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An empirically derived typology of behaviour problems based on parent ratings of preschool children.

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AN EMPIRICALLY DERIVED TYPOLOGY OF BEHAVIOUR PROBLEMS BASED ON PARENT RATINGS OF PRESCHOOL CHILDREN

by

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Abstract

The purpose of the current study was to build upon prior efforts to produce a meaningful typology of preschool children's behaviour problems. Distinct empirically-derived subtypes were identified through the use of cluster analytic techniques and the reliability and validity of generated subtypes was tested. Archival data were collected on a sample of 268 children, aged 2 1/2 to 5-years old, who were referred for an initial screening to determine their suitability for an Assessment/Day treatment program within a preschool children's mental health centre. Parents of the referred children had completed the Parent Rating Scales for Preschool Children from the Behavior Assessment System for Children, (BASC, PRS-P; Reynolds & Kamphaus, 1992). To evaluate multivariate patterns of preschool children's behaviour problems, the sample was randomly split in half and a two-step cluster analysis was performed on each half-sample. This procedure yielded five distinct and reliable subtypes of preschool children's behaviour problems. Identified subtypes included profiles characterized as: Normal, Attention Problems, Disruptive Behaviour Problems, Disruptive Behaviour Problems/Atypical, and Mixed internalizing and externalizing problems. The identification of the Disruptive Behaviour Problems/Atypical and Mixed subtypes in the current clinical sample is of particular interest as they represent a group of the most severely disturbed children that have not been identified in previous subtyping investigations of preschool children's behaviour problems. Ratings of the preschooler's adaptive and social skills using the BASC Adaptive Scales, as well as ratings of parental stress using the Parenting Stress Index (PSI; Abidin, 1995), were chosen as external variables to assess the distinctiveness of the derived subtypes. A series of between subjects multivariate analyses indicated significant

group differences on both the BASC Adaptive Scales and PSI scales between the derived subtypes. Taken together, these findings provide evidence for the reliability and validity of the subtypes identified in the present study and they are consistent with the findings of previous subtyping investigations focussing on school-aged children. In addition, the results of the current study support a multidimensional conceptualization of psychopathology in preschoolers. Future research should be aimed at replication of these subtypes in other larger clinical samples of preschool children, including those referred to less intensive treatment programs (e.g., outpatient mental health centers). In addition, determining clinical correlates of these subtypes and further validating them with studies using multiple informants is a necessary next step.

Dedication

This work is dedicated to my parents, Zahoor and Parveen Beg, for their unwavering love, support, and prayers over the years.

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Chapter I

Introduction

Why Study Preschool Children's Behaviour Problems?

In the last two decades, interest in the psychosocial development of young children has increased considerably. New theories and fields of research on the social and emotional development of preschool children (e.g., attachment theory, theories of self-regulation) have emerged along with an increasing interest in the behavioural and emotional problems specific to this age group (Campbell, 1990; Richman & Landsdown, 1988; Trad, 1989). However, in the study of psychopathology in preschoolers, basic issues of assessment, taxonomy, epidemiology of deviant behaviour, and its development have only been scantily addressed (Koot, Van Den Oord, Verhulst, & Boomsma, 1996). Numerous efforts have been undertaken to develop standardized assessment procedures and taxonomic systems of psychopathology (e.g., Achenbach, 1993; Rutter, Tuma, & Lann, 1988), and a considerable number of prevalence studies have been performed involving nearly 250,000 school-aged children (for an overview see Verhulst, 1995). However, firm data on the prevalence and correlates of symptoms, and on the validity of differentiated syndromes of psychopathology in children below six years of age remain limited (Koot et al., 1996). As highlighted in recent hearings for the U.S. Surgeon General's Report on Children's Mental Health,

> this state of affairs has led to a worrisome state of diagnostic and therapeutic nihilism toward preschoolers, depriving the clinical community of appropriate tools to address the severe mental health problems of this age group and to offer these children safe and effective treatments. The delay in diagnosis and treatment of these children may result in developmental deviance begetting further perturbed development, kindling of further psychopathology, disturbances in family functioning, and the sequela of untreated mental health problems. (pp. S31-S32; Wilens, Biederman, Brown, Monuteaux, Prince, & Spencer, 2002)

Preschoolers with behaviour problems represent a population of children with serious, and often harmful, behaviours that increase their risk for chronic mental health problems. Prevalence estimates of preschool behaviour problems range from 12-24% depending on the method of sample selection and the severity of the disorder (Pavuluri & Luk, 1996). In a recent study, Wilens et al. (2002) examined patterns of psychopathology and dysfunction in clinically referred preschoolers. The authors reported that preschoolers were commonly referred for psychiatric evaluation and frequently manifested substantial psychopathology, psychiatric comorbidity, and functional impairment. These preschoolers were affected by an average of two major psychiatric disorders, with attention deficit hyperactivity disorder (ADHD) and opposition defiant disorder (ODD) being the most common disorders identified. The onset of the psychopathology was also noted to precede the age of referral by over two years. These findings are consistent with an emerging literature documenting high levels of psychopathology in preschool-aged children (e.g., Hooks, Mayes, & Volkmar, 1988; Lavigne, Gibbons, & Christoffel, 1996; Mesman & Koot, 2001; Thomas & Guskin, 2001).

Increasing evidence also suggests that problem behaviour remains stable after it has emerged (Campbell 1991). A number of studies have established the stability of adult ratings of behaviour problems in very young children. Studies have identified children showing clinically significant problems in the preschool period on the basis of parental complaints of problems (e.g., Campbell, Szumowski, Ewing, Gluck & Breaux, 1982), cutoff scores derived from parent or teacher reports (e.g., Campbell, 1994; McGee, Silva & Williams, 1984), or combined teacher and observer ratings (Egeland,

Kalkoske, Gottesman, & Erickson, 1990). Despite variations in the nature of the samples, the definitions of problem status, and the country in which the studies were carried out, the findings are remarkably similar. The data indicate that children identified as hard-to-manage at three to four years of age have a high probability (approximately 50:50) of continuing to show difficulties throughout the elementary school years and into early adolescence (Campbell, 1995; Lavigne, Arend, Rosenbaum, Binns, Christtofel, & Gibbons, 1998). It is clear that stability over one- and two-year periods is remarkably high, both for representative and more highly selected samples (e.g., Achenbach, Edelbrock, & Howell, 1987; Egeland et al., 1990; Pianta & Caldwell, 1990; Rose, Rose, & Feldman, 1989). Longer-term follow up studies likewise indicate relatively high stability from the preschool to elementary school-age spanning three to seven year follow-up intervals (e.g., Campbell & Ewing, 1990; Egeland et al, 1990; Mesman & Koot, 2001; Richman, Stevenson, & Graham, 1982). These results reflect a substantial continuity of psychopathology from the preschool years into later childhood and adolescence.

Given the significant prevalence rates of behaviour problems in preschool children and their relationship to disorders manifesting in later childhood, the early identification and treatment of children at risk for different types of psychopathology is crucial (Cicchetti & Cohen, 1995). However, these efforts have been frustrated by the lack of a clear understanding of the structure of preschool children's behaviour problems (Sonuga-Barke, Thompson, Stevenson, & Viney, 1997).

Categorical models, such as the DSM-IV, have fallen short in providing such a classification system of preschool children's behaviour problems (Campbell, 1990).

More and more, investigators are turning towards dimensional models in their efforts to classify childhood psychopathology (Achenbach & Edelbrock, 1981). One frequently used approach within the dimensional model has been the construction and multivariate analyses of behaviour rating scales. Though such investigations have begun to appear for school-aged children and older, the situation remains bleak for preschoolers as such empirical approaches to classifying behaviour problems in this age group are almost non-existent.

The current investigation will examine the subtypes of preschool children's behaviour problems based upon parent report data from the Behaviour Assessment Systems for Children (BASC, Reynolds & Kamphaus, 1992). Specifically, the objective of the present study is to generate subtypes of behaviour problems with a clinical sample of preschool children utilizing a behaviour rating scale with well differentiated items and scales that represent sound behavioural constructs. Subtyping will be accomplished through the use of a two-stage cluster analysis technique.

In order to critically evaluate the current literature on preschool children's behavior problems, it is necessary to discuss previous research investigations that have examined the underlying typology of behaviour problems both in school-aged and preschool populations. First, there must be a discussion of the developmental considerations when trying to differentiate normal from abnormal behaviour in the preschool population. Secondly, a comparison between categorical and dimensional models of classification of preschool children's behaviour problems will be presented. The role of empirically based assessment and the use of rating scales will be outlined. Immediately following will be a review of the multivariate techniques, both factor and

cluster analytic, that have been applied to the problem of developing a typology of preschool children's behaviour problems. A summary of the findings and shortcomings of these studies will be presented. Finally, the purpose and the hypotheses of the present investigation will be reviewed.

Developmental Considerations in Classifying Preschool Behaviour Problems

One of the problems in determining the clinical significance of behaviour difficulties in young children is that many of the behaviours of interest (e.g., frequent tantrums, noncompliance, and aggression towards peers) are normative behaviours during this period (Keenan & Wakschlag, 2000). A number of studies have examined adult reports of specific problem behaviours in young children by asking parents, preschool teachers, or child care providers to rate the presence/absence and severity of a range of behaviours, many of which are quite common. In general, these studies indicate that parents and preschool/daycare teachers express concerns about management difficulties, overactivity, inattention, and relationships with siblings and peers (e.g., Crowther, Bond, & Rolf, 1981; Earls, 1980; Koot, 1993, Stallard, 1993). In addition, major concerns appear to vary with developmental level. Parental concerns about toddlers emphasize eating, sleeping, and toileting problems, whereas concerns about discipline peak at age 3 (Jenkinss, Bax, & Hart, 1980). In general, parent- and teacher- reports of problems tend to increase from age two to three (Crowther et al., 1981; Koot, 1993). Between the ages of three and five, tantrums, overactivity, attentional problems, and fighting with peers seem to decrease in nonclincial samples (Coleman, Wolkind, & Ashley, 1977). That adults do recognize a range of difficult behaviours raises the issue of whether such

behaviours reflect signs of emerging problems or age-related manifestations of developmental transitions.

From a developmental perspective, the increase in negativity and oppositionality during this period heralds the onset of independence, including the child's wish to "do it by myself" and the accompanying frustrations in the face of limits. This suggests that many annoying or difficult behaviours are age appropriate, reflecting developmental change or age-related conflict or frustration, and it would be erroneous to classify them as psychiatric symptoms (Campbell, 1995). Conversely, behaviors that significantly interfere with developmental and social functioning should be regarded as clinical symptoms. For example, defiance, tantrums, and discipline problems appear normative in toddlerhood and may reflect a child's attempt to assert his or her need for autonomy (Kaler & Koop, 1990). However, in the context of a variety of other problem behaviours indicative of more widespread aggression, noncompliance, and anxiety, the tantrums may be seen as symptomatic behaviour. Similarly, problems sharing toys or taking turns when playing with peers or siblings may be seen as an important developmental step in learning the rules of social exchange and sharing (Dunn, 1988). However, when they occur in the context of frequent aggressive encounters with other children, disobedience, and temper tantrums, these toy struggles might be seen as a symptom of a more serious problem warranting treatment. Taken together, these studies indicate that behaviours that are considered indicative of psychological disturbance in some contexts are common and that one must take into account developmental considerations when evaluating preschool behaviours as problematic.

The concepts of psychopathology, emotional disturbance, psychosocial dysfunction, socioemotional maladjustment, and behaviour disorder have often been used interchangeably in the literature to denote disturbances in childhood behaviour (Saunders, 2000). Therefore, given the importance of operationalizing concepts in research studies, a definition of the concept of "behaviour problem" as it is used in the present study is required.

Campbell (1995) suggested that a definition of a behaviour problem in preschool children should include several components: (1) the presence of a pattern or constellation of symptoms; (2) a pattern of symptoms with at least short-term stability that goes beyond a transient adjustment to stress or change, such as that subsequent to the birth of a sibling or entry into child care; (3) a cluster of symptoms that is evident in several settings; (4) symptoms that are relatively severe; and (5) a constellation of symptoms that interferes with the child's ability to negotiate developmental challenges, thereby reflecting some impairment in functioning. She points out that these criteria may help to differentiate between normal, age appropriate behaviours that upset adults - but reflect normative, age-related developmental transitions - from potentially more serious difficulties that signify the onset of a problem requiring clinical attention.

As implied by the above definition and the aforementioned studies, developmental considerations suggest that isolated behaviours, though sometimes annoying and difficult to deal with for adults, rarely reflect psychopathology. Rather, a constellation of problem behaviours needs to be present to diagnose a clinically significant behaviour disorder (Campbell, 1995). The following section addresses the

various attempts that have been made to identify (i.e., classify) such constellations of behaviour problems in preschool children.

Classification of Preschool Children's Problem Behaviour

Existing Models. In the child development literature several models have been proposed that link developmental theory to behaviour problems in children (e.g., Freud, 1965; Wolff, 1960). Most notably, and more specific to preschool children, are the models of temperament and attachment.

Temperament refers to an infant's individual style and frequency of expressing needs and emotions such as frequency and duration of crying, infant cuddliness and consolability, activity level, alertness, and self-quieting (for a review see Chess & Thomas, 1996). Thomas, Chess, and Birch (1968), in a classic prospective study of early infant temperament and the development of behaviour disorders in young children, found three main temperament subtypes. *Easy babies*, the most common type, got hungry and slept at predictable times, reacted to new situations cheerfully, and seldom fussed. *Difficult babies* were irritable, intense in reaction, and irregular in biological routine. Those in the third group, *slow-to-warm-up babies,* reacted warily to new situations but eventually came to enjoy them. Thomas et al. (1968) found that difficult and slow-to-warm babies were more difficult to care for and more likely to develop later behaviour problems, though parenting style played a significant role in terms of whether later behaviour problems emerged. On the other hand, easy infants adjusted to a wider range of parental management styles and were less likely to develop later problems.

Recent studies have shown difficult temperament characteristics to be predictive of internalizing behaviour problems at age five (Pierrehumbert, Miljkovitch, Plancherel,

Halfon, & Ansermet, 2000). They also act as a vulnerability factor for internalizing and behaviour problems in preschoolers (Tschann, Kaiser, Chesney, & Alkon, 1996), and predict clusters of common behaviour problems in school-aged children (Telgasi & MacMahon, 1990).

Attachment theory (Ainsworth, 1969; Bowlby, 1969) combines ethological, cognitive, and social constructs and stresses the biological advantage of developing a secure attachment between the infant and primary caregiver. Individual differences in patterns of attachment have been explored in depth by Ainsworth and her colleagues (e.g., Ainsworth, Blehar, Waters, & Wall, 1978), and they have identified a number of subtypes or patterns of attachment including relationships marked by secure attachment, avoidant attachment, ambivalent attachment, and disorganized attachment (for a review see Cicchetti, Toth, & Lynch, 1994). Recent research on attachment and childhood psychopathology has made some progress in linking attachment processes to depression (Cummings & Cicchetti, 1990), oppositional and conduct disorders (Lyons-Ruth, 1996), reactive attachment disorders (Zeanah, 1996), and eating disorders (Cole-Detke & Kobak, 1996).

Attachment and temperament models have identified subtypes of behavioural presentations in preschool children, and recent research in the child development literature has attempted to link attachment and temperament patterns to behaviour problems of preschool and school-aged children. However, the paucity of such research suggests that obstacles continue to exist. Although developmental issues in infancy and toddlerhood have been relatively well researched (for a review see Rosenblith & Sims-Knight, 1992), less progress has been made in characterizing high-risk patterns and

disorders during the same age period (del Carmen & Huffman, 1996). Consequently, it appears a worthwhile endeavour to outline subtypes or patterns of preschool children's behaviour problems. The discussion now turns to the various attempts that have been made to delineate such patterns.

Categorical Models. For the most part, efforts to define and study child psychopathology have largely been confined to the study of children who demonstrate recognized diagnostic syndromes (Kamphaus, Huberty, DiStefano, & Petoskey, 1997). In this regard, the *International Classification of Diseases,* 10th ed. (ICD-10; World Health Organization, 1992) and the *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. (DSM-IV; American Psychiatric Association, 1994) are currently the most frequently used and influential systems of classification (Thangavelu & Martin, 1995). These manuals adopt a categorical approach to classification with an explicit assumption that the normal differs from the pathological by kind rather than degree (Wilson, 1993) and that distinctions can be drawn between qualitatively different types of disorders (Kendall, 1991). These categorical approaches have been questioned in terms of classification of child psychopathology and have severe limitations when applied to preschoolers (Campbell, 1990).

Firstly, the DSM-IV conceptualization of preschool child behaviour problems artificially limits scientific efforts by only allowing examination of categorical variables with a sharp delineation between categories (i.e., the child either does or does not have a disorder). However, in the case of preschoolers, it is difficult to define categories of behaviour problems since there tends to be such a high overlap of diagnostic categories. For example, it has been suggested that it is difficult to differentiate ADHD in toddlers

from other discipline problems at this age (Campbell, Breaux, Ewing, Szumowski, & Pierce, 1986). In addition, one study indicated comorbid psychiatric disorders were common with preschoolers, manifesting an average of two major psychiatric disorders per child (Wilens et al., 2002). Thus, the existence of discrete diagnostic categories at this age is open to question (Egeland et al., 1990).

A second limitation of applying categorical models of behaviour problems to preschool children is the lack of compatibility with age-specific symptoms (Pavuluri & Luk, 1998). Although the authors of the DSM-IV wisely specified that certain childhood disorders (e.g., conduct disorder) could not apply meaningfully to very young children, other disorders are described more ambiguously and yet are still applied to preschoolers. It has been argued that DSM-IV and ICD-10 criteria do not adequately address developmental issues, etiology, risk factors, and the caregiver relationship - all of which are necessary to classify and categorize preschool-aged children's behaviour problems (Campbell, 1990; Emde, Bingham, & Harmon, 1993; Sroufe & Rutter, 1984).

Finally, categorical models often ignore those children who do not meet diagnostic criteria, but who nevertheless have clinically significant behaviour problems (Cantwell, 1996). As Cantwell notes, categorical classification systems such as the DSM-IV often fail to identify "subsyndromal conditions" that produce "functional impairment." Systematic studies have shown that such subthreshold disorders in the pediatric age range are more common in the practice of primary care practitioners than DSM-IV or ICD-10 diagnosable psychiatric conditions (Costello, 1990). In summing up his exploration of the categorical accounts of childhood disorder as they influence the

practice of, and research in, child clinical psychology and psychiatry, Sonuga-Barke (1998) concluded that categorical models

> in fact are more than "tools of the trade" and are not in any fundamental sense atheoretical. They embody and promote the "strong" metatheory of mental disorder associated with the medical model.... On the one hand, they provide shared understandings of disorder that allow communication and rational debate within the clinical and scientific community. On the other, they promote a categorical approach to measurement of disorder that undermines the scientific credibility of child psychopathology. They also constrain research at the level of both theory development and theory testing. (p. 129)

For the above mentioned reasons, it appears that categorical models are less than optimal for the classification of preschool behaviour problems. A more appropriate model for such classification may be found within a dimensional modeling approach.

Dimensional Models. In contrast to categorical models, a dimensional approach to the study of preschool children's behaviour problems allows for the study of behaviours that are grouped on the basis of constructs or dimensions. This model enables the study of all children on a particular dimension or several dimensions (Meehl, 1995). Because a dimensional approach is not likely to exclude children from study because they are not diagnosed, it promotes greater understanding of the full range of child behaviour (Kamphaus, Petoskey, Cody, Rowe, Huberty, & Reynolds, 1999). Fergusson and Horwood (1995) compared the efficacy of the categorically and dimensionally scored measures of oppositional defiant disorder, conduct disorder, and ADHD at 15 years of age as predictors of outcomes observed at 16 years of age. Their results indicated that dimensionally scored variables were considerably better predictors of outcome than measures based on a diagnostic classification. Their findings supported the view that disruptive behaviour problems have dimensional properties in which the severity of disturbance ranges from none to severe.

Despite having outlined the potential benefits of dimensional models in conceptualizing preschool children's behaviour problems, such models do not exist for preschool children. Campbell (1990) notes that

> the categorization of problems in young children is particularly problematic, however. Although behaviors rated on checklists may cluster in relatively similar ways across the age range, the usefulness of either dimensional or categorical approaches with preschool-age-children has not been examined systematically, raising a number of questions about the classification of problem behavior (p. 67).

Campbell (1990) continues: "the dimensional, descriptive approach of Achenbach and Edelbrock seems far more appropriate for use with young children because age-related guidelines are available in the form of age and sex norms for severity and clinical significance of parent-reported behavior" (p. 73). It is to this empirically based descriptive approach that we now turn our attention.

Empirically Based Approach to Studying Preschool Behaviour Problems. The empirically based approach as outlined by Achenbach (1985) is a two-step process involving empirically based assessment and empirically based taxonomy. The first step involves assessment procedures that are tested in various ways to identify problems that discriminate between criterion groups of subjects who are regarded as relatively normal versus maladaptively deviant. In other words, this first step requires the development of psychometrically sound assessment instruments to assess problem behaviours in preschool children. Fortunately, the existence of objective behavioural rating scales represents the completion of this first step for the purposes of the current investigation. After satisfactory assessment procedures and candidate items have been developed, the second step of the empirically based approach is to develop an empirically based taxonomy. This is achieved by employing multivariate analyses of the problem items to

identify sets of problems that co-occur. Factor and cluster analytic methodologies are often used to derive sets of co-occurring items. These derived sets of items can be viewed as subtypes. The focus of the current investigation lies within the boundaries of this second step, that is, to identify sets of co-occurring items that would yield subtypes of preschool child behaviour problems. Both these steps, the assessment of preschool behaviour problems and subtyping of preschool behaviour problems, will be examined in greater detail in the following sections.

Assessment of Preschool Children's Behaviour Problems

In recent years, interest has increased substantially in using parent and teacher rating scales as a method of assessing behavioural, social, and emotional problems of children and youth (Merrel, 1999). A recent report by Reschly (1998) compared the frequency of use of various child assessment instruments by school psychologists in three surveys from the years 1986, 1992, and 1997. One clear trend was the increase in use of behaviour rating scales. In 1997, there were three behaviour rating scales that ranked in the top 15 most frequently used instruments. These were the Behavior Assessment System for Children (BASC), Child Behavior Checklist (CBCL), and Conner's Parent/Teacher Rating Scales. At the same time that behaviour rating scales have become more widely used, there have been numerous advances in research on rating scale technology that have increased the desirability of using this form of assessment (Elliot, Busse, & Gresham, 1993).

The widespread popularity of behaviour rating scales is not incidental. These scales offer many advantages for clinicians and researchers conducting child assessments. Merrel (1999) outlines six advantages of behaviour rating scales including: (1) they are

less expensive and more time efficient, (2) they are capable of providing data on low frequency but important behaviours that might not be seen in a limited number of direct observations (e.g., violent or assaultive behaviour), (3) they are an objective assessment method that provide more reliable data than unstructured interviews or projective techniques, (4) they can be used to assess subjects who cannot readily provide information about themselves (e.g., preschoolers), (5) they capitalize on observations over a period of time in a child's natural environment, and (6) they capitalize on the judgments and observations of persons who are highly familiar with the child's behaviour (e.g., parents or teachers).

Behaviour Rating Scales with Preschoolers. Only a decade or two ago, just a few behaviour rating scales were designed for use with preschool children. Most of these scales were not widely available and were not developed with national normative samples. In addition, few of these measures possessed adequate technical properties and a solid research base. More recently, there have been substantial developments in this arena, resulting in the development of several widely available and technically sophisticated rating scales designed exclusively for use with young children (Merrell, 1999). One such scale, and the instrument to be utilized in the current investigation, is the Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1992).

BASC Parent Rating Scale-Preschool (PRS-P). The Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1992) is a comprehensive system for assessing personality and behaviour of children and adolescents. Included in the BASC system are parent and teacher rating scales for preschool-age children (2 1/2 - 5), school-age children (6-11), and adolescents (12-18). These versions have separate

normative data and are somewhat unique in their questions and scales. However, they continue to share a common conceptual and practical framework, and have considerable item overlap across versions. For the purposes of the current study, the parent rating scale for preschool age-children will be utilized. Parents are considered "expert informants" for preschool children as they are in the best position to observe the behaviour of the preschool child over long periods of time and in a variety of different contexts (Achenbach et al., 1987; McConaughy, 1993).

The parent rating scale for preschoolers (ages 2 ½ to 5; PRS-P) includes 131 items that can be completed in about 10-20 minutes and are rated according to four dimensions: *never, sometimes, often,* and *almost always*. These items are then scored and transferred into clinical profiles. The items represent a broad range of positive and negative behaviour of various types. The BASC is one of the only instruments that includes measures of adaptive (i.e., positive) behaviour in addition to maladaptive behaviour. Because they have been identified as potential protective factors against the development of childhood psychopathology, it is important to include these adaptive behaviours in studies of children's behaviour problems (Coie et al., 1993; Keenan & Shaw, 1997). Norms for preschool children are provided in the BASC manual (Reynolds & Kamphaus, 1992) and in a recent norms supplement (Reynolds & Kamphaus, 1998) for a non-clinical sample of 946 children aged 2 ½ to 5 years.

The BASC has been positively reviewed in the professional literature (e.g., Flanagan, 1995; Merrel, 1999; Sandoval & Echandia, 1999). In his review of children's behaviour rating scales, Merrel (1999) noted that, "[the BASC rating scales] were developed with the latest and most state-of-the-art standards and technology, have an

impressive empirical research base, and appear to be very easy to use and practical. They truly represent the best of the newer generation of behavior rating scales" (p. 81). In reviewing the BASC parent rating scale for preschoolers (PRS-P), Merrel (1999) specifically commented that

> the rating scales of the BASC that are designed specifically for the use with young children, namely the TRS-P and PRS-P, appear to be an excellent addition to the available rating scale instrumentation for this age group. The scales are very well constructed, comprehensive, and appear to have good technical properties...there is certainly enough supporting evidence to justify recommending the rating scales designed for assessment of young children. (pp. 343-344)

The BASC manual is extensively documented and provides highly detailed and comprehensive reliability and validity evidence. However, because the BASC is a relatively new instrument and was commercially published before any external research was disseminated in peer-reviewed journals, there has been very little additional research published documenting the validity of the system for use with preschool children. One additional published study (McNamara, Holman, & Rigel, 1994) evaluated the usefulness of the BASC in determining the mental health needs of a Head Start population, and provides some additional support for the construct validity of the measure.

Subtypes of Preschool Children's Behaviour Problems

The second step of the empirically based approach employs multivariate analyses of the problem items on assessment measures to identify sets of problems that co-occur (Achenbach, 1997). Simply put, researchers have looked for clusters of behaviours that may occur together and thereby define a typology of disorder. Comprehensive reviews published in the literature have consistently identified two major classes of factor analytically derived dimensions of problem behaviour in children (Achenbach & Edelbrock, 1978, 1981). Across the age-span from preschool to adolescence the most

commonly reported distinction is between externalized and internalized behaviour problems. "Externalizing" behaviours are characterized by undercontrolled behaviours that are expressed outward against others or have an impact on the child's environment. These behaviours typically are very annoying and/or have the potential to harm others (e.g., overactivity, tantrums, fighting, destructive behaviour, and noncompliance). "Internalizing" behaviours reflect overcontrol, having their major impact on the child. These behaviours appear to be an expression of social withdrawal, fearfulness, unhappiness, and anxiety. Unfortunately, internalizing behaviours are often difficult to recognize by adults because they are less overt and less annoying than externalizing behaviours (Campbell, 1990).

Despite the hundreds of studies that have confirmed these broadband dimensions of children's behaviour problems, there remains a debate regarding the number of factors that adequately categorize child psychopathology. It is not clear whether these rather global typologies of internalizing and externalizing symptomatology are sufficiently precise in their characterization of children's problems, or whether specific subtypes of internalizing and externalizing disorders must be the focus (Campbell, 1990). In order to explore the issue investigators have attempted to develop empirically based typologies for the classification of children's behaviour problems through the analysis of factors that emerge from behaviour rating scales. The goal of these studies is to identify homogeneous subgroups of children such that the clinical characteristics can be examined and used to generate a classification and interpretation system for clinicians (Kline, Lachar, & Gdowski, 1987).

Few attempts have been made to develop such typologies for preschool children. The following section reviews studies that have factor analyzed behaviour rating scales in order to develop meaningful subtypes of preschool behaviour problems.

Factor Analytic Studies of Preschool Children's Behaviour Problems

Kohn and Rosman (1972) developed a teacher rating instrument, the Symptom Checklist, to be used with three- to six-year olds. The Symptom Checklist is a 58-item checklist intended as an inventory of those clinically important behaviors that could be observed in a preschool setting. A review by Peterson (1961) of previous factor analytic studies of personality and behavior rating forms with older children and adolescents revealed that two consistent factors typically emerged. One factor, which he labeled Conduct Problems, included such items as disobedience, disruptiveness, destructiveness, and uncooperativeness. The second factor, which Peterson labeled Personality Problems, included feelings of inferiority, lack of self-confidence, and social withdrawal. The purpose of Kohn and Rosman's (1972) factor analytic study was to determine if a two factor model would be "parsimonious and psychologically meaningful" in explaining the data from the Symptom Checklist with preschool children.

Teacher ratings of 407 children, ranging in age from 36 to70 months, in six day care centres in New York City were obtained for the 58-item Symptom Checklist. Data analysis supported a two factor solution. Factor 1 represented items suggesting withdrawal, a lack of interest, and a failure to elicit the cooperation of peers (i.e., similar to Peterson's (1961) Personality Problems factor). Factor 2 (similar to Peterson's Conduct Problems factor) reflected items indicating defiance and creating disturbances, which upset the normal classroom routine. However, it is interesting to note that Kohn

and Rosman (1972) rotated nine factors but only reported on two because, "we were guided by our theoretical expectations" (p. 433).

Behar and Stringfield's (1974) Preschool Behavior Questionnaire (PBQ) was developed to serve as a short screening instrument for the identification of preschoolers, aged three to six, with behavior problems. It was designed as a measure to be completed by preschool teachers and child-care workers. The authors felt that previous scales were not useful because they were not designed for preschool aged children, were inadequately standardized, or were too lengthy. The PBQ represented a modification of the Children's Behavior Questionnaire, a 26-item behavior checklist previously standardized in England on elementary school children (Rutter, 1967). Ten new items, specific to the preschool child, were added to Rutter's checklist and the wording of several of Rutter's items was changed. The scale was standardized on both a normal and a disturbed population. The normal sample consisted of 496 preschool children from seven different preschools in the U.S. The disturbed population consisted of 102 preschoolers drawn from 15 preschools throughout the U.S. involved in early intervention work with behavior-disturbed children. The average age of the preschoolers was 4.4 years. Teachers of the children in both groups completed the PBQ on each child in their classes.

Using all of the subjects, both normal and disturbed, the data were factor analyzed using a principal component analysis that led to a three factor solution. Each of the three major factors of the PBQ was unipolar. Factor 1 appeared to measure a Hostile-Aggressive dimension comprised of items that suggested a lack of consideration for others, irritability, and fighting with others. The authors noted the strong similarity to Peterson's (1961) Conduct Problems factor and to Kohn and Rosman's (1972) Factor 2

on their Symptom Checklist. Factor 2 on the PBQ was labeled as Anxious-Fearful and was comprised of items reflecting unhappiness, fearfulness, a tendency to cry easily, and a tendency to stare into space. Again, this Factor was noted to be similar to Peterson's Personality Problems and Kohn and Rosman's Factor 1. Thus the first two dimensions of the PBQ strongly resembled both Peterson's and Kohn and Rosman's two dimensions. In addition to these two factors, the PBQ contained a third significant factor that was characterized by poor attention span and restlessness. Therefore, Factor 3 appeared to measure a Hyperactive-Distractable dimension.

Fowler and Park (1979) also investigated the multivariate structure of the Preschool Behavior Questionnaire (Behar & Stringfield, 1974) in a normal population of preschool children living in the northeastern U.S.. Teacher ratings of 349 girls and 352 boys attending kindergarten (mean age of 59 months) using a short form of the PBQ (one item concerning children's sexual problems had been eliminated) diverged from those earlier reported by Behar and Stringfield (1974). Fowler and Park's (1979) first factor was a broad dimension that combined features of Behar and Stringfield's Factors 1 and 3 (i.e., a combination of trait designations of aggressiveness, distractibility, and hyperactivity). Their second factor was similar to that of Behar and Stringfield's Factor 2, as well as with results reported by other investigators (Kohn & Rosman, 1972; Peterson, 1961) reflecting traits of anxiety, fearfulness, and emotional lability. These findings are notable in that the authors did not find a uniquely defined factor that measured hyperactivity and distractibility as reported by Behar and Stringfield (1974). The authors attributed the broad dimensional nature of Factor 1, which combined the aggressive-hostile dimension with the hyperactive-distractable dimension, to the fact that

teachers were rating along a single dimension (i.e., the ability of the child to perform adequately in the classroom). Displays of aggression and hostility or hyperactivity and distractibility are all equally salient behavioral events (i.e., they are disruptive).

Prior, White, Merrigan, and Adler (1998) also factor analyzed the Preschool Behavior Questionnaire (Behar & Stringfield, 1974) as part of a survey of behavioral problems in a sample of 743 four-year-old preschoolers in a multicultural Australian urban area. They conducted a principal component factor analysis to determine whether the original three factors of the PBQ held true for this population. Their results replicated those found by Fowler and Park (1979), supporting a Hostile-aggressive factor and an Anxious-fearful factor. However, the Hyperactive-distractible factor was not distinct, these items loading on the Hostile-aggressive factor.

O'Donnell and van Tuinan (1979) used a revised version of the Behavior Problem Checklist (BPC) (Quay, 1977), which was designed for elementary and junior high school students, to investigate behavior problems in preschool children. Based on research using the BPC with older children (Quay, 1977), the authors predicted that the primary dimensions of acting-out and anxious-inhibited behaviours would be evident in their data. They had no other a priori expectations as to the content of other dimensions. Nursery teachers of 196 preschool children (mean age of 53.2 months) completed the revised version of the BPC (56 items). Principal components factor analysis revealed a six factor solution. Factor I (Conduct Problem) described hostile, acting-out behaviour, including, negativism, disruptiveness, destructiveness, impertinence, and fighting. Factor II (Personality Problems) included items focusing on feelings of inferiority, shyness, lack of self-confidence, and anxiety. These results were consistent with other factors that had

been obtained for preschool children by investigators using other checklists (Behar & Stringfield, 1974; Kohn & Rosman, 1972) and confirmed the presence of both acting-out and anxious-withdrawn patterns of psychopathology among preschoolers. These results were also consistent with patterns of behaviour found amongst older children (Peterson, 1961; Quay, 1972).

Factor III (Social Withdrawal) was defined by items suggesting social withdrawal, sluggishness, preoccupation, anhedonia, and aloofness. Factor IV (Attention Seeking) included items of jealousy, attention seeking, and wanting help on things he/she should do alone. Factor V (Hyperactivity) was defined by items suggesting restlessness, hyperactivity, a tendency to be easily startled, tension, and rowdiness. This factor was similar to the Hyperactivity factor found by Behar and Stringfield (1974). Factor VI (Distractibility) had items reflecting short attention span, distractibility, and clumsiness. The authors noted that there were significant correlations among many of the factors. Therefore, to examine the patterns of these correlations objectively, a second-order iterative principal axis factor analysis was conducted. Two second-order factors were extracted. The first was defined by the primary factors of Hyperactivity (Factor V), Distractibility (VI), Conduct Problem (I), and Attention Seeking (IV). The other second-order factor was defined by the primary factors of Personality (II) and Social Withdrawal (III). These two second order factors, again, reflected the externalizing and internalizing dimensions found by previous investigators (Behar & Stringfield, 1974; Kohn & Rosman, 1972).

In finding six primary factors, O'Donnell and van Tuinan (1979) commented that the factoral domain of preschool children's psychopathology is more complex than

previously described. The finding of two second-order factors reflecting externalizing and internalizing disorders is consistent with the position of other investigators (Peterson, 1961, Kohn & Rosman, 1972) who have favoured using broad higher order behaviour problem dimensions. The authors concluded that "the domain of behavior problems in preschool children can be represented by two relatively broad dimensions (Conduct and Personality) together with two narrow dimensions (Attention Seeking and Distractibility) (p.73).

Hinshaw, Morrison, Carte, and Cornsweet (1987) investigated the factor structure of a revised version of the Behavior Problem Checklist (RBPC) (Quay & Peterson, 1983) with a large sample of preschool children. The RBPC contained the broadband externalizing scales of Conduct Disorder (CD) and Socialized Aggression (SA) and the internalizing scale of Anxiety-Withdrawal (AW). Additional scales included the Attentional Problems-Immaturity (AP) scale and the minor scales of Psychotic Behavior (PB) and Motor Tension-Excess (ME). RBPCs were completed by teachers on 284 children labeled "at-risk" for subsequent learning failure (based on a measure designed to evaluate deficiencies in perceptual performance) and on 299 control children. There were 320 boys and 263 girls with a mean age of 69.7 months. Principal component analysis of teacher ratings revealed five components accounting for 53% of the total variance. Component 1 correlated with the CD (r = .99) scale and, hence, was named Conduct Disorder. Component 2 encompassed mostly items from the AP scale (correlation r = .97) and it was also termed Attentional Problems-Immaturity. Unmotivated-Isolated (UI) was the name given to Component 3. Component 4 was comprised mostly of items from the AW and its correlation with this scale was r = .98.

Therefore, the fourth component was called Anxiety-Withdrawal. Finally, the fifth component correlated with the PB scale (r = .94) and was also named Psychotic Behaviors. Separate principal component analysis for boys and girls also yielded similar results. For boys, four rotated components closely resembling the CD, AP, AW, and UI dimensions emerged. The analysis of the girls' data yielded four nearly identical components, along with a fifth that was quite similar to the original ME scale.

Parents of 362 (199 boys and 163 girls) at-risk children were sampled for the parent ratings on the RPBC. Principal component analysis revealed six components that accounted for only 38% of the total variance. The first component was named Conduct Disorder. The second component resembled a narrower version of the AP but without items pertaining to immaturity. Component 3 reflected items from the Motor-Tension-Excess scale and several items that reflected impatience. This component was called Hyperactive-Impatient (HI). The fifth component was named Anxiety (A) because it contained items relating to the AW scale but without withdrawal items being present. Components 4 and 6 were not found previously in the teacher ratings analysis. Each contained a blend from the original AW, PB, ME, and SA scales. These components reflected combinations of passive, withdrawn, conforming, and immature behaviors, along with incoherent or parroting speech. Component 4 was named Tense-Withdrawn and Component 6 was named Passive-Conforming. These two components were both small in size and had a relative lack of internal coherence.

One of the few efforts to standardize assessment of behaviour problems in the two- to three-year old age range is the Behaviour Screening Questionnaire (BSQ), a measure developed in England by Richman and Graham (1971). It consists of questions

that are administered by trained interviewers to mothers whose reports about their children are scored on three-step scales for 12 problem areas such as eating, sleeping, activity, concentration, and fears. A 19-item checklist version of the BSQ, called the Behavior Checklist (BCL) has been developed for mothers to complete independently (Richman, 1977). There is also a 22-item version, the Preschool Behavior Checklist (PBCL), for completion by preschool teachers (McGuire & Richman, 1986). Both the BCL and PBCL have been investigated in factor analytic studies (Luk, Leung, Bacon-Shone, & Lieh-Mak, 1991; McGuire & Richman, 1986; Pavuluri & Luk, 1996; Sonuga-Barke, Thompson, Stevenson, & Viney, 1997).

McGuire and Richman (1986) developed the Preschool Behavior Checklist (PBCL) to determine the prevalence of behavioral and emotional difficulties exhibited in two- to five-year-olds in various nursery settings. The 22-item scale asks the rater to choose between several alternatives rather than saying how applicable one statement is to a child. The logic is that in this way detail about frequency and severity of the behaviours can be determined. McGuire and Richman (1986) completed both factor analysis and a cluster analysis of the PBCL (results of the cluster analysis are reported later in a following section). Two staff members completed PBCLs on each of 187 children (90 girls, 97 boys) ranging in age from 26 to 58 months (mean of 48.5 months). Six factors were derived from factor analysis. The first and largest factor (Conduct/Restless) encompassed a combination of management problems, destructive behaviour, restlessness and poor concentration. Factor 2 (Emotional/Miserable) included items focused on being sensitive, attention seeking, whiny, miserable, prone to tempers, and fearful. The third factor (Aggression) was marked by fighting, interfering in the play

of others, whining to staff, and being destructive. Factor 4 (Immature/Isolated) included aimless wandering, social isolation, unclear speech, and poor concentration. The fifth factor (Social Withdrawal) was marked by social isolation from peers and adults. The final factor, factor 6, was named Sphincter Problems.

McGuire and Richman (1986) completed a further factor analysis, specifying a three factor solution, in order to compare the results with those obtained in previous studies (Behar & Stringfield, 1974; Fowler & Park, 1979, Kohn & Rosman, 1973). Factor I incorporated conduct/restlessness/aggression, factor II included social isolation with immaturity and factor III consisted of the "emotional/miserable" dimension virtually unchanged. The authors concluded that the clearest factor from the PBCL (I-conduct/ restlessness/aggression) corresponded closely to the conduct factors found by Kohn and Rosman (1973) (anger/defiance) and Fowler and Park (1979) (aggressiveness/ distractibility/hyperactivity). They also stated that their results did not support the idea of two separate factors for conduct problems and over-activity as found by Behar and Stringfield (1974).

Luk et al. (1991) also investigated the factor structure of the Preschool Behavior Checklist (PBCL) (McGuire & Richman, 1986) with a sample of 851 Chinese preschool children (50.5% boys, 49.5% girls), ages 36-48 months (mean age 43.1 months). Factor analysis of the PBCL revealed four factors. The first and largest factor was comprised of hyperactive and conduct problems, including behaviours such as overactivity, unpopularity, poor concentration, temper tantrums, fighting, and destructiveness. The second factor involved speech difficulties and social withdrawal including articulating difficulties, withdrawal from peers and staff, and aimless wandering. The third factor

consisted mainly of emotional problems and was composed of items illustrating behaviours such as attention-seeking, whining, complaining, getting upset easily, and fearfulness. Factor 4 represented sphincter control problems such as wetting and soiling. The authors concluded that there was broad similarity in the factor structure of their study with Chinese children and that reported by McGuire and Richman (1986) in the U.K. In addition, the factors for emotional and sphincter problems were exactly the same for both studies. However, the authors noted that there were some differences. McGuire and Richman (1986) found two separate factors for hyperactive and conduct symptoms, whereas these were combined into a single factor in the study conducted by Luk et al (1991). In addition, there was only one single speech/withdrawn factor, whereas two separate factors were found in the original U.K. study (Immature/Isolated and Social Withdrawal). For the interest of comparison, Luk et al. (1991) also reanalyzed their data for a three factor solution. Replicating McGuire and Richman's (1986) re-analysis, they found the first and largest factor to be a combination of conduct and hyperactive symptoms. Factor 2 also referred to speech/withdrawn problems and Factor 3 loaded on items reflecting emotional symptoms.

Two studies (Pavuluri & Luk, 1996; Sonuga-Barke, Thompson, Stevenson, & Viney, 1997) have factor analyzed the Behavior Checklist (BCL; Richman, 1977), which, like the PBCL, was also derived from the Behavior Screening Questionnaire (BSQ) (Richman & Graham, 1971). The BCL is a 19-item checklist version of the BSQ that was developed for mothers to complete independently.

Pavuluri and Luk (1996) had the parents of 272 New Zealand preschoolers (57% boys, 43% girls), with a mean age of 46.3 months, complete the BCL. Factor analysis of

the BCL yielded seven factors. The first factor consisted of predominantly emotional problems such as unhappy mood, worry, fears, sibling rivalry, and poor peer relationships. The second factor was concerned with toileting problems such as night wetting, day wetting and soiling. The third factor referred to conduct problems such as difficulty in managing, temper tantrums, sibling rivalry, and unhappy mood. The fourth factor consisted mainly of sleep related difficulties and included settling to bed, waking at night, sleeping with parents, and clinging behaviours. The fifth factor involved eating behaviours, with items such as poor appetite and fussy eating. The sixth factor was comprised of only two items, poor concentration and attention seeking. The final factor included language related items, such as poor speech and articulation. No significant sex differences in the prevalence of parent reported preschool problems were found.

Of the seven factors found in this study, four factors reflected issues of development (i.e., toileting, speech, eating and sleep), whereas the other two factors reflected either emotional or conduct problems. Pavaluri and Luk (1996) also noted that there was unhappy mood along with other conduct symptoms (e.g., items such as poor peer relationships in the emotional factor), suggesting that emotional and conduct symptoms are somewhat mixed in preschoolers. The authors concluded that the factor structure derived from this study was similar to previous studies in the identification of three main categories of behaviours: externalizing, internalizing, and developmental factors.

Sonuga-Barke et al.(1997) also examined the factor structure of the Behaviour Checklist (BCL; Richman, 1977). The BCL was completed by 1047 British parents of three-year-old children taking part in an epidemiological survey of child development.

Principal component analysis revealed a six factor solution. The factors were labeled: (I) poor social adjustment (SOC); (II) sleep problems (SLP); (III) poor emotional adjustment (EMO); (IV) overactive/inattentive (OA); (V) soiling and wetting (SOIL); and (VI) eating problems (FEED). Once again, these results supported previous findings of a clear distinction between factors within the behavioural domain (SOC, OA, and EMO) and other developmental problems (SLP, SOIL, and FEED). The authors also conducted a cluster analysis in order to investigate the extent to which the scaled scores allowed the identification of distinct groups of children with particular constellations of adjustment problems. Results of the cluster analysis are reported in a following section.

The aforementioned studies yielded reliable and valid ratings of broad-band dimensions of behavioural and emotional problems among preschoolers. However, Achenbach, Edelbrock, and Howell (1987) noted that they left open the question of whether more differentiated syndromes of problems could be found among two- and three-year-olds. They extended empirically based procedures previously developed for assessing older children (Child Behavior Checklist for Ages 4-16, Achenbach & Edelbrock, 1983) to two- and three-year-olds. Unlike many of the previous studies which utilized teachers as informants, Achenbach et al. (1987) utilized parent report because "parents are the most intimately involved and universally available informants concerning the problems of two- and three-year-olds" (p.632). Their assessment instrument was The Child Behavior Checklist for Ages two to three (CBCL/2-3). It consists of 99 items describing behavioural/emotional problems that parents report for the child if the problems have been present in the last two months.

The CBCL/2-3 was used in a longitudinal study of 55 low birth weight and 32 full-term children, 198 children randomly selected from the general population, and a clinical sample of 96 children referred to a mental health service. To increase the number of CBCLs for two-year-olds considered to be at risk for behaviour problems, the investigators included 17 low birth weight children whose three-year CBCLs were also used. No other subjects were included more than once. The factor analytic sample of 398 was evenly divided between boys and girls. A principal components analysis of 94 items of the CBCL/2-3 (five were excluded due to being reported for less than 5% of the sample) revealed six factors (or syndromes as referred to by the authors). Four of the six syndromes had clear counterparts in those identified for several age groups of each sex using the CBCL/4-16 and were consequently given similar labels. These included the Social Withdrawal, Depressed, Somatic Problems, and Aggressive syndromes. The two other syndromes - Sleep Problems and Destructive - were more unique and formed a clearer syndrome at ages two to three than at the older ages. No significant differences was found between boys or girls on any of the six scales.

To determine whether these six syndrome scales formed broad band groupings like those found in previous studies with preschoolers, Achenbach et al. (1987) performed a second order factor analysis of the syndrome scales. Results indicated that the Social Withdrawal and Depressed scales loaded together on one factor, the Destructive and Aggressive scales on the second factor, and the Sleep Problems and Somatic scales had no loadings on either factor. The investigators designated these two broadband groupings as Internalizing and Externalizing. Achenbach et al. (1987) concluded that their study yielded broadband internalizing and externalizing groupings,

but also showed that considerably more differentiation is possible for two- and three-year-olds in terms of six narrowband syndromes.

Koot, Van Den Oord, Verhulst, and Boomsma (1997) studied the cross-cultural validity of the CBCL/2-3 with three different samples of two- and three-year-old Dutch children. The clinical sample consisted of 426 children (284 boys, 142 girls) referred to guidance and mental health settings. The community sample consisted of 420 preschoolers (215 boys, 205 girls) drawn randomly from the population. Finally, parents of 1,306 pairs of 3-year old twin pairs (1,291 boys, 1,321 girls) also filled out the CBCL/2-3 for each child. A series of exploratory and confirmatory factor analyses was used to identify CBCL/2-3 syndromes in each of the three samples. Results indicated a seven-factor model for all three samples. The syndrome scales derived from these factors were labeled Oppositional, Withdrawn/Depressed, Aggressive, Anxious, Overactive, Sleep Problems, and Somatic Problems. However, the Somatic factor was judged insufficiently robust to retain as a scale. Factor intercorrelations and a second-order factor analysis provided support for two broadband groupings of problem behaviours: Externalizing and Internalizing. The Externalizing factor was defined by high loadings for Aggressive, Oppositional, and Overactive. The Internalizing factor was defined by high loadings for Anxious and moderate loadings for Withdrawn/Depressed, whereas Sleep Problems represented a separate syndrome. Koot et al. (1997) concluded that their cross-cultural comparison of CBCL/2-3 syndromes indicated a high degree of congruence between the American and Dutch scale structures for boys and girls between two and three years of age, demonstrating only small cross-cultural differences. The most significant difference was the unexpected finding of a distinct overactive syndrome. As

noted earlier, only one other study by Behar and Stringfield (1974) obtained a distinct Hyperactive-Distractable factor using a teacher-rated questionnaire. They interpreted this finding as confirming the possibility of a further differentiation of preschoolers' externalizing problem behaviours.

Summary of Factor Analytic Studies

The above studies represent an effort by researchers to develop a clear understanding of the structure of preschool behaviour problems by employing factor analytic techniques with the data obtained from the use of various rating scales. The logic is that variables such as the behavioural, emotional and developmental problems identified in a rating scale can be expressed as a function of factors. These studies are summarized in Table 1. A number of general observations can be made from these findings.

Firstly, these studies have provided consistent evidence that behaviour problems in preschool children generally load onto externalizing (e.g., aggressiveness, destructiveness, inattention) and internalizing (e.g., anxiety, social withdrawal) broadband factors (Achenbach et al., 1987: Kohn & Rosman, 1972, Prior et al., 1998) much as they do for older children (e.g., Achenbach & Edelbrock, 1981). However, there appears to be little consistency in factors beyond the broad band factors of externalizing and internalizing problems in preschool children. Within the externalizing category, several studies have found a distinct hyperactive factor that has emerged as separate from conduct problems (Behar & Stringfield, 1974; Hinshaw et al., 1987, Koot et al., 1997), while other studies found a mixed hyperactive-conduct factor (Fowler & Park, 1979; Luk et al., 1991; McGuire & Richman, 1986). Within the internalizing

Table 1

Factor Analytic Studies of Subtypes of Preschool Children's Behaviour Problems

Kohn & Rosman (1972)	**Behar & Stringfeld (1974)**	**Fowler & Park (1979)**	**Prior et al. (1998)**	**O'Donnel & Tuinan (1979)**	**Hinshaw et al. (1987)**	**Hinshaw et al. (1987)**	**McGuire Richman (1986)**	**Luk et al. (1991)**	**Pavaluri & Luk (1996)**	**Sonuga-Burke et al. (1997)**	**Achenbch & Edelbr. (1983)**	**Koot et al. (1997)**
Symptom Checklist	PBQ	PBQ	PBQ	RBPC	RBPC (Teacher)	RPBC (Parent)	PBCL	PBCL	BCL	BCL	CBCL	CBCL
Factors	**Factors**	**Factors**	**Factors**	**Factors**	**Factors**	**Factors**	**Factors**	**Factors**	**Factors**	**Factors**	**Factors**	**Factors**
I-Conduct Problems	I-Hostile-Aggress.	I –Aggress. Hostile/ Hyperact..	I-Aggress. Hostile/ Hyperact.	I Conduct Problems	I-Conduct Disorder	I-Conduct Disorder	I-Conduct Restless	I-Conduct/ Hyperact.	I-Emotnl. Problems	III-Emotnl Problems	I-Social Withdrawl	I-Oppositnl
I – Personality Problems	II – Anxious Fearful	II – Anxious Fearful	II – Anxious Fearful	VI-Distract	II – Atten. Problems	II – Atten. Problems	II-Emotion Miserable	III-Emotnl. Problems	II-Toilet Problems	V-Soiling/ Wetting	II-Depress.	II-Withdrn. Depressed
	III – Hyperact. Distract.			V – Hyperact.	III–Unmot. Isolated	III– Hyper. Impatient	V-Social Withdrawl	II-Speech Withdrawn	III-Condct. Problems	I-Poor Soc. Adjustmnt	III -Sleep Problems	IV-Anxious
				III – Social Withdrawl.	IV – Anx. /Withdrawl	IV-Tense Withdrawn	VI-Sphinct problems	IV-Sphinct problems	IV-Fussy Eating	VI-Eating Problems	VI-Destructive	V - Overactive
				IV – Attn. Seeking	V-Psychot. Behaviors	V-Anxiety	III-Aggresiv.		V-Sleep Problems	II-Sleep Problems	V-Aggress	III-Aggressive
				II – Personality Problems		VI-Passive Conform.	IV-Immat. Isolated		VI-Atten. Problems	IV-Hyper./ Inattentive	IV-Somat. Problems	VI-Sleep Problems
									VII-Lang. Problems			
				2nd order factors			**2nd order factors**	**2nd order factors**			**2nd order factors**	**2nd order factors**
				I-Externaliz.			I-Conduct Problems	I-Condcut Hyperact.			II-Externaliz.	I-Externaliz.
				II – Internaliz.			II-Social isol/immat.	II-Speech/ Withdrawn			I-Internaliz.	II-Internaliz.
							III-Emot./ Miserable	III-Emotnl. Symptoms				

category, depression, withdrawal, and anxiety tend to co-occur but they show different factor patterns from one study to another. For example, some studies obtained factors distinguishing anxiety from withdrawn behaviour (Hinshaw et al., 1987; Luk et al., 1991; McGuire & Richman, 1986).

In addition, there is evidence for more fine grained distinctions between dimensions within these two broadbands. A number of studies found a variety of narrow-band factors. For example, Achenbach et al. (1987) found independent dimensions of social withdrawal, depression, sleep problems, somatic problems, aggressiveness, and destructiveness. In studies that utilized instruments with developmental items (e.g., McGuire & Richman, 1986; Sonuga-Burke et al., 1997), multiple developmental factors such as eating, sleeping, toileting, and speech were found apart from the two major externalizing and internalizing factors. In sum, these studies of preschool behaviour problems seem to support the intermediate position that both broadband dimensions (externalizing and internalizing) and narrowband dimensions are necessary to adequately categorize preschool behaviour problems.

Shortcomings of Factor Analytic Studies of Preschool Children's Behaviour Problems

A closer examination of these studies reveals a number of shortcomings. As noted earlier, there appears to be little consistency in factors beyond the broadband factors of externalizing and internalizing problems in preschool children. One of the most obvious reasons for this is that the vast majority of these studies utilized screening instruments with a low number of undifferentiated items. With the exception of three studies (Achenbach et al., 1987; Hinshaw et al. 1987; Koot et al., 1997), previous research was conducted on measures consisting of 19 to 58 items. The primary factors

from these studies using brief screening behaviour rating scales were often found to be significantly correlated with one another and consequently prompted second order factor analyses, which produced the two broadband factors. To make matters worse, detailed examination of the items in each of these factors revealed that very few are homogeneous. For example, the factor named "conduct disorder" often included inattentive, impulsive, or hyperactive items. Similarly, "negative interaction," "refusing to play," and "poor peer relations" were included in the emotional factor. It would seem that in an effort to develop a typology of preschool behaviour problems, psychometrically sound behaviour rating scales that include well defined behavioural constructs and well differentiated items need to be utilized (Achenbach, 1997).

Another limitation of these factor analytic studies is that, with the exception of the two studies using the CBCL (Achenbach & Edelbrock, 1983; Koot et al., 1997), the samples used were nonclinical populations, obtained from day care centres and nurseries (i.e., they did not sample from a clinical population of preschoolers with behaviour problems). It would seem that to delineate narrow band factors of preschool children's behaviour problems, a clinical sample of preschoolers from mental health clinics would be necessary along with sampling of "normal" preschoolers (Rescorla, 1986). In sum, the factor analytic studies of preschool children with behaviour problems has confirmed previous findings of broadband externalizing and internalizing factors. However, the issue regarding narrowband dimensions within the externalizing and internalizing factors remains unclear. The majority of these studies were compromised by limited sampling (i.e., no clinical sample of preschoolers) and by the use of behaviour rating scales with

few and poorly differentiated items. Consequently, the likelihood of these studies detecting narrowband factors was significantly reduced.

Researchers within the field of developmental psychopathology have also leveled a more general criticism at the use of factor analytic techniques to generate statistically based diagnostic categories of behaviour problems in children (Kamphaus et al., 1999). They argue that in factor analytic studies, variables are given more importance and consequently shift the focus away from studying the child as a whole.

Variable- vs. Person-Oriented Approaches to Subtyping.

The above mentioned factor analytic studies represent what has been called a "variable" approach to studying individual development (Bergman & Magnusson, 1987). In this variable-oriented approach, the main conceptual and analytical unit is the variable and not the individual. Bergman and Magnusson (1987) argue that the classification of individuals as a main research tool has, ironically, become less prominent within the scientific discipline of psychology. They cite a possible explanation for this trend being the enormous expansion of efficient methods for variable analysis and hypothesis testing in both experimental and nonexperimental settings (e.g., ANOVA and regression analysis). However, this variable-oriented approach to individual development has limitations: "The modeling/description of variables over individuals can be very difficult to translate into properties characterizing single individuals because the information provided by the statistical method is variable oriented, not individual oriented" (p. 92). For this reason a number of researchers in the field of child psychopathology have argued that although factor analysis isolates different problem dimensions (behaviours), it is not ideal for studying how well individuals fit into psychiatric classification systems (Paykel,

1981). In fact, these dimensions overlap to such an extent that different groups of children with particular problems cannot be distinguished (Campbell, 1990). For example, Rescorla (1986) studied the relationship between the Child Behavior Checklist (CBCL) and DSM-III classification on three- to five-year-olds. More than one-third of the children in the sample were above the median on both the acting out, externalizing dimension and the emotional, internalizing dimension. These limitations, together with the desired emphasis on the individual rather than the variable, suggest that variable-oriented research has to be complemented with a person-oriented research approach.

The plea to consider information about the person as an indivisible whole, and not just as a combination of discrete variables to be analyzed separately, has been voiced for many decades (e.g., Allport, 1937; Cairns, 1979; Lerner, 1984; Lewin, 1935). In this "person"-oriented approach, the person (or child), rather than the variable expressing symptom status, is the main unit of analysis and main object of interest (Bergman & Magnusson, 1997) (i.e., the central object of interest is information about the child as a *Gestalt)*. Methodologically, this "person" approach involves what Bergman and Magnusson (1997) refer to as "pattern analysis." Individuals are studied on the basis of their patterns of individual characteristics that are relevant for the problem under consideration. The person-oriented approach has sometimes been referred to as variable oriented, because in many of its applications, variables are used to construct score profiles of an individual's scores, which are then used in the statistical analysis. "However, variables included in such an analysis have no meaning in themselves. They are considered only as components of the pattern under analysis and interpreted in relation to all other variables considered simultaneously; the relevant aspect is the *profile*

of scores" (Bergman & Magnusson, 1997, p. 293). Broadly speaking, a pattern approach is a way of restoring the person, in this case the child, to developmental psychopathology research using appropriate methods. One such method is cluster analysis (Bergman & Magnusson, 1987).

Cluster Analytic Approach to Studying Behaviour Problem Subtypes

Cluster analysis refers to a group of multivariate techniques whose primary purpose is to assemble objects based on characteristics that they possess (Everitt, 1980). Cluster analysis classifies individuals, so each individual is similar to others in the cluster with respect to a predetermined selection criterion. The resulting clusters of individuals should exhibit high internal (within cluster) homogeneity and high external (between cluster) heterogeneity. If classification is successful, the objects within the clusters will be close together when plotted geometrically, and different clusters will be farther apart. A common use of cluster analysis in clinical psychology is the identification of types (clusters) of disorders (Hair & Black, 1998). For example, a researcher may want to determine if different types of attention deficit hyperactivity disorder (ADHD) exist. A cluster analysis may reveal that a syndrome that specifies attention deficits should be separated from a syndrome that emphasizes hyperactivity. The cluster analysis can reveal what symptoms discriminate the two categories. Subsequent to the analysis, reliability and validity of the proposed subtypes needs to be established (Hair & Black, 1998). Consequently, cluster analysis, which generates groups of individuals rather than behaviours, is a potentially more effective tool to generate subtypes of preschool child behaviour problems. This procedure has been used with both school aged children and

preschoolers to support the differentiation of problem behaviour into subgroups. These studies are reviewed in the following section.

Cluster Analytic Studies with School Aged Children. The first attempt to develop an empirically based typology for childhood was the seminal work of Edelbrock and Achenbach (1980). Their early work in cluster analyzing parent ratings on the CBCL of referral samples identified separate taxonomies for boys and girls aged 6-11 and 12-16. These taxonomies were similar in that global Internalizing and Externalizing patterns were found in all groups. In addition, cluster analysis of the CBCL identified six profile types for boys and seven profile types for girls. Some lower level child behaviour clusters such as Somatic Complaints, Hyperactive, and Delinquent were also found across groups. However, other clusters such as Depression, Aggressive-Cruel, Schizoid, and Sex Problems were unique to certain age and gender groups.

Curry and Thompson (1985) used the Missouri Children's Behavior Checklist (MCBC) and cluster analytic methods with small clinical and referral samples. Their Mildly Aggressive, Aggressive-Active, and Inhibited-Nonaggressive clusters are similar to those found by Edelbrock and Achenbach (Curry & Thompson, 1985). In a subsequent study, Thompson, Kronenberger, and Curry (1989) identified seven clusters involving a sample of 854 children. They identified four behaviour problem clusters and three clusters for children without any behaviour problems (low social skills, problem free, and sociable). Achenbach, Howell, McConaughy, and Stanger (1995) recently identified (using the Young Adult Behavior Checklist and Young Adult Self-Report) new clusters with a national sample. The clusters from that study included Strange, Irresponsible, and Shows Off.

Research has also been conducted using the Personality Inventory for Children-Revised edition (PIC-R; Wirt, Lachar, Klinedinst, & Seat, 1984) to identify subtypes of psychopathology exhibited by neuropsychological and learning disabled samples (Butler, Rourke, Fuerst, & Fisk, 1997; Gdowski, Lachar, & Kline, 1985; Rourke & Fuerst, 1991; Saunders, Hall, Casey, & Strang, 2000). These studies have revealed at least six empirically derived subtypes of psychopathology including: (1) a profile pattern indicating the absence of psychopathology, (2) profiles exhibiting only significant cognitive deficits; (3) profiles characterized by a pattern of cognitive deficits and internalized psychopathology, (4) profiles exhibiting a pattern of cognitive deficits and externalized psychopathology, (5) profiles characterized by significant internalized psychopathology, and (6) profiles marked by significant externalized psychopathology (Saunders, 2000).

A number of cluster analytic studies have also been conducted recently with school-age children using the BASC teacher and parent rating scales. Kamphaus, Huberty, DiStefano, and Petoskey (1997) studied teacher ratings of 1,227 six- to eleven-year-olds based on teacher ratings from the Behavior Assessment System for Children (BASC TRS-C; Reynolds & Kamphaus, 1992). Their cluster analysis yielded a seven cluster solution that included well-adapted, average, learning disorder, disruptive behaviour disorder, physical complaints and worry, severe psychopathology, and mildly disruptive.

Kamphaus et al. (1999) used the BASC Parent Rating Scales for Children (PRS-C) norming data of 2,029 six to eleven-year-old children to investigate subtypes of child behaviour problems. Their cluster analysis resulted in a nine cluster solution. Four of

these clusters represented groups of children relatively free of psychopathology and were labeled adapted, average, well adapted, and minimal problems. The five behaviour problem clusters were labeled as physical complaints/worry, attention problems, internalizing, general psychopathology-severe, and disruptive behaviour problems. Kamphaus et al. (1999) noted that the results confirmed the findings of previous investigations, producing both well-adapted and maladapted clusters. In addition, their findings also added new subtypes for consideration by future researchers.

In summary, cluster analytic studies with school-aged children have replicated the broadband findings of externalizing and internalizing dimensions. In addition, there seems to be a cluster of children with severe behaviour problems marked by the presence of both internalizing and externalizing psychopathology. Although some overlap across these cluster analytic studies is evident, considerable inconsistency remains. Kamphaus et al. (1999) noted that: "The research in this area has not produced a number of large samples that have been analyzed similarly. Perhaps in the future a valid typology based on a convergence of evidence can be derived" (p. 614). This inconsistency in the area of subtypes of behaviour problems is even more evident with preschool aged children.

Cluster Analytic Studies with Preschool Children. Wolkind and Everitt (1974) were impressed with the lack of data available to develop a classification system for disturbed preschool children. In order to begin to rectify this situation, Wolkind and Everitt (1974) decided to investigate the different patterns of behavioural items seen in a non-clinical population of preschool children using cluster analysis. A sample of 127 three-year-old children consisted of a randomly selected group of 97 nursery school children and 30 "high risk" children. The "high risk" group was composed of children

who had been in the care of the social services department (i.e., residential nursery or foster care). Mothers or foster mothers of all the children were interviewed using a slightly modified version of the behavioural interview of Richman and Graham (1971). Questioning was based on the child's behaviour four weeks before the interview. The 42 items covered areas including eating and sleeping difficulties, aspects of relationships, bladder and bowel function, and affective state. The ratings were made by the clinician conducting the interview.

Using Ward's hierarchical clustering technique (Ward, 1963), Wolkind and Everitt (1974) identified a five cluster solution. Cluster 1 represented a "developmental phase" and consisted mostly of items involving fear, sleeping and eating problems. The investigators felt that this pattern of items was related to parent-child interaction rather than a syndrome of poor prognosis. Almost every child in Cluster 2 wet the bed at night. Poor peer relations, temper tantrums, and management problems were also common. Wolkind and Everitt felt this was a possible precursor of later conduct disorders. Cluster 3 appeared to be a group of normal well-adjusted children. Cluster 4 was marked by children who appeared to have no peer contacts outside of the nursery school/foster home and high scores across a variety of items. Cluster 5 consisted of children with severe separation anxiety, fears, and habits. Dependency, worrying, and night wetting were common. Wolkind and Everitt interpreted this cluster to be a "well marked neurotic syndrome." It is worth noting that the Clusters 1 and 2 were deemed to be the more well defined clusters with the remaining three clusters being somewhat less well defined. Support for the validity of clusters came from the results of the scores generated through maternal ratings on a mental health questionnaire one year later. The mothers of the

children in the "disturbed" clusters (i.e., clusters 2, 4, 5) differed significantly in their scores from the mothers of the children in clusters 1 and 3. The scores for mothers of the children in clusters 1 and 3 did not differ from each other. Wolkind and Everitt cited this as evidence of the validity of the clusters as mothers of disturbed children often score worse on measures of maternal mental health than mothers of normal children.

Richman, Stevenson, and Graham (1982) were also interested in developing a typology of disorders occurring at three years of age. They used the behavioural ratings from their own scale, the Behavior Screening Questionnaire (BSQ) (Richman & Graham, 1971) with 205 three-year-old children. Fifty percent of the sample was designated as a "problem group" (i.e., children who scored higher than ten on the BSQ) and the remaining 50% of the sample was composed of a normal control group. The BSQ consists of 21 questions that are administered by trained interviewers to mothers whose reports about their children are scored on 3-step scales for 12 problem areas such as eating, sleeping, activity, concentration, and fears. Richman et al. (1982) decided to stop clustering when they reached five clusters. A five cluster solution was specified by the authors, as it seemed appropriate on inspection of the data and because they wished to make their data comparable with those of Wolkind and Everitt (1974).

The five clusters consisted of four clusters of disturbed children and one cluster of normal children. The four disturbed clusters that emerged included a group that had a general sphincter control problem (cluster 3 - 24% of children), a group with a specific sphincter problem (night wetting) (cluster 2 - 22% of children), a group with a widespread disorder characterized by a range of conduct problems (cluster 4 - 10% of children) and those with somewhat less widespread problems characterized by appetite

disturbance and restlessness or overactivity (cluster 5 - 23% of children). It is interesting to note that no neurotic or emotionally disturbed cluster emerged from their analysis. Richman et al. (1982) attribute this finding to the rather limited section relating to fearful and anxious behaviour on their questionnaire. They also noted that these groups corresponded reasonably well with those identified by Wolkind and Everitt (1974).

Richman et al. (1982) established the validity of these clusters by demonstrating that children in each cluster were similar to each other in a number of ways, other than the behaviour problem evidenced. For example, those children in the disturbed groups (clusters 4 and 5) had families with much higher rates of poor parental marriage and mothers rated as highly critical or low in warmth. Further validation was provided by the degree to which the clusters were predictive of the child's future outcome based on longitudinal data from reassessing this group at four and eight years of age. Of the children in the "widespread disorder characterized by a range of conduct problems" cluster, 89% continued to exhibit problems at age four and 67% remained with problems at age eight. Of children originally in the normal cluster only 13%, at age four, and 28%, at age eight, continued to exhibit problems. The remaining three groups were intermediate in outcome at both four and eight years with very little difference between them.

McGuire and Richman (1986) completed both factor analysis and a cluster analysis of the Preschool Behavior Checklist (PBCL), a 22-item scale developed to determine the prevalence of behavioural and emotional difficulties exhibited in two- to five-year-olds in various nursery settings. Results of the factor analysis on 187 children (90 girls, 97 boys) were reported earlier and indicated the following six factors: Factor 1,

Conduct/Restless; Factor 2, Emotional/Miserable; Factor 3, Aggressive; Factor 4, Immature/Isolated, Factor 5, Social Withdrawal; and Factor 6, sphincter problems.

McGuire and Richman (1986) conducted a cluster analysis to analyze the PBCL because they were interested in grouping individuals, rather than simply grouping behaviours via factor analysis. This cluster analysis revealed a 5 cluster solution. Of the five clusters, two (Clusters 1 and 5) were defined as definite problem groups. Cluster 1 (conduct disorder with restlessness, 14% of the sample) were children with poor concentration, destructive, aggressive, active, difficult to manage, who interfered with the play of others. Cluster 5 (isolated and immature, 12% of the sample) also had poor concentration but they were in addition very sensitive, withdrawn from peers, not well liked, attention seeking, and had some speech problems. Cluster 3 (nervous and lethargic, 4% of sample) were also withdrawn from peers, attention seeking, had speech problems and a tendency to be aimless. In addition, they were nearly all said to be inactive. Cluster 4 (clingy and attention seeking, 10% of sample) were characterized by being sensitive, whiny, and likely to demand attention from staff. Cluster 2 (normal, 59% of sample) was made up of children judged to have no problems. The 5 clusters identified with the PBCL were similar in some ways to those described by Wolkind and Everitt (1974). Validity of the clusters was demonstrated by comparing cluster membership to observational ratings in which the observer rated each child as having no problem, a dubious problem, or a definite problem. Eighty-seven per cent of those in cluster 2 ("normals") received a "no problem" rating, 11% were placed in the "dubious" category and only 2% were rated as having a definite problem. In contrast, 60% of cluster 4 (clingy and attention seeking), 67% of cluster 1 (conduct with restlessness),

71% of cluster 3 (nervous and lethargic) and 88% of cluster 5 (isolated and immature) were said to have at least a dubious problem.

Sonuga-Barke, Thompson, Stevenson, and Viney (1997) investigated the patterns of problems in a group of 1047 British preschool children using both cluster and factor analysis of the Behaviour Checklist (BCL; Richman, 1977). The results of the factor analysis indicated the following six factors: (I) SOC-poor social adjustment; (II) SLP-poor sleep problems; (III) EMO-poor emotional adjustment; (IV) OA-overactive/ inattentive; (V) SOIL-soiling and wetting; and (VI) FEED-eating problems. They concluded that this analysis supported a distinction between factors within the behavioural domain (SOC, OA, and EMO) and other developmental problems (SLP, SOIL, and FEED).

Sonuga-Barke et al. (1997) also conducted a cluster analysis to investigate which scales on the factors within the behavioural domain allowed the identification of distinct groups of children with particular constellations of adjustment problems. Scale scores for SOC, EMO, and OA were entered into a cluster analysis. The three factor scores produced a six cluster solution. The largest cluster was comprised of well adjusted children (36%). The next three largest clusters represented pure behavioural characteristics, but at a subthreshold level of clinical significance. One group was unusually active (23%), a second was timid (17%), while a third was characterized by mild problems with social adjustment (14%). The final two groups, which were the smallest, were characterized by the most severe problems and a co-morbid association of poor social adjustment with either hyperactivity (5%) or poor emotional adjustment (5%).

The investigators established the reliability and stability of these cluster solutions by examining the cluster structure in two randomly selected half samples and then comparing these with the solution from the total sample. A comparison of cluster centres showed the clusters produced by analysis of each half sample were similar to each other and to those derived from the whole sample, thus providing evidence for a reliable cluster solution. The validity of the cluster solutions was established in a number of different ways including comparing the eight-year outcome for children in the different clusters. The two groups of potential clinical significance fared worse at eight years than any of the other groups. Of these two groups the neurotic/conduct group had the most internalizing problems and the hyperactive conduct group had the most externalizing problems.

Summary of Cluster Analytic Studies of Preschool Children's Behaviour Problems

Cluster analysis is a statistical procedure that searches for relatively homogeneous groups of objects or individuals, rather than types of behaviour (Bergman & Magnusson, 1997). Table 2 summarizes the findings of the cluster analytic studies examining the behaviour problems of preschool children. These studies provide further support for differentiating preschool problems into subgroups. Two clusters were common across three of the four studies (i.e., one with externalizing and the other with internalizing problems). In the one study in which no internalizing cluster was found, the investigators attributed this to the limited section relating to fearful and anxious behaviour on their questionnaire (Richman et al., 1982). Instead, their measure (BSQ) included more developmental items, and separate clusters such as a soiling/wetting group have emerged. These results are consistent with those found in factor analytic studies with preschoolers

Table 2

Correspondence Between Preschool Behaviour Problem Typologies in Cluster Analytic Studies

Wolkind & Everitt (1974)	**Richman et al. (1982)**	**McGuire & Richman (1986)**	**Sonuga-Barke et al. (1997)**
n=127 (3 yr. olds)	n=205 (3 yr. olds)	n=187 (2-5 yr. olds)	n=1047 (3 yr. olds)
Behavioural Interview (42 items)	Behaviour Screening Questionnaire (21 items)	Preschool Behaviour Checklist (22 items)	Behaviour Checklist (19 items)
Rated by interviewer from mother's report	Rated by interviewer from mother's report	Rated by nursery school staff	Rated by parents
Subtypes	**Subtypes**	**Subtypes**	**Subtypes**
Cluster 3 – Normal	Cluster 1 - Normal	Cluster 2 – Normal	Cluster 1 – No problems
Cluster 2 –Early conduct disorder	Cluster 4 – Disturbed/ night wetting, conduct problems	Cluster 1 – Conduct disorder with restlessness	Cluster 6 - Hyperactive/ Conduct Disorder
Cluster 5 – Early neurotic disorder (anxiety, fears)	–	Cluster 5 – Isolated and immature	Cluster 5 –Neurotic / Conduct Disorder
Cluster 1 – Develop-mental phase	Cluster 5 – Disturbed/ restless/ fussy eaters	–	–
Cluster 4 – Atypical/ isolated	–	–	–
–	Cluster 2 – Normal/ Night wetting	–	–
–	Cluster 3 –Distrubed/ widesperead sphincter control problem	–	–
–	–	Cluster 3 – Nervous and lethargic	–
–	–	Cluster 4 – Clingy and attention seeking	–
–	–	–	Cluster 2 – Minor problems/Active
–	–	–	Cluster 4 – Minor problems/ Naughty
–	–	–	Cluster 3 - Minor Problems/ Timid

(i.e., externalizing, internalizing and developmental subgroups). In addition, the most recent cluster analytic study of preschool behaviour problems (Sonuga-Barke et al., 1997) indicated two clusters of preschoolers with severe problems (hyperactive and neurotic), both with comorbid symptoms of conduct problems. This finding is consistent with the cluster analytic findings with school-aged children (e.g., Kamphaus et al., 1999) and also with the literature indicating that many disturbed preschool children show more than one behaviour problem (Wilens et al., 2002) and that they often show both internalizing and externalizing symptoms (Rescorla, 1986). Unlike some of the factor analytic studies with preschoolers (e.g., Behar & Stringfield, 1974), no distinction was found between the preschoolers with conduct problems and hyperactivity in any of the studies using cluster analysis.

Shortcomings of Cluster Analytic Studies of Preschool Children's Behaviour Problems. Many of the criticisms leveled at the factor analytic studies of preschool behaviour problems also apply to these cluster analytic studies. First, the samples for all four cluster analytic studies were drawn from the normal population of preschool children with none of the studies sampling a clinical population. A further sample limitation was the fact that all but one of the studies (McGuire & Richman, 1986) used only three-year-olds in their investigations.

These studies also utilized screening behaviour rating scales possessing a low number of items (ranging from 19 to 42 items). In fact, the three most recent cluster analytic studies (McGuire & Richman, 1986; Richman et al., 1982; Sonuga-Barke et al., 1997) were all conducted in Britain utilizing the same behaviour rating scale (BSQ, Richman et al., 1975) or a derivation thereof (PBCL, McGuire & Richman, 1986; BCL,

Richman, 1977). Despite the fact that parents are considered the most knowledgeable informants for their preschool children (Achenbach et al., 1987), only the most recent cluster analytic study (Sonuga-Barke et al., 1997) had parents complete the behaviour rating scales. The remainder of the studies had behaviour rating scales completed either by nursery school staff (McGuire & Richman, 1986) or the interviewer (Richman et al., 1982; Wolkind & Everitt, 1974).

Finally, cluster analytic methods are not as thoroughly delineated as other statistical grouping procedures, such as factor analytic methods, for which numerous conventions apply (Speece, 1994). Consequently, few studies attempt to validate their results internally with independent samples or subsamples (Kamphaus et al., 1999). This criticism also applies to the cluster analytic studies of preschool children's behaviour problems. Only the most recent study (Sonuga-Barke et al., 1997) made an attempt to establish the reliability of the resulting cluster solution. There was no mention of reliability checks of cluster solutions in the previous three studies.

Present Study

The emerging search for a typology of preschool children's behaviour problems has led to empirical investigations within a dimensional model framework. Specifically, multivariate techniques, such as factor and cluster analysis, have been applied to behaviour rating scales of preschool children in an attempt to clarify the structure of preschool children's behaviour problems. Results from both factor and cluster analytic studies consistently indicate the presence of two broadband dimensions of preschool children's behaviour problems, (i.e., externalizing and internalizing), which are consistent with those found in subtyping research with older school-aged children. However, there

remains a great deal of inconsistency with regard to the existence and nature of more narrowband dimensions of preschool behaviour problems. Previous factor and cluster analytic studies have been limited in their ability to discern finer grained distinctions within the externalizing and internalizing dimensions due to a number of shortcomings. This is especially true of cluster analytic efforts that have exclusively sampled normal populations (and with a very restricted age group), utilized screening assessment measures with relatively few and poorly differentiated items, utilized raters other than the preschool child's parents, and have not established the reliability of their obtained clusters. The present study seeks to address these weaknesses.

The purpose of the present study is to build upon prior efforts to produce a meaningful typology of preschool child behaviour problems. The specific objectives of the present study are outlined below:

(1) Sample from a clinical population of preschool children (2½ to 5-years old) with behaviour problems using the Behavior Assessment System for Children Parent Rating Scales for Preschoolers (BASC; PRS-P). These scales have a relatively large number of items that represent well-supported behavioural constructs seen in school-age children (e.g., aggression and depression) and also include adaptive behaviour scales.

(2) Address the reliability of the empirically generated subtypes of preschool children's behaviour problems by utilizing split-half samples.

(3) Determine if the identified subtypes of behaviour problems share similarities with subtypes identified in previous research with preschool and school-aged children.

(4) Test the validity of the derived subtypes by examining their differences with regard to external variables (i.e., adaptive behaviour ratings on the BASC and ratings of parental stress). Because they have been identified as potential protective factors against the development of childhood psychopathology, it is important to include ratings of adaptive behaviour in studies of child psychopathology (Coie et al., 1993; Keenan & Shaw, 1997). Ratings of parental stress were also chosen as an external variable to assess cluster distinctiveness, as the literature has indicated differences in levels of parental stress depending upon the particular behaviour problem exhibited by the child (e.g., Conte, 1998; Creasey & Jarvis, 1994; Ross, Blanc, McNeil, Eyber, & Hembree-Kigin, 1998)

Hypotheses

Hypothesis 1: BASC subtypes. Cluster analysis of the BASC (PRS-P) clinical scales will result in the identification of several distinct dimensions of psychopathology in the present clinical sample. Based upon findings of the previous cluster-analytic research investigations, it is reasonable to expect that the following subtypes will be identified: (I) normal subtype, (II) pure externalizing subtype; (III) pure internalizing subtype; (IV) severe subtype with elevations on both externalizing and internalizing scales; and (V) externalizing with attention problems subtype. As the consistency of identified behaviour problem subtypes is limited, no other predictions regarding more narrow band dimensions will be made.

Hypothesis 2: Reliability (Internal Validity) of BASC subtypes. There will be a significant degree of similarity between subtypes derived from each of the split-half samples.

Hypothesis 3: The BASC derived clusters will differ on measures of adaptive behaviour and parental stress (External Validity). Given the finding that adaptive behaviours serve a protective role in terms of the development of children's behaviour problems, it is expected that the normal subtype will exhibit the highest level of adaptive behaviours and those preschool children with the most severe behaviour problems will demonstrate the lowest level of adaptive behaviour. In addition, it is expected that children characterized by more externalizing behaviour problems will have lower levels of adaptive behaviour than children with internalizing behaviour problems.

Based on previous research, it is also expected that more severe subtypes (e.g., both externalizing and internalizing behaviour problems) will be related to the highest levels of parental stress, followed by subtypes of an externalizing nature, and the relatively least stressful will be clusters representing predominantly internalizing behaviour problems and those preschoolers who are free of any behaviour problems (i.e., normals).

Chapter II

Method

Subjects

The sample for the present investigation consisted of 268 children (171 male, 97 female) between the ages of 2½ and 5 years (M = 53.54 months, SD = 8.11). Participating children were predominantly Caucasian (n = 221, 82.5%) and the participating parent was generally the child's mother (n = 257, 95.9%). The 268 subjects were obtained from archival data of consecutive referrals for the past five years to The Child's Place, a preschool children's mental health centre in Windsor, Ontario. Referred children receive an initial screening to determine their suitability for an Assessment/Day Treatment program that services children experiencing significant emotional and behavioural problems. As part of the intervention model, children identified as in need of treatment are integrated with children who do not demonstrate clinically significant problems ("normative children"). For the normative children, both the child and the family have been determined to have no demonstrated need for psychological intervention and are functioning within "normal" or adequate limits as determined by the same screening process. Unfortunately, due to the fact that information was not available in the psychological assessment screening file indicating which children were identified as peer models and which were identified for treatment placements, the exact number of "normal" versus clinical children is not known. However, it is known that of those children accepted to the Assessment/Day Treatment program each year, 20% are considered to be normative. It is also known that very few children who are screened to be peer models are rejected. Therefore, it is assumed that in the current sample the

number of "normal" children is in the range of 20 -25% and the number of "clinical" children is in the range of 75 - 80%. Participants in the present investigation represent an independent sample of subjects that have not been previously used in any other subtyping investigation.

To examine issues related to reliability of the findings the sample was randomly split in half. Sample 1 consisted of 134 children (91 male, 43 female) with a mean age of age of 53.81 months (SD = 8.91) who were predominantly Caucasian (n = 107, 79.90%) and the participating parent was generally the child's mother (n = 128, 95.50%). Similarly, Sample 2 consisted of 134 children (80 male, 54 female) with a mean age of 53.28 months (SD = 7.26) who were predominantly Caucasian (n = 114, 85.10%) and the participating parent was generally the child's mother (n = 129, 96.30%). Refer to Table 3 for a complete description of the demographic characteristics of Sample 1, Sample 2, and the total sample.

Measures

Parent Rating Scale-Preschool (PRS-P) of the BASC. The primary assessment instrument used for the purposes of the present investigation was the Behavior Assessment System for Children, Parent Rating Scale for ages 2½-5 (BASC, PRS-P; Reynolds & Kamphaus, 1992). The PRS-P is but one component of the BASC, which also includes parent rating scales for children (ages 6-11) and adolescents (ages 12-18), as well as teacher rating scales for all three age groups, self-report scales, a classroom observation system, and a history form. The PRS-P is comprised of 131 items that are rated on a four-point scale: *never, sometimes, often*, and *almost always* in response to behaviours observed in the preschool child in the previous six months. The items are

Table 3

Distribution of Gender, Age, Ethnicity, and Gender of Parent of Participating Children

	Sample 1 (n = 134)		Sample 2 (n = 134)		Total (n = 268)	
Variable	*n*	%	*n*	%	*n*	%
Gender:						
Male	91	67.90	80	59.70	171	63.80
Female	43	32.10	54	40.30	97	36.20
Age:						
2	3	2.20	1	0.70	4	1.50
3	21	15.50	19	14.20	40	14.90
4	72	53.70	83	61.90	155	57.80
5	38	28.40	31	23.10	69	25.70
Ethnicity:						
Caucasian	107	79.90	114	85.10	221	82.50
Black	9	6.70	8	6.00	17	6.30
Hispanic	1	1.50	0	0.00	2	0.70
Asian	2	2.20	5	3.70	8	3.00
Other [a]	13	9.70	7	5.20	20	7.50
Completed by:						
Mother	128	95.50	129	96.30	257	95.90
Father	6	4.50	5	3.70	10	4.10

[a] Did not identify themselves as members of Caucasian, Black, Hispanic, or Asian groups

written at a third grade reading level. Audiocassettes of all levels of the PRS are available for those with a limited ability in reading English.

The BASC PRS-P has a complex and sophisticated structure that includes four composite scales (Externalizing Problems, Internalizing Problems, Adaptive Skills, and Behavioral Symptoms Index), two adaptive scales (Adaptability and Social Skills), and eight clinical scales (Aggression, Anxiety, Attention Problems, Atypicality, Depression, Hyperactivity, Somatization, and Withdrawal). There is no item overlap across any of the clinical or adaptive scales. In addition to these scales, the BASC rating scales contain an F index, which is a validity scale designed to detect excessively negative responses made by a parent (see Table 4 for a complete listing of BASC PSR-P composite, clinical, and validity scales). Raw scores on the BASC are converted to *T*-scores that are converted to five possible classification levels: "Very Low" (*T*-scores of 30 and lower), "Low" (*T*-scores between 31-40), "Average" (*T*-scores between 41-59), "At-Risk" (*T*-scores between 60-69), and "Clinically Significant" (*T*-scores of 70 or higher). Classification levels for BASC adaptive scales are in the opposite direction from those of the clinical scales, but retain the classification levels.

Four sets of normative tables were developed based on linear transformation of raw scores to *T*- scores: General, Male, Female, and Clinical. The current study uses the General norms for a number of reasons: (1) gender separate norms can mask gender differences (Kamphaus & Frick, 1996); (2) the bulk of the evidence suggests that gender differences are not marked in preschool children (Campbell, 1995); (3) and previous cluster analytic studies utilizing the BASC have employed General norms (Kamphaus et al., 1997; Kamphaus et al., 1999).

Table 4
Scale Structure of the Parent Rating Scale-Preschool of the Behaviour Assessment System for Children, with Brief Description

Name of Scale	Brief Description
F Index	Infrequency index designed to detect excessively negative responses made by parent.
Externalizing Problems	Composite Scale – Aggression and Hyperactivity
Aggression	The tendency to act in a hostile manner (either verbal or physical) that is threatening to others.
Hyperactivity	The tendencies to be overly active, rush through work or activities, and act without thinking.
Internalizing Problems	Composite Scale – Anxiety, Depression, and Somatization
Anxiety	The tendency to be nervous, fearful, or worried about real or imagined problems.
Depression	Feelings of unhappiness, sadness, and stress that may result in an inability to carry out everyday activities or may bring on thoughts of suicide
Somatization	The tendency to be overly sensitive to and complain about relatively minor physical problems and discomforts.
Additional Scales	
Atypicality	The tendency to behave in ways that are immature, considered "odd," or commonly associated with psychosis (such as experiencing visual or auditory hallucinations).
Withdrawal	The tendency to evade others to avoid social contact.
Attention Problems	The tendency to be easily distracted and unable to concentrate more than momentarily.
Behavioral Symptoms Index	Composite – Hyperactivity, Aggression, Anxiety, Depression, and Attention Problems
Adaptive Skills	Composite – Adaptability and Social Skills
Adaptability	The ability to adapt readily to changes in the environment.
Social Skills	The skills necessary for interacting successfully with peers and adults in home, school, and community settings.

The BASC manual details substantial reliability and validity evidence. Internal consistency reliabilities for the PRS-P are in the median .70 range for the scale scores, and in the .80 to .90 range for composite scores. Short-term test-retest reliability for the preschool forms is high, with a median value of .85. Interrater reliability between parents for the preschool form is reported, and spans the .30 to .50 ranges. Convergent construct validity for PRS-P is demonstrated in the manual through significant correlations with the Child Behavior Checklist and Personality Inventory for Children. Construct validity of the BASC rating scales is further demonstrated in the manual through showing sensitivity to differences among various clinical groups, although it is unclear how much the preschool forms were represented in these studies.

Parenting Stress Index (PSI; Abidin, 1995). The PSI provides a measure of the magnitude of stress in the parent-child interaction. Parents rate 101 items on a 5-point scale, and scores are summed to form 13 subscale scores in two broad domains: stress that results from characteristics of the parent, and stress that results from characteristics of the child. Items cover areas such as the marital relationship, parental depression, parental attachment to the child, various aspects of the child's temperament, and the degree to which the child is reinforcing to the parent. A complete listing of PSI composite scales and subscales can be found in Table 5. The construct and predictive validity of the PSI has been established by a large number of studies with a variety of populations (e.g., developmental, behavioural problems, disabilities and illness, and at-risk families). These are documented in the manual (Abidin, 1995).

Procedures

Data collected consisted of profiles generated from the BASC parent rating scales. Profiles were obtained from archival data generated as part of the prescreening process for preschoolers referred to the mental health agency to determine their suitability for an Assessment/Day Treatment program. PSI scores were collected in a similar manner. The first intent of the present study was to generate empirically derived patterns of preschool children's behaviour problems based on parent report data. The data utilized in the clustering procedure consisted of the eight clinical scales of the BASC (i.e., Aggression, Hyperactivity, Anxiety, Depression, Somatization, Attention Problems, Atypicality, and Withdrawal) as they were variables that broadly sampled maladaptive behaviours that are exhibited in home and community settings. Based on the work of previous investigators (i.e., Saunders, Hall, Casey, & Strang, 2000; Gdowski et al., 1985), the BASC clinical scales were recoded from their original *T*-scores into a finite ordinal scale (see Table A1). The recoded scores reflect the *T*-score interpretative ranges recommended by Reynolds and Kamphaus (1992). *T*- scores were recoded to reflect clinically significant profile elevations that would yield the most distinct cluster solutions with respect to their behavioural correlates by emphasizing profile pattern rather than profile elevation. In order to identify subtypes of BASC profiles within the clinical sample the clustering procedure employed generally followed the steps outlined in Hair and Black (1998).

Prior to beginning the clustering procedure, the data were inspected for potential outliers. Outliers may represent a rare profile of scores due to errors of measurement, or a presentation of problems not commonly found in the population. It has long been

Table 5

Scale Structure of the Parenting Stress Index with Brief Description

Name of Scale	Brief Description
Defensive Responding	Validity Scale – indicating that individual may be responding in a defensive manner
Child Domain	Composite Scale – consisting of: DI, AD, RE, DE, MO, AC
Distractibility/Hyperactivity (DI)	Associated with children who display many of the behaviours associated with ADHD (e.g., overactivity, short attention span, etc.)
Adaptability (AD)	Associated with the child's inability to adjust to changes in his or her physical or social environment.
Reinforces Parent (RE)	Associated with the degree to which parent experiences child as source of positive reinforcement.
Demandingness (DE)	Associated with parent experiencing the child as placing many demands upon him or her.
Mood (MO)	Associated with children whose affective functioning shows evidence of dysfunction.
Acceptability (AC)	Associated with child possessing characteristics (physical, emotional, intellectual) that do not match parent expectations.
Parent Domain	Composite Scale – consisting of : CO, IS, AT, HE, RO, DP, SP
Competence (CO)	Associated with parent's sense of competence in the role of parent.
Isolation (IS)	Associated with parent feeling isolated from support systems.
Attachment (AT)	Associated with parent not feeling sense of emotional closeness to child and/or parent's difficulty in understanding child's needs.
Health (HE)	Associated with deterioration in parental health.
Role Restriction (RO)	Associated with parent experiencing the parental role as restricting.
Depression (DP)	Associated with the presence of significant depression in parent.
Spouse (SP)	Associated with parents who are lacking emotional and active support of the other parent in child management.
Total Stress	Composite Scale – consisting of Child and Parent Domain Scales
Life Stress	Associated with index of the amount of stress outside the parent-child relationship that parent is currently experiencing (e.g., loss of job, death of family member)

recognized that the results of cluster analysis may be disturbed by these multivariate outliers (Hair & Black, 1998). Following the recommendation of Bergman and Magnusson (1997), an a priori decision was made to place identified outliers into a residue group that would not be classified with the remainder of the sample but would be described separately. Potential outliers were identified and their profiles inspected to assure the validity of these cases. For example, a check was conducted to ensure that all obtained *T*-scores were possible according to the norms tables, and a search was made for unlikely patterns (e.g., an Aggression scale score of 90 with all other *T*-scores within the average range). No apparent invalid profiles or cases were identified or removed to a residue group as a result of this process.

The clustering method selected for use in the current study was based on the recommendation of Blashfield and Aldenderfer (1988). Euclidian distance was used as the similarity index. The clustering procedure involved a two-step procedure. Ward's method, a hierarchical agglomerative procedure, was used to identify initial cluster solutions because of its tendency to produce homogeneous cluster solutions in which within-cluster variance is minimized (Milligan & Cooper, 1987). A drawback of a hierarchical analysis is that once a case is assigned to a cluster, it cannot be removed (i.e., its cluster membership cannot change). Therefore, the second step in the clustering procedure involved a *K*-means analysis, an iterative clustering method that was used to refine the hierarchical cluster solution. The intent of the *K*-means analysis was to make possible shifts in cluster membership of cases by correcting fusion errors that occur during the hierarchical cluster analysis. To accomplish this, the cluster centroids

obtained from the hierarchical analysis were used as the initial seeds for the *K*-means analysis.

The claim has been made in the literature that cluster analysis can produce distinct groups of cases using completely "random data" (Huberty, DiStefano, & Kamphaus, 1997). In addition, different methods of analysis will often produce different solutions. As a result, the reliability and validity of the resulting typology is of concern. Hence, replication of subtypes is essential when determining the reliability of empirically derived subtypes (Hair & Black, 1998). To account for these issues and ensure the reliability of the final cluster solution, the sample was randomly split in half and a two-step cluster analysis was performed on each half-sample. The degree of similarity between the cluster patterns derived from each of the split-half samples was then correlated.

To determine the external validity of the cluster solution (i.e., the behaviour problem subtypes), variables were selected that were not used to form the clusters, but known to vary across the clusters (i.e., ratings of adaptive behaviour and parental stress). In the present study, the BASC Adaptive Skills scales (i.e., Social Skills and Adaptability scales) were used as independent measures of adaptive behaviours. Ratings of parental stress, as measured by the Parenting Stress Inventory (PSI), were also chosen as external variables to assess cluster distinctiveness, as the literature has indicated that different levels of parental stress are associated with different types of behaviour problems exhibited by their child (e.g., Conte, 1998; Ross, 1998). MANOVAs were conducted based on cluster membership for the entire sample to determine whether differences were evident on the BASC Adaptive Skills measures and various PSI measures for the identified clusters. PSI scores were transformed into linear *T*-scores prior to analysis.

Four separate MANOVAs were conducted to examine for differences in: (a) the Social Skills and Adaptability scales of the BASC; (b) the individual scales within the Child Domain of the PSI; (c) the individual scales within the Parent Domain of the PSI; and (d) the broadband composite scores of the PSI (Child Domain, Parent Domain, and Life Stress). A post-hoc comparison of significant MANOVA results using Tukey's HSD was conducted to examine differences between individual clusters.

Chapter III

Results

Overview of Data Analysis

The present study was designed to build upon prior efforts to produce a meaningful typology of preschool children's behaviour problems. To this end, a series of cluster analyses were applied to parent-report profiles to identify multivariate subtypes of psychopathology exhibited by the sample. To ensure the internal validity of the BASC subtypes, the sample was randomly split into two equal halves and a two-step cluster-analysis procedure was conducted on each half. The relationships between mean profile patterns of derived subtypes from each of the split-half samples were then compared. To examine the external validity of the subtypes, the BASC subtypes were compared on several variables not utilized during cluster analysis by means of four separate MANOVAs.

Hypothesis 1: BASC Subtypes

Cluster analytic findings. It was predicted that cluster analysis of the BASC profiles would indicate several distinct dimensions of preschool children's behaviour problems in the present sample. Examination of the agglomerative schedules and dendograms for the cluster analyses conducted on the split-half samples (i.e., Ward's method) suggested that 4 to 6 clusters would provide the best description of the data. In addition, visual inspection of the data and initial grouping of the data set using a number of *K*-means analyses (specified for a solution of 4 to 6), and examination of the resulting pseudo-*F* statistics indicated that a 5 cluster solution would likely best represent the data for each of the split-half samples.

Taking these findings into consideration, the interpretability and clinical relevance of each cluster solution was examined to determine the final number of clusters. Although this criterion is somewhat subjective, no quantitative criteria have been proven effective for determining the best number of clusters across all techniques and samples (Everitt, 1980). Furthermore, it has been suggested that replicability (i.e., reliability) and clinical interpretability are superior to quantitative methods when evaluating the adequacy of a specific cluster solution (Fuerst, 1991). The meaningfulness of clusters was determined using several rational criteria, including cluster mean deviance from average, similarity of shape to well recognized syndromes, similarity to subtype dimensions that have previously been identified in the child psychopathology literature, and the size of cluster. Based upon this evaluation, a five-cluster solution was chosen for each of the split-half samples.

For clarity, descriptive labels summarizing the major features of the BASC profiles were assigned to each cluster. For each of the five subtypes, mean BASC *T*-scores were calculated for all scales and composite scales for Sample 1 (see Table 6) and Sample 2 (see Table 7), resulting in the profiles presented in Figures 1 through 5. These five clusters yielded several interpretable and distinct subtypes that were consistent with several patterns of psychopathology reported in the literature: one cluster indicating the absence of any behaviour problems (Normal; Figure 1); one cluster indicating a primary concern with attention problems (Attention Problems; Figure 2); one cluster indicating concerns with both externalizing problems (i.e., Aggression and Hyperactivity) and attention problems (Disruptive Behaviour Problems; Figure 3); one cluster almost

Table 6

Means and Standard Deviations for the Five Subtypes of Preschool Children's Behaviour Problems - Sample 1

	BASC Scale							
Subtype	AG	HY	AX	DP	SM	ATN	ATY	WD
1. (Norm); *n* = 40 (30%)								
M	46.30	47.08	43.98	43.28	44.30	49.13	49.15	45.95
SD	9.21	8.33	8.62	7.97	8.85	8.88	11.13	8.88
2. (Attn); *n* = 30 (22%)								
M	47.87	57.10	53.03	55.47	48.60	69.37	59.43	61.97
SD	12.27	13.45	9.44	10.43	10.01	10.55	11.84	12.56
3. (DPB); *n* = 22 (16%)								
M	69.18	68.45	50.73	57.32	50.55	70.18	46.32	41.59
SD	10.34	9.78	7.97	9.53	11.11	17.30	7.59	7.81
4. (DPB/ATY); *n* = 21 (16%)								
M	69.14	78.95	49.43	61.19	50.81	79.33	79.81	48.10
SD	11.63	7.71	10.32	10.41	8.68	9.14	12.04	10.93
5. (Mix); *n* = 21 (16%)								
M	80.67	76.52	61.57	75.33	52.90	68.19	74.10	55.38
SD	7.89	8.98	13.56	9.87	9.49	15.16	18.65	13.43

Note: *AG:* Aggression; *HY:* Hyperactivity; *AX:* Anxiety; *DP:* Depression; *SM:* Somatization; *ATN:* Attention Problems; *ATY:* Atypicality; *WD:* Withdrawal; *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Table 6 (cont.)

Means and Standard Deviations for the Five Subtypes of Preschool Children's Behaviour Problems - Sample 1

	BASC Scale					
Subtype	EXT	INT	BSI	AD	SS	ASC
1. (Norm); *n* = 40 (30%)						
M	47.52	43.90	50.47	46.72	48.03	48.13
SD	10.36	14.02	31.21	10.44	10.68	14.66
2. (Attn); *n* = 30 (22%)						
M	55.53	53.17	60.83	39.10	42.47	39.87
SD	6.20	8.40	7.14	8.21	8.83	7.80
3. (DPB); *n* = 22 (16%)						
M	70.09	55.10	64.64	41.40	39.95	39.95
SD	8.11	7.14	6.69	10.65	11.16	10.84
4. (DPB/ATY); *n* = 21 (16%)						
M	76.38	52.24	77.86	36.57	39.38	36.90
SD	8.82	13.00	8.26	8.84	8.76	8.60
5. (Mix); *n* = 21 (16%)						
M	81.43	67.24	81.95	35.19	40.14	36.76
SD	6.93	8.25	6.81	12.43	13.80	14.86

Note: *EXT:* Externalizing Problems Composite; *INT:* Internalizing Problems Composite; *BSI:* Behavioral Symptoms Index; *AD:* Adaptability; *SS:* Social Skills; *ASC*: Adaptive Skills Composite; *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Table 7

Means and Standard Deviations for the Five Subtypes of Preschool Children's Behaviour Problems - Sample 2

	BASC Scale							
Subtype	AG	HY	AX	DP	SM	ATN	ATY	WD
1. (Norm); *n* = 37 (27%)								
M	49.62	51.68	48.30	47.65	45.62	54.81	48.41	48.05
SD	11.36	7.85	9.37	9.73	7.78	8.69	8.28	8.24
2. (Attn); *n* = 20 (15%)								
M	53.00	60.25	52.80	55.85	59.70	69.10	60.65	61.45
SD	6.99	9.93	10.50	6.95	13.20	11.00	11.20	16.07
3. (DPB); *n* = 25 (19%)								
M	71.04	76.08	45.44	55.48	46.40	69.60	51.20	44.72
SD	11.22	8.64	9.51	11.86	8.23	11.40	6.72	9.83
4. (DPB/ATY); *n* = 25 (19%)								
M	70.12	80.08	49.68	61.40	51.44	82.04	75.92	41.28
SD	9.69	8.54	8.47	8.72	10.58	10.04	14.23	5.93
5. (Mix); *n* = 27 (20%)								
M	79.15	77.37	66.33	77.85	57.30	75.52	78.37	60.78
SD	11.80	11.95	13.06	13.11	15.72	11.68	16.94	15.14

Note: *AG:* Aggression; *HY:* Hyperactivity; *AX:* Anxiety; *DP:* Depression; *SM:* Somatization; *ATN:* Attention Problems; *ATY:* Atypicality; *WD:* Withdrawal; *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Table 7(cont.)

Means and Standard Deviations for the Five Subtypes of Preschool Children's Behaviour Problems - Sample 2

	BASC Scale					
Subtype	EXT	INT	BSI	AD	SS	ASC
1. (Norm); *n* = 37 (27%)						
M	51.41	46.49	50.32	48.81	44.92	46.86
SD	7.97	8.05	7.66	8.94	10.61	9.76
2. (Attn); *n* = 20 (15%)						
M	57.30	58.10	62.55	37.65	41.25	38.55
SD	8.12	9.39	7.89	8.02	10.50	8.78
3. (DPB); *n* = 25 (19%)						
M	76.00	48.76	66.44	37.58	37.60	36.28
SD	8.00	8.05	7.74	8.21	10.38	9.08
4. (DPB/ATY); *n* = 25 (19%)						
M	77.64	55.60	78.12	36.60	34.84	34.56
SD	8.46	8.43	7.83	10.69	9.00	9.49
5. (Mix); *n* = 27 (20%)						
M	81.00	72.22	85.70	31.07	37.56	32.74
SD	11.58	12.18	9.62	9.33	9.99	9.23

Note: *EXT:* Externalizing Problems Composite; *INT:* Internalizing Problems Composite; *BSI:* Behavioral Symptoms Index; *AD:* Adaptability; *SS:* Social Skills; *ASC*: Adaptive Skills Composite; *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

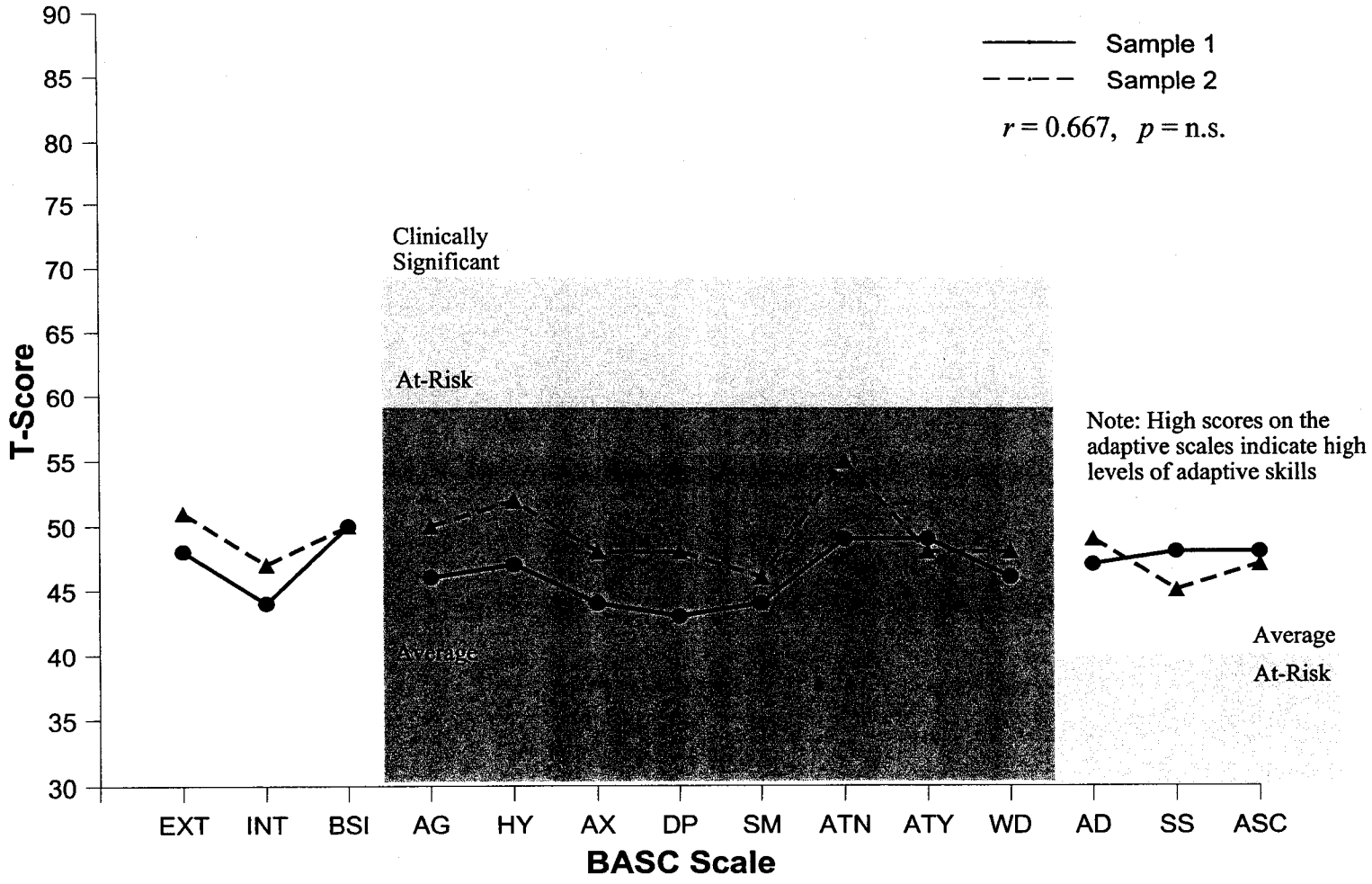

Figure 1. Mean BASC profile for the Normal subtype

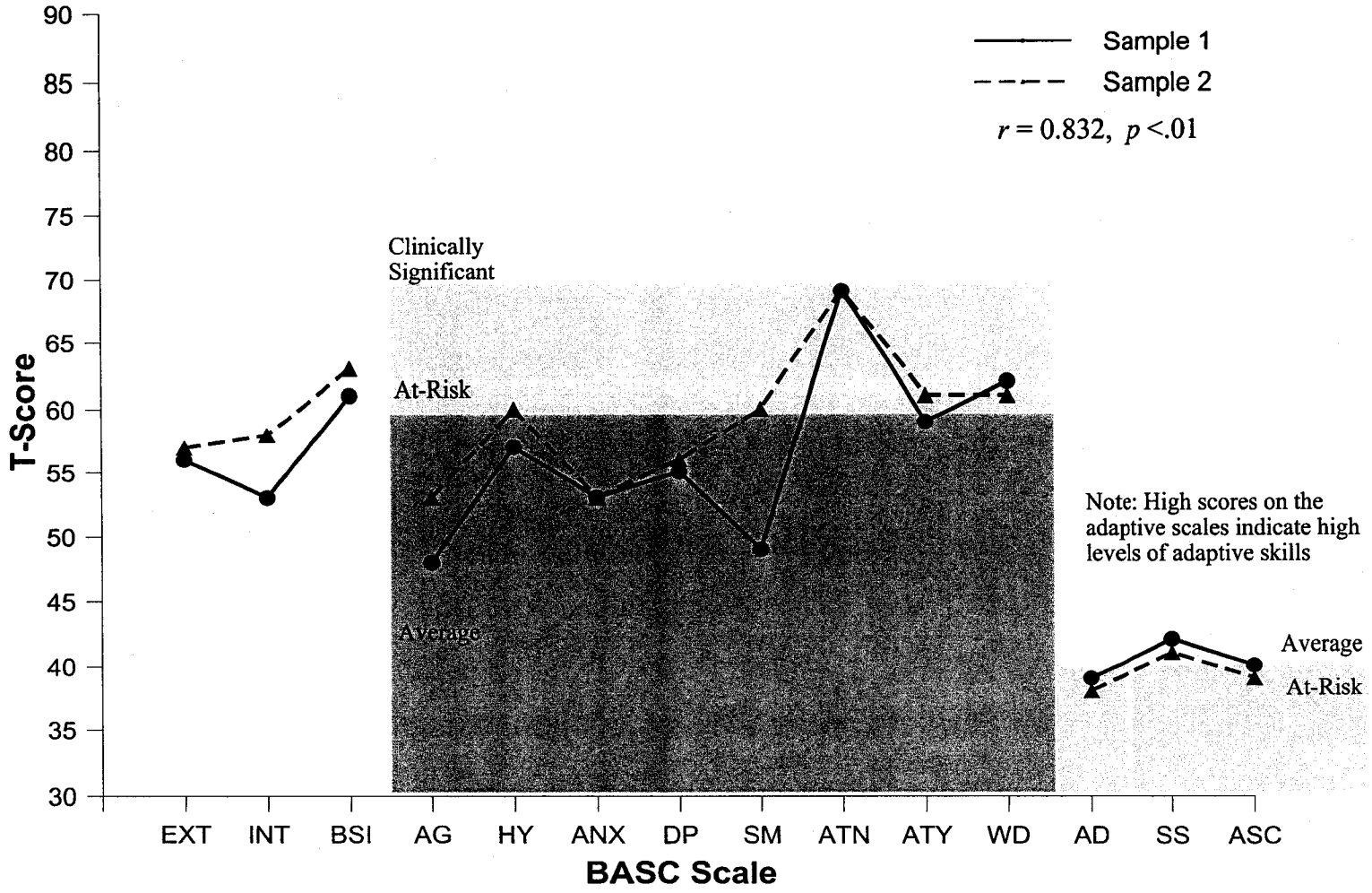

Figure 2. Mean BASC profile for the Attention Problems subtype

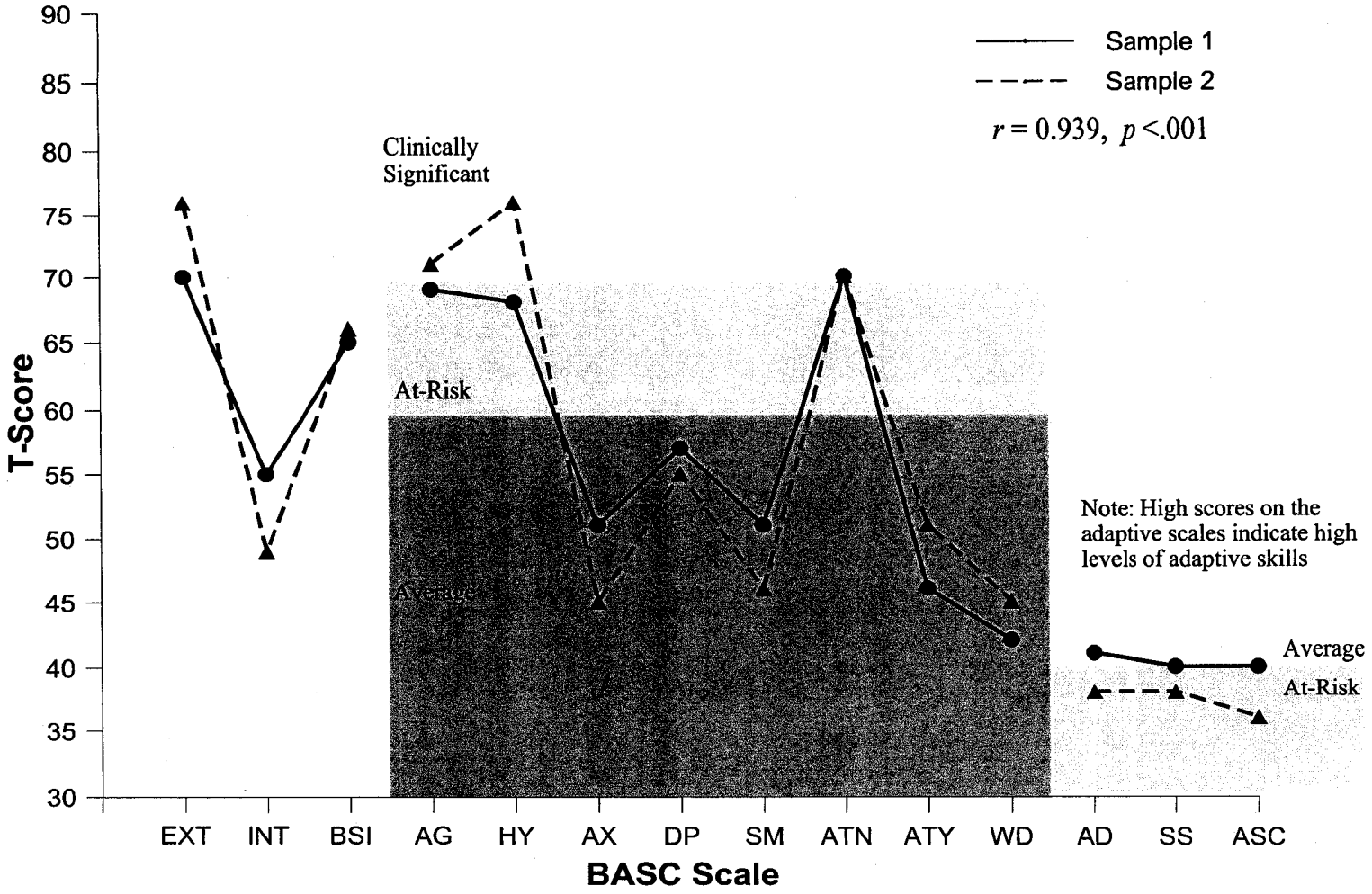

Figure 3. Mean BASC profile for the Disruptive Behaviour Problems subtype

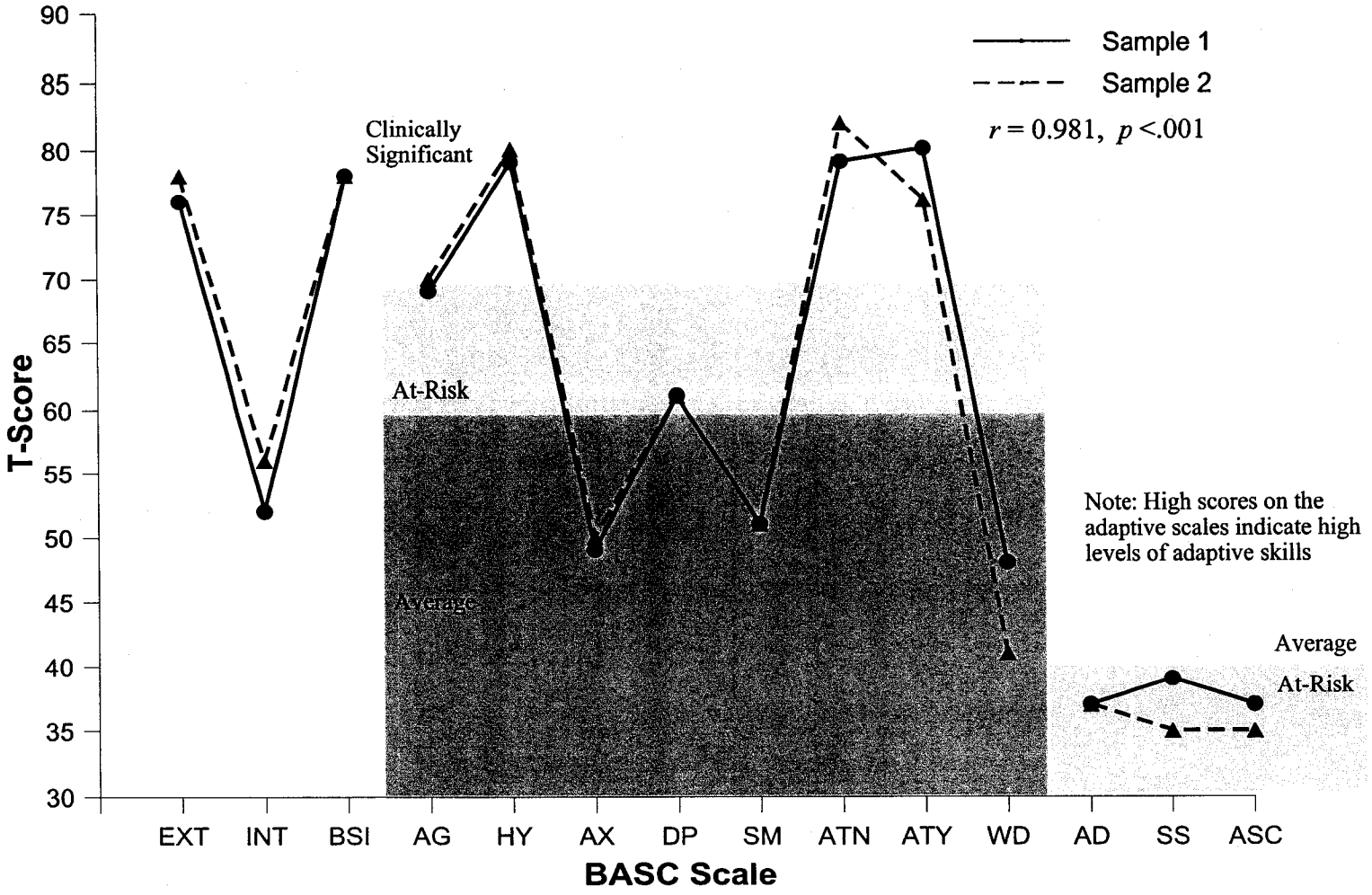

Figure 4. Mean BASC profile for the Disruptive Behaviour Problems /Atypical subtype

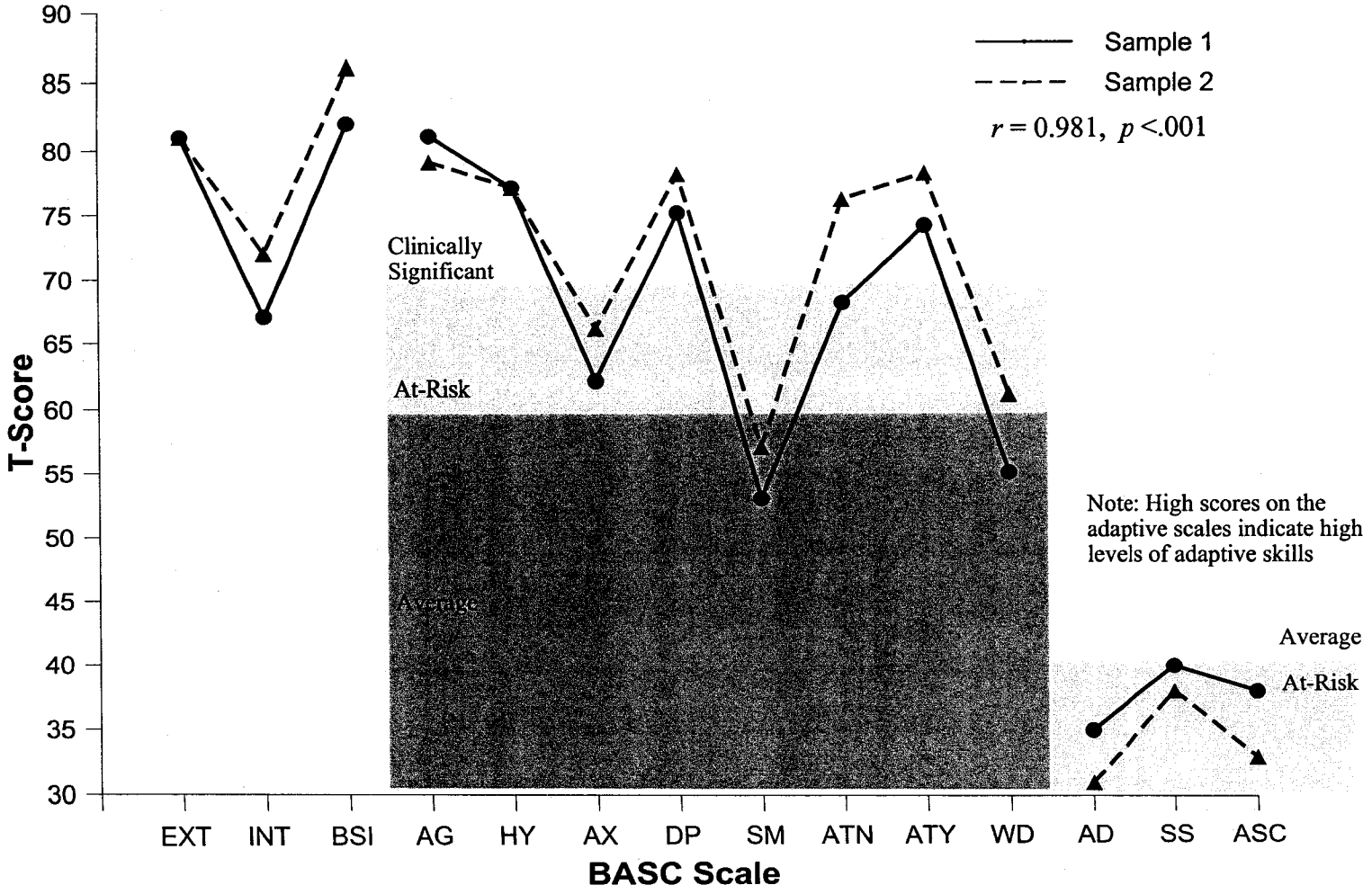

Figure 5. Mean BASC profile for the Mixed subtype

identical to the Disruptive Behaviour Problems cluster but in addition a concern with atypical behaviour (Disruptive Behaviour Problems/Atypical; Figure 4); and one cluster with both externalized and internalized behaviour problems (Mixed; Figure 5). Table 8 presents the proportion of subjects in each of the five BASC subtypes for the two half-samples as well as the total sample.

Relationship to known subtypes of preschool children's behaviour problems. It was anticipated that subtypes similar to those reported in the literature for both preschool and school aged children would be identified in this investigation using the BASC. Based upon the findings of previous subtyping research investigations involving both factor and cluster analytic studies it was expected that BASC subtypes would be identified for mean profiles characterized by: (I) normal subtype, (II) pure externalizing subtype; (III) pure internalizing subtype; (IV) severe subtype with elevations on both externalizing and internalizing scales; and (V) externalizing with attention problems subtype.

Visual inspection of Figures 1 through 5 suggested that almost all the BASC patterns appeared to be very similar to those identified in the previous investigation of school-aged children's behaviour problems utilizing the BASC (i.e., Kamphaus et al., 1999) as well as previous investigations of preschool children's behaviour problems. For example, profiles characterized by an absence of behaviour problems, attention problems, externalizing behaviour problems along with attention problems (i.e., Disruptive Behaviour Problems subtype), and internalized/externalized features were found in the present study. In addition, a profile characterized by significant externalizing problems along with significant atypical behaviours was also reported. However, not all of the previously identified patterns of behaviour problems were in evidence for the present data

Table 8

Percentage of Subjects Within Sample 1, Sample 2, and Total Sample groups for Each of the Five BASC Subtypes

	Sample 1		Sample 2		Total Sample	
Subtype	*n*	%	*n*	%	*n*	%
1. (Norm)	40	29.9	37	27.6	77	28.7
2. (Attn)	30	22.4	20	14.9	50	18.7
3. (DBP)	22	16.4	25	18.7	47	17.5
4. (DBP/ATY)	21	15.7	25	18.7	46	17.2
5. (Mix)	21	15.7	27	20.1	48	17.9

Note: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

set. Specifically, no pure externalizing or internalizing profiles were identified.

Hypothesis 2: Reliability (Internal Validity) of BASC subtypes.

Given the somewhat subjective nature of cluster analysis with regard to selecting an "optimal" cluster solution, great care should be taken in ensuring the reliability of the final cluster solution. Although no single method exists to ensure reliability, one common approach is to split the sample into two groups. Each cluster is then analyzed separately, and the results are then compared (Hair & Black, 1998). Such a procedure was utilized in the current investigation to ensure the reliability of derived subtypes. It was hypothesized that the subtypes derived from the cluster analyses of each of the split-half samples would be significantly similar.

The relationship between each pair of mean profile patterns for the five BASC subtypes was correlated to determine their degree of pattern similarity. Significant correlations were found for four of the five subtypes: Attention Problems ($r = 0.832, p < .01$); Disruptive Behaviour Problems ($r = 0.939, p < .001$); Disruptive Behaviour Problems/Atypical ($r = 0.981, p < .001$); and Mixed ($r = 0.971, p < .001$). The only subtype for which a significant correlation was not found was the Normal subtype ($r = 0.677, p =$ n.s.). Given the very low variance in the Normal subtype profiles (i.e., a "flat" profile) a low correlation between the two patterns is not unusual (Saunders, 2000). Due to similarities between pattern profiles for Samples 1 and 2, the samples were collapsed and cluster membership for the entire sample was used in determining external validity of derived subtypes (see Table 9 and Figures 6 through 10).

Table 9

Means and Standard Deviations for the Five Subtypes of Preschool Children's Behaviour Problems - Total Sample

	BASC Scale							
Subtype	AG	HY	AX	DP	SM	ATN	ATY	WD
1. (Norm); *n* = 77 (29%)								
M	47.90	49.29	46.05	45.38	44.94	51.86	48.79	46.96
SD	10.37	8.37	9.19	9.07	8.33	9.19	9.81	8.59
2. (Attn); *n* = 50 (19%)								
M	49.92	58.36	52.94	55.62	53.04	69.26	59.92	61.76
SD	10.70	12.16	9.77	9.11	12.53	10.62	11.49	13.92
3. (DPB); *n* = 47 (17%)								
M	70.17	72.51	47.91	56.34	48.34	69.87	48.91	43.26
SD	10.75	9.87	9.13	10.76	9.80	14.30	7.48	8.98
4. (DPB/ATY); *n* = 46 (17%)								
M	69.67	79.57	49.57	61.30	51.15	80.80	77.70	44.39
SD	10.51	8.10	9.25	9.42	9.66	9.63	13.28	9.15
5. (Mix); *n* = 48 (18%)								
M	79.81	77.00	64.25	76.75	55.38	72.31	76.50	58.42
SD	10.20	10.65	13.35	11.76	13.41	13.67	17.65	14.52

Note: *AG:* Aggression; *HY:* Hyperactivity; *AX:* Anxiety; *DP:* Depression; *SM:* Somatization; *ATN:* Attention Problems; *ATY:* Atypicality; *WD:* Withdrawal; *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Table 9 (cont.)

Means and Standard Deviations for the Five Subtypes of Preschool Children's Behaviour Problems - Total Sample

	BASC Scale					
Subtype	EXT	INT	BSI	AD	SS	ASC
1. (Norm); *n* = 77 (29%)						
M	49.39	45.14	50.40	47.73	46.53	47.52
SD	9.43	11.55	22.97	9.74	10.69	12.48
2. (Attn); *n* = 50 (19%)						
M	56.24	55.14	61.52	38.52	41.98	39.34
SD	7.01	9.05	7.42	8.08	9.45	8.14
3. (DPB); *n* = 47 (17%)						
M	73.23	51.17	65.60	39.36	38.70	38.00
SD	8.50	8.56	7.24	9.54	10.70	10.00
4. (DPB/ATY); *n* = 46 (17%)						
M	77.07	55.37	78.00	36.59	36.91	35.63
SD	8.55	7.79	7.94	9.78	9.08	9.07
5. (Mix); *n* = 48 (18%)						
M	81.19	70.04	84.06	32.88	38.69	34.50
SD	9.73	10.83	8.63	10.87	11.74	12.05

Note: *EXT:* Externalizing Problems Composite; *INT:* Internalizing Problems Composite; *BSI:* Behavioral Symptoms Index; *AD:* Adaptability; *SS:* Social Skills; *ASC*: Adaptive Skills Composite; *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/ Atypical subtype; *Mix:* Mixed subtype.

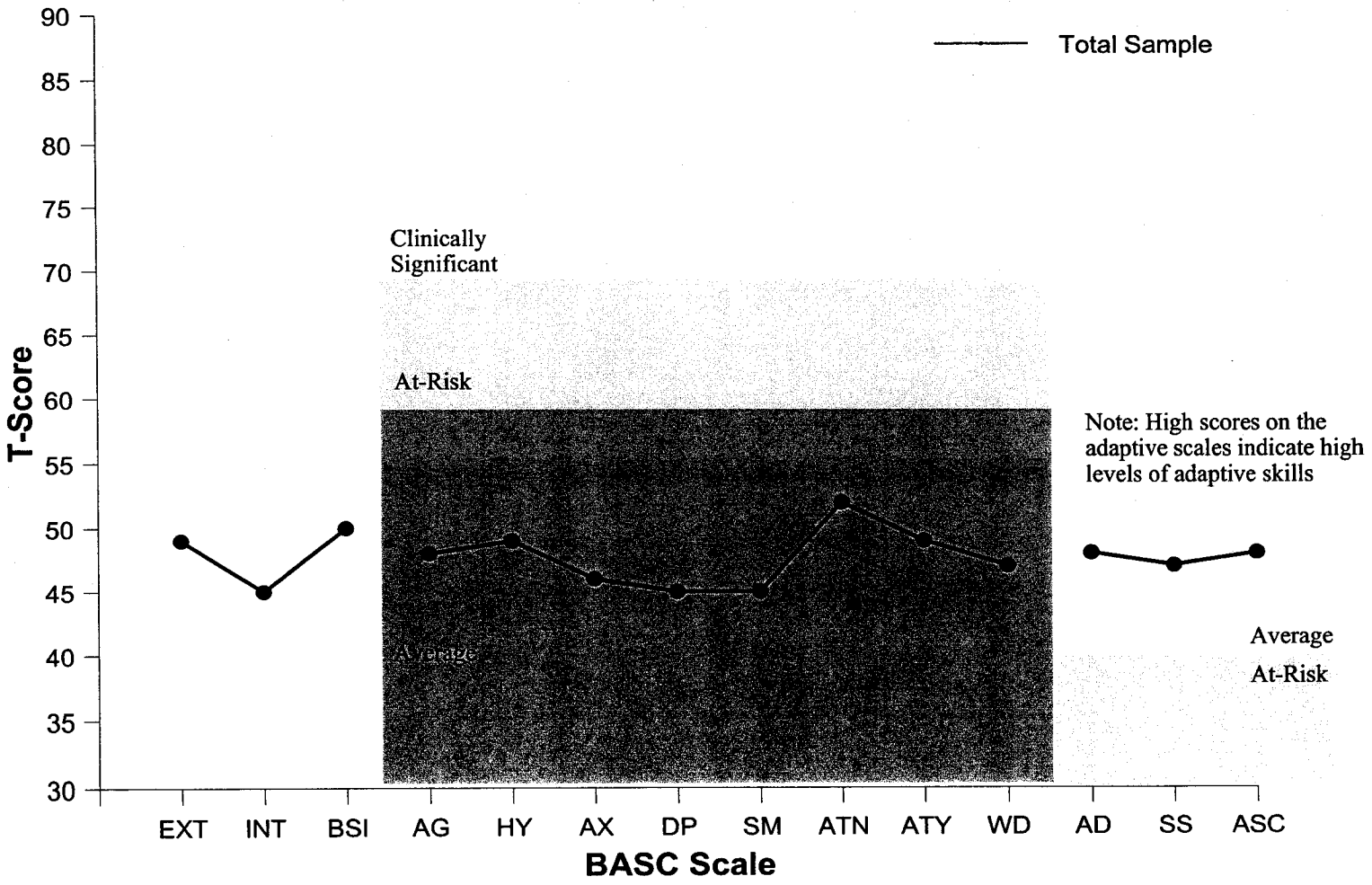

Figure 6. Mean BASC profile for the Normal subtype - Total Sample

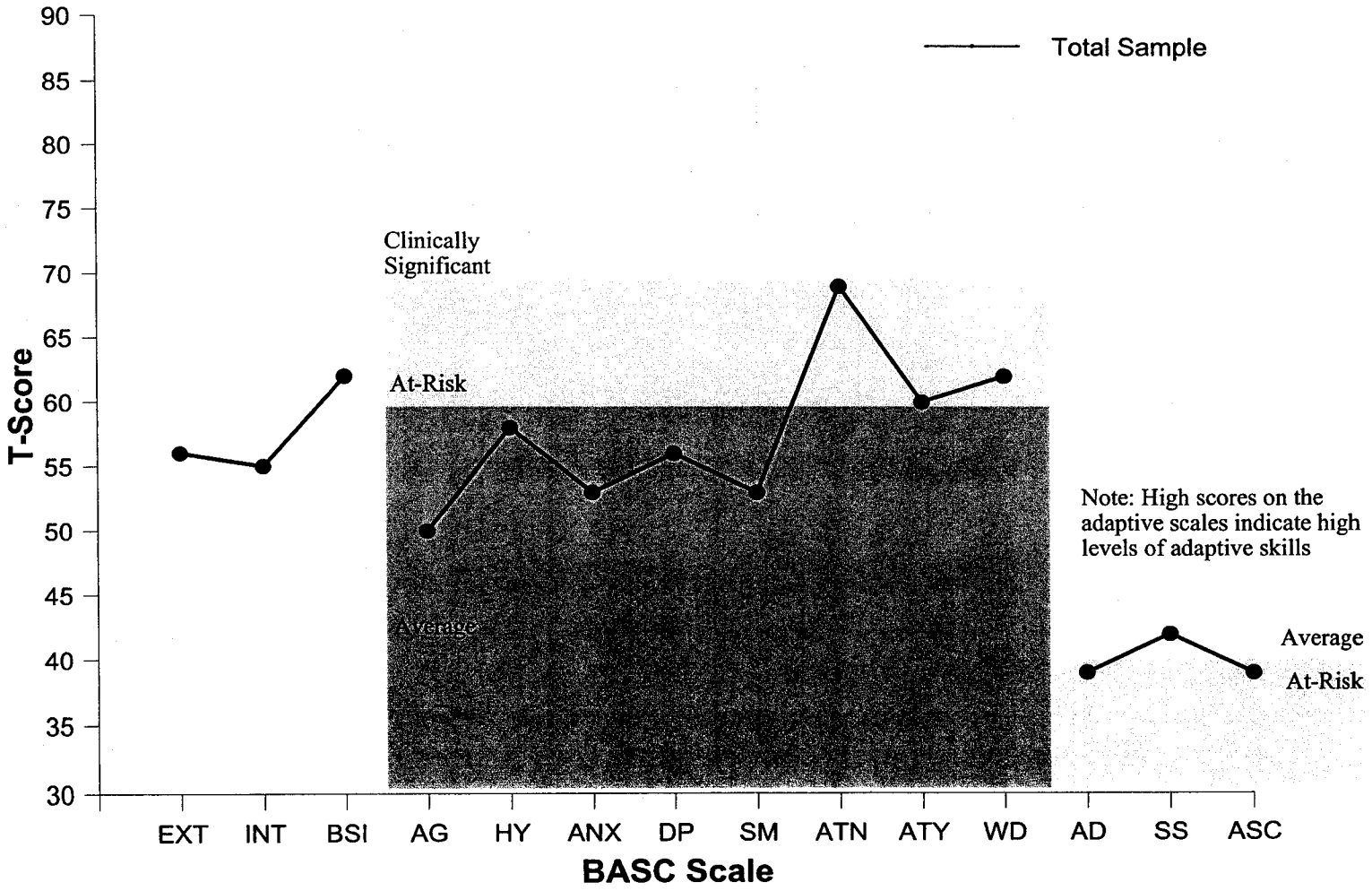

Figure 7. Mean BASC profile for the Attention Problems subtype -Total Sample

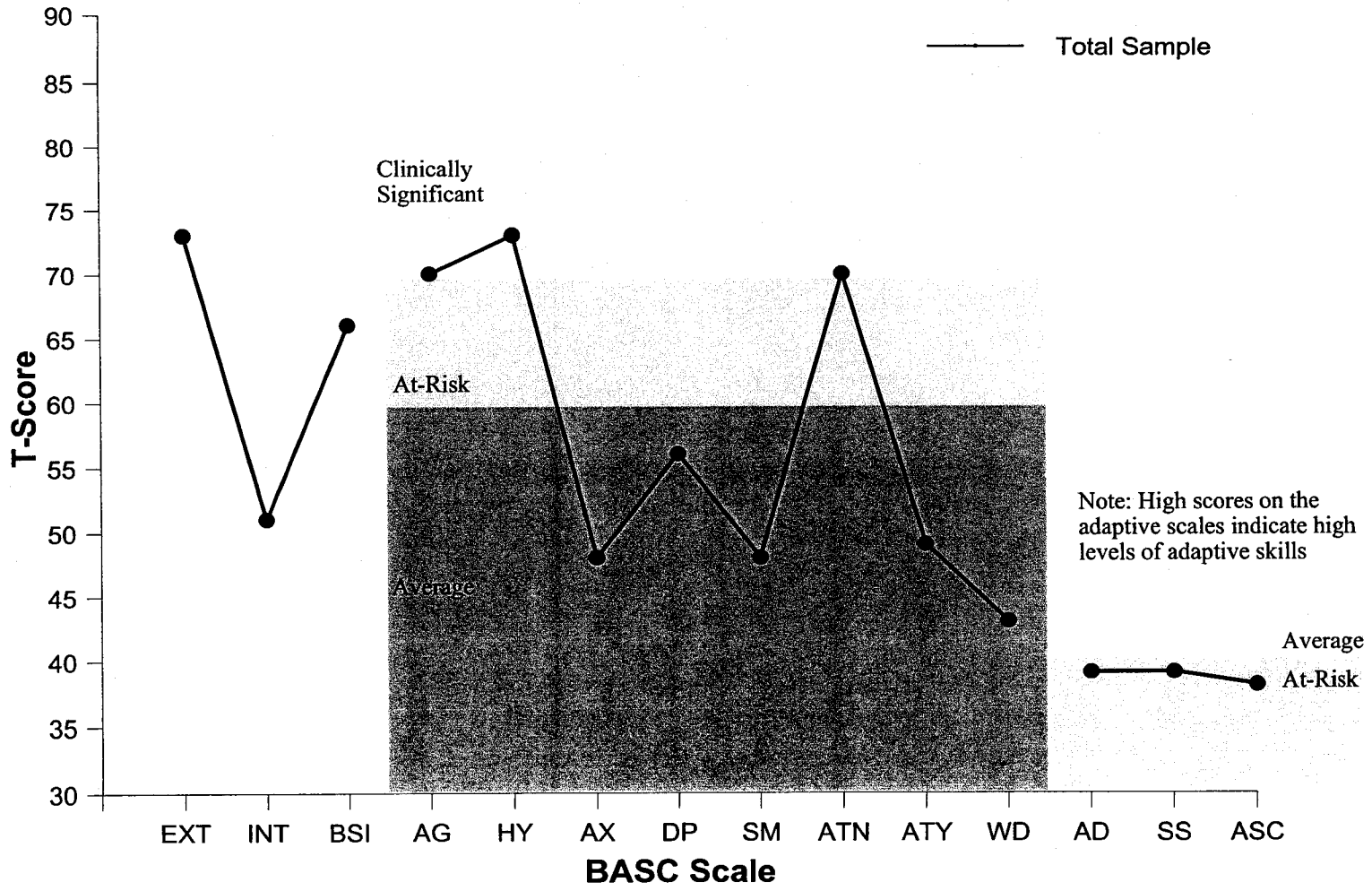

Figure 8. Mean BASC profile for the Disruptive Behaviour Problems subtype - Total Sample

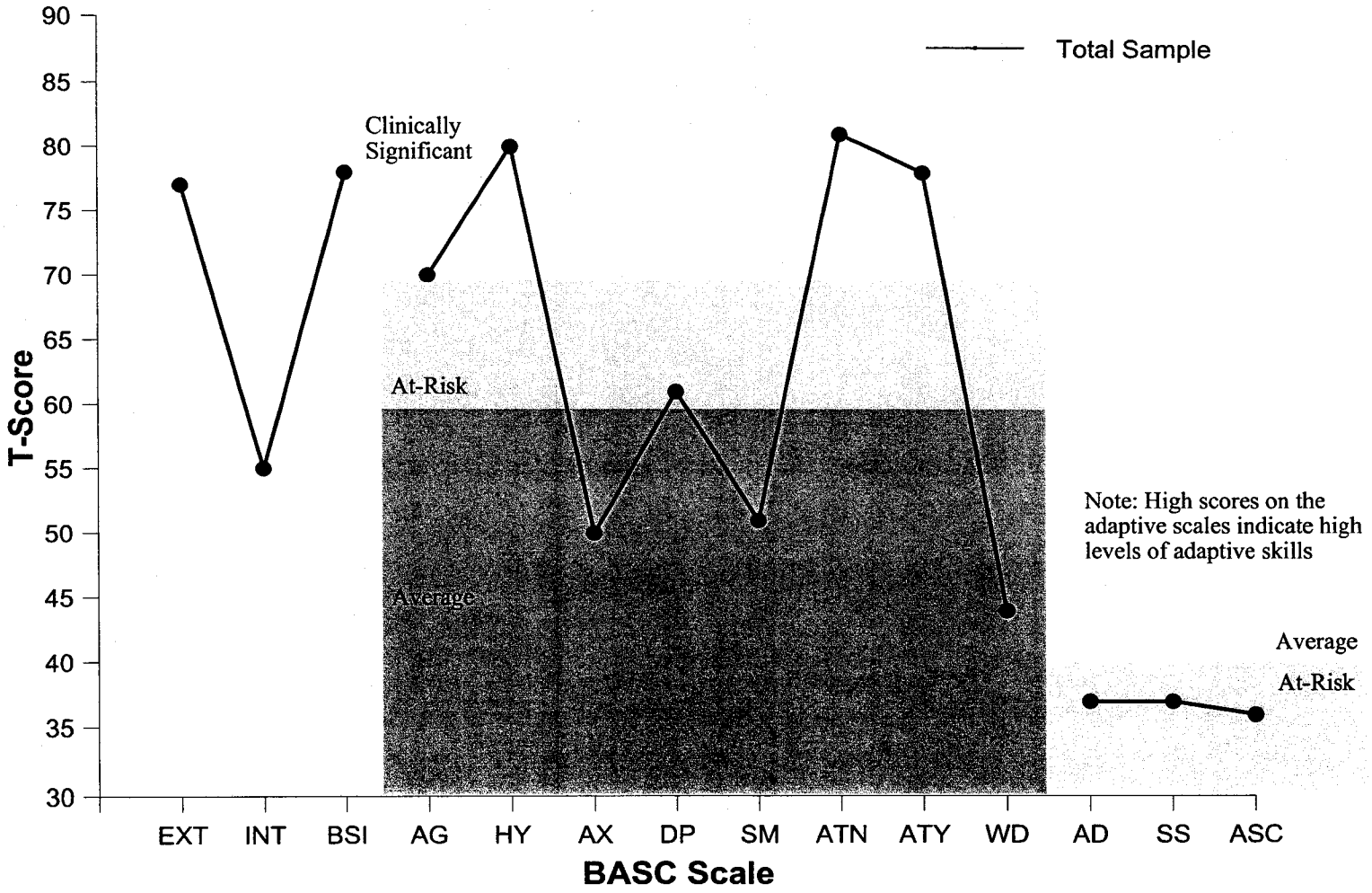

Figure 9. Mean BASC profile for the Disruptive Behaviour Problems /Atypical subtype - Total Sample

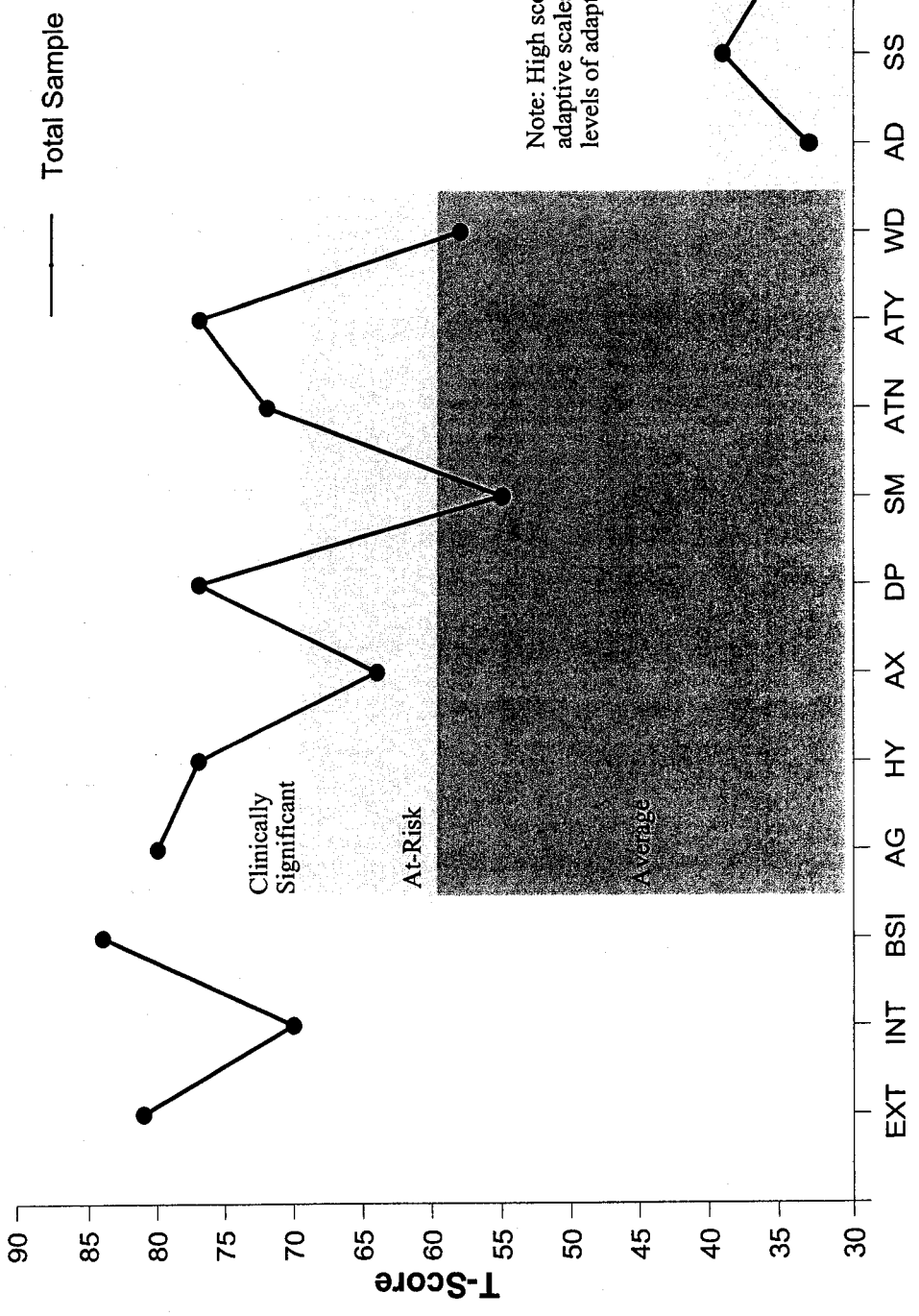

Figure 10. Mean BASC profile for the Mixed subtype - Total Sample

Hypothesis 3: Relationship of BASC derived clusters with measures of adaptive behaviour and parental stress (External Validity).

To determine the external validity of the derived behaviour problem subtypes, variables were selected that were not used to form the clusters but would be predicted to vary across the clusters. The first group of variables to be examined were the scales comprising the Adaptive Skills Composite of the BASC (i.e., Adaptability and Social Skills). The second group of variables were the scales comprising the Parenting Stress Index (PSI). Ratings of parental stress were chosen as the literature has indicated different levels of parental stress are related to differences in the behaviour problems exhibited by the child. Four separate between-subjects multivariate analyses of variance (MANOVAs) were conducted using cluster membership for the entire sample to determine whether differences in scaled scores on the BASC Adaptive Skills measures and the PSI measures (i.e., Child Domain scales, Parent Domain scales, and Composite scales) differed depending on cluster membership. PSI scores were transformed into linear *T*-scores prior to analysis.

External validity of BASC subtypes using Adaptive Skills measures. A MANOVA was performed to determine whether significant differences in Adaptability and Social Skills were evident between the subtypes generated in the present investigation. With use of the Wilk's criterion, significant differences were found between the clusters, $F(8, 524) = 11.13$, $p<.001$. In addition, significant differences were also found for each of the variables based on cluster membership. A listing of univariate *F*-scores along with means and standard deviations for the BASC Adaptive Skills Composite scales can be found in Table 10.

Table 10

Means (M), Standard Deviations (SD), and Univariate F-scores for Differences in BASC Adaptive Skills Composite Scales Based on Cluster Membership

BASC Adaptive Scales[b]	Cluster[a] Norm.	Attn.	DBP	DBP/ ATY	Mix	*F*	*p*
Adaptability							
M	47.73	38.52	39.36	36.59	32.88	20.70	.001
SD	9.74	8.08	9.54	9.77	10.87		
Social Skills							
M	46.53	41.98	38.70	36.91	38.69	8.44	.001
SD	10.69	9.45	10.70	9.08	11.74		

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: Low scores on Adaptability and Social Skills scales reflect greater maladaptive functioning.

Note[c]: See Appendix B, Tables B1 and B2, for post-hoc comparisons between individual subtypes.

External validity of BASC subtypes using Child Domain scales of the PSI. A MANOVA was performed to determine whether significant differences in the Child Domain scales (i.e., Adaptability, Acceptability, Demandingness, Mood, Distractibility/Hyperactivity, and Reinforces Parent) were evident between the subtypes generated in the present investigation. With use of the Wilk's criterion, significant differences were found between the clusters, $F(24, 716.37) = 9.11, p < .001$. In addition, significant differences were also found for each of the variables based on cluster membership. A listing of univariate *F*-scores, along with means and standard deviations for the PSI Child Domain scales, can be found in Table 11. Figure 11 presents the scores on the PSI Child Domain scales for the BASC subtypes.

External validity of BASC subtypes using Parent Domain scales of the PSI. A MANOVA was performed to determine whether significant differences in the Parent Domain scales (i.e., Attachment, Competence, Depression, Health, Isolation, Role Restriction, and Spouse) were evident between the subtypes generated in the present investigation. With use of the Wilk's criterion, significant differences were found between the clusters, $F(28, 733.35) = 3.31, p < .001$. In addition, significant differences were also found for each of the variables based on cluster membership. A listing of univariate *F*-scores, along with means and standard deviations for the PSI Parent Domain scales, can be found in Table 12. Figure 12 presents the scores on the PSI Parent Domain scales for the BASC subtypes.

External validity of BASC subtypes using Composite scales of the PSI. A MANOVA was performed to determine whether significant differences in the Composite scales (i.e., Child Domain, Parent Domain, Life Stress) were evident between the subtypes generated

Table 11

Means (M), Standard Deviations (SD), and Univariate F-scores for Differences in PSI Child Domain Scales Based on Cluster Membership

PSI Child Domain Scales	Cluster					*F*	*p*
	Norm.	Attn.	DBP	DBP/ ATY	Mix		
Acceptability							
M	52.13	61.63	60.07	68.21	65.50	11.04	.001
SD	11.41	13.33	12.81	13.97	13.53		
Adaptability							
M	52.69	62.95	61.18	67.29	71.44	22.64	.001
SD	10.42	10.57	9.39	11.68	9.84		
Demandingness							
M	52.38	63.06	68.10	74.85	77.03	38.86	.001
SD	10.58	10.52	11.96	10.74	11.77		
Distract./Hyperact.							
M	47.64	60.56	65.36	70.28	66.68	29.29	.001
SD	11.23	11.25	12.35	10.76	12.11		
Mood							
M	52.22	61.63	65.17	69.58	74.92	28.47	.001
SD	11.01	11.03	11.23	12.09	10.86		
Reinforces Parent							
M	49.27	54.28	61.72	66.89	69.90	18.35	.001
SD	10.22	11.39	13.19	15.16	18.36		

Note[a]: *Distract./Hyperact.*: Distractibility/Hyperactivity; *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: See Appendix B, Tables B3 to B8, for post-hoc comparisons between individual subtypes.

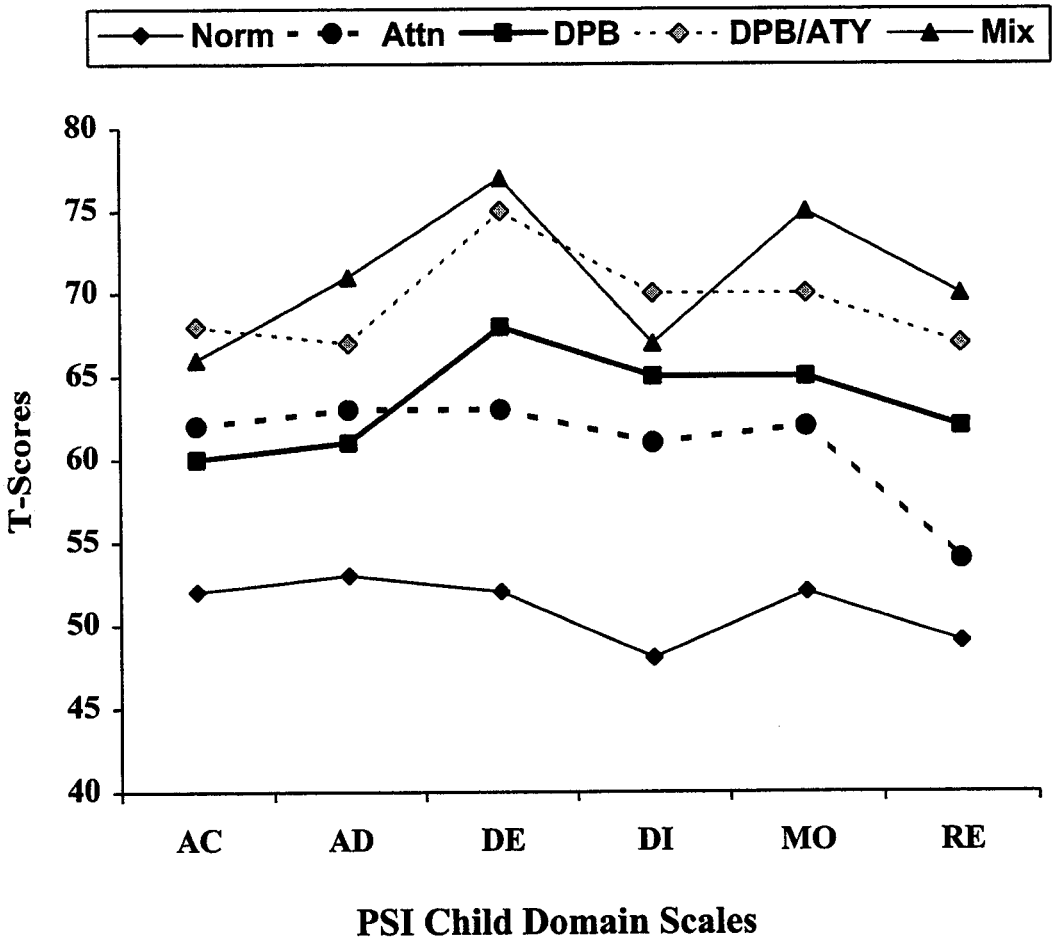

Figure 11. PSI Child Domain scores based on BASC subtypes

Note: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype

PSI Child Domain Scales: *AC:* Acceptability; *AD:* Adaptability; *DE:* Demandingness; *DI:* Hyperactivity/Distractability; *MO:* Mood; *RE:* Reinforces Parent

Table 12

Means (M), Standard Deviations (SD), and Univariate F-scores for Differences in PSI Parent Domain Scales Based on Cluster Membership

PSI Parent Domain Scales	Cluster					*F*	*p*
	Norm.	Attn.	DBP	DBP/ ATY	Mix		
Attachment							
M	45.98	49.09	50.23	52.96	55.97	5.74	.001
SD	8.94	10.69	11.12	10.00	13.80		
Competence							
M	44.83	51.20	59.08	56.73	61.17	13.23	.001
SD	10.97	11.59	44.83	11.50	15.69		
Depression							
M	45.41	50.76	57.14	51.71	57.66	9.33	.001
SD	9.49	13.43	11.54	10.90	12.51		
Health							
M	49.11	55.65	57.97	55.89	61.79	8.98	.001
SD	9.37	9.43	10.34	14.02	11.34		
Isolation							
M	50.43	56.48	58.31	51.81	59.98	4.84	.001
SD	10.78	15.62	10.57	13.89	12.88		
Role Restriction							
M	45.76	51.01	54.39	54.01	54.56	6.30	.001
SD	9.40	11.96	9.18	12.55	10.77		
Spouse							
M	48.91	53.81	59.36	54.38	55.79	5.91	.001
SD	10.74	11.05	9.98	12.91	9.29		

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: See Appendix B, Tables B9 to B15, for post-hoc comparisons between individual subtypes.

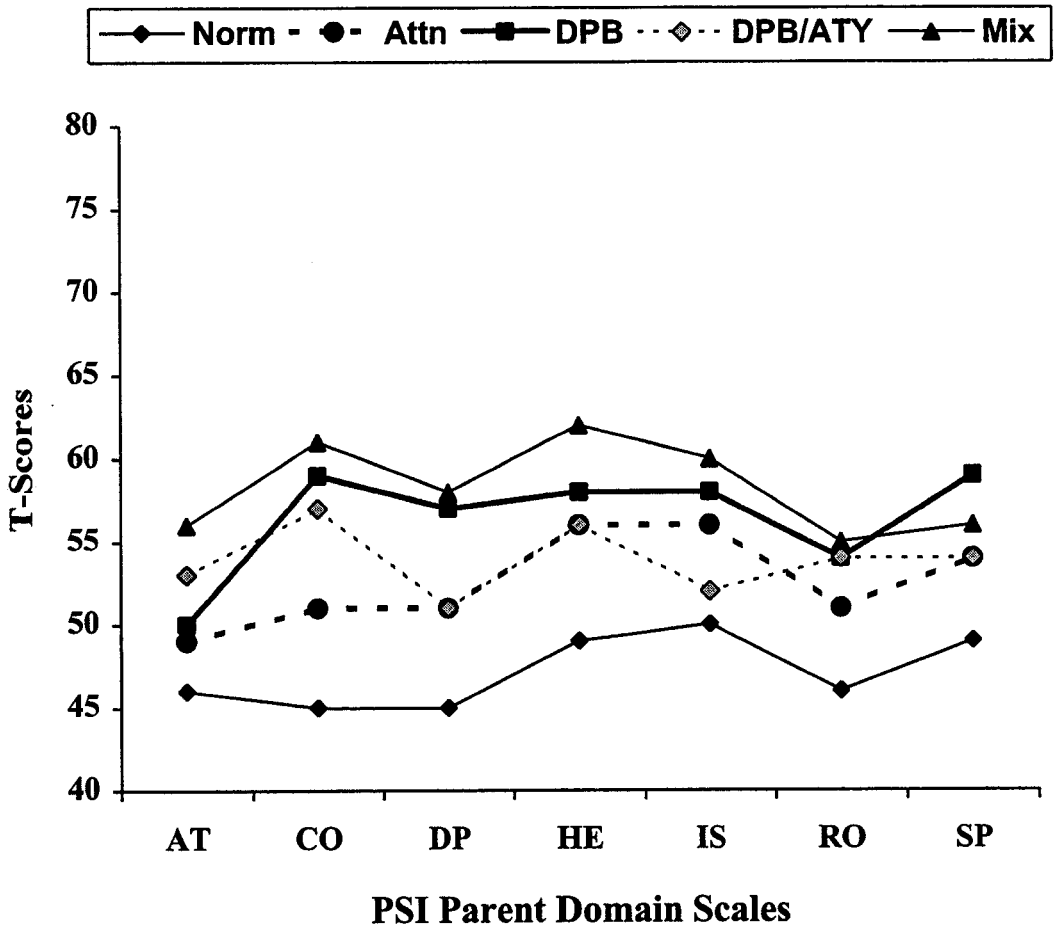

Figure 12. PSI Parent Domain scores based on BASC subtypes

Note: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype

PSI Parent Domain Scales: *AT:* Attachment; *CO:* Competence; *DP:* Depression; *HE*: Health; *IS:* Isolation; *RO:* Role Restriction; *SP:* Spouse

in the present investigation. With use of the Wilk's criterion, significant differences were found between the clusters, $F(12, 550.61) = 13.94, p < .001$. In addition, significant differences were also found for two of the three Composite scales based on cluster membership: Child Domain and Parent Domain. Life Stress was not significantly affected by cluster membership. A listing of univariate *F*-scores along with means and standard deviations for the PSI Composite scales can be found in Table 13. Figure 13 presents the scores on the PSI Composite scales for the BASC subtypes.

Post-hoc comparisons. A post-hoc comparison of significant MANOVA results using Tukey's HSD was conducted to examine differences between individual clusters. A comparison of mean differences between clusters on the Adaptability scale (see Appendix B, Table B1) revealed that the Normal subtype differed significantly from all other subtypes. The Mixed subtype also differed significantly from other subtypes with the exception of the Disruptive Behaviour Problems/Atypical subtype. The Attention Problems, Disruptive Behaviour Problems, and Disruptive Behaviour Problems/Atypical subtypes did not differ significantly from each other on the Adaptability scale. The differences between clusters were less obvious on the Social Skills scale (see Table B2) with only the Normal subtype differing significantly from the Disruptive Behaviour Problems, Disruptive Behaviour Problems/Atypical, and Mixed subtypes but with no other significant difference between subtypes.

In comparing mean differences between clusters on the various scales of the PSI (Abidin, 1995) the most significant differences found between the clusters were on the Child Domain Composite scale (see Table B16). Each subtype was significantly different from every other subtype with only two exceptions. There was no significant

Table 13

Means (M), Standard Deviations (SD), and Univariate F-scores for Differences in PSI Composite Scales Based on Cluster Membership

PSI Composite Scales	Cluster					*F*	*p*
	Norm.	Attn.	DBP	DBP/ ATY	Mix		
Child Domain							
M	51.16	64.39	67.71	75.45	76.81	45.00	.001
SD	10.95	8.98	10.92	10.98	12.04		
Parent Domain							
M	45.73	52.72	58.73	54.16	60.52	12.53	.001
SD	9.21	11.63	11.11	14.58	11.63		
Life Stress							
M	54.16	58.25	57.18	57.60	62.08	1.77	.137
SD	14.81	15.30	11.61	13.80	17.41		

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: See Appendix B, Tables B16 and B17, for post-hoc comparisons between individual subtypes.

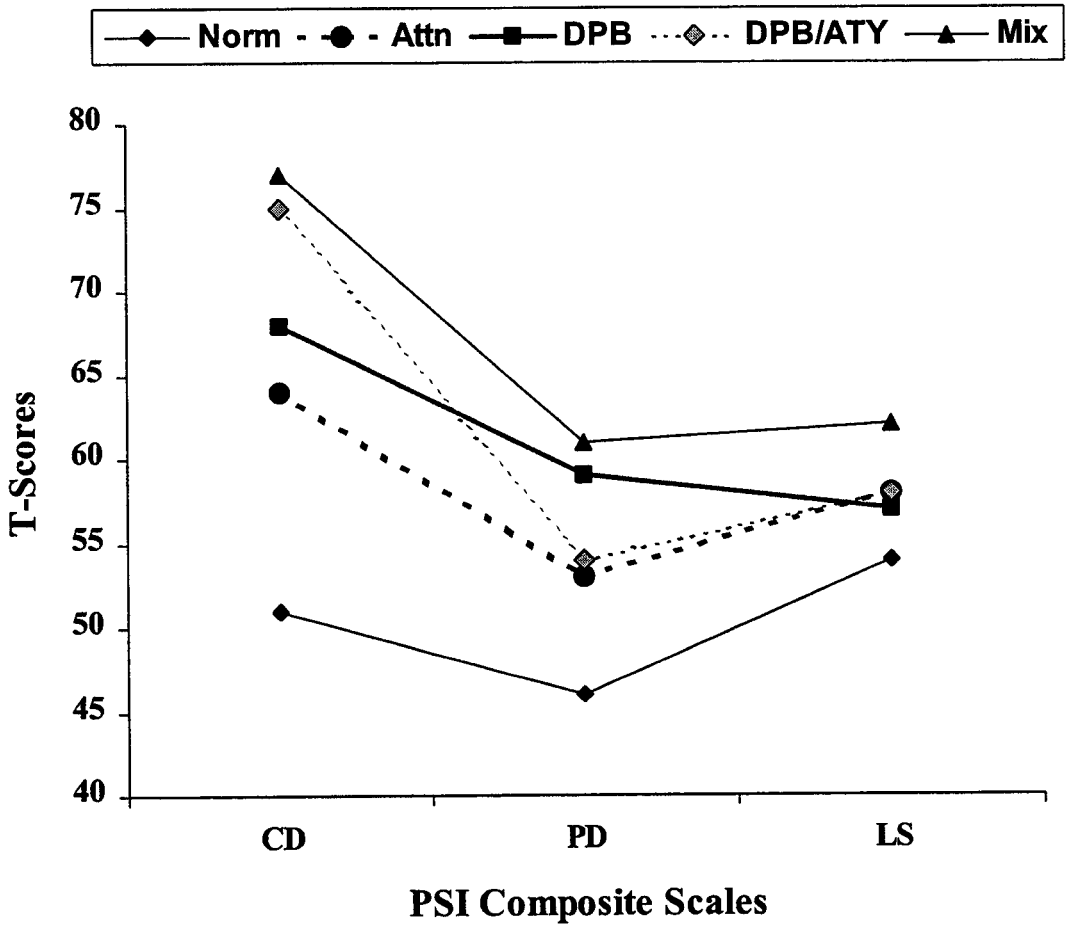

Figure 13. PSI Composite scores based on BASC subtypes

Note: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype

PSI Composite Scales: *CD:* Child Domain; *PD:* Parent Domain; *LS:* Life Stress

difference found between the Attention and the Disruptive Behaviour Problems subtypes nor between the Disruptive Behaviour Problems/Atypical and Mixed subtypes on the Child Domain Composite scale. A closer examination of the specific scales comprising the Child Domain Composite scale revealed that the greatest differences between clusters were on the Adaptability (see Table B4), Demandingness (see Table B5), and Mood (see Table B7) scales. Again, the differences between subtypes appeared to be that the Normal subtype differed from the four clinical subtypes. The Attention and Disruptive Behaviour Problems did not differ from each other; however, they did differ from the Normal subtype and Disruptive Behaviour Problems/Atypical and Mixed subtypes. The Disruptive Behaviour Problems/Atypical and Mixed subtypes differed from all other subtypes but not each other. The differences between subtypes were much less pronounced on the Parent Domain Composite scale of the PSI (see Table B17), as well as on the individual scales comprising the Parent Domain Composite (see Tables B9 through B15). Generally, the Normal subtype differed from the four clinical subtypes but there were no significant differences between the clinical subtypes on the Parent Domain scales.

Summary of Data Analysis

Cluster analysis of the parent report data using two-stage cluster analyses yielded five reliable and clinically meaningful subtypes of preschool children's behaviour problems. These subtypes were very similar to patterns of behaviour problems previously reported in the literature. However, not all previously identified subtypes were replicated. The validity of these subtypes was ascertained in a number of different ways. A comparison of the derived clusters from each of the split-half samples revealed

that the profile pattern for four of the five clinical subtypes were significantly related, thus supporting the internal validity of the derived subtypes. The Normal subtypes did not show significant correlations between the two split-half samples due to their relatively "flat" profiles (i.e., low variance). External validity of the cluster solution was also established through a series of between-subjects multivariate analyses of variance (MANOVA) that indicated there were significant differences on both the BASC Adaptive Scales and PSI scales between the derived subtypes. Post-hoc comparisons indicated that the most significant differences between clusters were found on the Child Domain Composite scale of the PSI with the least amount of child-related parental stress attributed to the Normal subtype, the most amount of child-related parental stress related to the Disruptive Behaviour Problems/Atypical and Mixed subtypes, and the Attention Problems and Disruptive Behaviour Problems subtypes falling in the middle.

Chapter IV

Discussion

The purpose of the present study was to build upon prior efforts to produce a meaningful typology of preschool children's behaviour problems. The results of this investigation are promising, as the data generally provided support for previous research conducted on empirically derived subtypes of childhood psychopathology. In addition, the results provide support for the use of an empirically based typology as a more objective alternative to the use of categorical systems.

Cluster analysis of parent generated data yielded reliable and clinically meaningful subtypes of preschool child psychopathology that were comparable to those described in previous studies both with preschool children (e.g., McGuire & Richman, 1986; Sonuga-Barke et al., 1997; Richman et al., 1982; Wolkind & Everitt, 1974) and school-aged children (e.g., Curry & Thompson, 1985; Kamphaus et al., 1999; Saunders et al., 2000). These subtypes represented several key forms of psychopathology - normal, attention problems, disruptive behaviour problems, disruptive behaviour problems with atypical features, and combined externalized and internalized behaviours. Examination of the external validity of the BASC subtypes also indicated significant differences between the clusters on both measures of adaptive skills and parenting stress.

BASC Subtypes of Preschool Children's Behaviour Problems

It was anticipated that examination of BASC subtypes would result in the identification of several distinct dimensions of preschool children's behaviour problems in the present sample. Examination of the data from the present investigation generally supported this hypothesis. While two previously identified subtypes of preschoolers'

behaviour problems did not emerge (i.e., pure internalizing and pure externalizing subtypes), the present investigation identified five reliable subtypes of preschool children's behaviour problems.

Consistent with findings of previous subtyping research using both preschool- and school-aged children, the subtypes generated from the present sample reflected profiles characterized by an absence of behavioural problems, attention problems, disruptive behaviour problems, disruptive behaviour problems and atypical behaviours, and combined internalized and externalized behavioural problems. Until now, subtypes have been mainly described based upon visual inspection of the BASC profiles and application of descriptive labels. The following discussion provides a rationale for the selection of each cluster and clinical interpretations of the BASC clusters. However, at the present time such interpretations are tentative. Further external validation and the identification of behavioural correlates will be necessary before definitive statements can be made about these groups of children. Each subtype from the current investigation will also be discussed in the broader context of existing literature on the behaviour problems of preschool children. In addition, each subtype will be compared to those subtypes previously identified in the literature.

Normal subtype. The Normal subtype was characterized by an absence of any significant elevations on the clinical scales and, in addition, little deviation from the normative mean on the adaptive scales. This pattern suggests that these children are generally well adjusted or present with more transient difficulties compared to others who present with more significant psychopathology. These children comprised approximately 29% of the current sample, the largest of any of the clusters. There are a number of

possible explanations for the identification of this cluster in a "clinical" sample. Firstly, this pattern is typical of non-clinical children and may reflect the inclusion of children who were designated as peer models (i.e., "normal" children). Unfortunately, the number of peer models included in the Normal subtype is not known due to the fact that those data were unavailable for coding. Secondly, in clinical samples, children exhibiting a normal profile may present with more acute situationally dependent behavioural problems that appear to be transient and much less chronic than those seen in most children referred for services (Saunders et al., 2000). Finally, it is possible that this cluster also reflects children whose parents could be denying or underreporting the behaviour problems that their preschool child is exhibiting. Given that there are several possible reasons in addition to normal adjustment as to why the clinical scales of the Normal subtype are not significantly elevated, this subtype may be better described as an "unelevated" group rather than as a "normal" group. However, since previous subtyping investigations have labeled such unelevated profiles as "Normal," the current study adheres to the existing convention.

The Normal subtype found in the current investigation is consistent with the normal profile patterns reported in all the previous cluster analytic studies of preschool children behaviour problems (i.e., McGuire & Richman, 1986; Richman et al., 1982; Sonuga-Barke et al., 1997; Wolkind & Everitt, 1974). In addition, this profile pattern is comparable to the within normal limits profile patterns reported in cluster analytic studies investigating behaviour problems of school-aged children using a variety of different measures (e.g., Behaviour Problem-free, Curry & Thompson, 1985; Average, Kamphaus et al., 1999; Normal, Saunders et al., 2000; Problem-free, Thompson et al., 1989). More

specifically, the Normal subtype derived in the current investigation with preschool children is remarkably similar and appears to replicate the Average subtype found by Kamphaus et al (1999) who also used parent ratings from the BASC, but with school-aged children (See Appendix C, Figure C1).

Attention Problems subtype. This subtype is comprised of children with significant elevations on the Attention Problems scale. In addition, slight elevations on the Withdrawal and Atypicality scales combined with poor Adaptability ratings were also noted. This profile suggests that these children have severe attention problems that appear in a variety of contexts, are easily distractable, and have difficulty following complex directions. They are also likely to be withdrawn, to have trouble making new friends, and to be "clingy." These children warrant further study to determine if their difficulties resemble some form of Attention-Deficit/ Hyperactivity Disorder (ADHD). Supporting this recommendation is an investigation of the utility of the BASC PRS for making the diagnosis of ADHD with a sample of 309 children with the disorder who were drawn from a community sample of 7,231 children in grades 1-4. Ostrander, Weinfurt, Yarnold, and August (1998) identified BASC PRS scales that differentiated children with ADHD from the general population, and the optimal *T*-scores for making this differentiation. They found the Attention Problems scale to be extremely efficient for making a diagnosis of ADHD, whether combined or inattentive type. Ostrander et al. (1998) reported that a cut off score of $T > 59$ on the Attention Problems scale correctly classified 88% of their cases of ADHD. Research has also shown that the Attention Problems scale was able to identify a group of children with inattention in the absence of hyperactivity, or the ADHD, primarily inattentive type (Vaughn, Riccio, Hynd, & Hall,

1997). Interestingly, the finding that children in this subtype demonstrate poor adaptive skills also is consistent with research regarding the adaptive skills of children with ADHD (Stein, Szumowski, Blondis, & Roizen, 1995).

Although a pure Attention Problems subtype was not predicted in the current investigation due to the lack of consistent corresponding subtypes in previous cluster analytic investigations of preschool children's behaviour problems, there is support for this profile pattern from one cluster analytic study and also a number of factor analytic studies with preschool children. Sonuga-Barke et al. (1997) identified a Minor Problems/Active subtype that included children who were unusually inattentive and active but did not demonstrate clinically significant externalizing or internalizing problems, very much akin to the Attention Problems subtype found in the current investigation. An overactive/inattentive factor, has been identified in a number of other factor analytic investigations of preschool children's behaviour problems (e.g., Behar & Stringfield, 1974; Hinshaw et al., 1987; Pavaluri & Luk, 1996, Sonuga-Barke et al., 1997).

Comparable subtypes have also been found in cluster analytic investigations of behaviour problems in school-aged children. For example, Edelbrock and Achenbach (1980) found a Hyperactive subtype that included children presenting with primarily hyperactive/ inattentive problems. This subtype was found across both boys and girls and in both age groups 6-11 years and 12-16 years. The Attention Problems subtype found in the current investigation with preschool children is remarkably bears a strong resemblance to the Attention Problems subtype found by Kamphaus et al (1999) using the BASC PRS with school-aged children (See Appendix C, Figure C2). The profile

patterns are highly similar and differ only in elevation, which is to be expected given the nature of the clinical sample in the current investigation.

Disruptive Behaviour Problems subtype. Characteristic features of these children include significant problems with deviant externalizing behaviours (e.g., Aggression and Hyperactivity) and deficits in adaptive behaviours (e.g., Adaptability and Social Skills). In addition, these children have significantly elevated Attention Problem scores and moderately elevated Depression scores. This subtype represents a behavioural pattern referred to as Disruptive Behaviour Problems (Lahey & Loeber, 1994). Disruptive Behaviour Problems (or Disorders) have historically been researched in terms of Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) as defined by the *DSM-IV* (APA, 1994). Specifically, this research has almost exclusively focused on school-aged children and adolescents.

Frick, Lahey, Loeber, Tannenbaum, Van Horn, Christ et al. (1993) conducted a quantitative meta-analysis of 60 factor analytic studies of conduct problem behaviours with a combined sample of 28,401 children and adolescents. The results indicated that conduct problem behaviours could be summarized by two bipolar dimensions. One dimension divided behaviours into overt (involving direct confrontation) and covert (not involving direct confrontation). The second orthogonal dimension was a destructive-nondestructive dimension of behaviour. The intersection of these two bipolar dimensions resulted in a division of conduct problem behaviours into four dimensions: (1) oppositional behaviour, (2) physical aggression, (3) property crimes, and (4) status offenses. The oppositional dimension (overt and nondestructive) marked by temper tantrums, arguing, annoying others, stubbornness, anger, defying adults, and being touchy

are identical to the behaviours reflected in the elevated Aggression and Hyperactivity scales of the Disruptive Behaviour Problems subtype found in the current investigation and also match up well with the DSM category of ODD. The finding of an accompanying significant elevation on the Attention Problems scale in the Disruptive Behaviour Problems subtype also has support from the conduct disorder literature in that there is a consistent finding of comorbidity between attention problems and conduct disorders (Frick, 1998).

In samples of children with conduct disorders, the proportion of children with ADHD ranges from 65% to 90% (Abikoff & Klein, 1992; Trites & Laprade, 1983). Comorbidity with ADHD also seems to affect the manifestation and course of conduct disorders. As summarized by Abikoff and Klein (1992), the presence of ADHD leads to more severe and aggressive conduct problems, more persistent conduct problems, and more peer rejection in children with conduct disorders. This may also account for the deficits in Adaptability and Social Skills seen in the Disruptive Behaviour Problems subtype.

As stated earlier, research on disruptive behaviour disorders has been conducted with school-aged children and adolescents. In their review of the few studies that have been conducted on disruptive behaviour disorders in preschool children, Keenan and Wakschlag (2002) concluded that typical and atypical behaviour problems could be differentiated in the preschool period, and that disruptive behaviour problems do exist in the preschool population. Consequently, there is support for the Disruptive Behaviour Problems subtype found in the current investigation with preschool children. However, the conclusion was qualified by stating that whether behaviours associated with

Oppositional Defiant Disorder and Conduct Disorder that are measured in preschool children are functionally equivalent to those measured in school-age children is not yet known. Hence, the finding of a Disruptive Behaviour Problems profile may not indicate the eventuality of a Conduct Disorder diagnosis, but such a profile clearly indicates substantial risk for disruptive behaviour problems that lie on the spectrum of Conduct Disorder, Oppositional Defiant Disorder, or ADHD.

Similar subtypes have been found in previous cluster analytic investigations of both preschool- and school-aged children, providing further support for the Disruptive Behaviour Problems subtype. All previous cluster analytic studies involving preschool children identified a subtype reflecting conduct (i.e., disruptive behaviour) problems (see Table 2).

Sonuga-Barke et al. (1997) found a group of preschoolers that displayed signs of comorbid conduct problems and hyperactivity. McGuire and Richman (1986) identified a conduct disorder with restlessness cluster that included preschool children who had poor concentration, interfered with the play of others, were destructive, aggressive, and difficult to manage. Richman et al. (1982) found a subtype of children characterized by a range of conduct problems and Wolkind and Everitt (1974) identified a group of children who had poor peer relations, temper tantrums, and management problems, a subtype they labeled "early conduct disorder." Factor analytic investigations with preschool children overwhelmingly identified a conduct problems factor (see Table 1). Cluster analytic studies of school-aged children also have found subtypes similar to the Disruptive Behaviour Problems subtype identified in the current investigation (e.g., Aggressive-Active cluster, Curry et al., 1984; Delinquent, Edelbrock & Achenbach, 1980; External

Behaviour Problem, Thompson et al., 1989). Once again, the strongest support for this subtype comes from the work of Kamphaus et al. (1999). Investigation of the BASC PRS in school-aged children revealed a Disruptive Behaviour Problems subtype. This profile pattern is very similar to that of the Disruptive Behaviour Problems found in the current investigation (see Appendix C, Figure C3). As with the Attention Problems subtype, the profile patterns differ only in elevation, which is to be expected given the nature of the clinical sample in the current investigation.

Disruptive Behaviour Problem/Atypical subtype (DBP/ATY). This subtype is very similar to that of the previously described DBP subtype with two notable exceptions. First, the scale elevations for the Hyperactivity and Attention Problems scales are much higher than for the DBP subtype (see Appendix C, Figure C4) indicating that these children are characterized by extremely high levels of activity, by pervasive and severe attention problems that are commonly accompanied by severe impulsivity, and by disruptive behaviours. In addition, these children have clinically significant elevations on the Atypicality scale. This scale was designed as a psychoticism scale with items assessing auditory and visual hallucinations and disorganized, delusional, and bizarre thinking (Reynolds & Kamphaus, 1992). A clinically significant elevation on this scale indicates that the child is having unusual perceptions and sensations, confusion, and difficulties with maintaining logic or focus. Therefore, it appears that this profile pattern represents a group of children who present with more severe disruptive behaviour problems than the DPB subtype and with some type of disordered thinking and/or atypical behaviour. In addition, much like their DBP counterparts, these children also present with deficits in their adaptability and social skills.

However, it must be noted that little is known about psychotic processes in very young children. Before children have relatively sophisticated expressive language skills, the presence of psychotic processes is difficult to establish (Volkmar, 1996). In addition, preschool children may have imaginary friends or may believe in fantasy figures. Transient hallucinations in preschool children are occasionally observed, particularly at times of stress and anxiety (Rothstein, 1981) and prognostically these are relatively benign. The inability of preschool children to use adult rules of logic or notions of reality makes it difficult to establish the presence of delusions or thought disorder (Volkmar, 1996). Most research suggests that psychotic disorders, like schizophrenia, with an onset before age 6 years are extremely rare (Werry, 1996). Alternatively, retrospective studies suggest that precursors of childhood onset schizophrenia may include unusual personality styles, neurodevelopmental abnormalities, language problems, and motor problems (Russel, 1992, Werry, 1996). Though some of the items on the Atypicality scale of the BASC reflect these areas, much more research is needed before elevations on this scale can be conclusive regarding any kind of psychotic disorder in preschool children.

The DBP/ATY subtype was not predicted in the current investigation due to the lack of any similar subtypes characterized by thought problems/atypical behaviours in cluster analytic investigations with preschool children or in previous studies using the BASC with school-age children. Though not nearly as robust as the support for disruptive behaviour problems, there does exist some evidence in the literature supporting subtypes with psychotic features. Hinshaw et al. (1987) factor analyzed teacher ratings on the Revised Behaviour Problem Checklist (Quay & Peterson; 1983) with a large

sample of kindergarten children and found a factor characterized by strange ideas, repetitive speech, incoherent speech, depression, and telling of imaginary things. They called this factor Psychotic Behavior. Achenbach & McConaughy (1997) describe a Thought Problems syndrome based on cluster analytic investigations of the Child Behaviour Checklist 4-18 (CBCL/4-18), the Teacher's Report Form, and Youth Self-Report (Achenbach, 1993). Items endorsed in this syndrome include, "hears sounds or voices that aren't there," "sees things that aren't there," "strange behaviour," "strange ideas," "can't get mind off certain thoughts," and "repeats certain acts over and over." These are very similar to the items on the Atypicality scale of the BASC.

In cluster analyzing a group of children referred for neuropsychological assesment using the Personality Inventory for Children-Revised (PIC-R; Wirt, Lachar, Klinedinst, & Seat, 1984), Saunders et al. (2000) identified a Cognitive Social Skills Deficit subtype characterized by cognitive deficits as well as significant elevations on the Psychosis and Social Skills scales indicating a lack of appropriate social skills and socially inappropriate or atypical behaviours. In sum, although subtypes characterized by thought problems/atypical behaviours may be rare in preschoolers, there is some support from the current investigation using a clinical sample of preschoolers and from psychopathology research with older children for their existence.

Mixed subtype. This group of children are the most seriously disturbed, as they exhibit significant problems with a wide variety of behaviours. They have severe externalizing behaviours (e.g., Aggression, Hyperactivity) in the presence of internalizing problems (e.g., Depression, Anxiety), as well as clinically significant elevations on the Attention Problems and Atypicality scales. This is the only subtype that displayed

clinically significant levels of internalizing problems. Therefore, these children not only display disruptive, atypical, and inattentive behaviours, but are also characterized by a dysphoric mood, being frequently sad, tired, negative, and moderately anxious. Additionally, these children have the poorest adaptive skills of any of the subtypes along with poor social skills.

The finding of the Mixed subtype characterized by both externalizing and internalizing behaviour problems is consistent with recently reported data on clinical samples of preschool children. Wilens et al. (2002) found that preschool children seen at a pediatric psychiatry clinic typically presented with at least two disorders per child with the most common disorders being ADHD, disruptive disorders, mood disorders, and anxiety disorders. Thomas and Guskin (2001), in a sample of preschool children presenting to an early childhood psychiatry clinic, found that clinically significant externalizing and internalizing symptoms co-presented in 45.1% of the children. Lavigne et al. (1998) in a longitudinal pediatric-based study found that one third of preschoolers with abnormal disruptive behaviour subsequently developed an emotional disorder (i.e., internalizing disorder) by the age of 6 years.

The Mixed subtype represents a profile pattern not previously described in cluster analytic research with preschool children. The most reasonable explanation for this would seem to be that previous subtyping research with preschoolers did not involve children referred to a mental health clinic, as was the case in the present investigation. However, similar profile patterns to the Mixed subtype can be found in cluster analytic research with school-aged children. Edelbrock and Achenbach (1980) found a Depressed-Social Withdrawal-Aggressive subtype, representing both externalizing

(Aggression) and internalizaing (Depressed-Social Withdrawl) behaviours, in clinic referred boys and girls aged 6-11 years. Curry and Thomspon (1985) reported an Undifferentiated Disturbance Cluster comprised of children with elevations on the Aggression, Inhibition, Activity Level, and Sleep Disturbance scales of the Missouri Children's Behavior Checklist (MCBC; Sines, Pauker, Sines, & Owen, 1969). Thompson et al. (1989), also using the MCBC, identified a mixed internal and external behaviour problem subtype in both samples of children referred to an outpatient psychiatric clinic and children diagnosed with a chronic illness. Studies using the Personality Inventory for Children-Revised (Wirt et al., 1984) have also identified mixed external and internal subtypes (Type 7, Gdowski et al., 1985; Antisocial, Butler et al., 1997; Combined Internalized/Externalized, Saunders et al., 2000). The Mixed subtype in the current investigation using the BASC PRS with preschoolers appears to replicate the General Psychopathology-Severe subtype reported by Kamphaus et al. (1999) using the BASC PRS with school-aged children (see Appendix C, Figure C5), the main difference being in the significantly higher elevations on the Aggression and Hyperactivity scales. Once again, this likely reflects the nature of the clinical sample utilized in the current study as opposed to the community sample employed by Kamphaus et al. (1999).

Reliability and Validity of BASC Subtypes

Given the potentially arbitrary nature of the solutions provided by cluster analytic techniques, it was important to examine the stability, reliability, and validity of the solution. In the current investigation the process of establishing reliability of the derived subtypes was established by examining the cluster structure of two randomly selected half-samples. A comparison of profile patterns showed that the clusters produced by

analysis of each half-sample were highly similar to each other. This suggested a stable and reliable solution. The only subtype for which this was not the case was the Normal subtype. However, this is not unexpected given the very low variability in the Normal subtype profiles (i.e., a "flat" profile). Specifically, the size of the correlation coefficient for the profile patterns is partially dependent upon the variability of the patterns. When the variability is reduced, this reduces sample variance and ultimately results in sharp reductions in the magnitude of the correlation coefficient (Saunders, 2000).

The validity of the cluster solutions was explored in a number of ways. First, the various subtypes were compared on the basis of their Adaptability and Social Skill scores. Although there were statistically significant group differences for the Adaptability and Social Skills, post-hoc pairwise comparisons revealed that the only clinically meaningful difference appeared to be between the Normal subtype on one hand and the clinical subtypes (i.e., Attention Problems, DBP, DBP/ATY, and Mixed) on the other. The clinical subtypes were characterized by deficits in both adaptive skills (i.e., being inflexible, somewhat rigid, easily upset when routines are changed, and stubborn) and social skills (i.e., problems getting along with others, poorly developed social skills, trouble initiating and maintaining appropriate conversation, and socially awkward). The Normal subtype was characterized by children who possessed adequate social skills and were relatively flexible with only occasional upsets and complaints.

In retrospect, this finding is not surprising given that the current sample represents children who were referred to an Assessment/Day Treatment program (i.e., intensive treatment) for severe emotional and behavioural problems. Therefore, despite differing in the nature of their presenting problem, these children share the fact that their problems

are severe in nature. Consequently, the finding of poor adaptive and social skills across the clinical subtypes would be expected and is consistent with the literature.

Support for this position comes from a longitudinal study of preschool children with either disruptive behaviours or disruptive behaviours with deficits in adaptive functioning (Barkley, Shelton, Crosswait, Moorehouse, Fletcher, Barret, et al., 2002). In comparison to disruptive behaviour problem children, the children with disruptive behaviour problems and deficits in adaptive functioning had more symptoms of ADHD and Conduct Disorder, more severe and pervasive behaviour problems at home, more parent-rated externalizing and internalizing problems, lower academic competence, and more behaviour problems at school. August, MacDonald, Realmuto and Skare (1996) also found no difference between hyperactive/inattentive and aggressiveness/conduct problems in predicting level of maladaptive functioning in school-aged children.

Similar findings exist for the social skills of severely disturbed preschoolers. For example, Vaughn, Hogan, Lancelotta, and Shapiro (1992) compared social competence in 6 groups of preschool children, one group without behavioural problems (control), and five with behaviour problems: mild and severe attention/activity behaviour problems, mild and severe conduct behaviour problems, and severe anxious/withdrawal behaviour problems. Their results indicated that children from the mild behaviour problems subgroups were less at risk for peer problems than were children in the severe attention and conduct behaviour problems groups. In addition, the severe externalizing subgroups were more likely than controls to be rejected by their peers and had lower social skills. Other studies with preschool children (Stormont, 2000) and adolescents (Clark, Prior, &

Kinsella, 2002) also show minimal to no difference in the poor social skills of children with ADHD, hyperactivity and disruptive behaviour problems.

The validity of the cluster solution was also explored by comparing the derived subtypes on the various individual and composite scales of the Parenting Stress Index (PSI, Abidin, 1995). Ratings of parental stress were chosen as an external variable to assess cluster distinctiveness, as the literature has indicated differences in levels of parental stress depending upon the particular behaviour problem exhibited by the child (e.g., Conte, 1998; Creasey & Jarvis, 1994; Ross et al., 1998). Multivariate analyses revealed significant group differences for the PSI Child Domain and Parent Domain composite scores, as well as on the individual scales comprising these domains. The most robust support for subtype distinctiveness came from post-hoc pairwise comparisons of the subtypes on the Child Domain composite scale (see Appendix B, Table B16). The Child Domain composite scale reflects the parental stress that results from the characteristics of the child. As predicted, the parents of Normal preschoolers reported the least stress, while the parents of preschoolers with the most severe behaviour problems (i.e., DBP/ATY and Mixed subtypes) reported the greatest amount of stress. The Attention Problems and DBP groups of children, who also present with significant behavioural problems but not as severe as the DBP/ATY and Mixed subtypes, had parents whose reported stress due to child characteristics fell somewhere between the Normal subtypes and DBP/ATY and Mixed subtypes.

Parenting stress is a common correlate of children's internalizing and externalizing psychopathology (Mesman & Koot, 2000). Specifically, it appears that children with externalizing problems and/or attentional problems are more stressful to

parents than children with internalizing problems or no behaviour problems. Creasey and Jarvis (1994) reported that mothers with toddlers who exhibited more externalizing problems had higher levels of stress than mothers of children who had fewer behaviour problems. Noh, Dumas, Wolf, and Fisman (1989) compared levels of parenting stress of conduct disorder, autistic, Down syndrome, and normal children. Parents of conduct disorder children reported the highest levels of stress across all groups. Similar results were obtained by Donenberg and Baker (1993) who found that parents of children with externalizing behaviours (e.g., hyperactivity, aggression) reported higher child-related stress, more negative impact on their social life, and more negative and fewer positive feelings about parenting compared to parents of autistic and normal children.

Studies have also examined the parental stress of children with severe attentional difficulties. Conte (1998) found parents of children with ADHD reported greater stress levels than parents of children with internalizing disorders. Breen and Barkley (1988) found that child-related stress for mothers of girls with ADHD was much higher than for the mothers of normal girls. The severity of the child's ADHD has also been found to be a significant predictor of parental stress (Anastopoulos, Guevremont, Shelton, & DuPaul, 1992; Johnson & Reader, 2002).

A few studies have also examined the impact of single versus multiple disruptive behaviour disorders on parental stress. Barkley et al. (2002) found that parents of preschool children with disruptive behaviour problems and adaptive skills deficits reported greater child-related stress than did parents of preschoolers with only disruptive behaviour problems. Ross et al. (1998) examined parenting stress associated with preschool and school-aged children (2-8 years old) with single, dual, or multiple

disruptive behaviour disorders. The children were divided into the following categories: ODD only, ADHD only, dual diagnosis (ODD and ADHD), or multiple diagnosis (ADHD, ODD, and CD). Significant group differences were found on the PSI Child Domain composite score. In general, mothers of dual and multiple diagnosis children reported both a higher frequency of behaviour problems and higher levels of child-related stress than mothers from both of the single diagnosis groups. Bromley (1999) had similar findings in her investigation of parenting stress among parents of young children with ADHD in that parents of non-problem children reported the lowest stress, the combined ADHD and ODD group showed the worst, and the pure ADHD and ODD groups fell in the midrange. This body of research supports the validity of the subtypes found in the current investigation. A similar pattern of child-related parental stress was found in that the Normal subtype of children generated the least amount of parental stress, the most severe subtypes with multiple behaviour problems (i.e., Mixed and DBP/ATY) had the greatest amount of child-related parental stress, and the DBP and Attention Problem subtypes fell in the middle.

Although statistically significant group differences did emerge for the subtypes on the PSI Parent Domain Composite scale (see Table B17), these differences were much less pronounced than the group differences found on the PSI Child Domain score. In fact, the clinical significance of the group mean differences on the Parent Domain scale is minimal. Post-hoc pairwise comparisons revealed that the group differences could be accounted for by differences between the Normal subtype and the clinical subtypes. No significant differences were found between the clinical subtypes on the Parent Domain scales. This result is consistent with the findings of Ross et al. (1998), in which no

significant group differences were found for the single, dual and multiple behavioural problem diagnosis groups on the PSI Parent Domain scores, yet significant group differences were found on the PSI Child Domain scores. In addition, no significant group differences were found on PSI Life Stress scores indicating that the parents of both Normal and clinical subtypes did not differ in the amount of stress outside the parent-child relationship (e.g., loss of job, death of family member).

In sum, the strongest support for the validity of the derived subtypes in the current investigation was established by showing that the subtypes differed in terms of child-related parental stress. As predicted, child-related parental stress was found to be the lowest in the Normal subtype of children, highest in the most severe subtypes characterized by multiple behaviour problems (i.e., Mixed and DBP/ATY), and the DBP and Attention Problem subtypes falling in the middle. However, beyond the Normal versus clinical subtypes distinction, no meaningful differences were found between the clinical subtypes on parental stress related to parent characteristics. Although the Normal subtype differed significantly from the clinical subtypes on measures of adaptability and social skills, there were few clinically meaningful differences between the clinical subtypes on these measures. However, this was not surprising given the severe nature of the behavioural problems present in the current sample of preschoolers.

Hypothesized Subtypes not Found in the Current Investigation

The most consistent finding in both factor and cluster analytic studies of behaviour problems in preschoolers is the existence of broadband factors of internalizing and externalizing behaviour problems (Campbell, 1995). Based on this fact, it was hypothesized that both "pure" subtypes of internalizing and externalizing subtypes would

be identified in the current study. Although more narrowband factors of externalizing behaviour problems were identified (i.e., DBP and DPB/ATY subtypes), and a mixed externalizing-internalzing subtype was also identified, no pure internalizing or externalizing subtypes were discovered. There are a number of factors that may account for this finding.

First, the lack of a pure internalizing subtype may be directly related to the characteristics of the sample of preschool children used in the current investigation. The sample represents those children who have been referred to an intensive Assessment/Day Treatment program in a preschool children's mental health centre. Children whose behaviour is problematic to others are more likely to be referred for mental health treatment than children whose behaviour, even though equally disturbed, is quieter and less overt. Thus, children who are aggressive, disobedient, and overactive (i.e., externalizing) are more likely to be seen as a problem by parents than children who are quiet, withdrawn, and fearful (i.e., internalizing) children (Campbell, 1990). Furthermore, parents are more likely to seek help if their child's exasperating behaviour is apparent outside the home as well. That is, when the behaviour is both sufficiently disruptive to others (e.g., preschool teachers, pediatricians) and evident across situations (e.g., home and preschool), help-seeking is more likely. Reynolds and Kamphaus (2002) noted that children with internalizing problems, like depression, were more likely to be referred if they had accompanying significant behavioural problems. Given that the current sample is characterized by very difficult to manage children referred for intensive treatment, the likelihood of finding a pure internalizing group of children was greatly

reduced. For example, Thompson et al.'s (1989) cluster analytic investigation also did not reveal any internalizing subtype in their outpatient child psychiatry clinic subsample.

Another factor that can possibly explain the lack of a pure internalizing subtype involves informant characteristics. Parents were chosen as informants on their preschool children's behaviour as they are in the best position to observe the behaviour of the child over long periods of time, and in a variety of contexts (McConaughy, 1993). However, the literature suggests that parents may more accurately report on some types of behaviours than others (Bird, Gould, Rubio-Stipec, Staghezza, & Canino, 1991). In general, parents seem to report accurate levels of externalizing behaviours in their children (e.g., Edelbrock, Costello, Dulcan, Conover, & Kala, 1986; Herjanic & Reich, 1997). However, when describing internalizing problems, such as anxiety and depression, parents tend to under-report the presence of these types of behaviour problems (e.g., Angold, Weissman, John, Merikangas, Prusoff, Wickramaratne et al., 1987; Kashani, Ovraschel, Burk, & Reid, 1985). Part of the reason for this finding may be that internalizing behaviour problems are difficult to assess in preschoolers, as these children have difficulty verbalizing and reflecting on their inner experiences (Schwartz, Gladstone, & Kaslow, 1998). Compounding this difficulty is that those parents who do observe internalizing symptoms, such as mood and vegetative disturbances, in their preschool children typically present to pediatricians rather than mental health professionals (Trad, 1994).

Despite the fact that two externalizing subtypes with significant associated behaviour problems in other areas (i.e., DBP and DBP/ATY) and one combined externalizing/internalizing subtype were found, no pure externalizing subtype (i.e., with

significant elevations solely on the Aggression and/or Hyperactivity scales) was found in the current investigation. The research literature provides some evidence to support this finding.

Urban (1995), in examining the stability and distinctiveness of internalizing and externalizing behaviours from kindergarten to middle childhood, found that the stability for "pure" internalizing and externalizing groups was weak when compared to comorbid and well-functioning groups. Sonuga-Barke et al.'s (1997) cluster analysis of 1047 three-year-olds using the Behavioural Checklist (BCL; Richman, 1977) revealed similar findings. They derived six subtypes: one normal subtype, three pure subtypes (i.e., Active, Timid (internalizing), and Naughty (externalizing)), and two co-morbid subtypes (Hyperactive/Conduct Disorder and Neurotic/Conduct Disorder). The investigators concluded that although there were groups of children with essentially pure expressions of problem dimensions, the levels of problems experienced by children in these groups were typically in the normal range and likely to be neither of clinical concern nor of developmental significance. Problems of potential clinical concern that were likely to represent a risk to development were characteristic of both the comorbid groups. Thomas and Guskin's (2001) investigation of disruptive behaviour problems in preschoolers referred to an early childhood psychiatry clinic revealed that the co-presentation of externalizing and internalizing symptoms was most common in this group of children. Reynolds and Kamphaus (2002) also noted that children with symptoms of severe disruptive behaviour problems rarely present in isolation from other problems.

In light of the aforementioned studies, and given the severe nature of behavioural problems likely to be presented by the preschoolers in the current study, it would seem

that "pure" subtypes, whether internalizing or externalizing, would be less likely to be found. Instead, subtypes characterized by behaviour problems across multiple domains would be expected in preschool children referred for intensive treatment at a mental health centre. The results of the current investigation support this conclusion.

Strengths, Implications, and Clinical Utility

The results of this study provided support for previous research investigations that have examined empirically-derived subtypes of preschool and school-aged children's behaviour problems. In addition, the findings of the current investigation identified narrowband subtypes of preschool children's behaviour problems that have not been described before in preschool cluster analytic studies and provide a foundation for future avenues of research investigation.

The present investigation made several unique contributions to the literature both methodologically and in terms of the findings. First, the analysis of subtypes of preschool children's behaviour problems in a clinical sample has not yet been reported in the literature. Previous investigations with preschoolers have exclusively sampled from non-clinical populations. In addition, all but one previous study of preschool behaviour problems exclusively sampled from a population of three-year-olds. A relative strength of the present investigation was the use of a more representative sample of preschool-aged children (i.e., 2 ½- to 5-years-old). Unlike previous subtyping investigations with preschoolers, the current study used a behaviour rating scale, the Behavior Assessment System for Children (BASC, Reynolds & Kamphaus, 1992), with relatively large number of items that represent well-supported constructs (e.g., aggression, depression).

Another strength of using the BASC was that ratings of adaptive behaviours (i.e., adaptability and social skills) were also obtained in conjunction with ratings of maladaptive behaviours. This is important considering the potential protective role adaptive behaviours appear to play in the development of child psychopathology (Coie et al., 1993; Thomas & Guskin, 2001). The choice to use parent ratings of preschool children's behaviour also represents a strength of the current investigation over previous cluster analytic studies of preschoolers that mostly utilized interviewer and teacher ratings. The BASC Parent Rating Scales (PRS; Reynolds & Kamphaus, 1992) have been found to have greater specificity across scales than teacher ratings (Reynolds & Kamphaus, 2002). This means that parent ratings will produce profiles with greater specificity than teacher ratings and will denote less influence by the higher order factors (e.g., internalizing and externalizing). Finally, unlike the majority of previous subtyping investigations with preschoolers, close attention was paid to establishing the reliability (by utilizing split-half samples) and validity (by examining differences in subtypes with regards to external variables) of the empirically derived subtypes.

Unique contributions to the literature of preschool behaviour problems were also made in terms of the results of the current investigation. The present investigation provided support for a number of subtypes that were reported in previous cluster analytic and factor analytic studies with preschoolers. A subtype relatively free of any significant behaviour problems (i.e., Normal subtype), a subtype marked by significant problems with inattention in the absence of any significant externalizing behaviours (Attention Problems subtype), and a subtype marked by significant disruptive behaviours (i.e., aggression and hyperactivity; DBP subtype) were identified. However, the DBP subtype

was somewhat different from the subtypes identified in previous cluster analytic studies with preschoolers in that it involved a combination of behaviours and attentional difficulties.

In addition, two subtypes relatively unique to the preschool behaviour problem literature were generated in the present investigation (DBP/ATY, and Mixed subtypes). These two subtypes represent the most severely disturbed children, who had multiple behavioural problems, the lowest adaptive skills, and who generated the most child-related parental stress. These subtypes were identified due to the nature of the clinical sample in contrast to their non-identification in previous studies that utilized non-clinical populations. This finding highlights the importance of using clinical samples in investigations aimed at identifying subtypes of preschool psychopathology. Due to the severity of the psychosocial dysfunction of these children, further research focused on replication of these subtypes and determining behavioural correlates for these subtypes is of paramount importance.

The current investigation also provides some preliminary answers to questions posed in the literature regarding preschool children's behaviour problems. One of these questions is whether global typologies of internalizing and externalizing (i.e., broadband dimensions) are sufficiently precise to characterize children's problems or whether specific subtypes of internalizing and externalizing disorders (i.e., narrowband dimensions) are necessary for clinical decision making. The results of the current investigation support the position taken by previous investigators (e.g., Achenbach et al., 1987) that further differentiation beyond the broadband internalizing/ externalizing dimension is possible and, perhaps, desirable. For example, the DBP subtype is marked

not only by externalizing behaviours of aggression and hyperactivity, but also by significant attentional difficulties and moderate elevations of depression. The DBP/ATY group of children also shares a similar pattern as the DBP subtype, yet they are also differentiated by significant atypical behaviours. The Mixed subtype reflects preschoolers with both severe externalizing and internalizing difficulties. Simply lumping these subtypes together under the rubric of externalizing disorders would be misleading. Furthermore, the finding of an Attention Problems subtype separate from the externalizing subtypes supports the factor analytic studies of preschool children (e.g., Hinshaw et al., 1987; Koot et al., 1997) that reject the claim that specific attentional problems, impulse control deficits, and high activity level are merely reflections of more general problems with aggression.

Another issue highlighted in the preschool behaviour problem literature is the issue of diagnostic classification. Specifically, there has been debate over whether dimensional approaches are appropriate for the description of behaviour problems in young children, or whether it is more reasonable to apply a categorical diagnostic approach, such as the *DSM-IV* (American Psychiatric Association, 1994) for classification. Though no definitive answer can be given, the results of the current study certainly support the utility of a dimensional approach to the study of preschool children's behaviour problems. Using this approach, distinct empirically-derived subtypes were identified using cluster analytic techniques. Their reliability and validity were established, and support for these subtypes was found in the literature. It appears that dimensional measurement, which assumes that behaviour problems are best conceptualized as lying on a continuum as opposed to being categorically organized, is an

important adjunct to the study of childhood behaviour problems. Cluster analytic methods appear to be congruent with this dimensional approach. In addition, the use of cluster analytic techniques appears to address the often heard criticism of developmental psychopathology research - that variables are often emphasized rather than children (Bergman & Magnusson, 1997) Thus, cluster analytic methods are more person-oriented and test-related variables are used only for descriptive purposes.

This is not to say that categorical systems such as the *DSM-IV* are not useful. However, their utility with the preschool population is questionable due to the fact that the representation of preschool children in *DSM-IV* field trials was relatively low and the diagnostic categories are based largely on downward extension of adult and childhood models of psychopathology. Thus, the validity of the symptoms for preschool-age children was not adequately established prior to publication. In addition, there are no prevalence data from representative samples for any *DSM-IV* disorder for preschool children (Keenan & Wakschlag, 2003). Consequently, the authors warn that, "until the predictive validity of diagnostic methods in young children is established, diagnoses in preschoolers should be made with caution and may be best used descriptively as a means of identifying patterns of problem behaviour rather than using a diagnostic label" (Keenan & Wakschlag, 2000, p.44). Hence, it appears that a dimensional, descriptive approach, with age-related guidelines, as employed in the current investigation, is much more suited for use with preschool children.

The current study also addresses whether similar patterns of behaviour problems in school-aged children begin to emerge in the preschool years. The current investigation supported the presence of very similar forms of behaviour problems that have been

reported in subtyping research with school-aged children. The five subtypes identified in the present investigation corresponded to subtypes in the literature for school-aged children's behaviour problems. Four of the five subtypes in the present study (with the exception of DBP/ATY) significantly overlapped with subtypes that Kamphaus et al. (1999) identified using the BASC PRS for school-aged children. This is noteworthy due to the difference in age groups (preschool versus school-age), and population (community versus clinical) between the two samples. The fact that the profiles in the current investigation were significantly more elevated than in Kamphaus et al.'s (1999) study provides further support to the dimensional model of children's behaviour problems, which posits that deviant development is a matter of degree rather than type.

The present findings have significant implications for intervention. They suggest that preschool periods may be critical times during which clinically significant behaviour problems can emerge, marking the beginning of a pathway toward increasing difficulties in middle to late childhood. The present findings suggest the importance of beginning preventive interventions well before school age. Although clinical status at preschool age may not be sufficient to predict which children will exhibit later behaviour disorders (Pierce, Ewing, & Campbell, 1999), early disruptive behaviour problems clearly elevate risk of persistent problems and negatively spiraling interactions across home and school contexts (Fagot & Leve, 1998).

Methodological Considerations and Suggestions for Future Research

The current findings need to be evaluated in the light of their methodological limitations. One possible limitation of the present investigation stems from sample characteristics. The study consisted of primarily male, Caucasian preschool-aged

children. In addition, although the sample was relatively heterogeneous (i.e., included normal and clinical children), the normal preschoolers most likely were accounted for in the Normal subtype, and the remaining clinical subtypes appear to reflect the severe behaviour problems that would be expected in children who were referred to an Assessment/Day Treatment program at a mental health centre (i.e., a clinical sample). This sample characteristic might explain the high rate of comorbidity seen in the subtypes of referred children and lack of pure internalizing or externalizing subtypes. It is possible that nonreferred preschoolers may manifest less severe behaviour problems and comorbid states, as well as a more limited course of the disorder. For these reasons, replication in other clinical samples, including samples of preschoolers from diverse ethnic backgrounds and non-clinically referred preschool children, is needed to determine the generalizability of the current findings.

Sample size may have also had a negative impact on the cluster analysis utilized in the present study. As samples become larger, less frequently occurring profiles have the opportunity to be identified as unique subtypes, rather than being subsumed into more general subtypes. Several of the Kamphaus et al. (1999) subtypes from parent ratings of school-aged children on the BASC may be infrequently observed in clinical populations (e.g., Mildly Disrupted or Well Adjusted). As a result, the relatively small sample utilized in the present investigation may be responsible for the replication of only a subset of the Kamphaus et al. (1999) study subtypes. The use of a larger sample may generate more subtypes of psychopathology.

Another limitation of the current investigation was that the information about the preschool children's behaviour problems was obtained solely from the preschooler's

parent, most often the mother. As mentioned earlier, parents appear to be excellent informants when it comes to externalizing behaviours but tend to underestimate internalizing disorders such as anxiety and mood problems (Herjanic & Reich, 1997; Mesman & Koot, 2000). Parent perceptions of child behaviour are often influenced by their own emotional state (Campbell, 1995). In addition, children's behaviour often differs from one context to another (e.g., home versus school), from one parent to another. As a result, informants do not often agree on the child's behaviour (Achenbach et al., 1987). For example, on the BASC (Reynolds & Kamphaus, 1992) correlations between teacher and parent ratings are lowest at the preschool level ($r = 0.24$). The authors cite this finding as reason to recommend that ratings be obtained from multiple individuals across multiple settings. Therefore, future research ideally would incorporate parent, teacher, and clinician ratings to obtain a complete picture of the child's behaviour problems.

Cluster analysis, being somewhat subjective in nature, may also affect the subtypes generated in any research investigation. In the present study, a combination of hierarchical and nonhierarchical cluster methods were used and emphasis was placed on establishing the reliability and validity of the cluster solution. Nevertheless, given that the present investigation was the first to examine subtypes of preschool children's behaviour problems using the BASC, it will be necessary to determine the reliability and validity of these subtypes through replication and cross-validation. Cluster analysis of the BASC data should be conducted on similar samples of preschool children to determine whether the same mean profile patterns are replicated.

In addition, future research focused on the identification of specific correlates and subtype characteristics will be required. For example, family characteristics (e.g., number of siblings, quality of parenting, family psychopathology), ratings based upon direct observation, physical health, quality of interpersonal interactions, and patterns of cognitive functioning should be examined. The characterization of the clusters is essential for determining both the theoretical and practical implications of cluster membership. Identification of the possible correlates for each subtype will significantly increase their clinical utility by providing a wealth of information to the clinician.

Another central issue associated with cluster analytic research is the temporal stability of the subtypes. Unstable subtypes must be identified in order to avoid premature conclusions. Longitudinal follow-up, especially into school age, will be a critical component of determining the predictive validity of these subtypes.

The relative merits of categorical and dimensional assessment approaches also requires further research. Longitudinal studies that compare the predictive utility of *DSM-IV* diagnostic categories to the BASC (or other empirically based assessment instruments) for identifying children who will continue to have serious behaviour problems into early childhood would be helpful in evaluating the relative usefulness of these approaches with preschool children. Perhaps a combination of both approaches is necessary for research and clinical purposes (see Cantwell, 1996),

Finally, treatment studies of preschoolers with serious behaviour problems that take into account subtype membership would provide another way to externally validate the typology derived in the current investigation. Future studies should investigate if subtypes differ in terms of their response to specific types of psychotherapy (e.g.,

cognitive, structural, family, and individual), pharmacotherapy, or a combination thereof. For example, if children in the Mixed subtype responded differentially to anti-depressant medication than children in the other subtypes, or if children in the Disruptive Behaviour Problems subtype responded differentially to a combination of family therapy and stimulant medication than other subtypes, these findings would provide support for the validity of these subtypes.

Subtypes derived in the current investigation add to the ongoing literature by clustering parent ratings of preschool children's behaviour for a clinical sample. The results provide support for previously identified subtypes and also propose new subtypes for further investigation. A robust typology of preschool children's behaviour problems holds the potential for providing the basis of a classification system that may assist in early identification and treatment efforts.

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Appendix A

Table A1

Coded Score Equivalents for the BASC Clinical Scales

Classification	T-Score Range	Recode
Clinically Significant	70 and above	7
At-Risk	60-69	5
Average	41-59	3
Low	40 and below	1

Appendix B

Table B1

Comparison of Mean Differences between Clusters on the Adaptability Scale of the BASC using Tukey's HSD

		Cluster [a]			
Cluster	Norm.	Attn.	DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	**9.21**[b]	**8.37**	**11.14**	**14.85**
p		**(.001)**	**(.001)**	**(.001)**	**(.001)**
Attn.					
Mean difference	-	-	-0.84	1.93	**5.65**
p			(.993)	(.864)	**(.033)**
DBP					
Mean difference	-	-	-	2.77	**6.49**
p				(.636)	**(.010)**
DBP/ATY					
Mean difference	-	-	-	-	3.71
p					(.338)

Table B2

Comparison of Mean Differences between Clusters on the Social Skills Scale of the BASC using Tukey's HSD

		Cluster [a]			
Cluster	Norm.	Attn.	DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	4.55	**7.83**[b]	**9.62**	**7.84**
p		(.117)	**(.001)**	**(.001)**	**(.001)**
Attn.					
Mean difference	-	-	3.28	5.07	3.29
p			(.531)	(.124)	(.521)
DBP					
Mean difference	-	-	-	1.79	0.01
p				(.922)	(1.00)
DBP/ATY					
Mean difference	-	-	-	-	-1.77
p					(.922)

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: Numbers in bold indicate that the mean difference between clusters is significant at the .05 level.

Table B3

Comparison of Mean Differences between Clusters on the Acceptability Scale of the PSI using Tukey's HSD

			Cluster [a]		
Cluster	Norm.	Attn.	DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	**-9.50[b]**	**-7.94**	**-16.08**	**-13.37**
p		**(.004)**	**(.025)**	**(.001)**	**(.001)**
Attn.					
Mean difference	-	-	1.56	-6.58	-3.87
p			(.983)	(.175)	(.666)
DBP					
Mean difference	-	-	-	**-8.14**	-5.43
p				**(.048)**	(.324)
DBP/ATY					
Mean difference	-	-	-	-	2.71
p					(.886)

Table B4

Comparison of Mean Differences between Clusters on the Adaptability Scale of the PSI using Tukey's HSD

			Cluster [a]		
Cluster	Norm.	Attn.	DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	**-10.26 [b]**	**-8.50**	**-14.61**	**-18.76**
p		**(.001)**	**(.001)**	**(.001)**	**(.001)**
Attn.					
Mean difference	-	-	1.77	-4.34	**-8.49**
p			(.943)	(.364)	**(.003)**
DBP					
Mean difference	-	-	-	-6.11	**-10.26**
p				(.078)	**(.001)**
DBP/ATY					
Mean difference	-	-	-	-	-4.15
p					(.399)

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: Numbers in bold indicate that the mean difference between clusters is significant at the .05 level.

Table B5

Comparison of Mean Differences between Clusters on the Demandingness Scale of the PSI using Tukey's HSD

Cluster	Norm.	Attn.	Cluster [a] DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	**-10.68**[b]	**-15.71**	**-22.46**	**-24.64**
p		**(.001)**	**(.001)**	**(.001)**	**(.001)**
Attn.					
Mean difference	-	-	-5.04	**-11.79**	**-13.97**
p			(.261)	**(.001)**	**(.001)**
DBP					
Mean difference	-	-	-	-6.75	**-8.93**
p				(.062)	**(.003)**
DBP/ATY					
Mean difference	-	-	-	-	-2.18
p					(.909)

Table B6

Comparison of Mean Differences between Clusters on the Distractability/Hyperactivity scale of the PSI using Tukey's HSD

Cluster	Norm.	Attn.	Cluster [a] DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	**-12.92** [b]	**-17.72**	**-22.63**	**-19.04**
p		**(.001)**	**(.001)**	**(.001)**	**(.001)**
Attn.					
Mean difference	-	-	-4.80	**-9.72**	-6.12
p			(.348)	**(.003)**	(.128)
DBP					
Mean difference	-	-	-	-4.91	-1.32
p				(.340)	(.986)
DBP/ATY					
Mean difference	-	-	-	-	-3.59
p					(.646)

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: Numbers in bold indicate that the mean difference between clusters is significant at the .05 level.

Table B7

Comparison of Mean Differences between Clusters on the Mood Scale of the PSI using Tukey's HSD

			Cluster [a]		
Cluster	Norm.	Attn.	DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	**-9.41[b]**	**-12.95**	**-17.36**	**-22.70**
p		**(.001)**	**(.001)**	**(.001)**	**(.001)**
Attn.					
Mean difference	-	-	-3.54	**-7.95**	**-13.29**
p			(.628)	**(.019)**	**(.001)**
DBP					
Mean difference	-	-	-	-4.41	**-9.75**
p				(.422)	**(.001)**
DBP/ATY					
Mean difference	-	-	-	-	-5.34
p					(.224)

Table B8

Comparison of Mean Differences between Clusters on the Reinforces Parent Scale of the PSI using Tukey's HSD

			Cluster [a]		
Cluster	Norm.	Attn.	DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	-5.00	**-12.45[b]**	**-17.61**	**-20.62**
p		(.398)	**(.001)**	**(.001)**	**(.001)**
Attn.					
Mean difference	-	-	-7.44	**-12.61**	**-15.62**
p			(.115)	**(.001)**	**(.001)**
DBP					
Mean difference	-	-	-	-5.16	-8.17
p				(.466)	(.060)
DBP/ATY					
Mean difference	-	-	-	-	-3.01
p					(.869)

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: Numbers in bold indicate that the mean difference between clusters is significant at the .05 level.

Table B9

Comparison of Mean Differences between Clusters on the Attachment Scale of the PSI using Tukey's HSD

Cluster	Norm.	Attn.	Cluster [a] DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	-3.11	-3.92	**-6.98**[b]	**-9.99**
p		(.643)	(.414)	**(.022)**	**(.001)**
Attn.					
Mean difference	-	-	-0.81	-3.88	**-6.88**
p			(.997)	(.530)	**(.041)**
DBP					
Mean difference	-	-	-	-3.07	-6.07
p				(.735)	(.096)
DBP/ATY					
Mean difference	-	-	-	-	-3.00
p					(.742)

Table B10

Comparison of Mean Differences between Clusters on the Competence Scale of the PSI using Tukey's HSD

Cluster	Norm.	Attn.	Cluster [a] DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	-6.36	**-14.66**[b]	**-11.89**	**-16.34**
p		(.122)	**(.001)**	**(.001)**	**(.001)**
Attn.					
Mean difference	-	-	**-8.29**	-5.53	**-9.98**
p			**(.038)**	(.334)	**(.006)**
DBP					
Mean difference	-	-	-	2.77	-1.68
p				(.882)	(.977)
DBP/ATY					
Mean difference	-	-	-	-	-4.45
p					(.546)

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: Numbers in bold indicate that the mean difference between clusters is significant at the .05 level.

Table B11

Comparison of Mean Differences between Clusters on the Depression Scale of the PSI using Tukey's HSD

Cluster	Norm.	Attn.	Cluster [a] DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	-5.35	**-11.78**[b]	-6.30	**-12.25**
p		(.168)	**(.001)**	(.074)	**(.001)**
Attn.					
Mean difference	-	-	-6.44	-0.96	-6.90
p			(.102)	(.996)	(.060)
DBP					
Mean difference	-	-	-	5.48	-0.47
p				(.236)	(1.00)
DBP/ATY					
Mean difference	-	-	-	-	-5.94
p					(.157)

Table B12

Comparison of Mean Differences between Clusters on the Health Scale of the PSI using Tukey's HSD

Cluster	Norm.	Attn.	Cluster [a] DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	**-6.54**[b]	**-8.86**	**-6.78**	**-12.68**
p		**(.033)**	**(.001)**	**(.027)**	**(.001)**
Attn.					
Mean difference	-	-	-2.33	-0.24	-6.14
p			(.879)	(1.00)	(.088)
DBP					
Mean difference	-	-	-	2.08	-3.81
p				(.919)	(.518)
DBP/ATY					
Mean difference	-	-	-	-	-5.90
p					(.121)

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: Numbers in bold indicate that the mean difference between clusters is significant at the .05 level.

Table B13

Comparison of Mean Differences between Clusters on the Isolation Scale of the PSI using Tukey's HSD

Cluster	Norm.	Attn.	Cluster [a] DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	-6.05	**-7.93**[b]	-1.38	**-9.55**
p		(.150)	**(.024)**	(.986)	**(.003)**
Attn.					
Mean difference	-	-	-1.88	4.67	-3.50
p			(.966)	(.500)	(.733)
DBP					
Mean difference	-	-	-	6.55	-1.62
p				(.168)	(.979)
DBP/ATY					
Mean difference	-	-	-	-	**-8.17**
p					**(.040)**

Table B14

Comparison of Mean Differences between Clusters on the Role Restriction Scale of the PSI using Tukey's HSD

Cluster	Norm.	Attn.	Cluster [a] DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	-5.24	**-8.78**[b]	**-8.25**	**-8.80**
p		(.130)	**(.001)**	**(.003)**	**(.001)**
Attn.					
Mean difference	-	-	-3.54	-3.01	-3.55
p			(.130)	(.739)	(.575)
DBP					
Mean difference	-	-	-	0.53	-0.02
p				(1.00)	(1.00)
DBP/ATY					
Mean difference	-	-	-	-	-0.55
p					(.999)

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: Numbers in bold indicate that the mean difference between clusters is significant at the .05 level.

Table B15

Comparison of Mean Differences between Clusters on the Spouse Scale of the PSI using Tukey's HSD

Cluster	Norm.	Attn.	Cluster [a] DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	-4.90	**-10.49**[b]	-5.47	**-6.88**
p		(.190)	**(.001)**	(.120)	**(.018)**
Attn.					
Mean difference	-	-	-5.59	-0.57	-1.98
p			(.157)	(.999)	(.925)
DBP					
Mean difference	-	-	-	5.01	3.61
p				(.262)	(.572)
DBP/ATY					
Mean difference	-	-	-	-	-1.41
p					(.979)

Table B16

Comparison of Mean Differences between Clusters on the Child Domain Composite Scale of the PSI using Tukey's HSD

Cluster	Norm.	Attn.	Cluster [a] DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	**-13.23**[b]	**-16.55**	**-24.29**	**-25.65**
p		**(.001)**	**(.001)**	**(.001)**	**(.001)**
Attn.					
Mean difference	-	-	-3.32	**-11.06**	**-12.42**
p			(.653)	**(.001)**	**(.001)**
DBP					
Mean difference	-	-	-	**-7.73**	**-9.09**
p				**(.017)**	**(.002)**
DBP/ATY					
Mean difference	-	-	-	-	-1.36
p					(.981)

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: Numbers in bold indicate that the mean difference between clusters is significant at the .05 level.

Table B17

Comparison of Mean Differences between Clusters on the Parent Domain Composite Scale of the PSI using Tukey's HSD

Cluster	Norm.	Attn.	Cluster [a] DBP	DBP/ ATY	Mix
Norm.					
Mean difference	-	**-6.98**[b]	**-13.00**	**-8.42**	**-14.79**
p		**(.031)**	**(.001)**	**(.006)**	**(.001)**
Attn.					
Mean difference	-	-	-6.01	-1.44	**-7.81**
p			(.143)	(.982)	**(.023)**
DBP					
Mean difference	-	-	-	4.57	-1.80
p				(.412)	(.956)
DBP/ATY					
Mean difference	-	-	-	-	-6.37
p					(.109)

Note[a]: *Norm:* Normal Subtype; *Attn:* Attention Problems subtype; *DBP:* Disruptive Behaviour Problems subtype; *DBP/ATY:* Disruptive Behaviour Problems/Atypical subtype; *Mix:* Mixed subtype.

Note[b]: Numbers in bold indicate that the mean difference between clusters is significant at the .05 level.

Appendix C

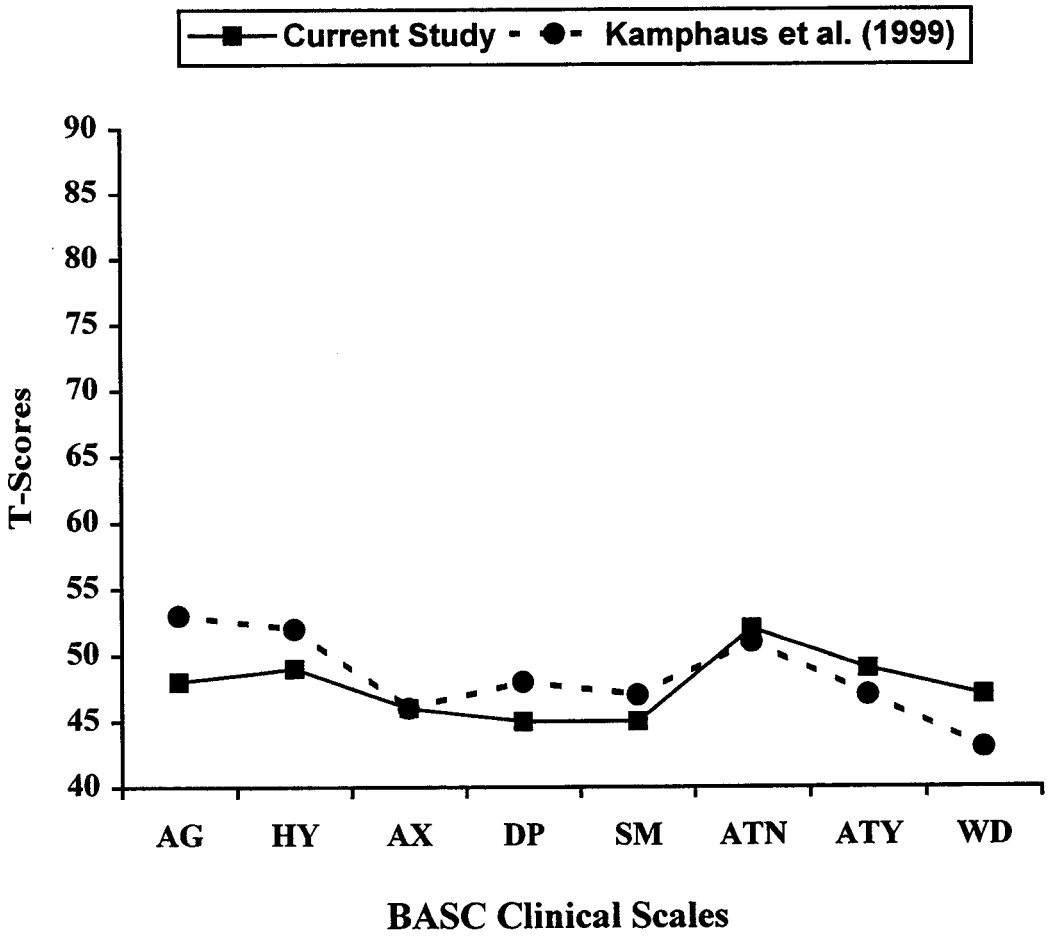

Figure C1. Comparison of Normal subtype from current investigation and the Average subtype from Kamphaus et al.(1999).

Note: *AG:* Aggression; *HY:* Hyperactivity; *AX:* Anxiety; *DP:* Depression; *SM:* Somatization; *ATN:* Attention Problems; *ATY:* Atypicality; *WD:* Withdrawal.

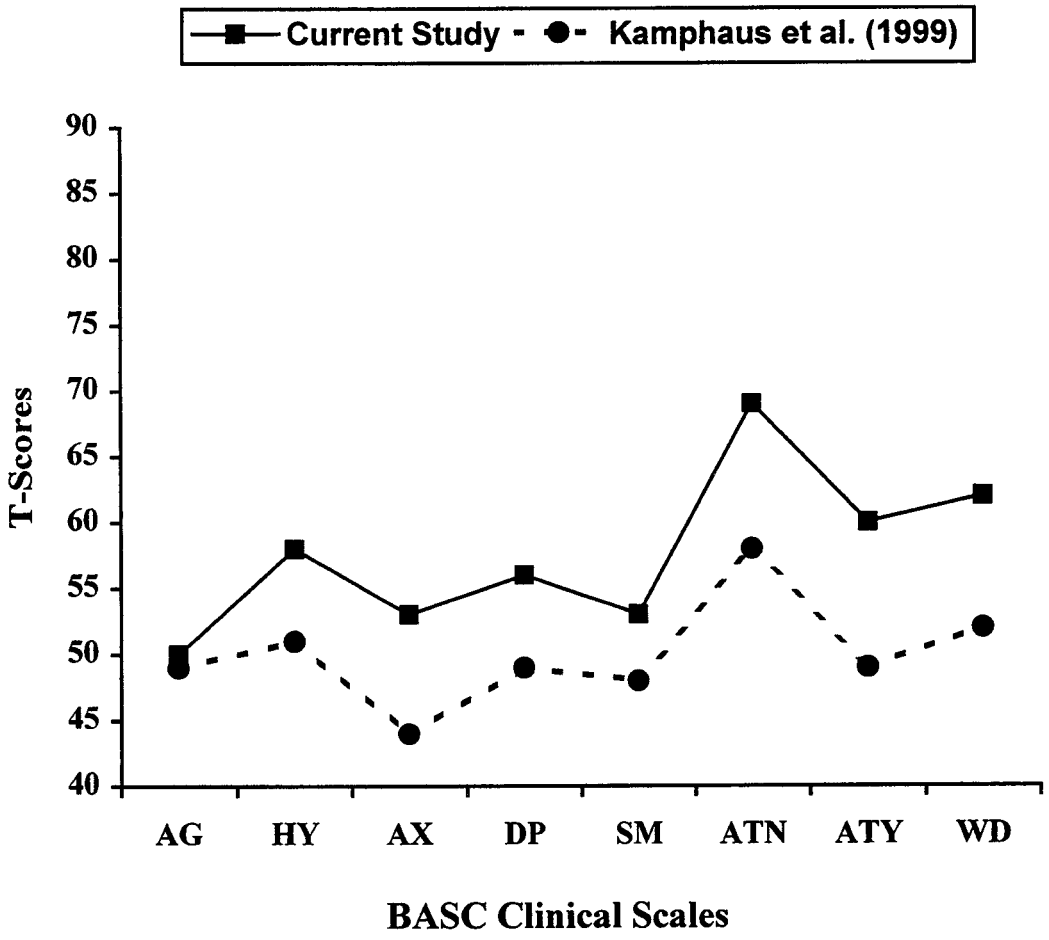

Figure C2. Comparison of Attention Problems subtype from current investigation and Kamphaus et al. (1999).

Note: *AG:* Aggression; *HY:* Hyperactivity; *AX:* Anxiety; *DP:* Depression; *SM:* Somatization; *ATN:* Attention Problems; *ATY:* Atypicality; *WD:* Withdrawal.

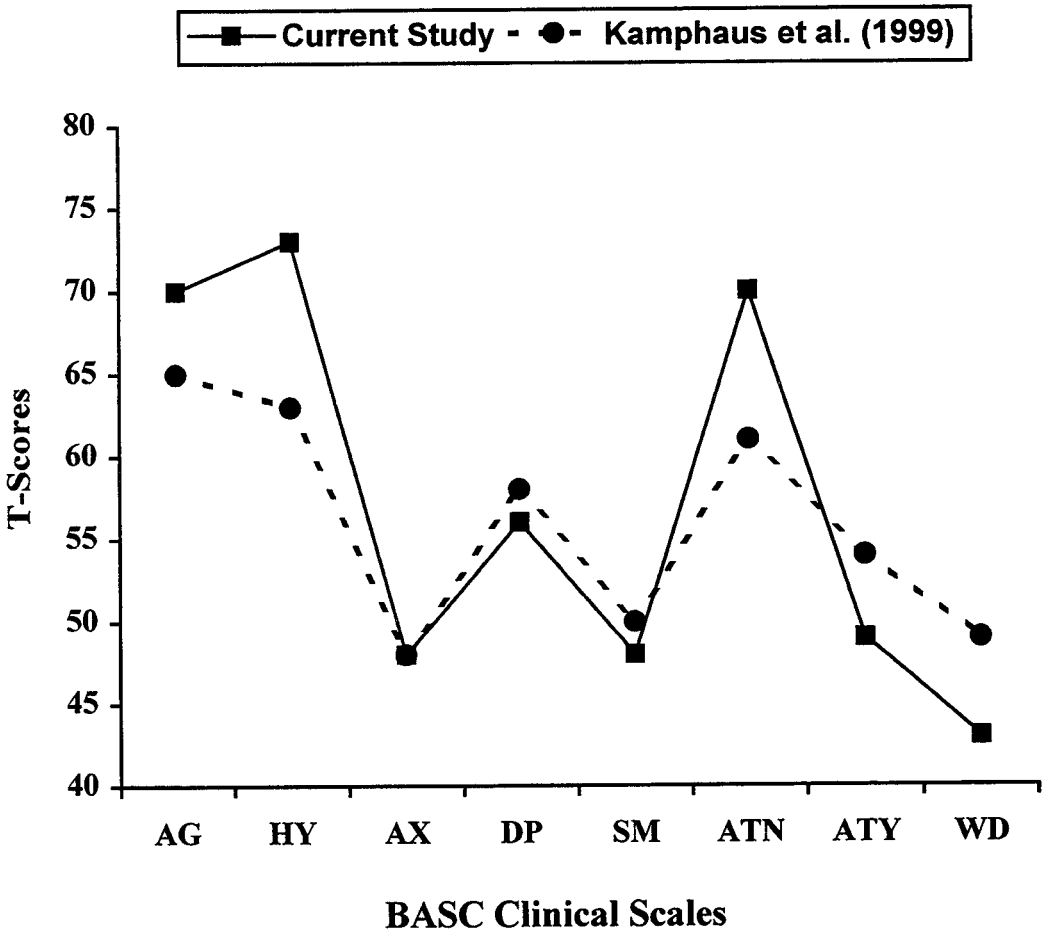

Figure C3. Comparison of Disruptive Behaviour Problems subtypes from current investigation and Kamphaus et al. (1999).

Note: *AG:* Aggression; *HY:* Hyperactivity; *AX:* Anxiety; *DP:* Depression; *SM:* Somatization; *ATN:* Attention Problems; *ATY:* Atypicality; *WD:* Withdrawal.

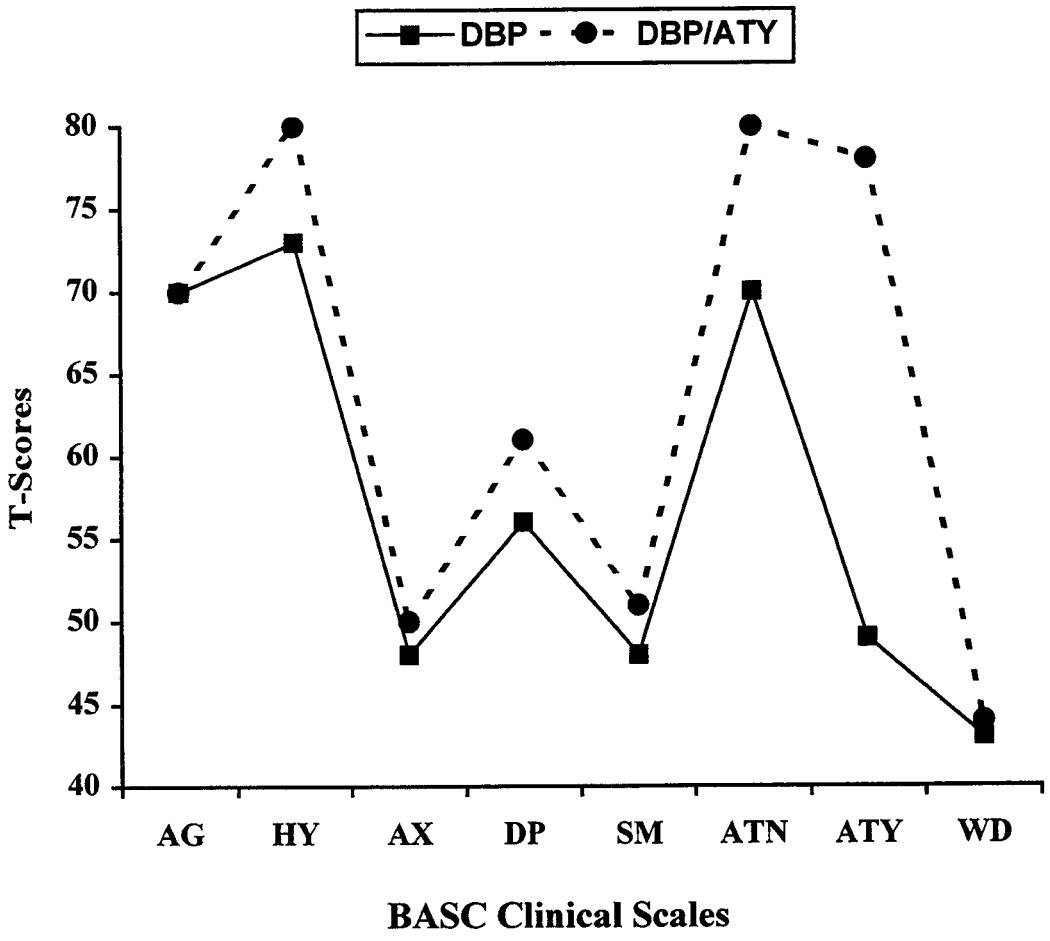

Figure C4. Comparison of Disruptive Behaviour Problem (DBP) subtype and Disruptive Behaviour Problem/Atypical (DBP/ATY) subtype from current investigation.

Note: *AG:* Aggression; *HY:* Hyperactivity; *AX:* Anxiety; *DP:* Depression; *SM:* Somatization; *ATN:* Attention Problems; *ATY:* Atypicality; *WD:* Withdrawal.

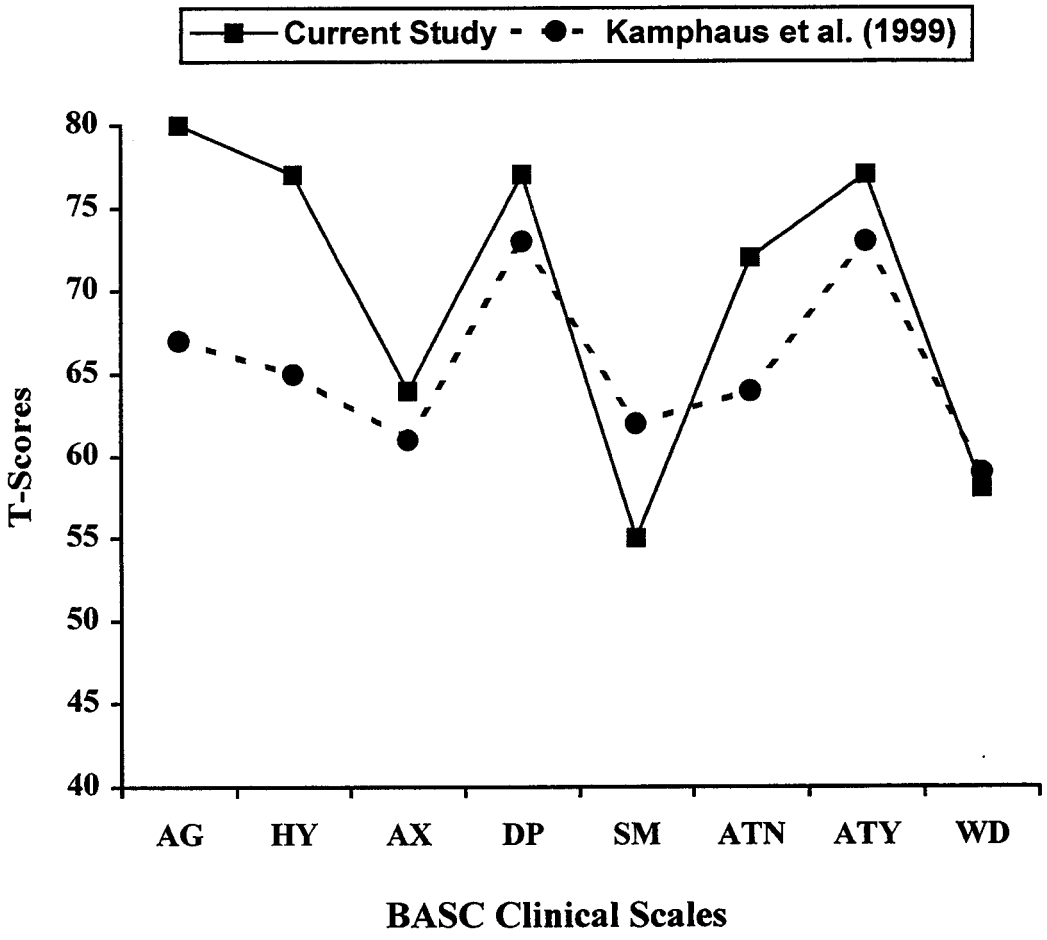

Figure C5. Comparison of the Mixed subtype from current investigation and Kamphaus et al.'s (1999) General Psychopathology-Severe subtype.

Note: *AG:* Aggression; *HY:* Hyperactivity; *AX:* Anxiety; *DP:* Depression; *SM:* Somatization; *ATN:* Attention Problems; *ATY:* Atypicality; *WD:* Withdrawal.

Vita Auctoris

Mohsan R. Beg was born on October 3, 1968, in Toronto, Ontario. In 1992 he received a B.Sc. in psychology and graduated with distinction from the University of Toronto. Upon graduating, he worked for two years as a Crisis Intervention Worker on the Scarborough Mobile Crisis Team before commencing post-graduate work in 1994. Since 1994, he has been enrolled in the doctoral program in Adult Clinical Psychology at the University of Windsor, where he was awarded a Master of Arts degree in 1996. In 2002 he completed a pre-doctoral internship at the Indiana University School of Medicine. He was awarded a Doctor of Philosophy degree in 2003 from the University of Windsor. He is currently employed at the University of Windsor Student Counselling Centre.