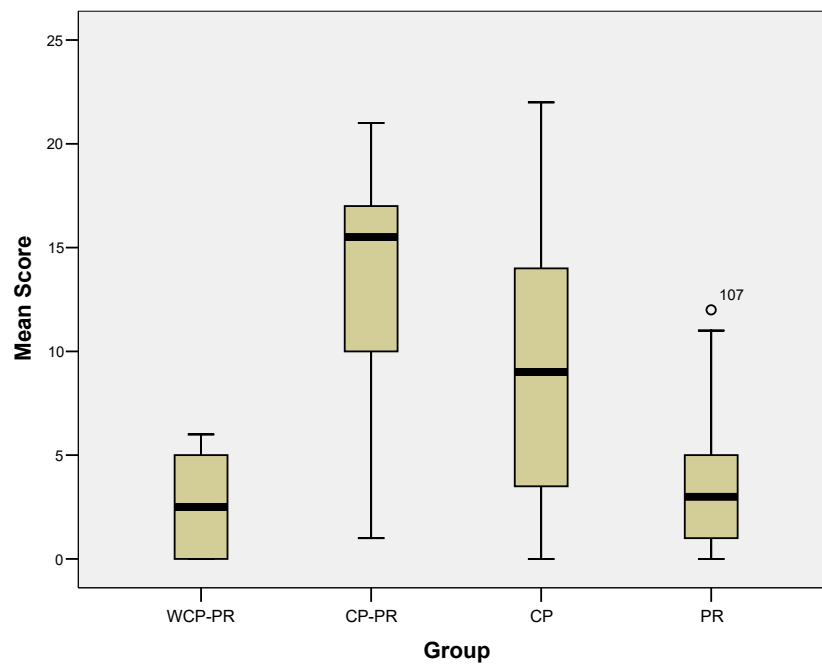


Figure 3. *Box-plots of the Groups' Mean Performance in the Test of Reading Ability Detection*

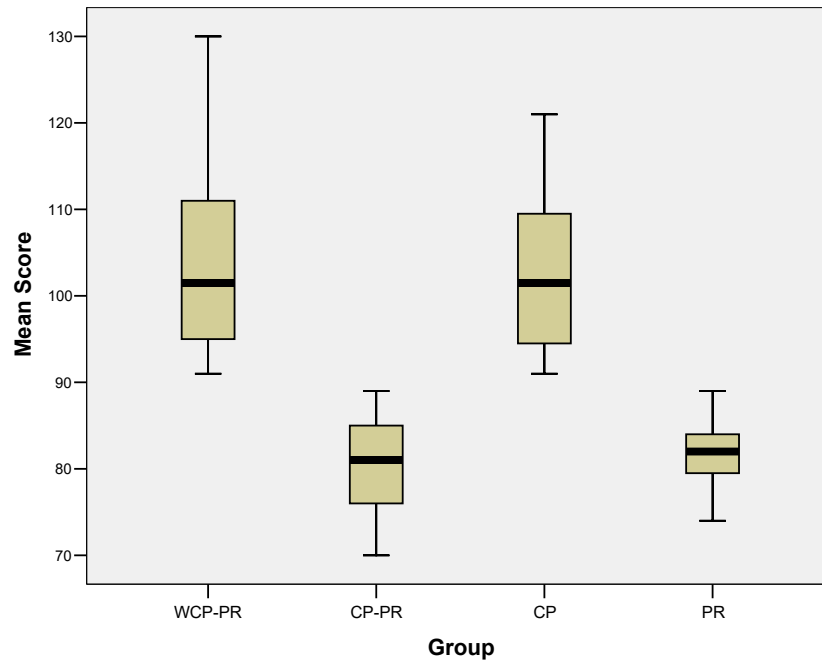


Figure 4a-4g. *Box- plots of the Groups' Mean Score in the Conners' CPT-II Measures*

Figure 4a

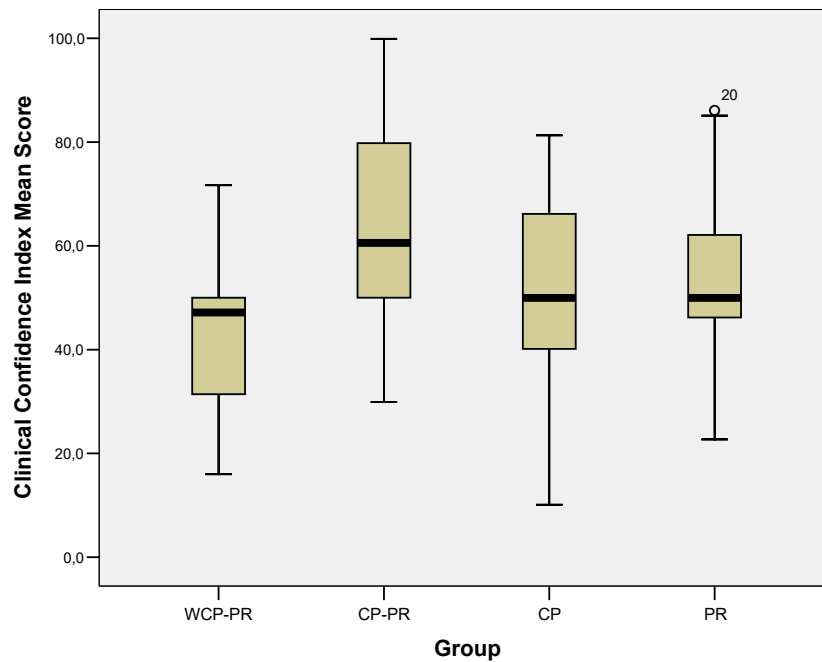


Figure 4b

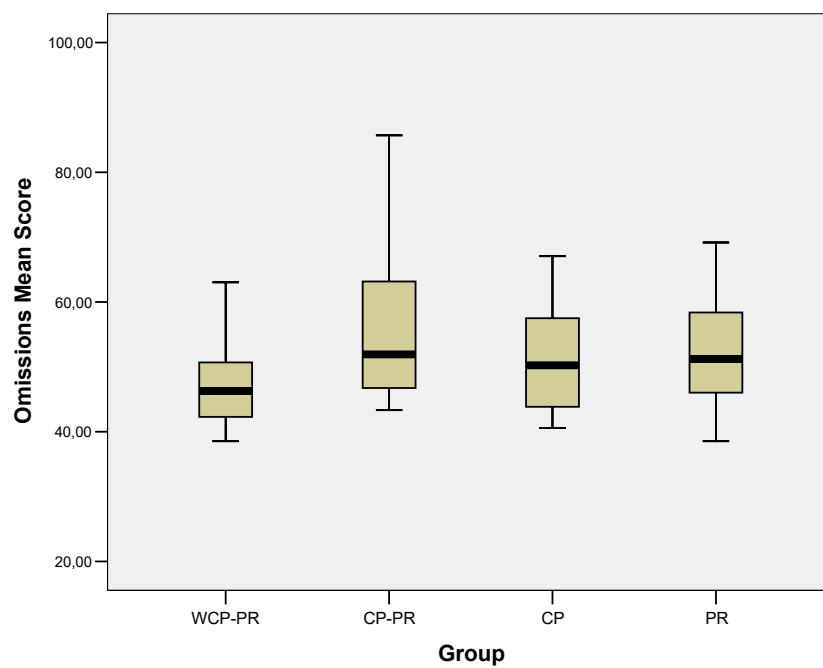


Figure 4c

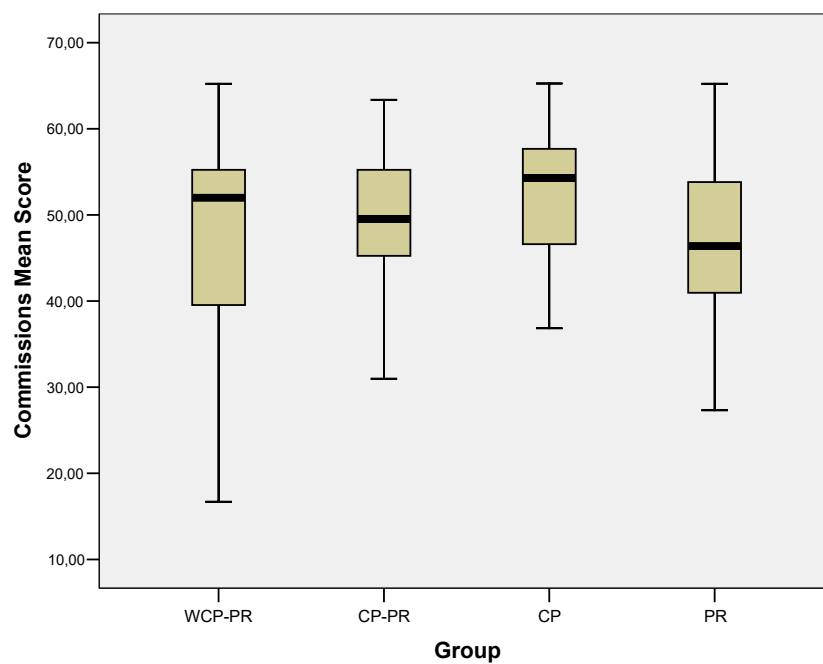


Figure 4d

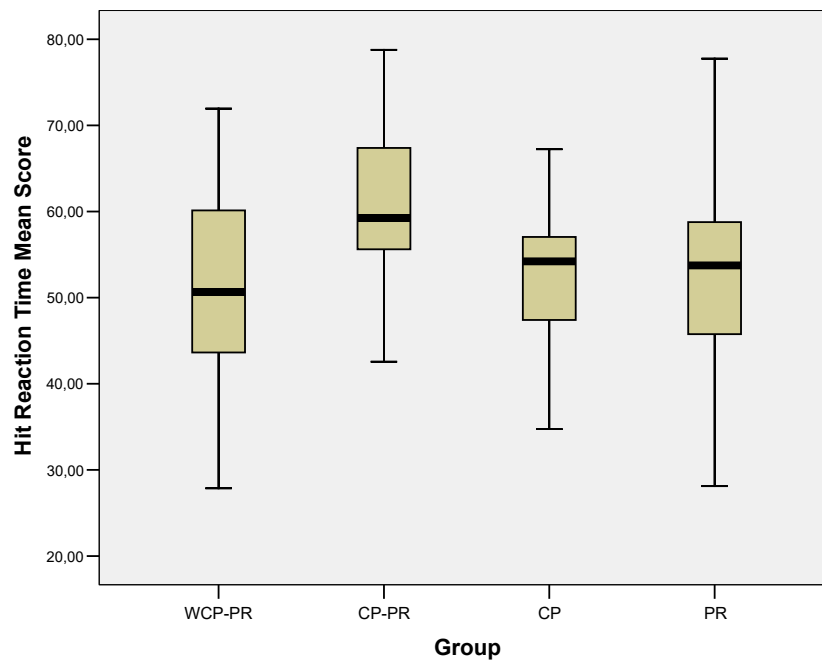


Figure 4e

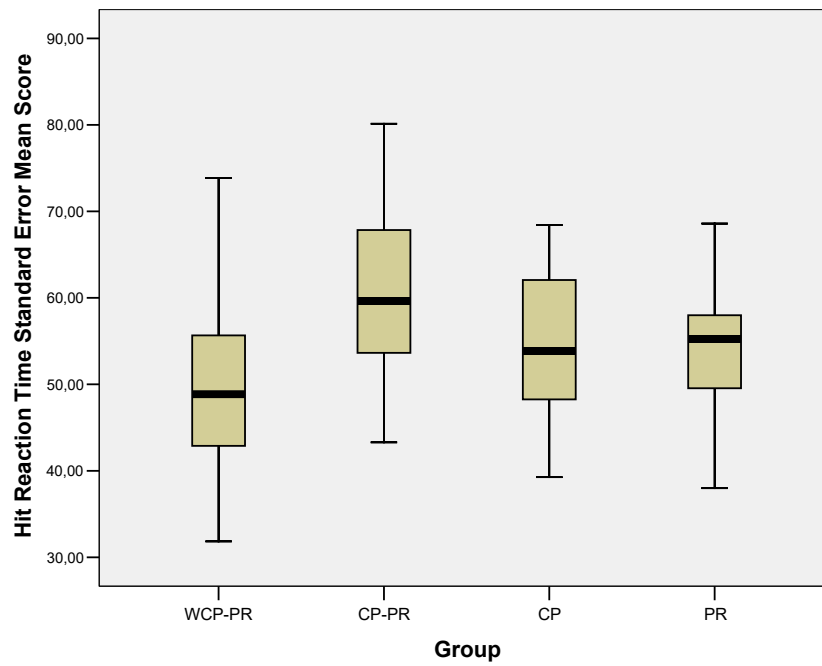


Figure 4f

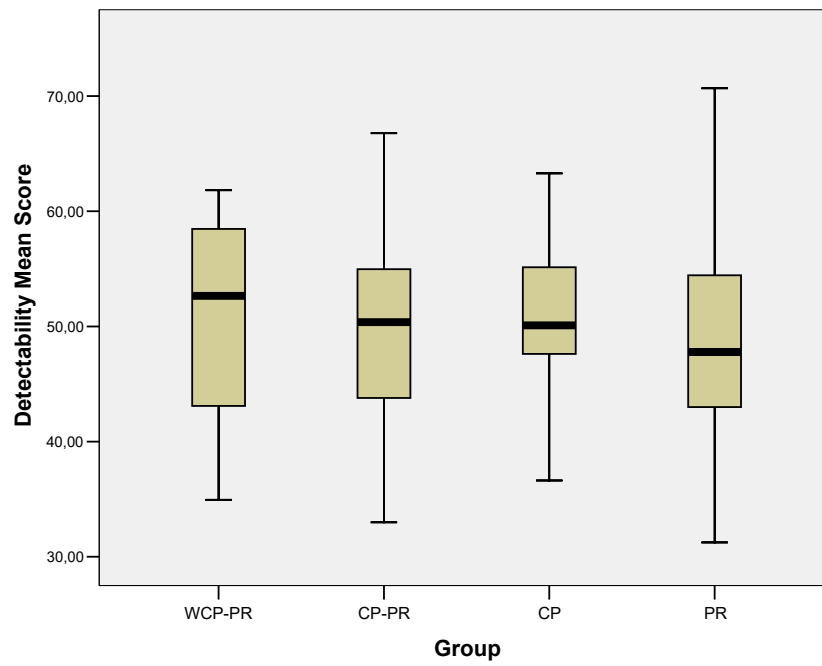


Figure 4g

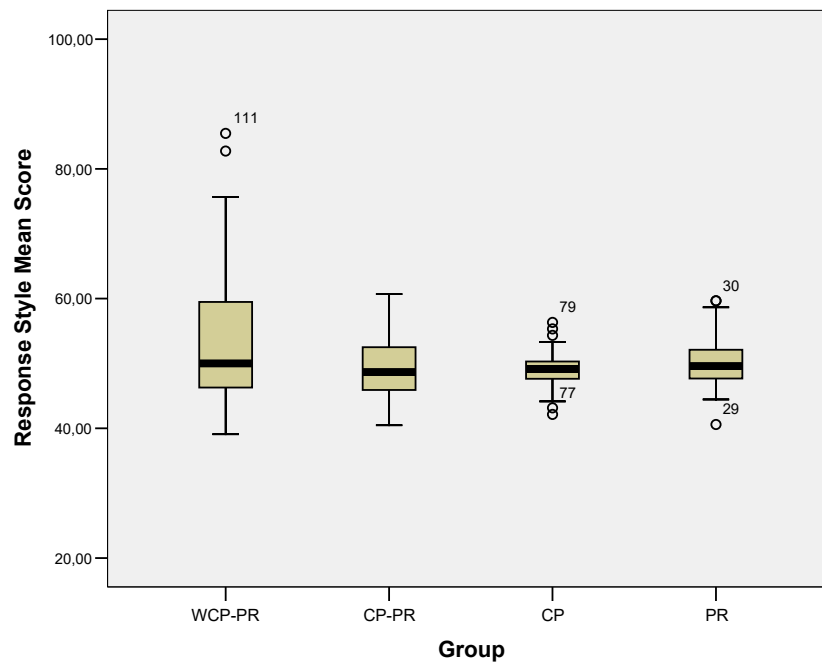


Figure 5a-5e. *Box-plots of the Groups' Mean Performance in WISC-III Verbal Measures*

Figure 5a

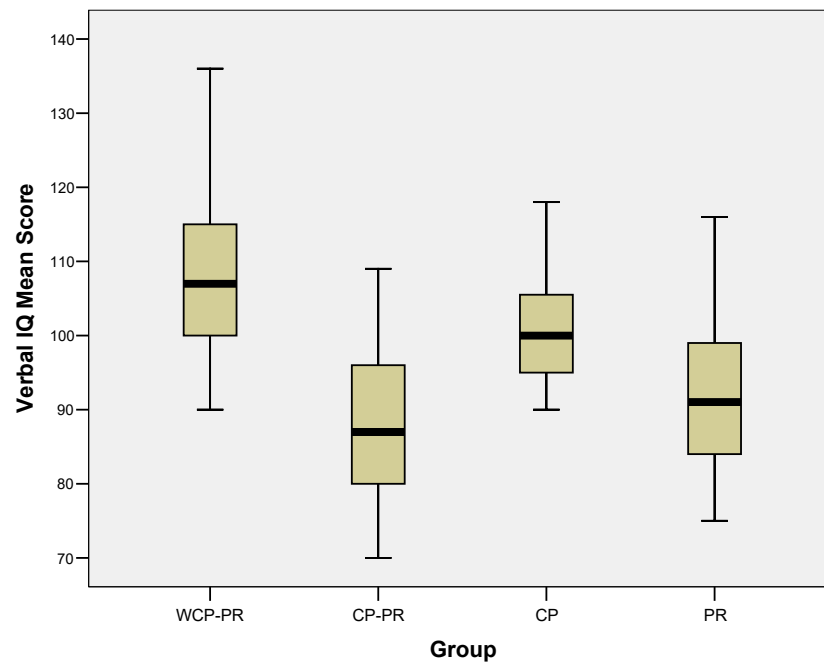


Figure 5b

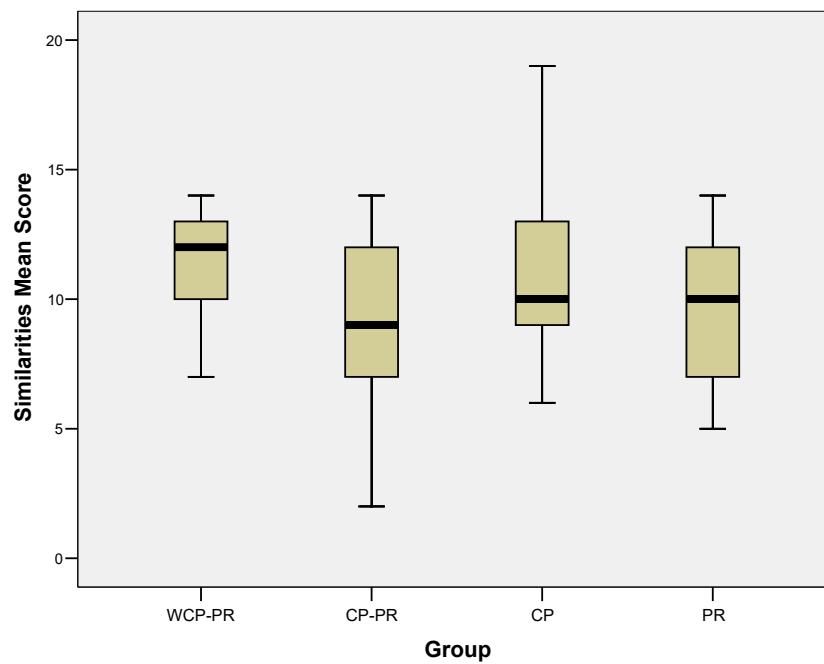


Figure 5c

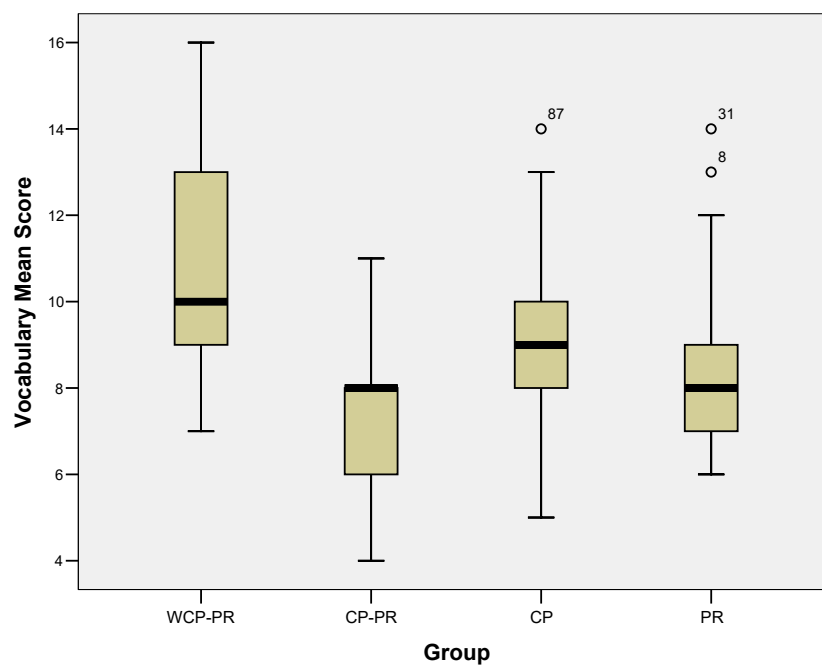


Figure 5d

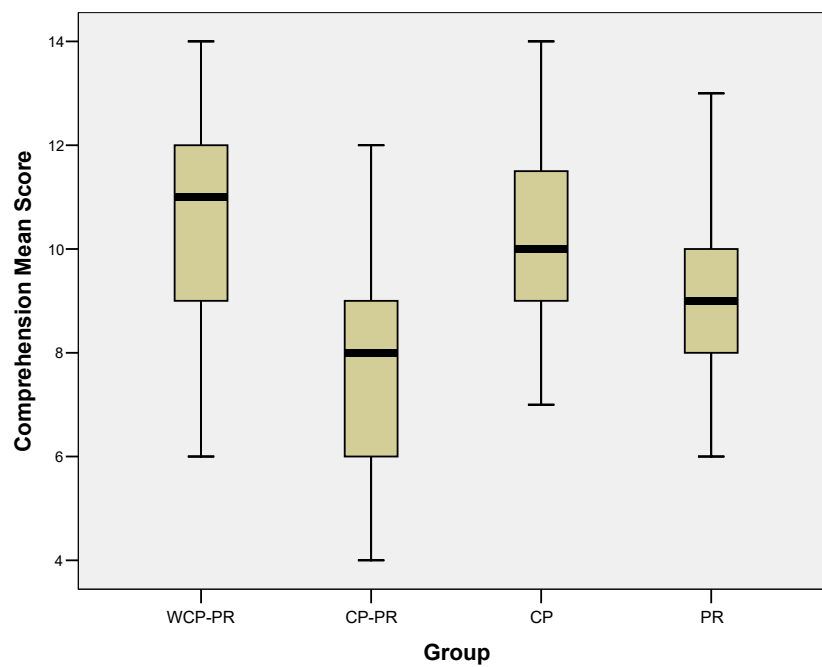


Figure 5e

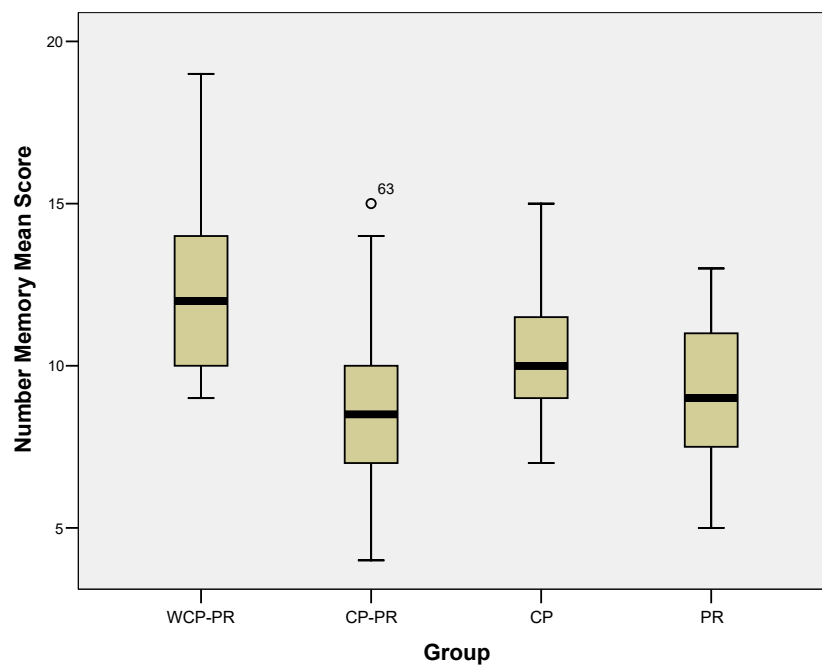


Figure 6. *Box-plots of the Groups' Mean Score in the Phonological Awareness Measures*

Figure 6a

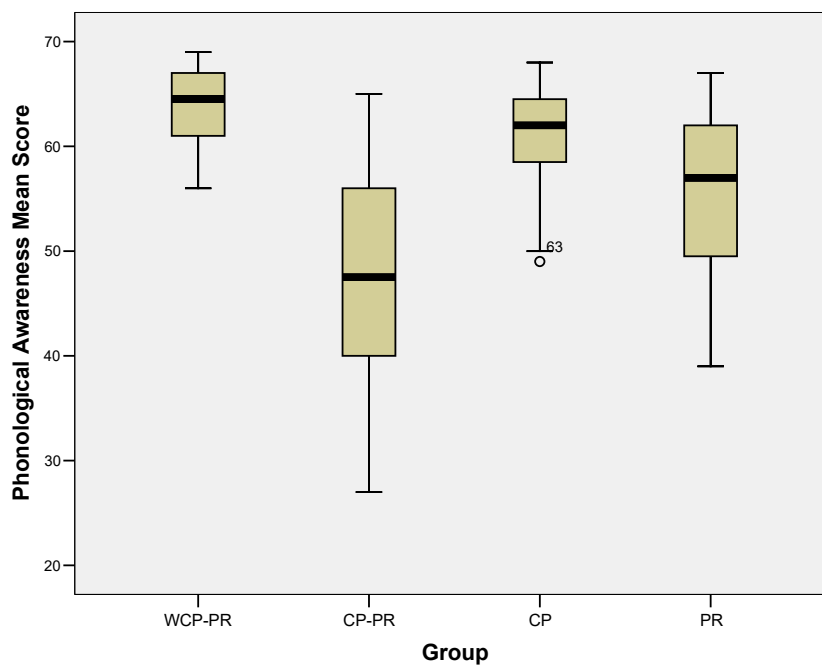


Figure 6b

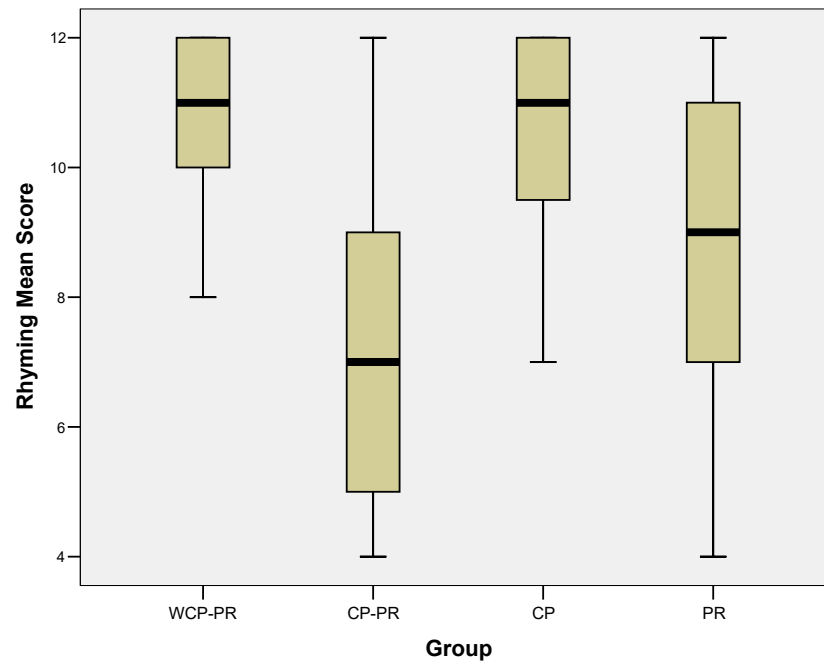


Figure 6c

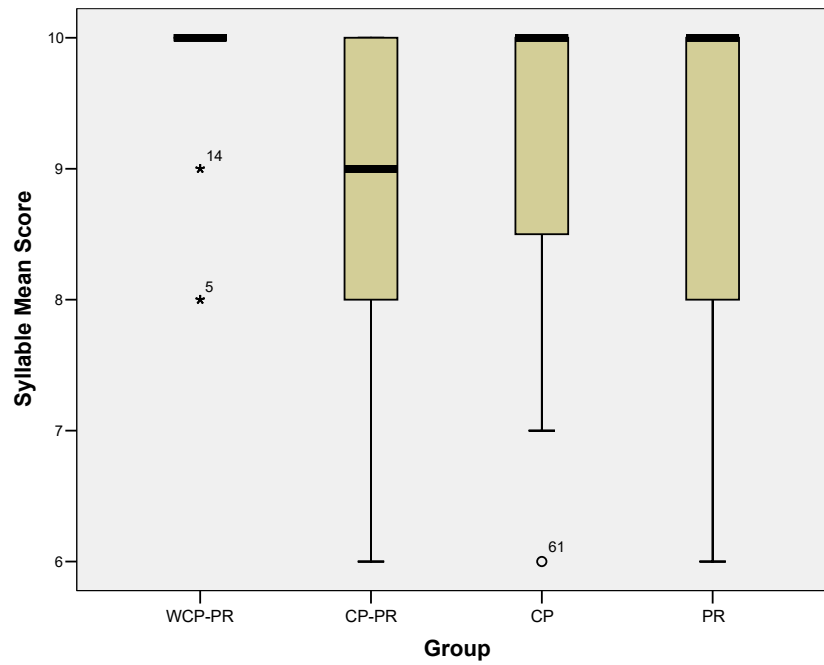


Figure 6d

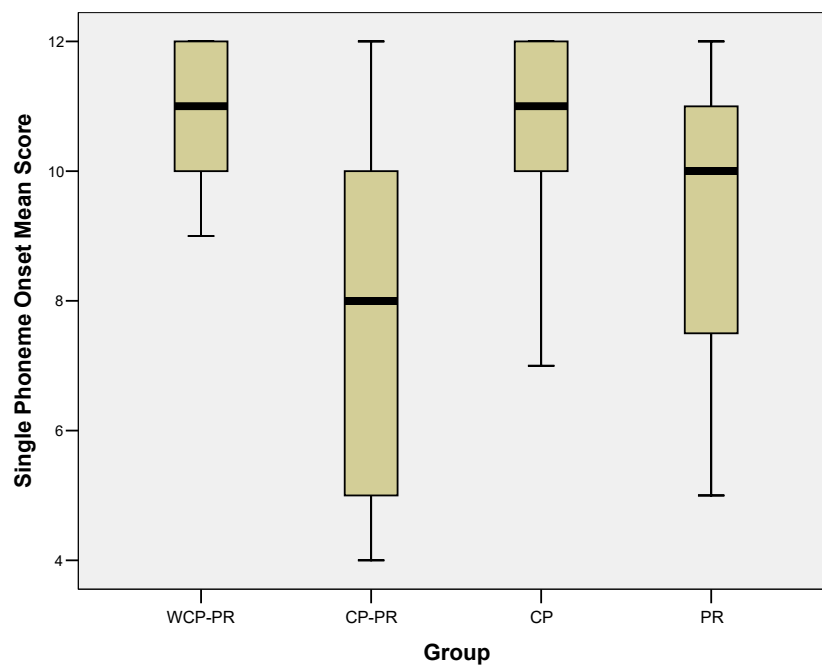


Figure 6e

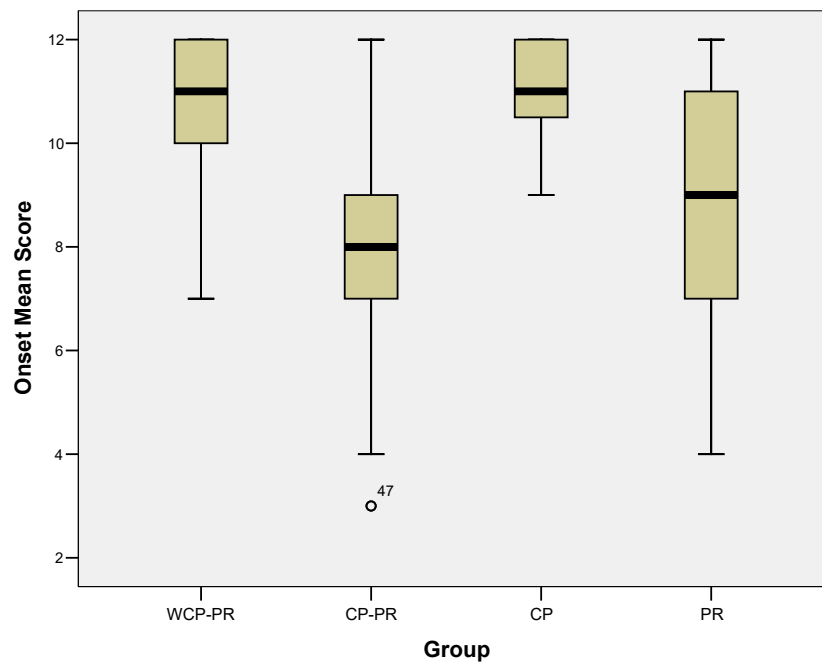


Figure 6f

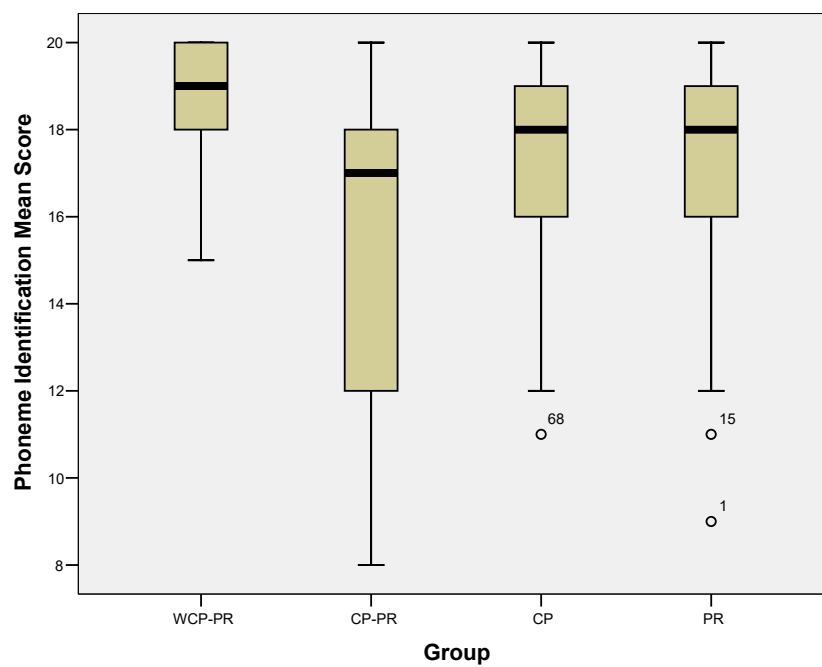


Figure 6g

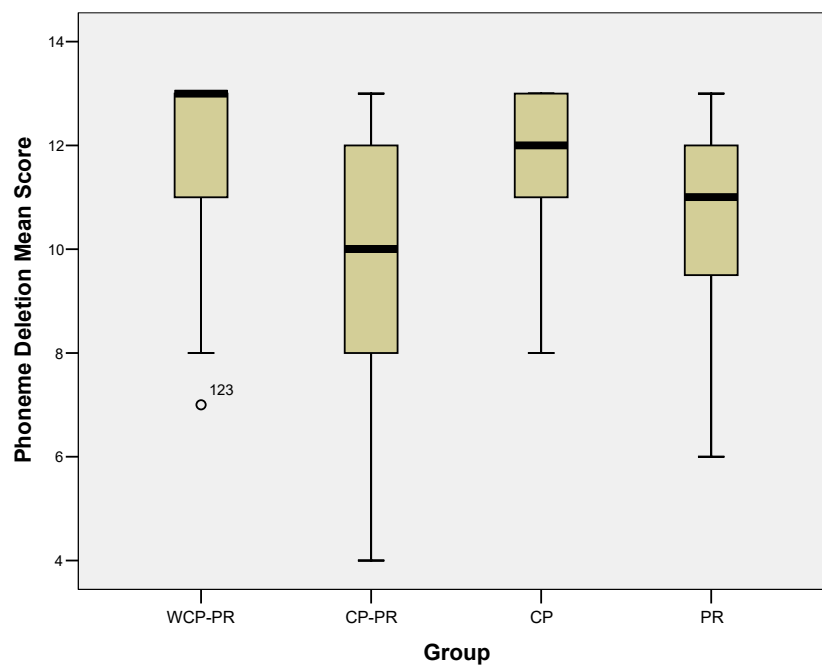


Figure 7a-7c. *Box-plots of the Groups' Mean Score in the TOL Measures*

Figure 7a

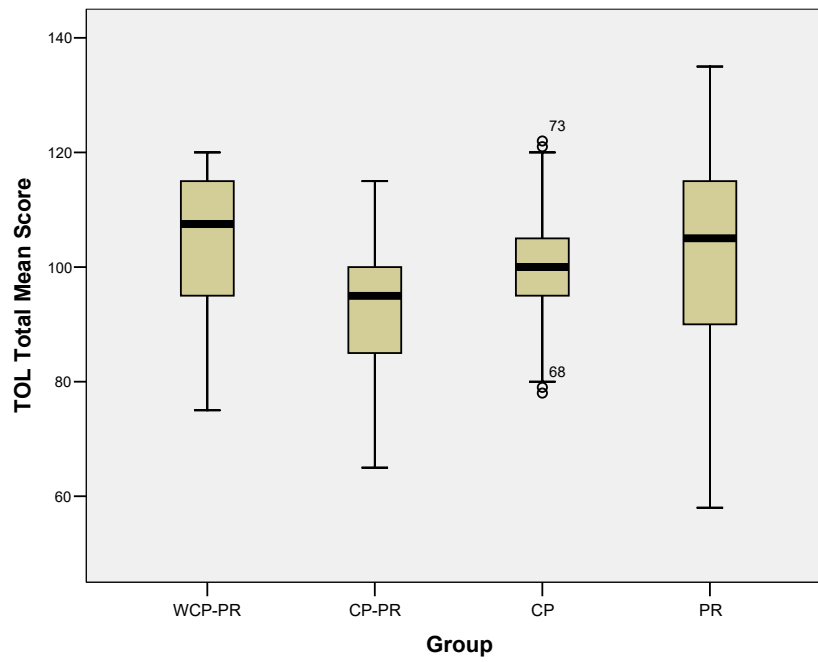


Figure 7b

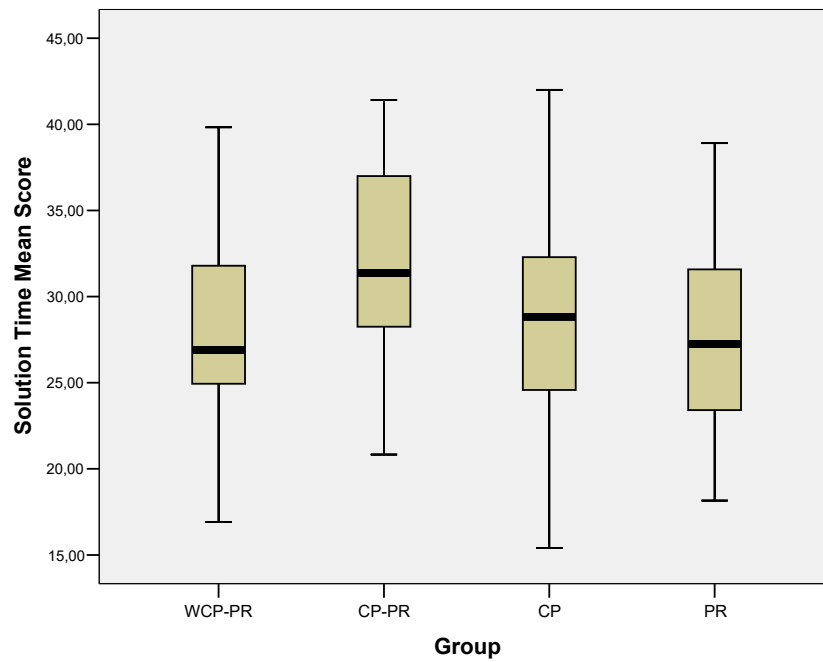


Figure 7c

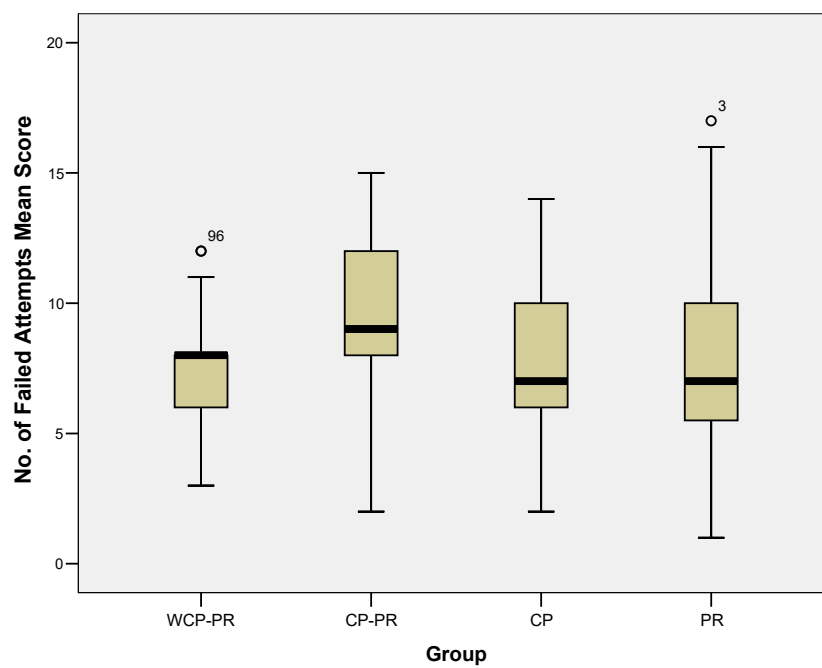
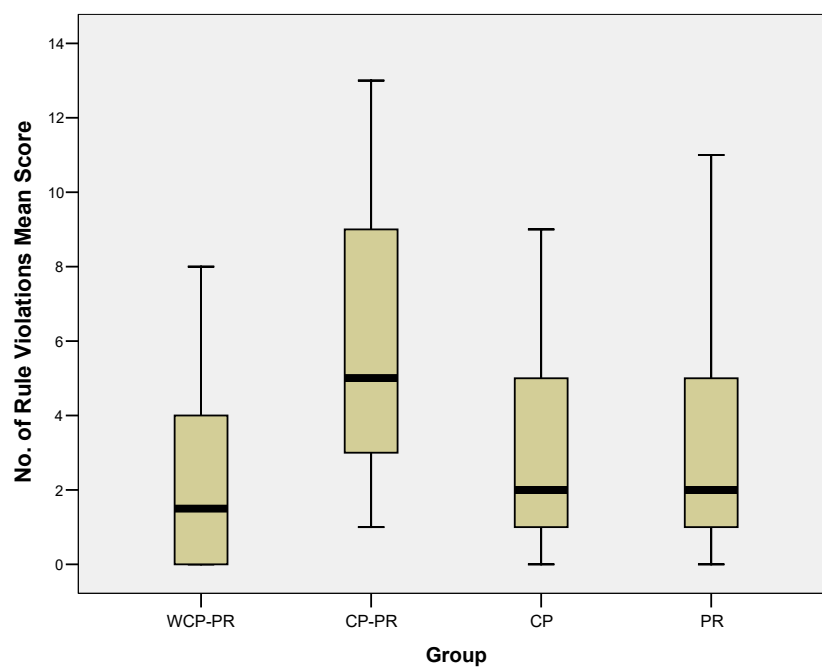


Figure 7d



Appendix H

**Between Group Differences in the Parental Involvement
Questionnaire**

Measures	Kruskal-Wallis		Mean Ranked Scores
Parental Involvement (PI)			
PI in School	$\chi^2(3)=.72$	$p=.86$	WCP-PR(29.23), CP(32.21), PR(32.30), CP-PR(29.23)
PI in Communication with School	$\chi^2(3)= 2.34$	$p=.50$	WCP-PR (27.94), CP(35.71), PR(31.56), CP-PR(37.77)
PI in Reading	$\chi^2(3)= 4.19$	$p=.24$	WCP-PR (34.94), CP(23.96), PR(32.20), CP-PR(38.95)
PI in Homework	$\chi^2(3)= 2.75$	$p=.43$	WCP-PR(32.81), CP(25.42), PR(32.40), CP-PR(34.78)
PI in Socio-educational Activities	$\chi^2(3)=1.36$	$p=.71$	WCP-PR(32.44), CP(29.83), PR(34.79), CP-PR(27.64)
Attitudes Towards PI			
School made clear of how much parents should be involved in child's school life	$\chi^2(3)=.42$	$p=.98$	WCP-PR(30.69), CP(30.83), PR(32.52), CP-PR(31.27)
School gives clear information on how child is getting on at school	$\chi^2(3)=2.84$	$p=.41$	WCP-PR(32.53), CP(25.92), PR(31.04), CP-PR(37.05)
Parent would like to be more involved in child's school life	$\chi^2(3)=.58$	$p=.90$	WCP-PR(29.44), CP(31.67), PR(31.50), CP-PR(34.32)
If parents talk too often to teachers they will be labeled as trouble makers	$\chi^2(3)=.80$	$p=.84$	WCP-PR(31.53), CP(29.38), PR(31.90), CP-PR(35.77)
Children's education is parent's responsibility	$\chi^2(3)=1.23$	$p=.74$	WCP-PR(28.72), CP (31.92), PR(33.68), CP-PR(27.95)
Children's education is school's responsibility	$\chi^2(3)=.86$	$p=.83$	WCP-PR(29.84), CP(35.18), PR(30.21), CP-PR(31.57)
Homework			
Child's difficulty in doing homework	$\chi^2(3)=6.72$	$p=.80$	WCP-PR(25.25), CP (28.58), PR(34.96), CP-PR(41.73)
Parents' confidence in helping with homework	$\chi^2(3)=4.00$	$p=.26$	WCP-PR(39.84), CP (29.46), PR (31.30), CP-PR(27.86)