

**UNIVERSITY OF SOUTHAMPTON**

**THE IMPACT OF PSYCHOLOGICAL INTERVENTIONS FOR AD/HD  
ON EXPRESSED EMOTION AND MOTHER-CHILD INTERACTION**

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ABSTRACT

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THE IMPACT OF PSYCHOLOGICAL INTERVENTIONS FOR AD/HD  
ON EXPRESSED EMOTION AND MOTHER-CHILD INTERACTION

By David Michael Daley

Participants were recruited as part of a randomised control trial of two types of parent based intervention for AD/HD, The New Forest Parent Training Study NFPTS. Developmentally appropriate measures of Expressed Emotion (EE), mother-child interaction and solo-child play were devised for this study.

The Southampton Pre-school Speech Sample, SoPreSS, consisted of global ratings of initial statements, warmth and relationship, as well as frequency counts of positive (PEB) and negative (NEB) maternal evaluations of behaviour. An investigation of baseline SoPreSS levels in mothers demonstrated that higher EE levels were associated with more symptoms of AD/HD and greater child socialisation problems, lower parenting self esteem, and higher negativity about the impact of the child on the family. The Southampton solo-child Play coding system (SoSCP) consisted of measures of engagement and fidgeting. Mothers with lower scores on SoPreSS had children with higher levels of engagement

The Southampton Mother-Child Interaction coding system SoMCI was developed as a measure of maternal and child interaction. SoMCI consisted of frequency counts of challenging child behaviours; positive and negative maternal behaviours and duration counts for joint and separate play. Mothers with high scores on SoPreSS displayed less affection, and more negative direction.

Children were randomly allocated to a parent training (PT), a parent counselling and support (PC&S), waiting list control group (WLC) or non AD/HD group (NAD/HD). NFPTS examined measures of child behaviour and maternal well-being before, and after intervention as well as at a 15 week follow-up. AD/HD was reduced in the PT group compared to both PC&S and WLC by a clinically significant degree. Both PT and PC&S had a beneficial effect on mothers sense of well being, however these effects were short lived and had disappeared by follow up visit. Factors predicting outcome for the PT group were unclear, for the PC&S group clinically significant change occurred for children with less severe AD/HD, and with mothers who were more positive and less negative. A discriminant analysis for PC&S demonstrated that clinically significant change in the PC&S group occurred for children who had greater problems with emotional adjustment, fewer symptoms of AD/HD and whose mothers used more expansions during play, and fewer maternal directions or NEB. The findings indicate that outcome for PT was independent of maternal EE status, maternal interaction style, child behaviour problems or maternal adjustment.

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## GLOSSARY OF TERMS

ADDH	Attention Deficit Disorder with Hyperactivity
ADDWO	Attention Deficit Disorder without Hyperactivity
AD/HD	Attention Deficit Hyperactive Disorder
ADD HV	Maternal Attention Deficit Disorder As Rated by Health Visitor
ADD PARENT	Maternal Attention Deficit Disorder As Rated by Mother
AFFECT	Southampton Mother-Child Coding System affection
BCL OA	Behaviour Check List Overactivity Scale
BCL EMO	Behaviour Check List Difficulty with Emotional Adjustment Scale
BCL FEED	Behaviour Check List Difficulty with Feeding Scale
BCL SLP	Behaviour Check List Difficulty with Sleeping Scale
BCL SOIL	Behaviour Check List Difficulty with Soiling Scale
BCL SOC	Behaviour Check List Difficulty with Socialisation Scale
CD	Conduct Disorder
CFI	Camberwell Family Interview
CHALL	Southampton Mother-Child Coding System Challenging Behaviour
CRITIC	Southampton Mother-Child Coding System Criticism and Disapproval
DBD	Disruptive Behaviour Disorders
DIRECT	Southampton Mother-Child Coding System Directive Behaviour
DSM	Diagnostic and Statistical Manual
EE	Expressed Emotion
EE-EOI	Expressed Emotion Emotional Over-involvement



ENGAGE	Engagement
ENP	Eligible Non-participants
EOI	Emotional Over-involvement
EXPANS	Southampton Mother-Child Coding System Expansion
FES	Family Environment Scale
FIDGET	Fidget
FIQ MAR	Family Impact Questionnaire Marriage
FIQ NF	Family Impact Questionnaire Negative Feelings
FIQ PF	Family Impact Questionnaire Positive Feelings
FIQ SL	Family Impact Questionnaire Social Life
FMSS	Five Minute Speech Sample
GEE	Global Expressed Emotion
GHQ	General Health Questionnaire
HNRF	Hyperactive Non-referred Group
ICD	International Classification of Disorder
IS	SoPreSS Initial Statements
JPLY	Southampton Mother-Child Coding System
MFFT	Matching Familiar Figures Test
MRI	Magnetic Resonance Imaging
NAD/HD	Non Attention Deficit Hyperactive Disorder
NEB	SoPreSS Negative Evaluations of Behaviour
OCD	Obsessive Compulsive Disorder
PC/S	Parent Counselling and Support
PC&S (C)	Parent Counselling and Support Clinical Significant Change Group

PC&S (NC)	Parent Counselling and Support No Clinical Significant Change Group
PEB	SoPreSS Positive Evaluations of Behaviour
PPACS CON	Pre-school Parent Account of Symptoms Interview Conduct Scale
PPACS HYP	Pre-school Parent Account of Symptoms Interview Hyperactivity Scale
PRAISE	Southampton Mother-Child Coding System praise
PSOC EFF	Parenting Sense of Competence Scale Efficacy Scale
PSOC SAT	Parenting Sense of Competence Scale Satisfaction Scale
PT	Parent Training
PT (C)	Parent Training Clinical Significant Change Group
PT (NC)	Parent Training No Clinical Significant Change Group
REL	SoPreSS Relationship
SES	Socio-Economic Status
SoMCI	Southampton Mother-Child Coding System
SoPreSS	Southampton Pre-school Speech Sample
SoSCP	Southampton Solo-Child Coding System
SPLY	Southampton Mother-Child Coding System
TMSS	Three Minute Speech Sample
UNP	Unsuitable Non-participants
WAR	SoPreSS Warmth
WLC	Waiting List Control
WWP	Werry-Weiss-Peters Activity Scale

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## CHAPTER ONE: CHILDHOOD AD/HD.

### 1.1: Definition of AD/HD

Despite several name changes over the past fifty years, the current diagnosis of attention-deficit-hyperactivity-disorder (AD/HD) shares the core group of symptoms, impulsivity, inattention, and motor restlessness, with earlier terms such as minimal brain dysfunction, hyperactive child syndrome and attention deficit disorder with or without hyperactivity. The disorder is relatively common, affecting approximately four percent of all children, although estimates vary widely from three to eleven percent or more (Zametkein & Ernst 1999). The disorder which continues throughout life, usually begins in childhood and is characterised by excessive activity, even when developmental level and limited behavioural control are taken into consideration. (Elia, Ambrosini & Rapoport 1999).

### 1.2: AD/HD category or continuum?

Controversy still remains over whether AD/HD represents a category or a continuum. The controversy surrounds whether AD/HD represents the extreme end of a normal spectrum of behaviour or a discrete disorder. Levy *et al* (1997) investigated heritability and continuum versus categorical approaches to AD/HD using a large scale Australian twin sample of nearly two thousand twins and siblings aged between four and twelve years of age. Probandwise concordance rates and correlations in monozygotic and dizygotic twins and siblings were calculated, and heritability estimates examined using the DF regression technique (De Fries and Fulker 1985). AD/HD was assessed using a fourteen item questionnaire, with both eight and five symptom cut off points, as well as a diagnostic interview. Results suggested that AD/HD had exceptionally high heritability (0.75 - 0.91). This finding was robust, in that it applied whether a continuum (trait) or categorical (diagnostic) approach was used to characterise AD/HD. These results led Levy *et al* (1997) to suggest that AD/HD was best viewed as the extreme expression of a behaviour which varied

genetically throughout the entire population, rather than as a disorder with discrete determinants.

### **1.3: Current interest in AD/HD**

The pattern of restless, inattentive and impulsive behaviour in children generally labelled as AD/HD has become one of the focal points of child psychiatric research in a matter of decades. The ever increasing interest in AD/HD is derived from a high prevalence rate within both the general and clinical populations (Szatmari, Boyle & Offord, 1989a), as well as a potentially poor prognosis associated with persistent, socially undesirable behaviour (Satterfield, Hoppe & Schell, 1982) and the possibility that the condition may contain a strong genetic link (Stevenson, 1991). The majority of research on AD/HD has documented differences between hyperactive and normal children, however, to be valid, a diagnostic entity must differ in aetiology, course, characteristics, or treatment response from those of other child psychiatric entities as well as from normality (Rutter, 1978).

Despite years of research which has attempted to clarify the nature of AD/HD, the distinction between it and other childhood disorders such as conduct disorder (CD) has never been adequately established. Therefore before beginning a discussion on the characteristics of AD/HD, it is necessary to investigate variations in research methodology. These variations have been a source of ambiguity about the validity of the disorder, and a limitation on our understanding of the literature related to AD/HD. It is possible to classify these variations into four categories i) Diagnostic Criteria, ii) Method of Assessment, iii) Sampling and iv) Design and each will be dealt with in turn.

### **1.4: Diagnostic criteria**

In testing the validity of a diagnosis of AD/HD, researchers have typically chosen one of two existing schemata: the DSM IV (American Psychiatric Association 1994) used

predominately in North American or the ICD 10 (World Health Organisation, 1994) often used in Britain and the rest of Europe. Diagnostic differences between clinicians in North American and Europe stem from these measures' differential emphasis on various core symptoms, requirement for pervasive symptomatology, and treatment of co-morbid psychopathology (Schachar,1991). During successive revisions of the DSM, changes have been made to the diagnostic criteria for AD/HD. For example in the DSM III a diagnosis of attention deficit disorder with hyperactivity (ADHD) was based on a minimum of six months of developmentally inappropriate overactivity, inattentiveness, and impulsiveness occurring before the age of seven. The occurrence of all three symptoms was essential to the diagnosis. If a child presented with inattentiveness and impulsiveness but without overactivity a different diagnosis was applied; attention deficit disorder without hyperactivity (AD/HD without hyperactivity). When the DSM III-R was devised a diagnosis of AD/HD no longer required the presence of inattentive, impulsive and overactive behaviours. Instead the diagnosis depended upon the presence of a minimum of eight symptoms drawn from a list of fourteen symptoms of impulsive, inattentive and overactive behaviours. This new classification meant that a child presenting with only two types of symptoms could receive a diagnosis of AD/HD. Effectively the DSM III-R created two new sub categories of AD/HD, one concerned mainly with overactivity and impulsiveness but without inattention. The second concerned with inattention and overactivity but without impulsiveness. With the advent of the DSM IV these classifications were further clarified. The DSM IV criteria for AD/HD requires a minimum of six symptoms of inattention drawn from a list of nine and a minimum of six symptoms of AD/HD/impulsivity also drawn from a list of nine. This has created three new classification for AD/HD:

i) Attention Deficit/Hyperactive Disorder, Combined Type.

ii) Attention Deficit/Hyperactive Disorder, Predominantly Inattentive Type.

iii) Attention-Deficit/Hyperactive Disorder, Predominantly Hyperactivity-Impulsive Type.

In comparison to the DSM III-R and IV, the diagnostic criteria in the ICD 9 and 10 for hyperkinetic disorders are not specified in the same detail. In the ICD 9, short attention span and distractibility were considered the essential features with disinhibition, extreme overactivity and impulsiveness important secondary traits. The ICD 10 emphasised the cardinal features of impaired attention and overactivity as being necessary for a diagnosis of hyperkinetic disorder with disinhibition in social relationships, recklessness, and impulsive flouting of social rules as secondary characteristics. Further differences exist between the two measures with regard to their treatment of situational and pervasive hyperactivity

The DSM III suggested that primary consideration should be placed on teachers' reports of child behaviour, while the DSM III-R accepted the possibility of situational variations of hyperactive-inattentive behaviours. The ICD 10 suggested that pervasive hyperactivity should be a principal criterion while the DSM IV stipulated that attention deficit or hyperactive/impulsivity symptoms should result in some impairment in two or more situations.

### **1.5: Method of assessment**

Another major source of difference lies in the method of establishing the presence of core symptoms for research studies. Usually participants are selected who meet criteria for either AD/HD or Hyperkinetic syndrome based on clinical assessment, without further specification of diagnostic method (Schachar, 1991). However without specialised training in the use of diagnostic criteria and terminology, it is unlikely that researchers can make clinical diagnoses which are sufficiently reliable for research purposes. Therefore assessment is usually based on behavioural rating scales or clinical interviews.

## **1.6: Behaviour rating scales**

Behaviour rating scales are the most common form of assessment. Their popularity owes much to their satisfactory test-retest reliability, and stable factor structure across different participant ages, samples and source of ratings (Taylor & Sandberg 1984). While rating scales demonstrate good reliability, their questionable validity could be a source of diagnostic unreliability. Agreement between different rating scales on similar dimensions of behaviour is lower than expected (Sandberg *et al* 1980), as is the level of agreement between similar informants such as parents or teachers (Achenbach *et al*, 1987). An associated problem is that a high degree of inter-correlation exists between factors derived from rating scales representing activity, inattentiveness and conduct problems. This high inter-correlation may reflect the co-occurrence of activity, inattention and conduct disturbance, but also poses problems for scoring, as well as the inclusion of items which fail to discriminate between AD/HD and conduct disorder. An explanation for this inter correlation may arise from factors such as the rater's expectation that defiant and aggressive children will also be hyperactive (Goodman & Stevenson,1989).

## **1.7: Standardised interviews**

Given the problems of validity with rating scales, and the complexity of trying to control for bias, clinical interviews may be a more valid way of establishing a diagnosis. Several interviews have been developed such as the Parental Account of Childhood Symptoms PACS (Taylor, Schachar & Heppinstall, 1993). In general these interviews require the parent to describe the child's behaviour problems rather than rate their subjective impressions of them. The interviewer then rates the child's behaviour based on their training and expert knowledge of specific definitions, along dimensions such as severity, and frequency. Inter-rater reliability for these ratings is extremely high at about 0.9 according to Taylor *et al*, (1986b). Another strength of clinical interviews is that they produce a distinct pattern of associations with criterion variables, something which rating scales are not capable of achieving.



### **1.8: Sampling technique**

Yet another important consideration in investigations of childhood AD/HD involves the source of participants. Most studies recruit their AD/HD participants from child psychiatric, paediatric or psycho-educational clinics. The problem with recruiting from these sources is that systematic differences in sample characteristics such as comorbid psychopathology or learning disability may exist. Population based studies also indicate that clinic samples may not be representative of children in the general population. Taylor *et al*, (1990) reported the findings of a general population based study which showed that only 25% of parents of children diagnosed with hyperkinetic disorder and 8% of parents of children with conduct disorder were considering seeking help for their child's behaviour problems. Though many more were concerned with their child's performance at school. However population based studies are limited in the depth and breadth of assessments that can be conducted. The danger of population based studies has been highlighted by Szatmari *et al.*, (1989) who obtained results from a population based study which indicated that AD/HD was specifically associated with evidence of developmental delay. However when clinical samples were examined directly, no evidence of an effect of developmental delay was apparent.

### **1.9: Design**

Studies which have been conducted to determine the validity of diagnoses of childhood AD/HD have either been correlational studies or clinical comparisons. Both designs attempt to isolate specific characteristics of AD/HD. Correlational studies are predicated on the premise that AD/HD is a dimension of behaviour with correlates that are uniform throughout the range of AD/HD scores (Schachar, 1991). This implies that correlates of AD/HD are similar irrespective of any complications from comorbid psychopathology. This is consistent with the view of AD/HD as a temperament trait. Clinical comparisons on the other hand imply that distinct correlates exist only at the extremes of hyperactive scores, this suggests that AD/HD

constitutes a disorder. This assumption has led most researchers to include just a hyperactive and normal control group in their research. This limits their ability to determine the validity of AD/HD, as it fails to distinguish the characteristics of AD/HD from those of other types of psychopathology. What is actually needed are comparisons of pure AD/HD and pure conduct disorder (Schachar, 1991).

### 1.10: Epidemiology

The most salient example of the importance of methodological factors is the result of epidemiological studies. Schachar, (1991) demonstrated this point by presenting results of selected epidemiological studies ( presented in table 1.1). Prevalence rates for ADD ranged from 1 to 1.5 percent depending upon the study, even more surprising were the results for AD/HD which ranged from 6 to 17 percent, while scores for pervasive AD/HD ranged from 1 to 9.9 percent. It is clear that variation in research sample accounts for much of the ambiguity surrounding the nature of AD/HD. It is therefore important to consider what the underlying prevalence rate for AD/HD might be.

**Table 1.1: Showing results of selected epidemiological studies of AD/HD**

STUDY	PREVALENCE %							
	Sex	Gender	ADD	AD/HD	PH	HK	CD	ED
Schachar et al (1981)	10	M-F	N/A	15	1	n/a	30	70
Mc Gee et al (1984a,b)	7	M-F	1	12	7	n/a	43	n/a
Anderson et al (1987)	11	M-F	1	12	4.5	n/a	47	26
Szatmari et al (1987c)	6-11	M-F	1.4	6	0.5	n/a	40	20
Taylor et al (1990)	7-8	M	1.5	17	9.9	1.7	58	14

Note : ADD = Attention Deficit Disorder; ADDH = Attention Deficit Disorder with Hyperactivity; PH = Pervasive Hyperactivity defined by parent and teacher questionnaires only; HK = Hyperkinetic Disorder defined by pervasive hyperactivity plus clinical interview; CD = Conduct Disorder; ED Emotional Disorder; M = Male; F = Female; n/a = Not Applicable.

### 1.11: Prevalence

The prevalence of AD/HD in the population has been reported to range from 1.7 to 18 percent (Elia, Ambrosia & Rapoport, 1999). The wide variation in prevalence may be explained by differences in informants, reports from teachers or parents, cultural differences or changes in definitions about the degree of impairment necessary for a classification of AD/HD. As previously discussed, changes in the classification system for AD/HD may also influence prevalence rates. Baumgaertel *et al.*, (1995) examined a non-referred sample of children on criteria for AD/HD on the DSM III-R and DSM IV. Prevalence rates increased from 9.6 percent to 17.8 percent when the DSM IV criteria were used instead of DSM III-R. Wolraich *et al.*, (1996) examined teacher reported prevalence rates for AD/HD based on DSM III-R and DSM IV criteria for over eight thousand children, aged between nine and ten. Results showed that prevalence rates were 7.3 percent for AD/HD on the DSM III-R, and 11.4 percent on the DSM IV. Within the sub categories of the DSM IV, prevalence rates were 5.4 percent for AD/HD inattentive, 2.4 for AD/HD hyperactive-impulsive and 3.6 percent for AD/HD combined type. Their conclusions were that the DSM IV criteria were likely to increase the prevalence of AD/HD in comparison with DSM III-R criteria.

Variations are also evident in the sex ratios of children referred to child psychiatrists and psychologists. The male/female gender ratio for referrals varies from 3 : 1 to 9 : 1 (Barkley *et al* 1990). In community samples of school aged children the ratio is closer to 2 : 1. Downey & Coyen., (1990) examined the epidemiology of disorders in children aged between ten and twenty years of age. For AD/HD prevalence rates were nearly twice as high in boys as in girls up to the age of seventeen.

It is difficult to compare international prevalence rates because of diverse diagnostic criteria and methods of assessment, as well as the cultural differences in the interpretation of behaviour. (Elia, Ambrosini & Rapoport, 1999). However no cultural differences have been reported in studies which have examined international

samples. Baumgaertel, Wolraich & Dietrich (1995) examined prevalence rates for teacher reports of AD/HD for over one thousand German children. Overall prevalence rates for AD/HD at 17 percent on the DSM IV were similar to prevalence rates reported in the United States of America.

### **1.12: Behavioural components of AD/HD**

As well as discussing influences on the definition and measurement of AD/HD, it is also important to discuss each component of AD/HD. As mentioned previously the three behaviour components of AD/HD are i) overactivity, ii) inattention and iii) impulsivity, and each component will be discussed in turn.

#### **1.12.1: Overactivity**

The salient issues regarding overactivity are definition and measurement. Apart from being a component of AD/HD, excessive motor overactivity can be viewed as restlessness in anxiety, psychomotor agitation in depression, or excessive energy and talkativeness in mania and in the hyperkenesis of autism (Sandberg, 1996).

Overactive behaviour also varies as a function of age; restless behaviour common in school age hyperactive children decreases by adolescence. Likewise it is normal for toddlers to be more active than school aged children. Therefore the age of the child needs to be taken into account when judging what constitutes abnormal levels of motor activity. A related problem is the overlap between normal and abnormal levels of activity. Large individual differences exist in relation to children's normal activity levels, and it is partly because of this fact that activity level is one of the components of normal temperamental variation in childhood (Buss & Plomin, 1975).

Children's levels of motor activity fluctuate widely depending upon the social context. A child may run around incessantly while playing in the garden or on the beach, but sit quietly while reading or watching a favourite television program. It is not therefore necessarily the amount of motor behaviour which may demonstrate overactivity but

the inappropriateness of the motor behaviour, in certain social settings. Despite difficulties in definition ICD 10 and DSM IV both regard excessive motor activity as a component of AD/HD and hyperkinetic disorder. Direct observation and mechanical recordings (actometers) of activity have shown that children rated as hyperactive using parent and teacher questionnaires have higher mean activity scores than normal children (Taylor *et al.*, 1991). They have also been shown to make more movements during their sleep than their normal peers (Porrino *et al.*, 1983).

### **1.12.2: Inattention**

As with overactivity, inattention is a relatively common component of childhood psychiatric disturbance, with poor concentration a reported feature of most childhood psychiatric disorders. Once again measurement is a problem, as it is next to impossible to infer attention level from the child's behaviour. Many factors contribute to a child's level of attention, such as boredom, daydreaming, preoccupation with worries, and the level of task difficulty. Observations of children do not indicate their attention level. For example a child in the classroom staring into space, may well be day dreaming or could just be concentrating on the solution to a complex problem. The same is true of observing children who are studying. One child may be looking at their books and understanding the information they are reading, another child may be just staring at the book, but dreaming about a different topic. While direct observation is not capable of inferring levels of attention, psychological tests of attention are capable of overcoming this problem. They themselves however have limitations, poor scores on a test may indicate inattention, or it may mean that the child had difficulty understanding the task, or even that the child was not trying. These are not problems specifically related to attention tests, but limitations on all psychometric tests in general.

Multiple tests are required to measure attention, as each test only addresses one component of attention. For example selective attention; an inability to filter out or

ignore irrelevant environmental events is measured by the child's ability to focus on one stimulus while excluding others. Sustained attention; an ability to maintain concentration despite distraction is measured by the child's ability to maintain attention to the task despite boredom, distraction or frustration. Research findings suggest that hyperactive children do not suffer from selective attention;. (Campbell & Werry, 1986). Deficits do however exist in sustained attention. Two measures of sustained attention i) reaction time tests, and ii) continuous performance tests have demonstrated differences between normal and AD/HD children. AD/HD children record inferior scores and their performance deteriorates over time on these measures when compared to the non AD/HD group (Douglas, 1983). Unfortunately Subsequent research has suggested that deficiencies in sustained attention are both context and task dependant. For example, attention in an AD/HD group improves if the task is interesting, if the child is fined for errors, if the task is self-paced rather than experimenter paced and if the experimenter is present rather than absent, all of which suggests a motivational rather than an attentional deficit (Barkley, 1990).

### **1.12.3: Impulsivity**

The third component of AD/HD is impulsivity. In simple terms hyperactive children "act before they think". When engaged in problem solving they are more likely to accept the first solution they think of rather than considering other alternatives. They are also more likely to blurt out incorrect answers and have difficulty in organised play, usually because of their inability to control their impulse to act prematurely. There is considerable support for the notion that hyperactive children are impulsive. Using the Matching Familiar Figures Test (MFFT Kagan, 1965) children had to identify a target figure from a series of similar figures. Those who took time to examine all the figures and chose carefully were termed reflective and made few mistakes. In contrast, hyperactive children's performance on the task were characterised by fast, inaccurate, impulsive responding (Barkley, 1990). They failed to compare systematically their choice with the entire array of options, to verify if

their choice was the correct one. Another possible account for this particular behaviour is that hyperactive's impulsive behaviour represents a desire to finish the task quickly rather, than a specific deficit in impulse control (Sonuga-Barke *et al.*, 1992). A study by Sonuga-Barke *et al.*, (1994) supports this notion, under standard conditions where response latency was confounded with trial length, AD/HD children appeared impulsive. When this confound was removed by implementing a fixed trial format AD/HD children were no more impulsive than normal children. They did however still make more errors.

### **1.13: Causes of AD/HD**

As well as discussing why AD/HD has emerged, it is also important to consider what might be the possible causes of AD/HD. Neurological, environmental and genetic causes of AD/HD will each be discussed briefly.

#### **1.13.1: Minimal brain dysfunction**

Early theories of AD/HD attributed the cause to abnormalities in the organisation of the brain stem, resulting from trauma, prenatal encephalopathy or birth injury (Kahn & Cohen, 1934). Evidence for minimal brain dysfunction came from structured observations of children in rehabilitation centres. Two main groups were studied i) exogenous those who had histories of central nervous damage but no family history of brain damage, and ii) endogenous those who had no history of central nervous damage but had family histories of brain damage. These two groups differed with respect to their behaviour. The exogenous children responded poorly to teaching and appeared overactive and easily distracted. Further examination of the exogenous group demonstrated that they closely resembled brain injured adults (Sandberg, 1996).

Supplementary support for the minimal brain damage theory came from studies of animals which showed a relationship between disordered behaviour and minor degrees of brain damage (Cromwell, Baumeister & Hawkins, 1963). Critics of the

minimal brain damage theory claimed that if AD/HD was a function of brain damage then all AD/HD children should show evidence of brain damage, and all brain damage children should develop AD/HD. Rutter, (1977) demonstrated that the majority of brain damaged children do not demonstrate symptoms of AD/HD, and only five percent of hyperactive children show any structural evidence of brain damage.

### **1.13.2: Environmental theories**

Alternative theories of the causation of AD/HD emerged in the 1970's. The most popular of these theories was a theory of food allergy formulated by Feingold, (1975). His theory was that children reacted in a hyperactive manner as a result of an allergy or toxic reaction to food substances usually additives. While these theories caught the imagination of researchers and clinicians, subsequent investigation revealed at best a minimal effect of food substances on the behaviour of children (Barkley, 1991). Other theories of causation such as maternal smoking and alcohol consumption during pregnancy, and lead poisoning have also been subsequently largely refuted (Taylor, 1991).

### **1.13.3: Genetic theories**

The most compelling evidence of a genetic component for AD/HD comes from Stevenson, (1991). He used 91 pairs of identical twins and 105 fraternal twins selected from London hospital records. A multiple regression analysis confirmed that the heritability of extreme group membership was significant for activity, as rated by the mother, and that heritability for attention deficits were also significant (Stevenson, 1991). In simple terms this means there is a significant genetic component in individuals' differences on activity and attention levels. Interest in a potential genetic mechanism underlying AD/HD has been increased with reports of an association with a single dopamine transporter gene (Cook *et al.*, 1995), and with reports of variations within the D4 receptor gene (La Hoste *et al.*, 1996). Genetic studies have focused mainly on candidate genes involved in dopaminergic transmission. Several reasons



exist for this particular focus, dopaminergic drugs are clinically efficacious in addressing the core problems associated with AD/HD. Imaging studies using Positron Imaging Topography PET, and Magnetic Resonance Imaging MRI techniques have implicated the frontostriatal circuitry in AD/HD, an area of the brain which is rich in dopaminergic innervation.

Castellanos et al., (1996) examined quantitative brain magnetic resonance imaging in AD/HD. Fifty seven boys with AD/HD aged between five and eighteen were compared to fifty five healthy matched controls using the same MRI scanner. Participants with AD/HD had a 4.7 percent smaller total cerebral volume, analysis of covariance for total cerebral volume demonstrated a significant loss of normal right to left asymmetry in the caudate, smaller right globus pallidus, smaller right anterior frontal region, smaller cerebellum and reversal of normal lateral ventricular asymmetry. Castellanos pointed out that the area's of deficit for AD/HD were consistent with hypothesised dysfunction's of the right sided prefrontal striate system in AD/HD.

#### **1.13.4: Interpersonal theories**

The last theory of AD/HD is a social one, while the aetiology of AD/HD may lie in an organic context, children develop in a social context. The nature of their interaction with parents and peers plays a significant role in compounding or improving the nature of their disorder. Early studies which claimed a specific pattern of psychopathology in family members of hyperactive children, such as anti-social and alcoholic fathers, and hysterical mothers lent support to the validity of an interpersonal influence on AD/HD (Cantwell, 1972). Subsequent studies have found an association between conduct disorder and mixed disorders and parental psychopathology but no association for AD/HD (Lahey *et al* 1989). This lack of association may be due to methodological weaknesses which have been previously discussed. Evidence for this theory comes from findings that show AD/HD and

Conduct Disorder CD have similar rates of maternal psychopathology, which do not vary with diagnostic criteria (Taylor 1991). Although in all probability an interaction of child and family factors (discussed in greater detail in chapter three and four) does not cause AD/HD, but it most likely exacerbates and maintains levels of AD/HD behaviour in vulnerable children.

#### **1.14: The course of AD/HD**

The persistence of AD/HD and its diagnosis in adults has been a source of even further controversy. Nearly all prospective studies of school age children with AD/HD have shown persistence of symptoms, at least into early adolescence, and sometime beyond. Mannuzza *et al.*, (1993) examined the adult outcome of AD/HD and non-AD/HD boys, by examining their educational achievement, occupational rank and psychiatric status. Participants were assessed in a prospective study with a follow up interval ranging from thirteen to nineteen years. Adults from the AD/HD sample when compared with the non-AD/HD sample had significantly higher rates of i) AD/HD symptoms (11 % versus 1%), ii) antisocial personality disorders (18% versus 2%) and iii) drug disorders (16% versus 4%). Educational and occupational achievements were also significantly compromised in the AD/HD group. In a further follow up study, Mannuzza *et al.*, (1998) reported that symptoms of AD/HD decreased during mid to late adolescence in their follow up sample of AD/HD boys and decreased further in adulthood. While the persistence of AD/HD symptoms into adolescence was associated with greater academic and behavioural impairment (Mannuzza *et al.*, 1993), the same was not true for those whose symptoms did not persist into adolescence. Mannuzza *et al.*, (1998) found that for participants whose symptoms decrease during adolescence, the long term outcome was similar to that of normal participants in most domains, with the exception of academic achievement.

### **1.15: Variations in AD/HD**

Yet another problem with AD/HD is the variations in its diagnosis. The low agreement among different informants on children's behaviours is evident in both clinical practice and research. In a meta-analysis of 119 studies, (Achenbach *et al.*, 1987) reported considerable consistency between reports by pairs of parents, teachers or social workers, but correlations among different types of informants were found to be as low as 0.28. Differences in the diagnostic classification of AD/HD have already been discussed but they just highlight the little addressed problem of situation versus pervasive AD/HD. Essentially the problem is that some children can demonstrate symptoms of AD/HD in every context such as home, clinic and school (pervasive) while other children demonstrate their AD/HD in just one setting such as school or home (situational).

Ho *et al.*, (1996) compared groups of home and school situationally AD/HD primary school boys with pervasively AD/HD and non-AD/HD controls on a battery of measures. The AD/HD groups persisted in the same categories during the six months of the study. Results showed that both situational AD/HD groups had lower measured activity levels than the pervasive AD/HD group and only the latter differed significantly from the non AD/HD group. Poor family relations characterised home AD/HD children, while school AD/HD children were characterised by low intelligence, motor clumsiness, poor reading and academic abilities. Pervasive AD/HD children differed from both situational groups and displayed higher levels of delayed language development. While situational AD/HD still has a dubious identity, Ho *et al's* (1996) findings demonstrated external correlates for situational and pervasive AD/HD, indicating that they should in the future be regarded as two separate entities.

### **1.16: Co-morbidity**

As well as taking into consideration the existence of both pervasive and situational AD/HD, it is also important to consider other childhood behavioural disorders which are associated with AD/HD. Conduct Disorder is the childhood disorder most closely associated with AD/HD. A high degree of comorbidity exists between AD/HD and CD, up to 30 percent in community samples (Szatmari *et al.*, 1989). Schachar *et al.*, (1995) studied 45 children with AD/HD, CD, or AD/HD + CD and compared them with 16 normal control children. They were interested in testing whether or not their three groups of children with behavioural disorders followed similar or different patterns of cognitive function, developmental risk, and psychosocial factors which characterise the pure forms of AD/HD and CD. Results showed that the AD/HD group had significant impairment on measures of inhibitory control and response alteration, and greater developmental delay when compared with the CD or normal group. The CD group showed greater signs of environmental adversity and greater problems with arithmetic than either the AD/HD or normal groups. The AD/HD+CD group were similar to the AD/HD group on cognitive, developmental and reading measures and similar to the CD group on psychosocial and arithmetic measure. These results support the individual nature of AD/HD+CD and enhance the theory that AD/HD+CD is a hybrid of pure AD/HD and CD.

### **1.17: Pre-school AD/HD**

The majority of research on AD/HD is focused on school age samples, where deficits and impairments in inattention, and impulsivity are most easily recognised. However Campbell, (1984) has pointed out that few studies have explored the nature and course of AD/HD in pre-school children despite the assumption that AD/HD develops during the pre-school years. McGee, *et al* (1991) have pointed out that the DSM III criteria for AD/HD claimed that “onset is typically by the age of three”, while the DSM IV states that “onset in about half the cases is before the age of four”. The parents of pre-school AD/HD children describe them as hyperactive restlessness and

aimlessness, requiring little sleep, being prone to frequent temper tantrums and lacking consideration for the feelings of others (Prior, Leonard & Wood 1983). The symptoms of AD/HD and conduct disorder appeared to be intertwined in pre-school children, as parents voice the most concern about discipline and peer problems. (Sandberg, 1996).

The first epidemiological survey of pre-school children undertaken by Richman, Stevenson & Graham, (1982) indicated that overactivity or restlessness presented marked difficulties in almost thirteen percent of three year old children, while inattention presented almost six percent. Richman, Stevenson & Graham, (1982) concluded that these specific problems were strongly related to language delay during the early years, and indicated a poor prognosis for development, as they indicated the presence of behaviour problems five years later.

Follow up studies of pre-school AD/HD children indicate continuity of AD/HD symptoms. Campbell *et al.*, (1977) examined groups of AD/HD and non-AD/HD controls at three years of age and again at five. While no differences existed between the two groups on cognitive measures, or maternal behaviour during interaction, differences existed on parent and teacher ratings of behaviour. Ratings of behaviour for the AD/HD pre-schoolers showed more conduct and inattentive-hyperactive problems at follow up. A second study by Campbell, (1994) followed two different groups of children identified at two years of age, and followed up a year later. Again no significant differences existed for cognitive performance, mechanical measures of movement, or off task behaviour. Out of seat behaviours did differentiate between the two groups but still the most consistent difference were reports of the child's problem behaviour

McGee *et al.*, (1991) compared a group of pervasively AD/HD children with a non-AD/HD control group over a twelve year follow up period. Initially the AD/HD group

came from families with high levels of social adversity, and had poorer language development, than the non-AD/HD group. Over the twelve years of follow up, data were collected at age five, seven, nine, eleven and fifteen. The AD/HD group continued to demonstrate poor cognitive skills, lower levels of reading ability, disruptive and inattentive behaviours at school and home as well as higher rates of DSM III disorders in preadolescence and adolescence. At the end of the twelve years of follow up only twenty five percent of AD/HD children had met recovery criteria. The short term studies of Campbell, (1977 & 1984) have suggested that AD/HD children identified at pre-school age continue to experience behavioural difficulties. The results of the McGee *et al.*, (1991) have confirmed these earlier studies and has extended them to late childhood and adolescence. All of these findings point to the adverse long term consequences of pre-school AD/HD.

### **1.18: Expressed emotion and AD/HD**

The association between parental EE and child behavioural disturbance has been well researched. Hibbs *et al.*, (1990) reported that children with disruptive behaviour disorders or obsessive-compulsive disorders were more likely to have parents with high EE than were non psychiatrically ill control children. While the role of EE in the determination of AD/HD has never been formally tested, studies do exist which have examined components of EE and their relationship to AD/HD. Milich & Loney, (1979) discovered two factors which were associated with poor prognosis for AD/HD children; (i) associated aggressive symptomatology in the child and (ii) a harsh family environment. Paternite & Loney, (1980) confirmed earlier research by Milich & Loney, (1979), and showed that a rating of a conflictual parent-child relationship was the single best familial predictor of concurrent aggressive symptoms and future aggressive symptoms. Marshall, Longwell, Goldstein & Swanson, (1990) examined the association between parental EE status as measured by the Five Minute Speech Sample and parenting behaviour for parents of AD/HD and non AD/HD boys. Their results showed that for both groups of parents maternal affective attitudes were highly

predictive of parenting behaviour and that negative parental attitudes may contribute to the development and maintenance of AD/HD. Similarly research by Mash & Johnston, (1982) has demonstrated that children who are impulsive, highly active or non-compliant tend to elicit higher levels of conflict and negative affect from their parents. Kosisky, (1990), cited in Hibbs *et al.*,(1990), found that mothers were more likely to be critical toward their AD/HD children than toward their well offspring. A potential advantage of this measure is that it may represent "unshared variance" a parental attitude directed toward one child only. Because of its potential "unshared" nature, EE may differ from measures of psychosocial adversity such as divorce, socio-economic hardship, or marital conflict, which affect all children within the family (Hirshfeld, *et al*, 1997). If EE represents "unshared variance" and mothers are more likely to be critical toward their AD/HD children, might EE change as a function of intervention, or might it predict the outcome of intervention? EE will be examined in more detail in chapter two.

### **1.19: Mother-child interaction and AD/HD**

While few studies have examined levels of EE in groups of AD/HD children, more work has been conducted examining issues of mother-child interaction and AD/HD. The results of most observational studies of mother-child interaction suggest that parents of AD/HD children give frequent attention to overactive and impulsive behaviour, while mothers frequently use repetition, verbal direction and reprimands. These same parents give fewer rewards for compliance and generally attend less to appropriate behaviours. The findings of Gardner (1994) have demonstrated that mothers of AD/HD children have been found to be more negative, controlling, intrusive and disapproving, and less rewarding and responsive than mothers of non AD/HD children. It would be inappropriate therefore to examine EE levels without also examining mother-child interaction. This is because change in EE status as a function of intervention might also result in changes in mother-child interaction.

### **1.20: The research questions**

The primary aim of this PhD study was to examine the role of EE and mother-child interaction in determining the outcome of parent based intervention for AD/HD. For this purpose developmentally suitable measures of EE (SoPreSS), mother-child interaction,(SoMCI) and solo-child play (SoSCP) were devised and their psychometric properties tested. The research questions were broken down into two sections, the first section involved questions pertaining to the development of suitable measures, the second section involved using those measures to examine their influence on the outcome of psychological intervention. In relation to the development of the measures two questions needed to be addressed

i) Might it be possible to devise reliable and developmentally suitable measures of EE (SoPreSS), solo-child play (SoSCP) and mother-child interaction (SoMCI)? In relation to reliability each measure should contain acceptable test-retest, code-recode and inter-rater reliability. For test-retest reliability two sets of speech samples or observations collected six months apart on participants in the waiting list control group, should still demonstrate an acceptable linear association. For code-recode the same speech samples or observations coded twice within a six month period should also demonstrate an acceptable linear association. Finally an acceptable linear association should also exist between the same speech samples and observations coded by more than one person.

ii) The validity of the measures also needs to be examined. In relation to validity, positive components of SoPreSS such as warmth and relationship should correlate with positive components of SoMCI such as affection and praise while negative components of SoPreSS should correlate with negative components SoMCI (Concurrent validity). The measures should also distinguish the AD/HD group from the non-AD/HD group, with the AD/HD group having higher negative scores and lower positive scores on all three measures (Discriminant validity). Finally all three



measures should be sensitive to change as a function of intervention. Intervention should result in lower SoPreSS scores, and more positive SoMCI and SoSCP scores.

Having examined the reliability and validity of the measures, their influence on the outcome of psychological outcome can then be examined. In relation to the influence of the measures on outcome three further questions need to be addressed

i) Will outcome be determined by baseline scores on SoPreSS, SoMCI and SoSCP?

Successful outcome in the PT and PC&S groups might occur for children who had higher levels of solo-play and lower scores on more subjective measures of AD/HD as well as low EE mothers, with a more positive interactional style.

ii) Will outcome be influenced by aspects of maternal adjustment? Successful outcome in the PT and PC&S groups might occur for children whose mothers have lower mental health scores, and higher levels of parenting self-esteem.

iii) Will the predictors of outcome be different for the PT and PC&S groups? The determinants of successful outcome might be different for the two groups? As PT offers parents advice on child management technique while PC&S only offers parents an opportunity to reflect on their parenting, outcome in the PC&S group may be predicted by lower levels of maternal EE and a more positive maternal interactional style, while PT may occur in the absence of these conditions.

### **1.21: Conclusions**

The definition, causes and course of AD/HD have all been presented. The three classifications for AD/HD created by the DSM IV have been discussed, as have problems of assessment of AD/HD using behaviour rating scales and clinical interviews. Sampling problems and issues of design have plagued previous research in AD/HD, leading to wide variations in the reported prevalence rate. The participants

for the studies presented in this thesis were all recruited from the New Forest Parent training study, NFPTS, which involved an epidemiological screening process and randomised treatment/control design. Chapter two will introduce the concept of expressed emotion EE and explain the utility of examining EE levels in mothers of AD/HD children.

## CHAPTER TWO EXPRESSED EMOTION.

### 2.1: Chapter overview

The intention of this chapter is to introduce the construct of Expressed Emotion (EE), discuss the measurement of EE, and the utility of examining it. Then the psychometric properties of the Southampton Pre-school Speech Sample (SoPreSS) will be discussed. SoPreSS is a speech sample measure of EE especially designed to examine EE in parents of difficult young children. Building on previous findings from Hibbs *et al.*, (1990) of associations between parental EE and child behavioural disturbance, EE in mothers of pre-school AD/HD and non AD/HD (NAD/HD) children will be examined using SoPreSS.

### 2.2: Introduction

It is well established that aspects of a parent's relationship with their children are predictive of future clinical outcome for children with emotional or behavioural disturbance (Offord *et al.*, 1992). The importance of parental emotional attitudes for the development and subsequent outcome of child psychopathology has been widely studied within clinical and community studies. Maternal expression of criticism, hostility and the absence of warmth have all been associated with child behavioural disturbance in non-referred pre-school children (Richman, Stevenson & Graham, 1982).

### **2.2.1: Definition and description of Expressed Emotion**

The construct of EE is used to describe the attitudes and feelings which people express about their ill relatives. EE is also an indicator of family stress, and has been studied in relation to the course of psychiatric illness since the late 1960's. EE is characterised by a critical and hostile attitude, emotional over-involvement (EOI) and a poorer outcome, especially for schizophrenic patients. A potential advantage of this measure is that it may represent "unshared variance" a parental attitude directed toward one child only. Because of its potential "unshared" nature, EE may differ from measures of psychosocial adversity such as divorce, socio-economic hardship, or marital conflict, which affect all children within the family (Hirshfeld, *et al.*, 1997).

### **2.2.2: History of EE**

The concept of EE was developed by George Brown and his colleagues, who in the 1950's began to investigate the relevance of environmental factors to relapse in schizophrenia. Their initial study followed a group of chronic male patients who were discharged into the community from hospital settings (Brown, Carstairs & Topping, 1958). It was found that in a significant number of cases, improvements noted during the inpatient setting were not maintained after discharge. After further investigation relapse was found to be associated with the type of living group to which the individual returned. In brief, those returning to live with a very close relative such as a spouse or parent, were more likely to relapse than those living with a more distant relative, or in a hostel or lodgings. Brown hypothesised that the emotional attitudes of relatives living with patients were related to the propensity to relapse. Following on their initial findings, Brown *et al.*, (1962) designed a prospective study to determine

whether the expression of hostility, or of any strong emotion in general by the relative towards the patient, could be isolated as behaviour that contributed to their relapse.

The results of their study using 101 schizophrenic patients, demonstrated a significant association between intensity of emotion and amount of hostility directed toward the patient by the relative, and the likelihood of deterioration of symptomatology and relapse during the following year.

### **2.2.3: Assessment of EE**

**2.2.3.1: Camberwell family interview;** (CFI), ( Leff & Vaughn, 1984). This is a semi-structured interview designed to tap relatives' attitudes, by asking them about the patient's behaviour and the quality of their family relationships. The interview can be rated reliably on several dimensions. The dimensions which have been identified as predictive of relapse are criticism, hostility and emotional over-involvement (EOI). Criticism which is the clearest predictor, refers to critical comments about specific behaviours while hostility refers to a more generalised negative attitude toward the patient. These two ratings have considerable overlap. Both may occur together, or there may be a high rating on hostility only. Very rarely does a high rating on hostility occur without a high rating on criticism as well. Therefore rated hostility does not assist significantly in predicting relapse over and above ratings of criticism. Criticism ratings on the CFI are generated by actually counting critical comments made during the interview, as defined by criteria involving voice tone (emphasis, repetition, and changes in speed, pitch, and volume) and content. EOI reflects over-concern, over-protective behaviours and over-identification

and is rated on a 6 point scale. A relative is designated as high on EE if they score high on criticism, EOI or both.

**2.2.3.2: Five minute speech sample; (FMSS), (Magana *et al.*, 1986).** This is an alternative to the CFI. The FMSS is a speech sample where relatives are asked to talk about their feelings toward the patient for five minutes. The audio taped monologue is scored on 9 aspects. Eight of these aspects are used to construct the index of EE, consisting of criticism and EOI. A parent is rated as highly critical when the following scores are rated; i) negative initial statement, ii) negative rating on quality of relationship, and iii) one or more critical remarks. Emotional over-involvement contains emotional display, overprotective/self sacrificing behaviour or any two of the following: excessive detail, expression of feelings about the patient (statement of attitude) or exaggerated praise (five or more positive remarks). Based on findings that the majority of EE was identified in the early part of the CFI, the FMSS gives the respondent only a short time to talk, with the expectation that critical, hostile or over-protective feelings will be elicited under this time pressure. While the FMSS scoring still relies on listening to the tone and the content of tape recordings, it can be completed in much less time than the CFI. This technique offers a promising tool for inclusion in large scale projects, and provides qualitative information of a more unique nature than that which would be elicited by structured questionnaires (McGuire & Earls, 1994).

#### **2.2.4: EE and adults**

The process of relapse in psychiatry has been examined from a number of perspectives. Studies of the post-hospital course of psychiatric patients focusing on the characteristics of relatives' have provided strong support for the predictive validity of EE. In general, relapse studies (Brown *et al.*, 1972; Vaughan., 1982) have compared the percentage of patients from high and low EE homes who relapse during the follow-up period of the study. These studies compared schizophrenic or neurotically depressed patients over follow-up periods ranging from 9 months to 2 years. While different criteria for relapse were used, in general the criteria were based on positive symptoms of the relevant disorder, and not on actual hospitalisation. In general high EE was associated with higher levels of relapse.

Leff et al, (1983) examined the levels of EE in a group of neurotically depressed patients. Their findings demonstrated that behavioural disturbance, work impairment, sex, and medication were correlated with relapse. The highest correlation, however was between EE and relapse, while controlling for the other variables did not reduce this correlation. For patients living with high EE relatives, reduced contact with those relatives and maintenance of medication were both protective factors, reducing the likelihood of relapse.

#### **2.2.5: Adult intervention studies**

Although the relapse studies provide strong evidence for a correlation between family EE status and risk of relapse they have not establish that EE or family climate has an influence on outcome. It is only possible to demonstrate this by actively altering

family climate and observing an effect on outcome. Intervention studies serve a dual purpose, that of testing the efficacy of specific clinical techniques in modifying family interactions, and also demonstrating whether changes in the family environment influence the patients' subsequent clinical course (Koenigsberg & Handley., 1986).

Hogarty *et al.*, (1986) used an intervention study to compare the effects of family psycho-education, social skills training and combined family therapy and social skills training with supportive psychotherapy in a group of 90 schizophrenic patients from high EE homes. After one year, no patients who received combination family therapy and social skills training had relapsed, while relapse rates were 19% for those who received family treatment, 20% for those who received social skills training, and 41% for those who received supportive psychotherapy.

Brewin (1994) assessed 26 relatives of schizophrenic patients before and after taking part in interventions designed to reduce levels of EE. During the course of the intervention there was a general reduction in relatives' criticism and hostility, a shift towards making more universal attributions for patients' negative behaviours and more use of attributions to illness. Reductions in criticism were not related to attributional change, but reductions in hostility were associated with shifts towards more universal and uncontrollable attributions.

#### **2.2.6: Effect of EE on patients**

Two distinct lines of evidence suggest that high EE caregivers' generate a stressful environment for patients. This idea will be examined firstly through studies of



physiological arousal and secondly through investigations examining the interaction between EE and stressful life events.

Tarrier *et al.*, (1979) measured 3 physiological variables associated with central nervous system, (CNS) activation in non acutely ill schizophrenic patients. Due to the stress of the testing procedure, patients displayed elevated levels of skin conductance and higher blood pressure. The presence of a low EE relative appeared to enhance accommodation to the testing situation, resulting in a drop in blood pressure and a corresponding drop in skin conductance fluctuation. The presence of high EE relatives did not have the same calming effect on the patient. The frequency of spontaneous fluctuation of skin conductance remained high and blood pressure increased slightly.

Birley & Brown., (1970) reported a greater likelihood of occurrence of a life event in the 3 weeks before relapse in acute schizophrenics than in a comparable period not immediately followed by relapse. Their definition of what constituted a life event included events which were independent of the patient's influence or behaviour. Their findings suggested that life events tended to precipitate relapse. Leff & Vaughn, (1984) replicated Birley and Brown's results with low EE families but found no greater likelihood for a life event in the 3 weeks before relapse for patients from high EE families. These findings led Leff *et al.*, (1983) to suggest a stress arousal model which emphasised a threshold level of coping. In their model EE served to heighten arousal levels above threshold, and so precipitate relapse.

### 2.2.7: EE and children

Although the majority of EE studies have been conducted using adults suffering from psychotic illnesses, the EE construct has been applied to children. Asarnow *et al.*, (1993) found that children who had been admitted to hospital with depression were more likely to experience persistence of depressive symptoms if they returned to high EE families after discharge.

Early findings on the possible role of EE in children arose from studies of individual components of EE such as warmth and hostility (Vostanis, Nicholls & Harrington, 1994). Quinton & Rutter (1985) reported an association between lack of parental warmth and hostility and child behavioural disturbance. Richman, Stevenson & Graham, (1982) reported similar findings. Other studies have used a dichotomy of high/low parental EE in referred children and adolescents. Schwartz *et al.*, (1990) found an association between high maternal criticism and both the presence of maternal depressive illness, and at least one child psychiatric disorder, such as conduct disorder or substance abuse. Similar results were found by Hibbs *et al.*, (1991) on a sample of children with disruptive behaviour and obsessive compulsive disorders.

As with adult studies, the correlation between high EE and childhood psychopathology is undisputed. However little is known about the role of the various EE components such as critical comments or EOI. Vostanis *et al.*, (1994) examined maternal EE ratings in 6 - 11 year old children with conduct or emotional problems, and non referred control children matched for sex and age. An examination of their

results showed that maternal warmth distinguished significantly between the three groups. Criticism distinguished the conduct disordered group from the other two and maternal criticism was positively associated with child behaviour ratings even among the non-referred children. Finally the ratings for warmth and criticism were found to be much more strongly associated with child behaviour than maternal ratings of their family environment.

Seifer *et al.*, (1992) examined factors which ameliorate risk between 4 and 13 years of age. Using a multiple risk index 50 high risk children and 102 low risk children were identified at four years of age. These children were assessed again at thirteen. Results showed that one of the variables which predicted less than optimal outcome was high levels of parental criticism. Hirshfeld *et al.*, (1997) examined the relationship between behavioural inhibition, child psychopathology, and EE in 11 year old children of mothers with and without panic disorders, and children judged to be behaviourally inhibited or non inhibited. Results suggested that child behavioural inhibition may be associated with maternal criticism/dissatisfaction.

Vostanis *et al.*, (1995) examined EE levels and levels of reported child behaviour using the child behaviour checklist (CBCL), in 28 children with conduct disorder (CD) and 29 children with emotional disorders (ED) over a 9 month period. Maternal EE and CBCL scores changed significantly during the nine month follow-up period. Initial CBCL scores predicted symptomatic changes in both the CD and ED groups. Only the initial CBCL ratings and not the initial EE levels strongly predicted symptomatic changes over this period. Therefore there was no evidence of a causal

role for maternal EE. However initial ratings of low warmth predicted the presence of CD at follow up.

Koenigsberg *et al.*, (1995) have demonstrated that the negative effects of high EE are not limited to the domain of psychiatry. In their study of adult and adolescent insulin dependent diabetics, and their families, higher levels of critical comments and lower familial warmth were associated with poorer glucose control among non-psychiatric diabetic patients.

#### **2.2.8: Stability of EE over time**

The claims of a relationship between level of EE and likelihood of relapse is based mostly on EE scores collected during or shortly after a patient's acute hospitalisation. This is obviously a stressful period for the family and it is possible that respondents' criticism or EOI may be intensified by the acuteness of their relative's illness. Brown, Birley & Wing, (1972) measured EE at time of hospitalisation and then again at a 9 month follow up for a group of relatives' of adult schizophrenics. Their results showed a decrease in the number of relatives making more than seven critical comments from (30 - 14 percent) and a complementary increase in the number of relatives' making non- critical comments from (32 - 47 percent). In addition the largest reduction in criticism occurred in relatives of patients who had improved the most. These findings led Brown *et al.*, to conclude that EE might not reflect a continuous state, but might in fact represent a tendency for relatives to assume certain attitudes during times of stress.

The situation is somewhat clearer when EE is measured in community samples of children. Here it is assumed that the possible stressor may be more stable, and so that EE ratings will also remain stable. McGuire & Earls, (1994) used the FMSS to measure the stability of EE ratings within one month for parents of disadvantaged and ethnic minority children ranging in age from 3 - 13 years. Results demonstrated that significant stability was established when borderline responses were included in the scoring. While some interchange existed between high EE and borderline EE on speech samples collected a month apart, all those who were classified low EE on the first sample remained low EE on the second speech sample. Vostanis *et al* (1995) examined changes in EE level in mothers of 28 children with conduct problems and 29 mothers of children with emotional problems. using the CFI. Mothers were interviewed twice within a nine month period and results demonstrated that mothers of children with conduct problems expressed significantly less criticism and higher levels of warmth at follow up. This mirrored a corresponding improvement in their children's behaviour problems. These findings lead the authors to suggest that perhaps EE in parents of young children was episodic, resulting from stressors such as adverse child behaviour.

### **2.2.9: Factors determining levels of EE**

While EE appears to reflect a style of interacting with an ill relative, it remains unclear to what extent this pattern of interaction is determined by the relatives' personality, and to what extent it is influenced by the patient. Leff & Vaughn, (1984) identified four styles of responding that tended to distinguish low EE relatives from high EE relatives; i) Primarily, low EE relatives tended to be *cool, controlled and*

*concerned but not overly anxious in their response to the patient's illness;* ii) Low EE relatives tended to respect the patient's desire for privacy and social distance; iii) Low EE relatives saw the patient as suffering from a recognisable illness, and not as a malingerer or someone who was responsible for their symptoms; iv) Lastly low EE relatives were less impatient, and more tolerant of the patients behaviour. It should be clear that these styles are both shaped by the patients behaviour, but also represent recognisable parental or caregiver personality styles.

Hubschmid & Zemp, (1989) hypothesised that high EE relationships were characterised by patterns of interaction which were particularly stressful for relatives and patients alike. Results from a semi structured interview were coded using a technique called Structural Analysis of Social Behaviour. Results showed that EE measures correlated strongly with certain features of the patient-carer relationship. Specifically high EE, compared to low EE showed a more negative emotional atmosphere. The structure of this relationship was rigid, conflict prone and demonstrated inflexible patterns of interaction.

Moore & Kuipers, (1992) assessed EE levels in staff working in community facilities with patients suffering long-term mental problems. After EE assessments staff members and their patients took part in a low conflict, direct interaction task. Results demonstrated that high EE staff were more likely than low EE staff to make negative statements during interaction and less likely to make supportive ones. Low EE staff tended to focus on positive aspects of the patients life, while patients of low EE staff

were more likely to make positive statements of self-affirmation during the interaction.

#### **2.2.10: Determinants of EE in families**

Hibbs *et al.*, (1990) investigated EE in the families of children and adolescents with disruptive behaviour disorders DBD, a psychiatric control group of children with obsessive compulsive disorder OCD and normal controls. Results showed that the frequency of high EE status and parental psychopathology, was similar for parents of children with DBD and OCD, while no such finding existed for parents of normal controls. Hibbs *et al.*, (1991) argued that these differences were due in part to the differential rate of psychiatric problems among the two groups. In their study 74 percent of parents with disruptive or obsessive children had a psychiatric problem compared with 29 percent of parents in the control group.

Stubbe *et al.*, (1993) assessed mothers for depressive neurotic symptoms using a self-report measure. Their results demonstrated that while EOI was related to neuroticism, the association between EOI and childhood anxiety disorders was independent of maternal neuroticism. Hibbs *et al.*, (1993) assessed parents for affective disorders and schizophrenia, and found associations between paternal psychopathology and paternal EE. Associations also existed between maternal affective disorder and maternal EE. Maternal EE was associated both with child and maternal psychopathology, while paternal EE was only associated with paternal psychopathology. Goodman *et al.*, (1994) used the FMSS to investigate EE. They

found that maternal depression was associated with critical and over involved comments.

Hirshfeld, (1997) examined the role of maternal psychopathology in influencing EE directed towards children with behavioural inhibition problems or psychiatric disorders. Their results demonstrated a significant association between EE and maternal psychopathology. A life-time history of maternal anxiety disorder was associated with higher criticism toward the child while maternal affective disorder was associated with EOI.

There are some suggestions that levels of EE are influenced by SES. Szmukler *et al.*, (cited in Koenigsberg & Handley ,1986) reported a modest correlations of .27 and .34 for mothers' and fathers' critical comments and SES status among parents of patients with eating disorders. In contrast Hibbs *et al.*, (1991) found no association between SES and EE status in their sample of parents of children with disruptive behaviour disorders, obsessive compulsive disorders and normal controls. Cultural setting appears to be an important determinant of level of EE. Vaughan & Lancetta., (1981) investigated the cross cultural influences of EE by replicating the methodology of British EE studies in North America within anglo-american families of schizophrenic patients. In their previous British EE studies, roughly 50 percent of families of schizophrenic patients were rated as high in EE. Results of the American studies demonstrated rates of high EE at 67 percent. British families showed less hostility and made fewer critical comments than their American counterparts. Only 4 percent of



the American sample made no critical comments compared with 33 percent of the British sample.

Scazufca & Kuipers, (1996) examined the relationship between burden of care and EE levels in relatives of schizophrenic patients. Their results indicated that high EE relatives reported more burden of care in all areas examined. They perceived more deficits in patients social role performance and were less likely to be working than low EE relatives.

#### **2.2.11: Problems with the assessment of EE**

The reliability of the FMSS has been examined. Magana *et al.*, (1986) found high levels of inter-rater reliability for the FMSS using three separate coders working on a set of practice tapes ( $r = 0.73$ ). Barnes-McGuire & Earls, (1994), examined the test-retest stability of FMSS in the parents of disadvantaged minority children. Five different methods were used to calculate test-retest reliability in this study ( $r = 0.25$  to  $0.69$ ). Magana *et al.*, (1986), also compared parents' scores on the FMSS with their scores on the CFI. There was a significant correlation between the high-low categories established on the basis of the FMSS and the raw number of criticisms coded from the CFI. FMSS classifications were also significantly correlated with CFI EOI.

However, Vostanis, Nicholls & Harrington, (1994) expressed some concern about the developmental suitability of the FMSS as a measure of EE in parents of young children. They found low levels of EOI in parents of 6 to 11 year old children with emotional and conduct disorders, despite an established literature which had

highlighted an association between EOI in mothers and children with anxiety disorders. Following this, they speculated that the coding system for the FMSS which was developed for adults was not sensitive enough to identify EOI in parents of young children. While it was thought that mothers of the clinical groups did express some concern, they tended not to exhibit self sacrificing or over protective behaviours, which were core features of the coding system for EOI in the FMSS.

The concerns of Vostanis *et al*, (1994), about the need for modifications to the FMSS coding system for EOI also apply to other components of the measure. Definitions of what constitutes relationships at different developmental stages has not yet been clearly established. The nature of the relationship between mother and child does change as a function of developmental age. Yet when rating relationship using the FMSS the categories apply adult relationship factors such as an inability to communicate or interest in the relatives hobbies or activities. When considering the more dependent type of relationship between mothers and pre-school children these categories, even if coded in a liberal way may not apply. The inappropriateness of the FMSS coding system also applies to the coding for criticism in negative comments. Criticism in the FMSS could only be rated when a parent made a negative description of the child's behaviour within a critical phrase. A description of the child's behaviour such as aggressive, had to be used in conjunction with a phrase such as "*I hate it*" or "*I resent it*" which conveyed the parents' recognition of the behaviour. This restriction is a serious problem, as parents of young children who often attribute developmental reasons for their child's behaviour are unlikely to use criticism during their speech sample, but will freely evaluate their children's behaviour negatively.

In order to assess EE in parents of pre-school children what was needed was a variation of the FMSS complete with a revised coding system specifically designed to cope with the descriptions that parents of young children use in speech samples. In the next section of this chapter I will outline the development of the Southampton Pre-school speech sample SoPreSS, discuss its psychometric properties, and investigate differences between mothers of AD/HD and control children on SoPreSS.

### **2.3: Study 1: The formation of developmentally appropriate measures of EE and solo-play**

This section will outline the development of SoPreSS and as well as the development of a measure solo-child play (SoSCP). Then the psychometric properties, reliability and finally validity of the measures will be discussed.

#### **2.3.1: Aims**

- i) To develop a developmentally suitable measure of EE for parents of pre-school children (SoPreSS).
  
- ii) To develop a developmentally suitable measure of solo-play for pre-school children. (SoSCP).
  
- iii) To investigate the psychometric properties of SoPreSS and SoSCP by examining their test-retest, code-recode and inter-rater reliability.
  
- iii) To examine the discriminant properties of SoPreSS and SoSCP by investigating differences between parents of AD/HD and NAD/HD children on SoPreSS.
  
- iv) To examine the association between SoPreSS and SoSCP scores and maternal reports of child behaviour problems and negative maternal adjustment.

#### **2.4: Method**

This section will describe the recruitment of participants and baseline measures used in this study. Most of the measures used are widely known and their reliability and

validity are without question. The Southampton solo-child play measure SoSCP and Southampton pre-school speech sample SoPreSS were devised especially for this study, and so time will be taken to present the psychometric properties of these measures.

#### **2.4.1: Screening procedure**

The data for this study was collected in parallel with the New Forest Parent Training Study NFPTS, a randomised control trial of two types of parent based intervention for AD/HD pre-school children. NFPTS will be discussed in more detail in chapter four. All children within the New Forest Health district were screened for pre-school AD/HD when they presented for their three year developmental check, between January 1995 and September 1996. At the three year check all parents completed a Werry-Weiss-Peters Activity Scale : WWP (Routh, 1978), a Behaviour Check List, BCL (Richman, Stevenson & Graham, 1982). All parents of children who scored over twenty points on the WWP and who were between three and three years six months at the time of screening were invited to join the study.

During the twenty one month data collection phase, 3051 children within the New Forest Health District met the age criteria, i.e. they were born between January 1992 and September 1993. From this group 1797 screening questionnaires (59%) were obtained from parents at developmental checks, and 286 of these scored over twenty points on the WWP. Parents with severe mental health problems, previous clinic histories for parent training, or parents who were distressed in some other way, which would have made training impossible were excluded from consideration for the

second stage. Examples of these exclusions included a mothers who had recently given birth to twins, who already had two other children under three, and a mother who was just experienced an acrimonious and violent marital separation. The remaining one hundred and five eligible parents who consented to participation in the study took part in a second screening stage which involved a revised form of the Parental Accounts of Childhood Symptoms Interview: PACS ( Taylor, Schachar & Heptinstall, 1993).

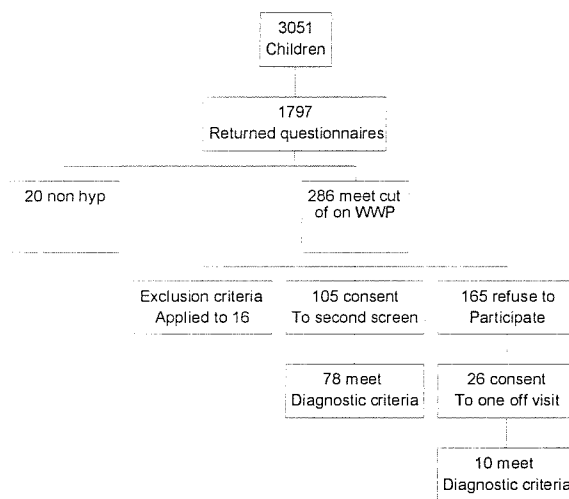
The PACS is a structured clinical interview which asks parents about the severity and frequency of their child's behaviour within two domains, i) AD/HD and ii) Oppositional defiance. A score of eighteen points or more on the AD/HD scale was necessary to gain entry into the study, this represented about the top four percent of the population with respect to hyperactivity problems. Seventy-eight children met these diagnostic criteria on the PACS for entry into the study.

Two other groups were also recruited, i) A non-AD/HD sample (NAD/HD), recruited from those children scoring under twenty on the WWP and from local nurseries; ii) An AD/HD non referred control group (HNRF) recruited from those people who were not willing to join the study, but who were willing to participate in a one-off visit and met all diagnostic criteria for entry into NFPTS. Figure 2.1 depicts the recruitment process.

### 2.4.2: Characteristics of sample

Children recruited for the main intervention study consisted of forty-five males and thirty-three females between the age of two years nine months and three years three months. The birth order of the consisted of 21 only children, 30 eldest children, 22 middle children and 5 youngest children. 43 mothers within the sample were married, 16 were co-habiting, 11 were single, while the remaining 8 had divorced and remarried. During the study 3 of the married group, separated from their partners, with 2 of them co-habiting with new partners. All the sample were British nationals, of British parents.

**Figure 2.1 : Recruitment stage one**



### 2.4.3: Characteristics of non-participants

Non participants consisted of 101 and 64 girls, and can be divided into two groups, (i) those who met screening criteria but did not wish to participate, (Eligible Non Participants ENP) and (ii) those who wanted to participate but didn't meet diagnostic

criteria on the PACS and so were excluded from the study, (Unsuitable Non Participants UNP). Mean screening scores for ENP, UNP and actual participants are displayed in table 2.1.

**Table 2.1: Showing mean and standard of deviation of baseline data for all groups**

MEASURE	ENP N = 165	UNP N = 27	HYP N = 78
WWP	25.33 (6.1)	28.68 (6.85)	27.24 (10.65)
BCL SOC	2.82 (1.07)	3.6 (1.81)	3.66 (1.87)
BCL SLP	2.33 (1.62)	3.25 (1.79)	2.39 (1.84)
BCL EMO	1.35 (1.39)	1.55 (1.28)	1.46 (1.41)
BCL OA	2.88 (1.12)	3.1 (1.03)	3.33 (1.55)
BCL SOIL	2.82 (2.3)	1.7 (1.93)	1.70 (1.78)
BCL FEED	1.78 (1.24)	2.1 (1.47)	1.56 (1.19)

#### 2.4.4: Screening measures

The following measures were used to in the screening process.

**2.4.4.1: Werry-weiss-peters activity scale (WWP)** ( Routh, 1978). This is a 27 item questionnaire used to screen the population for activity problems. The instrument provided a single score for mothers ratings of children’s levels of inappropriate activity in different settings, such as at home and while shopping. When scored as 0, 1, 2 from left to right a cut off point of 20 identifies the top 15 percent of the population.



**2.4.4.2: Behaviour check list (BCL)** ( Richman, Graham & Stevenson, 1982). This is an 19 item measure, which provided scores for mother's ratings of their pre-school children's adjustment in a range of different domains including sleep, toilet training, and social behaviour. A recent factor analysis by Sonuga-Barke, Thompson, Stevenson & Viney, (1997) produced a factor structure with factors for (i) poor social adjustment (SOC), (ii) sleep (SLP), (iii) poor emotional adjustment (EMO), (iv) overactive/inattentive (OA), (v) soiling/wetting (SOIL) and (vi) feeding problems (FEED).

**2.4.4.3: Parental account of childhood symptoms interview (PACS)** (Taylor, Sandberg and Hepinstall, 1993). This is a structured clinical interview which seeks information about the severity and frequency of a number of target behaviours, on two scales, i) AD/HD and ii) Conduct scale. The PACS highlighted the top 4% of the population in relation to pre-school AD/HD when a cut off point of 18 was used.

#### **2.4.5: Parent measures**

The following parent measures were taken for all participants at all time points.

**2.4.5.1: General health questionnaire (GHQ)** ( Goldberg, 1978). This is a 30 item questionnaire which asked questions about maternal mental health.

**2.4.5.2: Family impact questionnaire (FIQ)** (Doonenberg & Baker, 1993). This revised version had 32 questions, relating to 4 factors about the impact that the child had on their mother's i) Social Life (SL), ii) Positive feelings about the child (PF), iii) Negative feelings about the child (NF) and iv) Marriage (MAR) . Items pertaining to

sibling relationships and financial impact were not used. The complete FIQ has 50 items that assessed parents' perceptions of child impact on their families, relative to the impact most children have on their families. Statistical properties of the measure were examined by Doonenberg & Baker, (1993) using 118 respondents. Principal Component factor analysis with varimax rotation yielded an interpretable six factor solution. Scale reliability ranged from  $r = 0.83$  to  $0.92$ .

**2.4.5.3: Parental Sense of Competence Scale (PSOC)** (Johnston & Mash, 1989) a 17 item questionnaire with two scales. i) Parenting Satisfaction and ii) Parenting efficacy, aspects of parenting self esteem. Mash & Johnston, (1989) examined the factor loading of each question and found that loadings of 0.4 or greater existed for each item except question 17 with 9 items loading on the satisfaction factor and 7 loading on the efficacy factor. Internal consistency of the PSOC was examined by Johnston & Mash, (1989) using Cronbach Alpha coefficients. For the entire measure alpha was 0.79, with alpha scores of 0.75 and 0.76 for satisfaction and efficacy respectively.

**2.4.5.4: Southampton Pre-school speech sample (SoPreSS)** This is a speech sample measure of expressed emotion specifically devised for use with the parents of pre-school children. The development of SoPreSS will be presented in section three of this chapter.

#### **2.4.6: Child Measures**

The following child measures were taken for all participants at most time points.

**2.4.6.1: Parental Account of Childhood Symptoms Interview:** (Taylor, Sandberg and Hepinstall, 1993). This is a structured clinical interview with scales for AD/HD and CD.

**2.4.6.2: Southampton Solo-child play measure SoSCP** (Daley, Sonuga-Barke & Thompson 2000). This was an observation measure devised specifically for this study. The development of SoSCP will be presented in section four of this chapter.

**2.4.7: Development of the Southampton pre-school speech sample (SoPreSS)** This was a speech sample measure of EE. A set of standardised instructions given to parents asked them to speak for five minutes about their children, giving the experimenter details about the child's characteristics and information about their relationship with the child

#### **2.4.8: Collection of SoPreSS**

The speech samples were collected in accordance with the instructions in the FMSS Coding Manual (See appendix i). The Speech Sample was presented to the mothers as a warm up exercise in advance of the PACS clinical interview. All speech samples were collected before the PACS interview, to control for any extra negativity that might be present after 60 minutes of talking about the child's AD/HD and oppositional behaviours. In preparation for the speech sample, each child was set a drawing task by the experimenter and any other available adults or older children were

recruited to play with the child. Once the child was successfully settled, the experimenter and mother retired to a location out of ear shot and sight of the child. It was important to separate the mother and child for the duration of the speech sample, as the child's presence could potentially have affected the content of the speech sample. The combination of a set drawing task and the recruitment of significant others to care for the child meant that most of the speech samples were collected without interruption. SoPreSS was collected at baseline and follow up only.

#### **2.4.9: SoPreSS coding procedures**

The SoPreSS coding system was based on a combination of the coding manuals for the FMSS and the CFI (See Appendix ii). The six categories chosen are displayed in table 2.2. The four global categories were scored high, moderate, low or positive, neutral, negative depending on their content. The two frequency counts represented a record of the total number of either positive or negative evaluations of behaviour which occurred during the speech sample. All the speech samples were coded according to the manual taking into account tone and content, and a coding sheet with notes was completed for each sample (See Appendix iii). On speech samples where there was difficulty with coding a transcription was made to aid the coder.

**Table 2.2: Categories and rating types used in SoPreSS**

CATEGORY	RATING TYPE
Initial Statement (IS)	Global Rating
Warmth (WAR)	Global Rating
Statement of Relationship (REL)	Global Rating
Emotional Over-involvement	Global Rating
Positive Evaluation of Behaviour (PEB)	Frequency Count
Negative Evaluation of Behaviour (NEB)	Frequency Count

#### **2.4.10: Development of the Southampton solo-child play measure (SoSCP)**

This was an observation coding measure developed to measure levels of engagement and fidgeting in pre-school children observed during solo-child play.

#### **2.4.11: Observation of solo-child play.**

Ten minutes of solo-child play with a standard Fisher Price Fun Park toy was recorded for each visit. The Fun Park was a multi-purpose toy which included a roller-coaster (ramp), ferris wheel and aeroplanes. Instructions to the child were brief, they were asked to” *play with the toy on their own for a while, and then their mothers would come and play with them*”.

#### **2.4.12: Rationale for solo-child play observations**

The core features of AD/HD in children include developmentally inappropriate levels of inattention. The diagnosis of AD/HD in pre-school children can be very difficult, and is made all the more difficult by the lack of suitable assessment tools for AD/HD

in pre-school children (Weisglas-Kuperus, 1992). One appropriate method for assessment which is suitable for pre-school children is play observation. The importance of play during early development has been well documented (c/f Brunner, 1973), while Krakow & Kopp, (1983) have argued that the patterns of attention displayed during play may reflect qualitative disruptions in children's information processing skills. In discussing play behaviour a distinction must be made between exploration and play. Weisler & McCall, (1976) stated that the function of exploration was to acquire information about objects, situations or events, in line with Piaget's schema formation, while play consisted of behaviour which was intrinsically motivated and performed for its own sake.

Ruff, Lawson, Parrinello and Weissberg (1990) examined the play behaviour of children between one and four and a half years. They observed changes with age in the way children concentrated and sustained their attention during spontaneous play. In brief the results demonstrated that older children showed higher frequency and longer episodes of attention than younger children, the attention of younger children was most likely controlled by the physical characteristics of objects while older children's concentration was more influenced by factors such as construction. However it would appear that it is not just attention itself which may account for differences in play behaviour, other factors also predict attention. Ruff *et al* (1990) examined the long term stability of attentional aspects during free play in young children. From their study, they concluded that aspects of inattention such as off-task behaviour and physical movement away from the task appeared more often as predictors of attention than did duration of focused attention itself.

Touwen & Klaverboer, (1973) suggested behavioural aspects of play which could discriminate between children with and without attentional problems. When compared with their normal peers, children with attentional problems showed less exploration when starting to play, their total level of play behaviour was lower and they switched from one activity to another more frequently. Campbell *et al.*, (1984) observed AD/HD pre-schoolers in a free play situation, and compared them to normal controls. Hyperactive children engaged in more short duration activities (less than twenty seconds), and fewer long duration activities (more than one hundred and twenty seconds) compared to their normal peers. Alessandri, (1992) again compared AD/HD and non AD/HD children during free play. Results showed that AD/HD children engaged in less overall play and more non play, including shifting from one activity to another, compared to the non-AD/HD group. Klaverboer, (1988) observed AD/HD children at the beginning of their free play sessions, and commented on AD/HD children's approach to the play session. *"The AD/HD child throws himself at the toys, and after a very short period of time, he starts a new activity with a new toy. The child never plays for long with a toy, seldom or very shortly explores toys and hardly ever develops the imaginary play you see in non-AD/HD children"*.

#### **2.4.13: Southampton solo-child play Coding System SoSCP**

The solo child play data was also coded by an independent coder using Observer event recording software (Noldus, 1996). A coding manual was devised and piloted using a small, random selection of tapes (see appendix iv). This allowed for time to train the coder and for any amendments to be made to the coding manual. Table 2.3 displays the behavioural categories and their constituent behaviours for SoSCP.

**Table 2.3: Behavioural categories and constituent behaviours of SoSCP**

BEHAVIOURAL CATEGORIES	CONSTITUENT BEHAVIOURS
TIME ON TASK	TIME SPENT PLAYING WITH TOY
SWITCHING	PLAYING WITH THE RAMP
	PLAYING WITH THE AEROPLANES
	PLAYING WITH THE FERRIS WHEEL
	PLAYING WITH PART OF TOY ON FLOOR
FIDGETING	FIDGETING WITH BODY
	FIDGETING WITH OBJECT
	WRIGGLING AND SQUIRMING

#### **2.4.14: Coding Procedure for SoSCP**

Ten minutes of play was coded for each visit, this started when the Child sat down to play with the toy. The tape was allowed to run continuously and behaviours were recorded as they occurred. The coders were blind as to which children were in which condition, the tapes for each visit were coded in a specific order ensuring that no two visits to the same child were coded on the same day by the coder. This prevented the coder becoming familiar with the play behaviour of a specific child and removed the possibility of coder bias or prejudice.

#### **2.4.15: Data reduction for SoSCP**

Two new variables were created from the data for SoSCP. A total fidgeting variable (FIDGET) was created by aggregating the three existing fidgeting variables. A measure of engagement (ENGAGE) was also created by dividing total time on task by the aggregate number of switches. This new engagement variable represented the



average amount of time the child spent engaged in play with any one component of the toy.

## **2.5: Results**

SoPreSS and SoSCP were developed specifically for these studies. For this reason it was important to evaluate the psychometric properties of the new measures. The reliability and discriminant validity of each measure was examined and will be discussed in turn.. Then the discriminant properties of SoPreSS and SoSCP will be examined before associations between high and low SoPreSS scores and child behaviour, solo-play and maternal adjustment are examined.

### **2.5.1: Initial data treatment**

Prior to the commencement of data analysis, a number of procedures were completed to prepare the data for analysis. To control for missing data, any missing scores were replaced with the worst score for that group at that particular time point. For example, if a participant in the PT group's GHQ score was missing at time 2, then that participant was allocated the highest GHQ score for the PT group at that time point. This is because higher scores on the GHQ represent greater problems with mental health. Missing data existed for a total of seven participants at T3 and four of those seven participants at T2 (excluding SoPreSS which was not collected). Essentially the only missing data that occurred was when participants dropped out during the PT trial. The data was also checked for outliers, any scores which were more than two standard deviations away from the mean for that group and time point were replaced with a score equal to the mean for that group and time point. To control for significant results occurring through chance, or because of multiple measurement adjustments to alpha were made when multiple measurement occurred. This gave more conservative estimates of significance. When multivariate statistics are used, the corresponding

multivariate  $F$  values are always reported first before the univariate effects. When correlations are used, the 0.05 significance value for  $p$  was divided by the number of variables in that particular analysis. This produced an estimate of the acceptable significance level for that analysis. Finally, while no rounding occurred during data preparation or analysis, values presented in this results section are rounded up to two decimal places.

### **2.5.2: Analysis strategy for examination of psychometric properties of SoPreSS and SoSCP**

A Pearson  $r$  correlation was conducted to examine the association between components of each measure, as well as the association between each measure and questionnaire and interview measures of child behaviour and maternal adjustment. One way multivariate analysis of variance (MANOVA) was used to examine differences between SoPreSS and SoSCP scores for mothers of AD/HD and NAD/HD children, as well as to examine differences between mothers with high and low SoPreSS scores within the AD/HD group. Where possible multivariate statistics have been calculated. This is because multivariate analyses adjust the alpha level and so control for issues of multiple measurement. There are two assumptions underlying the significance test for the Pearson correlation coefficient, outlined by Green, Salkind & Akey, (1997).

i) The variables entered into the analysis must be bivariately normally distributed. When the bivariate normality assumption is met, the only statistical relationship that exists between two variables is a linear one. When the assumption is violated, a non linear relationship may exist. This assumption was tested by examining scatter-plots

of the data. Scatter-plots of the data used in this correlation study upheld the bivariate normality assumption.

ii) The variables used in the analysis must represent a random sample from the population and the scores on variables for one case must be independent of the scores on the variables for others cases. While it was not possible to directly test this assumption, participants who met all entry criteria for the study were chosen at random, so their scores used for this analysis should also represent a random sample.

There are three assumptions underlying one way MANOVA, outlined by Bray & Maxwell, (1985).

i) The participants are randomly sampled, and the score on a variable for any one participant is independent of the scores on this variable for all other participants. As participants were recruited for a randomised control trial, it was assumed that this assumption was not violated.

ii) The population variances and co-variances among the dependent variables are the same across all levels of the factor. Green, Salkind & Akey, (1997) point out that even though this assumption is robust to violation, the homogeneity of the variance-covariance matrix can be tested using Box's  $M$  statistic. However the results of Box's  $M$  are not reliable as a significant result may be due to violation of the multivariate normality assumption, and a non significant result may be due to small sample size or lack of power. For the purposes of this study it was therefore assumed that this assumption was not violated

iii) The dependent variables are multivariately normally distributed for each population, with the different populations being defined by the levels of the factor. As it would be difficult to comply with this assumption, Green Salkind & Akey, (1997) point out that one way MANOVA still yields relatively valid results in term of type 1 errors even when this assumption is violated.

### **2.5.3: The $r$ correlation coefficient**

The Pearson correlation coefficient ranges in value from -1 to +1, and indicates the degree of association between scores on one variable and scores on a second variable.

### **2.5.4: The $F$ statistic**

The  $F$  statistic evaluates whether the group means on the dependent variable differ significantly from one another. For one way MANOVA, several sets of  $F$  statistics are derived. Multivariate  $F$  evaluates whether the population means on a set of dependent variables vary across levels of a factor. Univariate  $F$  evaluates whether the population means for just one dependent variable vary across levels of the factor.

### **2.5.5: Psychometric properties of SoPreSS**

The psychometric properties of SoPreSS were examined through examination of the measures internal consistency, code-recode reliability, inter-rater reliability and test-retest reliability. Associations between SoPreSS and measures of child behaviour and maternal function were also examined. Upon examination of the psychometric properties of SoPreSS it was noted that the EOI scale did not have good internal consistency, or acceptable reliability. The poor internal consistency and unacceptable

reliability was most likely due to difficulties with the definition of EOI for parents who were already physically involved in their children’s care. This idea was supported by the expert EE coder responsible for the inter-rater reliability. It was therefore decided to drop the EOI component of SoPreSS.

**2.5.5.1: Intercorrelations between Properties of SoPreSS**

Inter-correlations between the components of EE were examined and are presented in table 2.4. The correlations showed that all positive components of EE correlated positively with each other and negatively with NEB, while NEB correlated negatively with the four positive components. More specifically, higher scores for IS were positively correlated with WAR and PEB and negatively correlated with NEB. These significant correlations showed that mothers who expressed positive IS, were also more likely to express more WAR and PEB and fewer NEB. The same pattern persisted for REL, WAR and PEB. Likewise NEB was negatively correlated with all other components of EE . EOI showed poor internal consistency and did not correlated with any other component of SoPreSS.

**Table 2.4: Intercorrelations between components of SoPreSS**

N = 108	IS	WAR	REL	NEB	PEB	EOI
IS	1.00	0.54 *	0.38 *	-0.53 *	0.47 *	-0.11
WAR		1.00	0.55 *	-0.57 *	0.37 *	-0.12
REL			1.00	-0.41 *	0.44 *	-0.14
NEB				1.00	-0.40 *	0.03
PEB					1.00	-0.18
EOI						1.00

***P* < .01 (alpha adjusted)**

### **2.5.5.2: Reliability of SoPreSS**

Reliability was examined in three ways using intraclass correlations; (cf McGraw & Wong 1996), (i) code-recode reliability; (ii) reliability across time and (iii) interrater reliability. Reliability controlling for chance agreement was also examined using Cohen's unweighted Kappa (Cohen 1960). Kappa statistics can only be calculated for categorical data and therefore is not available for PEB and NEB. Green, Salkind & Akey (2000) have stated that Kappa co-efficients in the range of 0.4 - 0.6 represent moderate reliability while 0.6 - 0.8 represent substantial reliability values.

### **2.5.5.3: Code-recode reliability**

To examine the code-recode reliability of the measure, fourteen speech samples from the AD/HD group and four from the NAD/HD group were selected. The cases were rated twice by the same coder with a three month period between the two ratings. The results are displayed in Table 2.5 and show a correlation of 0.73 ( $r = 0.49 - 0.90$ ). The code-recode reliability of the global ratings was more stable than for the frequency counts of evaluations of behaviour. The Kappa for code-recode reliability is also displayed in table 2.5 and excluding EOI shows that even after controlling for chance agreement code-recode reliability is 0.72 ( $r = 0.30 - 0.88$ ).

### **2.5.5.4: Interrater reliability**

To examine interrater reliability the same eighteen randomly selected speech samples used to establish code-recode reliability, were also recoded by an expert expressed emotion coder. The correlations are presented in table 2.5 and show that the mean correlation for interrater reliability was 0.79 ( $r = 0.35 - 0.93$ ). The Kappa inter-rater

reliability is also displayed in table 2.5 and shows that excluding EOI after controlling for chance agreement inter-rater reliability is 0.76 ( $r = 0.66 - 0.82$ ).

### 2.5.5.5: Test-retest reliability

For 18 children, SoPreSS samples were collected on two separate occasions six months apart and the scores correlated. The test-retest reliability, presented in table 2.5 was generally adequate with a mean of 0.49 ( $r = 0.17 - 0.60$ ). Excluding EOI the Kappa for test-retest reliability is also displayed in table 2.5 and shows that even after controlling for chance agreement test-retest reliability is 0.44 ( $r = 0.42 - 0.46$ ). The time duration between the test and re-test was six months, however the Kappa was still moderate demonstrating adequate reliability even when chance agreement was controlled for.

**Table 2.5: Reliability for SoPreSS coding system**

MEASURES N = 18	CODE-RECODE		INTERRATER		TEST RE-TEST	
	<i>r</i>	$\kappa$	<i>r</i>	$\kappa$	<i>r</i>	$\kappa$
IS	0.88 **	0.82	0.84 **	0.73	0.66**	0.46
WAR	0.87 **	0.66	0.93 **	0.82	0.52 *	0.44
REL	0.81 **	0.80	0.83 **	0.73	0.68 **	0.42
NEB	0.78*	n/a	0.88 **	n/a	0.48 *	n/a
PEB	0.67*	n/a	0.88 **	n/a	0.43 *	n/a
EOI	0.30	0.21	0.35	0.19	0.17	0.18

**\* $P < .05$ , \*\*  $P < .01$  (alpha adjusted) n/a = not applicable**



#### **2.5.5.6: Issues of validity**

Issues of validity are central to the examination of SoPreSS and SoSCP, in short the question of validity is a the question of accuracy; do the measures in fact demonstrate what it is claimed they demonstrate. Validity can be examined in many ways, face validity for example would examine whether SoPreSS as a measure of EE contained measurement elements of EE, such as warmth or relationship. Two types of validity will be examined in this chapter, concurrent validity the association between SoPreSS and SoSCP and other variables, and discriminant validity the ability of SoPreSS and SoMCI to distinguish the AD/HD and NAD/HD group. A third type of validity, sensitivity to change will be examined in chapter four when the longitudinal data is introduced.

#### **2.5.5.7: Concurrent validity for SoPreSS**

Concurrent validity will be examined in two stages, starting with the associations between components of SoPreSS and child behaviour, and then the associations between SoPreSS and maternal adjustment.

#### **2.5.5.8: Association between SoPreSS and measures of child behaviour**

A Pearson  $r$  correlation was conducted to examine the association between components of SoPreSS for the AD/HD group and questionnaire and interview measures of child behaviour. The results of this analysis are presented in table 2.6. Mother's reports of their children's AD/HD were correlated with SoPreSS. Mothers with more active children had lower WAR and less positive IS, REL, more NEB and fewer PEB. Similar associations existed for mothers of children with greater conduct

problems, with negative correlations for PPACS CON with IS, WAR, REL, more NEB's and fewer PEB. Maternal reports of poor social adjustment in their children were also associated with SoPreSS, with negative correlations between BCL SOC and IS, WAR, REL, PEB and a positive correlation with NEB. Non-significant associations for EMO and FEED demonstrated that SoPreSS scores were not significantly influenced by problems of emotional adjustment or feeding in children. Similarly while NEB was associated with SLP and IS with SOIL, the lack of associations between other components of SoPreSS and these measures highlight the specificity of the effect.

**Table 2.6: Association between SoPreSS and child behaviour**

MEASURE N =108	IS	WAR	REL	NEB	PEB
AD/HD					
PPACS	-0.40 *	-0.48 *	-0.46 *	0.60 *	-0.44 *
WWP	-0.32 *	-0.51 *	-0.36 *	0.51 *	-0.39 *
OA <sup>1</sup>	-0.35 *	-0.44 *	-0.35 *	0.50 *	-0.30 *
CONDUCT					
PPACS	-0.34 *	-0.27	-0.24	0.41 *	-0.32 *
SOC <sup>2</sup>	-0.33 *	-0.41 *	-0.45 *	0.41 *	-0.26 *
OTHER					
SOIL <sup>3</sup>	-0.26	-0.11	-0.04	0.14	-0.09
FEED <sup>4</sup>	-0.12	0.00	0.21	0.05	-0.03
EMO <sup>5</sup>	-0.01	-0.08	-0.01	0.02	-0.07
SLP <sup>6</sup>	-0.04	-0.07	0.04	0.27	-0.18

\*  $P < .003$  (alpha adjusted)

<sup>1</sup> BCL OA = Overactivity.

<sup>2</sup> BCL SOC = Poor social adjustment.

<sup>3</sup> BCL SOIL = Soiling/wetting.

<sup>4</sup> BCL FEED = Feeding problems.

<sup>5</sup> BCL EMO = Poor emotional adjustment.

<sup>6</sup> BCL SLP = Sleep problems

### **2.5.5.9: Association between SoPreSS and measures of maternal adjustment**

The negative correlation between FIQNF and IS, WAR, and REL, presented in table 2.7 indicated that mothers who reported more negative feelings towards their children also demonstrated lower WAR and less positive IS and REL. These mothers also made more NEB and fewer PEB. Higher scores on FIQSL were also negatively correlated with IS, WAR, and REL. Mothers who perceived their children to have had a greater negative impact on their social life also reported lower WAR, less positive IS, REL, and more PEB. These associations demonstrated that mothers with high EE as measured by SoPreSS also reported fewer positive feelings and greater negative feelings about their children. Non-significant associations for GHQ demonstrated that EE status was not significantly influenced by maternal mental health. This pattern of differential associations between components of SoPreSS and measures of maternal adjustment demonstrated that scores on all five components of SoPreSS (indicative of high EE) were associated with both behaviour problems in children and with mother's negative views of their children.

**Table 2.7: Association between SoPreSS and measures of maternal adjustment**

MEASURE N = 108	IS	WAR	REL	NEB	PEB
GHQ.	-0.16	-0.08	-0.14	0.15	-0.03
PSOC					
EFF	0.07	0.11	0.03	0.14	-0.11
SAT	0.21	0.34 *	0.21	-0.19	0.30 *
FIQ					
SL	-0.35 *	-0.36 *	-0.43 *	0.39 *	-0.29 *
NF	-0.41 *	-0.39 *	-0.36 *	0.38 *	-0.30 *
PF	-0.26	-0.42 *	-0.33 *	0.38*	-0.33 *
MAR	-0.23	-0.18	-0.28	0.14	-0.30 *
ADD					
PARENT	-0.17	-0.02	-0.25*	-0.00	-0.06
HV	0.08	0.10	0.24*	0.11	0.24*
OTHER					
SES	-0.15	-0.29*	-0.26	0.21	0.28*

\*  $P < .001$  (alpha adjusted)

#### 2.5.5.10: Discriminant validity for SoPreSS

Discriminant validity will be examined in two ways using one way MANOVA's i) by examining differences between the AD/HD and NAD/HD group on components of SoPreSS, and ii) by examining differences between the AD/HD group and HNRF group.

#### 2.5.5.11: Examination of differences between groups on SoPreSS

An initial one way MANOVA comparing AD/HD versus NAD/HD children demonstrated a significant multivariate difference using Wilks Lamda between the

two groups on SoPreSS,  $F = (2, 98) = 11.74, p < .001$ . Univariate differences between the two groups also existed for all components of the SoPreSS measure and the results are presented in table 2.14.

A similar MANOVA comparing AD/HD versus HNRF children also demonstrated significant multivariate differences using Wilks Lamda,  $F (2,88) = 3.93, p < .005$  and is also presented in table 2.8. It is important at this point to remember that the AD/HD and HNRF groups within this community sample, represented self referrals, as they had been told their child met diagnostic criteria for entry into the project and had chosen to participate or not to participate. Significant univariate differences existed between the two groups for REL and WAR, as HNRF mothers reported more positive relationships with their children and expressed greater warmth. Marginally significant differences existed for IS and PEB, as HNRF parents reported more positive IS, and greater numbers of PEB. It is interesting to note that even though mothers of HNRF children expressed a more positive REL, IS, more WAR and more PEB, no significant differences existed between the two groups on NEB. Both sets of mothers evaluated their child's behaviour in an equally negative light, but HNRF mothers were still able to express greater WAR, and REL and greater numbers of PEB.

**Table 2.8: SoPreSS levels for AD/HD V's NAD/HD and HNRF**

SoPreSS	AD/HD N = 88	NAD/HD N = 20	<i>F</i>	AD/HD N = 88	HNRF N = 10	<i>F</i>
IS	1.93 (0.68)	2.70 (0.46)	23.81 ****	1.93 (0.68)	2.30 (0.67)	3.45 *
WAR	1.72 (0.73)	2.80 (0.40)	43.32 ****	1.72 (0.73)	2.20 (0.79)	5.22 **
REL	1.99 (0.54)	2.55 (0.50)	19.85 ****	1.99 (0.54)	2.60 (0.52)	18.37 ****
NEB	5.66 (0.54)	1.23 (1.12)	36.38 ****	5.66 (3.18)	5.00 (5.48)	0.25
PEB	2.95 (1.90)	4.65 (2.22)	13.61 ****	2.95 (1.90)	3.90 (2.08)	3.44 *

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$  \*\*\*\*  $p < .001$ . Values in parentheses are standard deviations

### 2.5.6: Psychometric properties of SoSCP

SoSCP was devised specially for the NFPTS study. For this reason it was important to evaluate the psychometric properties of the new measure. The reliability and validity of the measure was examined and they will be discussed in turn.

#### 2.5.6.1: Inter correlations between properties of SoSCP

Although the solo-child measure consisted of only two categories, engagement and fidgeting, the statistical properties of the measure where examined in the same way. The internal consistency of the measure was examined using inter correlations between components of the measure, and are presented in table 2.9. As expected a negative correlation existed between ENGAGE and FIDGET, which demonstrated that children with higher levels of engagement had lower levels of fidgeting.

**Table 2.9: Inter correlations between components of SoSCP.**

MEASURE N = 108	ENGAGE	FIDGET
ENGAGE		-0.23 *
FIDGET		

\* =  $p < .01$  (alpha adjusted)

### **2.5.6.2: Reliability of SoSCP**

Reliability for SoSCP was assessed in three ways using intraclass correlations; (i) code-recode reliability; (ii) test-retest reliability and (iii) inter-rater reliability.

### **2.5.6.3: Code-recode reliability**

To examine the code-recode reliability of SoSCP, fourteen tapes, twelve from the AD/HD sample and four from the non-AD/HD sample were randomly chosen. These tapes were coded twice with a three month period between the two ratings. The results presented in table 2.10 show an overall correlation of 0.98 ( $r$  0.98 - 0.99).

### **2.5.6.4: Inter-rater reliability**

This was examined using the same sixteen tapes used to establish code-recode reliability. The tapes were also coded by a second coder and the correlations presented in table 2.10 show a mean correlation for inter-rater reliability of 0.65 ( $r$  0.69 - 0.70).

### 2.5.6.5: Test-retest reliability

SoSCP observations for sixteen children from the WLC group were collected on two occasions six months apart. Again the correlations are presented in table 2.10 and show that the mean correlation for test-retest was 0.80 ( $r$  0.69 - 0.90).

**Table 2.10: Reliability scores for SoSCP**

MEASURE N = 16	CODE RECODE	INTER-RATER	TEST RETEST
ENGAGE	0.99 *	0.61 *	0.69 *
FIDGET	0.98 *	0.70 *	0.90 *

\* =  $p < .01$

### 2.5.6.6: Validity of SoSCP

As with SoPreSS two types of validity will be discussed in this chapter, concurrent validity and discriminant validity. Sensitivity to change will be discussed in chapter four.

### 2.5.6.7: Discriminant validity for SoSCP

Discriminant validity will be investigated by examining differences on SoSCP between AD/HD and NAD/HD children.

### 2.5.6.8: Differences on SoSCP for AD/HD and non AD/HD children

A one way MANOVA was used to examine differences in patterns of solo-child play between children in the AD/HD and NAD/HD groups. A significant multivariate difference existed between the two groups  $F(2, 108) = 29.54, p < .001$ . The univariate differences, presented in table 2.11 demonstrated that NAD/HD children demonstrated significantly greater levels of engagement and lower levels of fidgeting.



**Table 2.11: SoSCP scores for AD/HD and NAD/HD children**

MEASURE	AD/HD N = 88	NAD/HD N = 20	<i>F</i>
ENGAGE	42.64 (19.92)	97.73 (54.55)	-4.11 *
FIDGET	5.35 (4.82)	1.76 (1.47)	5.91 *

figures in parentheses are standard deviations. \* =  $p < .01$

### 2.5.6.9: Concurrent validity for SoSCP

Concurrent validity was examined in three stages, starting with the association between SoSCP and child behaviour, then the association with maternal adjustment and finally with SoPreSS.

### 2.5.6.10: Association between SoSCP and child behaviour

Pearson correlations, presented in table 2.12 were conducted to examine the association between SoSCP and questionnaire and interview measures of child behaviour. Negative correlations between ENGAGE, PACS HYP and WWP, BCLSOC demonstrated that children with lower levels of engagement were consistently rated by their mothers as being more AD/HD, and having more problems with social adjustment. The moderately large positive but non-significant correlation coefficient between ENGAGE and BCL OA just added further evidence that children with lower levels of engagement were rated as being more active. The lack of association between FIDGET and measures of child behaviour was surprising, especially the lack of association between measures of ADHD and FIDGET. These associations were examined at the total score level, if associations had been examined

at the sub-component level, such as the fidgeting component of PACS, then perhaps an association may have existed.

**Table 2.12: Association between SoSCP and child behaviour**

MEASURE N = 108	ENGAGE	FIDGET
<b>AD/HD</b>		
PACS	-0.38 *	0.16
WWP	-0.39 *	0.11
OA	-0.26	0.10
<b>CONDUCT</b>		
PACS	-0.19	0.03
SOC	-0.29 *	0.09
<b>OTHER</b>		
SOIL	0.05	0.13
FEED	-0.07	0.10
EMO	-0.10	-0.04
SLP	-0.10	0.21

*p* < .008 (alpha adjusted)

**2.5.6.11: Association between SoSCP and maternal adjustment**

Pearson correlations presented in table 2.13 examined the association between SoSCP and measures of maternal adjustment. Significant negative correlations between ENGAGE FIQ NF and FIQ PF demonstrated that children with lower levels of engagement were rated by their mothers as having a greater negative impact on their mothers feelings. Positive, but non significant correlation coefficients for ENGAGE and PSOC EFF and PSOC SAT indicated that children with higher levels of

engagement also had mothers who reported more positive parenting self esteem. No associations were found between FIDGET and maternal behaviour

### 2.5.6.12: Association between SoSCP and SoPreSS

Pearson correlations presented in table 2.14 demonstrated that no significant correlations existed between SoSCP and SoPreSS. Neither were there any large but non-significant associations between solo-child play and EE.

**Table 2.13: Association between SoSCP and measures of maternal adjustment.**

MEASURE N = 108	ENGAGE	FIDGET
GHQ	0.03	0.02
PSOC		
EFF	0.21	-0.17
SAT	0.20	-0.03
FIQ SL	-0.26	-0.02
NF	-0.32 *	0.03
PF	-0.27 *	0.03
MAR	-0.17	-0.01
ADD PARENT	-0.15	-0.17
HV	-0.03	-0.06
OTHER SES	0.02	0.04

***P* < .006 (alpha adjusted)**

**Table 2.14: Association SoSCP and SoPreSS (EE)**

MEASURE N = 108	IS	WAR	REL	NEB	PEB
Engage	0.16	0.06	0.08	-0.05	-0.12
Fidget	0.01	0.07	0.06	0.03	0.13

**no significant correlations ( alpha adjusted)**

### **2.5.6.13: Exclusion of the FIDGET component of SoSCP**

Due to the poor concurrent validity of FIDGET, it was decided to remove the FIDGET component from SoSCP. This left just the ENGAGE component which had demonstrated good reliability and validity. For clarity, future references to SoSCP will just refer to ENGAGE.

### **2.5.7: Establishment of high and low EE**

The calculation of high and low EE for this study represents a marked departure from the norm. Historically with both the FMSS and CFI high EE has been calculated using a formula. For the FMSS negative EE (critical) was assigned when there was a negative rating for initial statement and a negative rating for relationship as well as at least one or more criticisms . In order to make SoPreSS a developmentally suitable measure critical comments has been replaced with NEB and PEB which range from 1-15 and 1 - 9 respectively. Due to the large range of NEB and PEB it was not possible to include them in a formula for calculating high EE. Instead it was decided to calculate three different components of EE i) Global EE (GEE) the sum of the global scales, in keeping the literature of combining overall ratings of EE. ii) total NEB and iii) total PEB.

To establish a binary variable representative of high and low EE, three median splits were calculated within the data. A median split for the combined scores of IS, WAR and REL resulted in a value for high and low global EE, which is denoted in the tables and text as GEE. As SoPreSS was scored 3, 2, 1, for positive neutral or negative IS, or 3, 2, 1, for high moderate or low warmth, high GEE is indicative of a more positive IS and REL and greater warmth. Similar median splits for NEB and PEB resulted in high and low PEB and NEB values.

#### **2.5.7.1: Analysis strategy for examining the differences between high and low EE groups**

To examine differences between high and low EE within the training groups on measures of child behaviour and maternal adjustment, a one way MANOVA was conducted using the dichotomous SoPreSS global score at time one as independent variable and baseline child behavioural and maternal adjustment scores as the dependent variable.

#### **2.5.7.2: The differences between high and low EE on baseline measures of child behaviour**

Three one way MANOVA's were conducted, for baseline child behaviour measures (GEE, NEB and PEB). Multivariate analysis demonstrated significant multivariate differences using Wilks Lamda for GEE,  $F(108,2) = 2.39, p < .05$ , NEB,  $F(108,2) = 5.51, p < .01$  and PEB  $F(108,2) = 2.64, p < .05$ . Corresponding univariate scores for GEE presented in table 2.15 demonstrated that mothers with low global EE scores on the SoPreSS described their children as demonstrating fewer symptoms of AD/HD on a clinical interview, and rated their children as showing fewer signs of AD/HD type problems on the WWP. Low GEE mothers also rated their children as having

significantly fewer socialisation and sleep problems on the BCL. Low NEB mothers also described and rated their children as demonstrating fewer symptoms of AD/HD, as well as fewer symptoms of oppositional defiance on both the PPACS and BCL and fewer soiling and sleeping problems on the BCL. High PEB mothers also rated their children as demonstrating fewer symptoms of AD/HD on both the PPACS and BCL, as well as fewer symptoms of oppositional defiance on the PPAC

**Table 2.15: Child behaviour for high and low GEE, NEB and PEB**

MEASURE	HIGH GEE N = 52	LOW GEE N = 56	F	HIGH NEB N = 47	LOW NEB N = 61	F	LOW PEB N = 58	HIGH PEB N = 50	F
AD/HD									
PPACS	21.92 (3.74)	16.79 (5.54)	11.87 **	22.07 (3.56)	16.14 (5.38)	38.03 **	20.07 (4.97)	17.06 (5.74)	8.45**
WWP	31.70 (8.45)	23.01 (9.82)	8.32 **	31.04 (7.94)	22.59 (10.3)	19.29 **	29.53 (9.28)	22.34 (9.95)	14.84 **
OA	3.76 (1.31)	2.86 (1.33)	2.30	3.85 (1.33)	2.69 (1.23)	19.68 **	3.38 (1.32)	2.97 (1.45)	2.51
CONDUCT									
PPACS	20.76 (7.24)	18.00 (6.55)	2.87	21.11 (6.39)	17.44 (6.94)	7.28 **	20.53 (6.63)	17.23 (6.89)	5.98 *
SOC	3.86 (1.39)	3.14 (1.66)	6.02 *	4.02 (1.56)	2.95 (1.47)	11.68 **	3.55 (1.61)	3.24 (1.58)	1.08
OTHER									
SOIL	1.95 (1.57)	1.86 (1.39)	0.03	2.05 (1.74)	1.42 (1.09)	4.83 *	1.64 (1.34)	1.75 (1.55)	0.13
FEED	1.52 (0.97)	1.69 (1.04)	1.44	1.56 (0.91)	1.68 (1.09)	0.34	1.71 (1.07)	1.54 (0.95)	3.57
EMO	1.26 (1.12)	1.65 (1.36)	0.20	1.41 (1.27)	1.59 (1.31)	0.46	1.36 (1.21)	1.68 (1.36)	1.58
SLP	2.80 (1.78)	1.97 (1.52)	4.14 *	2.74 (1.71)	1.94 (1.56)	5.83 *	2.56 (1.77)	1.95 (1.49)	0.70

\*  $P < .05$ , \*\*  $p < .01$ .

### **2.5.7.3: The difference between high and low EE on baseline measures of maternal adjustment**

Three further one way MANOVA's were conducted for (GEE, NEB and PEB) on measures of maternal adjustment. No multivariate differences existed for high and low GEE, NEB and PEB on measures of maternal adjustment. Univariate scores presented in table 2.16 demonstrated significant difference for SAT, FIQ SL, PF and MAR, indicating high GEE mothers reported lower levels of parenting satisfaction, and more negative feelings about the impact their child had on the family and on their marriage. A similar pattern existed for high and low NEB with significant differences on SAT, FIQ SL, PF and MAR. Further differences on FIQ SL and SES indicated that high GEE mothers reported more negative feelings about the impact their child had on their social life, and also belonged to lower SES groups than did low GEE mothers. No significant differences existed for PEB, but the means demonstrated the same trends as for GEE and NEB.

**Table 2.16: Maternal adjustment for high and low GEE, NEB and PEB**

MEASURE	HIGH GEE N = 52	LOW GEE N = 56	<i>F</i>	HIGH NEB N = 47	LOW NEB N = 61	<i>F</i>	LOW PEB N = 58	HIGH PEB N = 50	<i>F</i>
GHQ.	7.72 (8.60)	4.85 (5.90)	2.24	7.09 (8.09)	5.00 (6.17)	2.07	5.26 (7.24)	6.74 (6.99)	3.22
PSOC									
EFF	22.12 (4.73)	23.27 (5.40)	0.06	22.42 (4.54)	23.17 (5.61)	2.02	23.18 (5.27)	22.45 (5.08)	2.75
SAT	23.80 (5.07)	27.41 (5.56)	7.02 **	25.58 (5.32)	26.45 (5.90)	11.82 **	25.07 (5.04)	27.25 (6.13)	0.06
FIQ									
SL	18.22 (6.21)	16.20 (5.86)	1.86	19.51 (6.33)	15.01 (5.06)	14.50 **	17.34 (5.80)	16.48 (6.34)	0.04
NF	17.17 (14.8)	16.41 (3.80)	5.51*	17.03 (3.35)	14.65 (3.97)	8.10 **	16.14 (3.75)	15.12 (3.98)	0.03
PF	18.13 (3.83)	15.65 (3.47)	6.88 **	17.93 (3.53)	16.97 (3.07)	10.15 **	17.05 (3.77)	16.00 (3.76)	0.09
MAR	13.98 (3.64)	12.53 (3.37)	4.33 *	13.98 (3.70)	12.38 (3.25)	5.50 *	13.19 (3.23)	12.93 (3.87)	0.88
ADD PARENT	6.59 (4.61)	4.86 (3.94)	2.75	5.92 (4.64)	5.38 (3.83)	0.30	5.47 (3.78)	6.08 (5.08)	0.19
HV	1.48 (0.51)	1.62 (0.49)	1.07	1.57 (0.50)	1.52 (0.51)	0.02	1.53 (0.51)	1.58 (0.50)	0.15
OTHER SES	3.18 (1.40)	2.75 (1.39)	0.25	3.21 (1.35)	2.65 (1.41)	4.44 *	3.08 (1.52)	2.70 (1.23)	3.91

\*  $p < .1$ . \*\*  $P < .05$ ., Higher scores are negative.

#### 2.5.7.4: Examination of differences for high and low GEE, NEB and PEB for SoSCP

A one way MANOVA was used to examine differences in solo-child play for GEE, NEB and PEB. A significant multivariate difference existed for NEB,  $F(2, 95) = 5.39, p < .01$ . An examination of the associated univariate differences, presented in



table 2.17 demonstrated that children whose mothers' used low NEB's, also engaged in solo-play for longer.

**Table 2.17: Showing SoSCP scores for high and low GEE, NEB and PEB**

MEASURE	HIGH GEE N = 52	LOW GEE N = 56	<i>F</i>	HIGH NEB N = 47	LOW NEB N = 61	<i>F</i>	LOW PEB N = 58	HIGH PEB N = 50	<i>F</i>
ENGAGE	46.99 (23.9)	58.06 (40.8)	2.18	41.31 (20.1)	63.81 (41.8)	10.25 *	53.91 (31.4)	53.80 (40.7)	0.01
FIDGET	4.91 (4.47)	4.42 (4.82)	0.17	5.44 (4.57)	3.96 (4.70)	2.10	4.22 (3.86)	5.04 (5.49)	1.22

**Figures in parentheses represent standard deviations. \*  $p < .01$  (alpha adjusted)**

## 2.6: Conclusions

Results from the early relapse studies have shown that high EE is associated with relapse for a wide range of psychiatric problems, while psycho-physiological evidence has demonstrated the negative influence of high EE relatives. Further evidence from adult intervention studies has shown that it is possible to reduce the negative influence of high EE through various forms of training. Fewer studies have examined EE in young children, however enough evidence exists to suggest that high EE is equally as damaging to young children as to adults. A clear example of this are the associations between high EE and childhood behaviour problems. Concerns about the assessment of EE in young children has led to the development of SoPreSS. The psychometric properties of this been extensively examined in this chapter and an examination of SoPreSS levels in mothers of pre-school AD/HD children, and mothers of normal controls has demonstrated that mothers who reported higher EE levels also rated and described their children as demonstrating more symptoms of

AD/HD and possessing greater socialisation problems. Mothers with high EE also reported lower parenting self esteem, higher negativity about the impact of their child on the family.

## **CHAPTER THREE: AD/HD AND MOTHER-CHILD INTERACTION.**

### **3.1: Chapter overview**

In addition to examining EE, an examination of the contribution of family interaction to the development of childhood behaviour problems is necessary. The purpose of this chapter is to introduce the concept of mother-child interaction. An observational coding system, Southampton Mother-Child Interaction SoMCI will then be presented and its psychometric properties discussed. Finally the interaction style of mothers of AD/HD and NAD/HD pre-school will be examined using this scale.

### **3.2: Maternal behaviour and mother-child interaction**

Campbell *et al.*, (1986) examined the mother-child interaction of a group of 2 - 3 year old children with problems suggestive of AD/HD and a group of non-problem controls. At initial assessment differences between the two groups were found for maternal behaviour but not for child behaviour. Preliminary analysis indicated that mothers of problem children initiated more suggestions of alternative activities and used more negative controlling statements. A more in-depth analysis of the data using qualitative ratings of the interactions revealed that the maternal interactions of the problem group were characterised by less positive affect, more conflict, and less appropriate directions than were the interactions of control mothers. Further analysis conducted to control for the effect of SES, revealed one significant difference between the two groups in maternal redirection; a tendency for mothers of problem children to divert the child's attention away from one activity to an alternative one.

Mash & Johnston, (1982) examined the mother-child interaction pattern of younger and older AD/HD children and controls during unstructured and structured play. Results showed a number of observed differences between mothers of AD/HD and NAD/HD children. Mothers of AD/HD children were generally more directive and negative, while being less responsive and more controlling in response to child-initiated interactions. Differences between the interactional pattern of mothers of AD/HD and non AD/HD children were most evident during the structured task. Mothers of AD/HD children were more directive and negative and showed the least amount of interaction and praise. They were also the least responsive to child initiated interactions. Mash & Johnston, (1982) suggested that the lack of interaction and praise might suggest that mothers of AD/HD children found the interaction to be annoying.

Gardner, (1994) examined mother-child interaction during spontaneous joint play for parents and children with and without childhood behaviour problems, using a detailed home observational system. Mothers of non-problem children played a dominant role in the play sessions, they initiated a majority of episodes, contributed three times as many suggestions about the game as their children, and slightly more of the questions. These parents were highly responsive to their children's suggestions and questions, and they used a higher proportion of more sensitive forms of control, and higher rates of positive affect compared to problem-group mothers. Mothers of children with behaviour problems initiated few activity episodes, letting their problem children play a greater role in suggesting how they should play together. They were also less responsive to suggestions than their difficult children were to theirs. They used a

high proportion of control that was phrased in an imperative form, and a lower proportion of sensitive forms of control. Finally almost half of the mothers of problem children showed negative affect during joint play by threatening, hitting, shouting or showing anger.

The findings of these studies are consistent with the notion that mothers of AD/HD children have been found to be more negative, controlling, intrusive and disapproving, and less rewarding and responsive than mothers of NAD/HD children.

### **3.2.1: Child behaviour during mother-child interaction**

In Mash & Johnston's, (1982) study of mother-child interaction patterns with younger and older AD/HD children, striking age differences emerged. Younger AD/HD children demonstrated the most negative behaviour compared to older AD/HD children and younger and older controls. Younger AD/HD children were the most noncompliant and negative in the task situation and the least responsive to their mothers' directions or interactions. Younger AD/HD children showed less compliance than all other groups while their mothers provided the most direction and control. For younger AD/HD children the focus on interaction was almost exclusively on discipline and control while for the other groups the interaction setting also afforded them opportunities for non-play related social interaction with their mothers. Tarver-Behring *et al.*, (1985) also examined the mother-child interaction pattern of AD/HD boys and their normal siblings during free play and task settings. Results showed that AD/HD boys spent more time engaged in behaviours which conflicted with parental requests than did their normal siblings. These differences existed in

both free play and structured settings, but were most prevalent in the structured setting, where specific tasks had to be accomplished. During the task period AD/HD boys complied with their mothers commands less often, and spent a smaller percentage of the time engaged in compliant behaviours than their brothers. The AD/HD children were also less responsive to their mothers questions during free play than were their normal brothers.

In Gardner's, (1994) mother-child interaction study, the interactional pattern of pre-school children with childhood behaviour problems was examined during spontaneous joint play. Gardner, (1994) argued that differences in the interactional pattern between children with and without childhood behaviour problems reflected features which might be expected of children with behaviour problems, such as less compliance with maternal suggestions and less positive affect. The results of Gardner's study failed to yield any other differences between problem and non problem children. There were no group differences for negative affect, responsiveness to maternal questions, or the amount of suggestions and commands contributed during interaction.

### **3.2.2: Intrafamily Comparisons of Interaction**

Having discussed differences between the interactional patterns of parents with normal and difficult children, it is also important to consider intrafamily comparisons to try and partial out the relative effects of parent and child influences. Tallmadge & Barkley (1983) compared the mother-child and father-child interactions of both AD/HD and normal boys. AD/HD boys were more off-task and negative, while their

parents were more directive relative to control parents, irrespective of which parent was engaged in the interaction. The group differences in interaction were more apparent in the task settings as opposed to the free play settings, a finding consistent with previous studies (Mash & Johnston 1982; Barkley *et al.*, 1985). While few differences existed between fathers and mothers, AD/HD boys were significantly more compliant during interaction with their fathers than with their mothers.

Tarver-Behring *et al.*, (1985) examined the interactions of mothers of AD/HD children and contrasted them with the interactions of the same mothers with their AD/HD child's normal sibling. The AD/HD boys were noticeably more off-task on both free play and structured task settings, and less compliant during the task settings than their normal siblings. Tarver-Behring *et al.*, (1985) also noted a trend for mothers to respond more positively to the compliance of their NAD/HD sons than their AD/HD sons. No other groups differences were found. For instance no difference was found in the rate of maternal commands, a finding inconsistent with reports of studies which have compared AD/HD and unrelated normal children.

Befera & Barkley, (1985) conducted a similar experiment to Tarver-Behring *et al.*, (1985) but included both AD/HD and normal boys and girls. No significant group differences were apparent in the free play session. During the task period the AD/HD children were found to be less compliant, more off task, and more negative, while their mothers responded to their non-compliance with more commands and negative behaviour than the mothers of normal children. No main effects of gender were noted, but several group x gender interactions existed. In particular AD/HD boys received more commands as well as more praise from their mothers than did AD/HD

girls or normal controls. These findings were replicated by Barkley, (1989). There were few gender differences, but mothers were more controlling of the play of their AD/HD boys during free play sessions. They also gave them more praise during task sessions compared to their AD/HD girls.

Buss, (1981) examined the relationship between children's activity levels and independently assessed parent-child interactions in a group of 117 pre-school children and their parents. Four parent-child combinations were identified; they were mother - daughter, mother - son, father - daughter, and father - son. Buss' results indicated that parents of highly active children tended to intrude physically and were described as getting into power struggles and competition with their children. Impatience and hostility toward active children was observed within all the parent - child combinations except the father-son dyad.

While being far from conclusive, the results of these observational studies suggest that parents of AD/HD children give frequent attention to overactive and impulsive behaviour. Mothers frequently use repetition, verbal direction and reprimands. At the same time these parents gave fewer rewards for compliance and generally attended less to appropriate behaviour. Dansforth *et al.*, (1991) argues that this may be as a result of the AD/HD child's disruptive and attention seeking behaviour. He argued that parents of AD/HD children might have found it pleasant to be away from their demanding children, and so attended to their children most often when the situation demanded intervention and less often when the children were well behaved. It's also possible that AD/HD children may be more non-compliant and intrusive because these



behaviours evoke parental withdrawal of commands and verbal reprimands. In relation to the results of age differences, it appears that interactions between AD/HD children and their mothers follow the same developmental course as that in normal children and parents. However improvement in the reciprocal relationship lags far behind for families with AD/HD children (Dansforth *et al.*, 1991). Few differences exist between the interactions of AD/HD girls and boys and their parents, although mothers appear to provide greater praise to their AD/HD sons rather than their daughters. There are also few differences in the interactions of AD/HD mothers and fathers and their AD/HD children. One difference is that AD/HD boys are more compliant to their fathers' commands rather than their mothers' commands. Finally the conflicts seen between AD/HD children and their mothers are evident at pre-school and middle childhood and thus appear to be significantly stable over development with this population.

### **3.2.3: Determinants of interaction**

Depressed mothers have been described in the literature as experiencing difficulties with their parenting role which reflect the symptoms of their depression (Burdach & Borduin, cited in Downey & Coyne, 1990). Weissman & Paykel, (1974) stated that the helplessness and hostility which are associated with acute depression interfere with a mother's ability to be warm and consistent. Fisher *et al.*, (1989) suggested that depressed patients displayed high degrees of non-acknowledgement, resulting in mothers suffering from depression not interacting meaningfully with their children. Parents suffering from depression also tend to experience negativity toward the demands of parenting roles and feelings of rejection and hostility toward their child

(Webster-Stratton *et al*, 1988). Observational studies of depressed mothers interacting with their children have revealed startling differences in their interactional style.

Breznitz & Sherman, (1987) found that depressed mothers spoke less often to their three year old children and responded more slowly to their children's speech.

Mothers with mild depressive tendency also responded more slowly to their infants, and were less likely to use exaggerated intonation, typical of caregivers' speech with infants (Bettes, 1988). These findings suggest that depression impedes a mother's ability to imbue their speech with the affective signals thought to play an important role in the development of affect modulation in children.

Kochanska *et al.*, (1987) demonstrated that depressed mothers choose strategies that required less cognitive effort more frequently than did control mothers. These included enforcing obedience unilaterally and withdrawing when faced with child resistance. Control mothers by contrast were more likely to negotiate a solution with their children. The symptomatic depressive characteristics of hostility and irritability can also be seen in interaction studies. Cohen *et al.*, (1990) found that depressed mothers were more irritable towards their children during interaction than non- depressed control mothers. These differences also exist within non-clinical samples. Panaccione & Wahler (1986) found a strong association between mothers' depressive symptoms and hostile child-directed behaviour, including shouting and slapping, even when the severity of the child's behaviour had been controlled for.

### **3.2.4: Age differences and interaction**

Mash & Johnston, (1982) observed mothers of normal and AD/HD boys in both structured and free play settings. These groups were further sub-divided into younger children (aged 2 - 6) and older children aged (7 - 9). Results showed the usual differences between AD/HD and normal dyadic interaction. Observed interaction in the younger AD/HD group had twice the rate of negative interactions than did observed interactions in the older AD/HD group. Overall interactions of older AD/HD children were similar to those of younger NAD/HD children. Similar results were found by Barkley *et al.*, (1984) in a study of AD/HD children divided into groups aged 4 - 5, 6 - 7 and 8 - 9. Although the study failed to find statistically significant age differences, trends suggested that mothers of older AD/HD children spent more time passively observing their children. Children in the two older AD/HD groups were more compliant for longer with a corresponding decrease in maternal direction and increase in maternal praise.

### **3.2.5: Socio-economic status and interaction**

Few studies exist which have examined SES and its relationship to interactional style. Johnston, (1996) examined SES levels within families of AD/HD and NAD/HD children and found that comparable rates of SES existed between the two groups.

In summary not only does the behaviour of children with behaviour problems improve dramatically with age, it appears to result directly from a combination of maternal influence and the influence of the behaviour problem per se. In essence this indicated

that maternal behaviour rather than child behaviour was the more important and interesting aspect of the interaction to focus on.

### **3.2.6: Expressed Emotion and interaction between relatives and adults**

The nature of the relationship between EE and actual interaction needs to be clarified. For example can we induce that the tendency to appear critical, warm, or emotionally overinvolved in an interview or speech sample reflects a characteristic pattern by which the caregiver interacts with their ill relative. An examination of the relationship between EE and family interaction pattern may provide a bridging mechanism to explain how the relative's attitudes may influence the patient, (Koenigsberg & Handley, 1986). Valone *et al.*, (1983) designed a system for coding characteristics of family interactions which was designed to include the interactional analogues of the individual components of EE . This measure of "affective style" included codes for personal criticism, critical intrusiveness, neutral intrusiveness and primary support. Affective style was rated using transcripts, on the basis of interactions between the patient and their parents during structured tasks. Valone *et al.*, (1983) applied this affective style scale to parent-offspring interactions in 52 families of disturbed but non-psychotic adolescents. An independent index of EE was also devised for each parent using the CFI. Parents were classified on the basis of their CFI scores into one of 3 groups; i) dual low EE; ii) mixed low and high EE; and iii) dual high EE. Results showed that families with one or two high EE parents manifested a higher level of benign criticism than dual low EE parents, but no association was found between EE and interactional intrusiveness.

This finding was consistent with the notion that EE reflected a parental attitude which was expressed during family interactions. Miklowitz *et al.*, (1984) investigated the relationship between parental EE and affective style in 42 families of schizophrenic offspring. A significant association existed between the level of each parents' EE and the total number of critical and neutral intrusive statements made by each parent while in interaction with the patient. The EE constituents of critical comments and emotional over-involvement correlated with their respective affective style analogues, criticism and intrusive statements.

Further evidence for the behavioural differences manifested by high and low EE parents emerged from a study by Kuipers *et al.*, (1983). In this study the rate of relatives talking and the duration of looking were used as dependent variables.

Although patients did not differ on these measures, high EE relatives spent more time talking and less time looking at the patient than did low EE relatives unfortunately the content of the dialogue was not analysed in this study.

Hahlweg *et al.*, (1989) investigated the interactional pattern of relatives of young, recent onset schizophrenic patients displaying either high or low EE. Rather than use the previously described affective style coding system which only accounts for verbal interactions, a new coding system The Category System for Partner Interaction (KPI) was developed. This new system coded both verbal and non-verbal behaviour on a unit by unit basis. A new coding system was deemed necessary by Hahlweg *et al.*, because previous studies had compared EE assessed by the CFI, which accounts for both verbal and non verbal behaviour with the Affective Style scale which only

accounts for verbal interaction. The KPI was applied to both the patient and the relative to determine whether the interactional behaviour in patients was correlated with the EE level of their relatives. As Hahlweg *et al's.*, study was one of the first to consider patients and relatives behaviour in both verbal and non-verbal interaction. This made it possible to apply techniques of sequential analysis to investigate the relative contribution of patients and relatives to the observable family process. High EE-critical relatives were characterised by a negative interactional style in that they showed more negative non-verbal affect, more criticism and more negative solution proposals than either low EE or high EE-EOI relatives when discussing an emotionally loaded family problem with the patient. Patients who had high EE relatives showed more negative non-verbal affect and more self-justifying statements than patients with either low EE or high EE-EOI relatives. Patients living with high EE members irrespective of sub-group expressed more disagreements than patients living with low EE relatives. When the results of the sequential analysis were taken into account, high EE-critical families showed long lasting negative reciprocal patterns in the non verbal domain whereas low EE and high EE-EOI families had much shorter negative patterns. Surprisingly no relationship between the CFI EE rating and interactional behaviour was found. Hahlweg *et al* (1989) suggested two possible reasons for this finding. The time between the initial CFI interview and the direct observation task was longer than in previous studies and so the affective attitude may have changed by the time the direct interaction task was conducted. The longer interval may also have allowed more opportunity for patients to change in clinical state so that the nature of relatives interactions with their relatives was altered from what it was at the time the CFI was conducted.

### **3.2.7: Expressed Emotion and interaction between relatives and children**

Marshall *et al.*, (1990) examined whether parent and child affective attitudes and interactional behaviour co-varied with the presence or absence of associated aggressive symptomatology in families with AD/HD children. Parents' affective attitudes were measured using the FMSS and children's affective attitudes were measured using a modified version of the FMSS for children (the three minute speech sample TMSS). Marshall *et al.*, (1990) also used a direct interaction task to assess both verbal and non-verbal communication. During the direct interaction task parents were asked to choose two problems which led to the most conflict in their families from a list of six common problems. The results showed that a negative parent-child relationship as indicated by parental and child EE did not correlate with other prognostic factors of child aggression in the form of oppositional defiance or conduct disorder. The interaction data supported these findings, as direct observation of negative parental behaviour did not correlate with child aggressiveness. Furthermore while the child's affective attitudes, as measured by EE, mirrored those of the parents, their interactional behaviour did not correlate with their attitudes. Marshall *et al.*, (1990) suggested that the behavioural difference between aggressive and non-aggressive AD/HD children was so pronounced that it masked more subtle reactions to their parent's affective cues. Marshall *et al* also pointed out that their direct interaction task only measured concurrent parent-child behaviour, and failed to measure the subsequent long term impact of parental negativity on the child.

### **3.3: Study 2: The formation of an appropriate measure of mother-child interaction**

In the next section of this chapter we move on to an examination of mother-child interaction. As with the assessment of EE in parents of young children, no suitable observational measures existed for examining the interaction between mothers and children with AD/HD. Therefore a new observational coding system was devised; SoMCI. This measure was mainly concerned with positive and negative aspects of maternal play behaviour and drew on the work of Campbell, (1986), Johnston & Mash, (1982) and Gardner, (1994). The components and psychometric properties of SoMCI will be discussed in later sections.

#### **3.3.1: Aims**

- i) To examine the psychometric properties of SoMCI, by examining the measures, test-retest reliability, code-recode reliability and inter-rater reliability
  
- ii) To examine differences between mothers of AD/HD and NAD/HD children on SoMCI. It was hypothesised that mothers of non AD/HD children would express greater positive and fewer negative play behaviours, as well as greater levels of joint play and lower levels of separate play. In addition non AD/HD children would exhibit lower levels of challenging behaviour when compared with NAD/HD children.
  
- iii) To examine the associations between mother-child interaction as measured by SoMCI and reports of child ADHD, oppositional defiance, and negative maternal adjustment.



iv) To examine the influence of high and low EE on mother-child interaction as measured by SOMCI.

### **3.4: Method**

While the participants and design are identical to those of the NFPTS, outlined in chapter 2, this section introduces the SoMCI and discusses its properties and coding.

#### **3.4.1: Observation session**

Ten minutes of mother-child play with a standard Fisher Price Fun Park toy was recorded for each visit. The Fun Park was a multi-purpose toy which included a rollercoaster (ramp), ferris wheel and aeroplanes. Instructions for mothers were brief, they were asked to "play with the child and toy as they would normally do".

#### **3.4.2: Southampton mother-child interaction Coding System (SoMCI)**

All the observational data was coded using Observer event recording software (Noldus 1993). This system consisted of a dedicated computer, television and video. The observer system allowed real time recording of specific mother and child behaviours. The coder used a pre-programmed key board to record specific behaviours as they occurred. For this study a specific coding manual was devised based on maternal behaviour and interaction patterns from previous studies (See appendix v). Two coders were involved in the coding of the videotapes. A pilot study was conducted which involved a small number of tapes and was used to train the coders and to discuss and amend any problems concerning the coding manual. The tapes

used for the training sessions were re-coded at the end of the study by both coders.

Table 3.1 displays the main behavioural categories and their constituent behaviours.

**Table 3.1 : Behavioural Categories and Constituent Behaviours of SoMCI**

BEHAVIOURAL CATEGORIES	CONSTITUENT BEHAVIOURS
CHILD	CHALLENGING BEHAVIOUR (CHALL) <sup>1</sup>
MOTHER	EXPANSION (EXPANS) <sup>1</sup>
+ IVE PLAY	AFFECTION (AFFECT) <sup>1</sup>
	PRAISE (PRAISE) <sup>1</sup>
- IVE PLAY	DIRECTION (DIRECT) <sup>1</sup>
	CRITICAL COMMENTS (CRITIC) <sup>1</sup>
PLAY STYLE	JOINT PLAY (JPLY) <sup>1</sup>
	SEPARATE PLAY (SPLY) <sup>1</sup>

<sup>1</sup> text in parentheses denote shortened code names for categories used in subsequent tables.

### 3.4.3: Coding Procedure for SoMCI

Ten minutes of play was coded for each visit, this started when each dyad sat down to play with the toy. The tape was allowed to run continuously and behaviours were recorded as they occurred. The coders were blind as to which children were in which condition. The tapes for each visit were coded in a specific order ensuring that no two visits to the same child were coded on the same day by the coder. This prevented the coder becoming familiar with the play behaviour of a specific child and removed the possibility of coder bias or prejudice.

### **3.5: Results**

The internal consistency, code-recode reliability, test-retest and inter-rater reliability of SoMCI will all be presented. Then differences between AD/HD and NAD/HD groups on SoMCI will be examined as will associations between SoMCI and child behaviour, maternal adjustment, and SoPreSS. Finally the influence of high and low SoPreSS scores on SoMCI will be examined.

#### **3.5.1: Analysis strategy**

Pearson  $r$  correlations were used to examine the relationship between components of SoMCI and associations between SoMCI and other measures. Inter-class correlations were used to examine reliability of components of SoMCI. MANOVA was used to examine differences on SoMCI between parents and children in the AD/HD and NAD/HD groups, as well as differences between high and low EE groups on components of SoMCI. The properties of all these tests have been discussed in chapter two and so will not be discussed again.

#### **3.5.2: Psychometric properties of SoMCI**

SoMCI was devised specially for this study. For this reason it was important to evaluate the psychometric properties of the new measure. The reliability and discriminant validity of the measure was examined and will be discussed in turn.

#### **3.5.3: Intercorrelations between components of SoMCI**

Intercorrelations between components of SoMCI are presented in table 3.2. Due to the conservative alpha level used, only one significant positive correlation existed

between CRITIC and DIRECT. This showed that mothers who exhibited more criticism also showed more direction during play. A significant negative correlation existed between JPLY and SPLY which showed that mothers who spent more time in joint play spent less time in separate play. Although not significant, moderately large negative correlation coefficients existed between DIRECT and JPLY and CHALL and JPLY, these showed that mothers' who used more direction and children who demonstrated more challenging behaviour engaged in less joint play. Moderately large positive correlations coefficients between EXPANS and JPLY and DIRECT and SPLY showed that mothers who used more expansions also engaged in joint play for longer, while mothers who were more directive engaged in separate play for longer.

**Table 3.2: Intercorrelations between components of SoMCI**

N = 108	AFFECT	CHALL	CRITIC	EXPAN	DIRECT	PRAISE	JPLY	SPLY
AFFECT		-0.16	-0.19	0.14	-0.19	0.18	0.12	-0.07
CHALL			0.09	-0.12	0.15	-0.14	-0.21	0.18
CRITIC				-0.11	0.73*	0.13	-0.14	0.04
EXPAN					-0.11	0.21	0.20	-0.14
DIRECT						0.05	-0.20	0.21
PRAISE							0.02	-0.11
JPLY								-0.3*
SPLY								

\*  $p < .001$  (alpha adjusted)

### 3.5.4: Reliability of SoMCI.

As with SoPreSS, reliability for SoMCI was assessed in three ways using intraclass correlations; (i) code-recode reliability, (ii) test-retest and (iii) inter-rater reliability.

#### **3.5.4.1: Code-recode reliability**

To examine the code-recode reliability of the measure, sixteen time one observation tapes (twelve from the AD/HD group and four from the NAD/HD group) were chosen at random. These tape were rated twice by the same coder with a three month period between the two ratings. The results are presented in table 3.3 and demonstrated an overall code-recode correlation of 0.89 ( $r = 0.80 - 0.92$ ).

#### **3.5.4.2: Interrater reliability**

To examine interrater reliability the same sixteen randomly selected tapes used in the code-recode analysis were coded by a second observer, familiar with the coding manual. The correlation's are presented in table 3.3 and showed that the mean correlation for interrater reliability was 0.86 ( $r = 0.76 - 0.91$ ).

#### **3.5.4.3: Test-retest reliability**

For sixteen children and mothers from the WLC group, observations were collected on two occasions six months apart. These two sets of observations were then coded by the same coder. The correlation's are presented in table 3.3 and showed that the mean correlation for test-retest reliability was good at 0.93 ( $r = 0.88 - 0.96$ ).

**Table 3.3: Reliability scores for SoMCI.**

MEASURES N = 16	CODE-RECODE	INTERRATER	TEST RE-TEST
CHILD CHALL	0.92 *	0.82 *	0.96 *
MOTHER EXPANS	0.90 *	0.89 *	0.93 *
+ IVE PLAY PRAISE	0.83 *	0.91 *	0.94 *
AFFECT	0.91 *	0.76 *	0.93 *
- IVE PLAY DIRECT	0.98 *	0.95 *	0.91 *
CRITIC	0.86 *	0.86 *	0.93 *
PLAY STYLE JPLY	0.80 *	0.80 *	0.94 *
SPLY	0.92 *	0.90 *	0.88 *

\*  $p < .001$  (alpha adjusted)

### 3.5.5: Validity of SoMCI

As with the validity of SoPreSS and SoSCP, validity for SoMCI was examined in two way, concurrent validity was investigated by examining associations between the measure and other variables. Discriminant validity was then investigated by examining differences on components of SoMCI between the AD/HD and NAD/HD groups.

#### 3.5.5.1: Concurrent validity

Concurrent validity was again investigated by examining the associations between SoMCI and other measures, starting with child behaviour, then maternal adjustment, and finally SoPreSS.

### 3.5.5.2: Associations between SoMCI and measures of child behaviour

Pearson  $r$  correlations, presented in table 3.5 were used to examine the association between components of SoMCI and questionnaire and interview measures of child behaviour. There were few significant correlations except between AD/HD symptoms and affection. Negative correlations between AFFECT, PACSHYP, and WWP, demonstrated that mothers who exhibited less affection reported their children as having greater problems with AD/HD. Although not significant, moderately large negative correlation coefficients between AFFECT and BCL OA supported the notion that mothers who exhibited less affection reported their children as being more active. The moderately large negative correlation coefficient between AFFECT and BCL SOC indicated that mothers who exhibited less affection also reported their children to have greater socialisation problems. While the moderately large negative correlation between CRITIC and BCLOA showed that mothers who used greater amounts of criticism during play also rated their children as being more AD/HD. Significant positive correlations between DIRECT, PACS HYP and BCLOA, also showed that directive mothers rated their children as showing more symptoms of AD/HD. A moderately large positive but non significant correlation, between DIRECT and BCL SLP indicated that directive mothers reported more sleep problems in their children.

**Table 3.4: Association between SoMCI and measures of child behaviour.**

N = 108	AFFECT	CHALL	CRITIC	EXPAN	DIRECT	PRAISE	JPLY	SPLY
AD/HD								
PACS	-0.35 *	0.08	0.16	-0.11	0.29 *	-0.08	-0.19	0.11
WWP	-0.33 *	0.02	0.08	-0.03	0.17	-0.08	-0.02	0.10
OA	-0.28	0.12	0.27	-0.07	0.30 *	0.07	-0.15	0.13
CONDUCT								
PACS	-0.09	0.01	0.00	0.17	0.15	0.05	-0.07	0.10
BCLSOC	-0.27	0.03	0.03	0.00	0.19	-0.10	0.01	0.03
OTHER								
SOIL	-0.13	-0.04	-0.04	-0.00	-0.12	-0.03	-0.08	0.10
FEED	0.04	-0.06	-0.08	0.06	-0.18	-0.15	0.08	-0.15
EMO	-0.07	0.16	-0.07	-0.17	0.04	-0.11	-0.08	-0.01
SLP	0.05	0.11	0.10	0.08	0.25	0.03	-0.09	0.2

\*  $p < .002$  (alpha adjusted)

### 3.5.5.3: Association between SoMCI and measures of maternal adjustment

Pearson  $r$  correlations presented in table 3.6 examined associations between SoMCI and measures of maternal adjustment. A negative correlation between AFFECT and FIQNF demonstrated that mothers who exhibited greater amounts of affection during play described their children as having a less negative impact on the family. A moderately large negative, but non significant correlation coefficient between AFFECT and GHQ indicated that mothers who exhibited greater amounts of affection during play also reported few problems with mental health. Positive correlations between CHALL, FIQNF and GHQ demonstrated that children who exhibited challenging behaviour during play had mothers with more negative views about their child's impact on the family and higher levels of mental health problems. This was supported by moderately large but non significant, positive correlations between



AFFECT, FIQ SL and PF. Negative correlations between JPLY and ADD PARENT showed that mothers who played for longer with their children during the observation session reported fewer symptoms of ADD on a self report measure.

**Table 3.5: Association between SoMCI and measures of maternal adjustment**

N = 108	AFFECT	CHALL	CRITIC	EXPAN	DIRECT	PRAISE	JPLY	SPLY
GHQ	-0.25	0.32 *	0.01	-0.03	0.17	0.04	-0.11	-0.01
PSOC								
EFF	0.09	-0.25	-0.05	0.02	-0.19	0.12	0.13	-0.04
SAT	0.16	-0.13	-0.03	0.01	-0.15	0.17	0.12	-0.17
SL	-0.18	0.23	0.01	-0.04	0.09	-0.02	-0.24	0.19
NF	-0.38 *	0.31 *	0.02	-0.06	0.14	-0.18	-0.20	0.17
PF	-0.21	0.21	0.09	-0.13	0.20	-0.10	-0.14	0.07
MAR	0.10	0.09	-0.05	-0.08	-0.02	-0.04	-0.03	0.02
ADD PARENT	0.04	0.14	-0.10	0.24	0.04	-0.02	-0.33*	0.16
H.V	-0.02	-0.14	0.15	-0.16	-0.09	0.03	.16	-0.05
OTHER								
SES	-0.12	0.07	0.07	-0.11	0.24	-0.05	-0.21	0.06

\*  $p < .002$ . (alpha adjusted)

#### 3.5.5.4: Associations between SoMCI and SoPreSS

Again Pearson  $r$  correlations presented in table 3.7 were used to examine associations between SoMCI and SoPreSS. Significant positive correlations between AFFECT, WAR, and REL demonstrated that mothers who showed more affection during play with their children, reported higher levels of warmth and a more positive relationship on SoPreSS. Similarly the large negative correlation between AFFECT and NEB

demonstrated that mothers who demonstrated more affection reported few NEB. Due to the conservative alpha levels adopted to control for issues of multiple measurement no other significant correlations existed between SoPreSS and SoMCI. Moderately large positive correlation coefficients between EXPANS and WAR indicated that mothers who used more expansion during play reported higher levels of warmth on SoPreSS. Similar correlations between PRAISE and WAR indicated that mothers who praised more during play also reported higher warmth, while correlations between JPLY and IS indicated that mothers who played for longer with their children reported more positive initial statements. Other moderately large, but non-significant negative correlation coefficients for DIRECT and WAR indicated that mothers who used more direction during play with their children reported less warmth on SoPreSS, while negative correlation between JPLY and NEB indicated that mothers who played for longer with their children reported fewer NEB.

**Table 3.6: Association between SoMCI and SoPreSS**

N = 108	AFFECT	CHALL	CRITIC	EXPAN	DIRECT	PRAISE	JPLY	SPLY
IS	0.20	-0.11	-0.02	0.07	-0.12	0.12	0.24	-0.06
WAR	0.38*	-0.07	-0.03	0.12	-0.24	0.26	0.20	-0.09
REL	0.33*	-0.01	0.10	0.22	-0.08	0.11	0.10	-0.17
NEB	-0.39*	0.17	0.10	-0.08	0.25	-0.14	-0.29	0.00
PEB	0.16	0.04	0.12	0.10	-0.13	-0.04	0.09	-0.10

*p* < .001 (alpha adjusted)

### 3.5.6: Discriminant validity

Discriminant validity for SoMCI was examined in by comparing differences between the AD/HD and NAD/HD group on components of SoMCI.

### 3.5.6.1: Differences between AD/HD and NAD/HD groups on SoMCI

One way MANOVA was used to test differences in patterns of interaction between mothers and children in the AD/HD and NAD/HD groups, the results of this analysis are presented in table 3.4. A significant multivariate difference existed between the two groups,  $F(2, 98) = 2.90, p < .005$ . An examination of univariate differences between the two groups demonstrated four significant differences between the interaction pattern of mothers in the AD/HD and NAD/HD group, on EXPANS, AFFECT, PRAISE and JPLY. Mothers in the NAD/HD group used significantly more praise, more affection and more expansion and interacted for longer with their children. A marginally significant difference for maternal direction indicated that mothers in the NAD/HD group used less directive behaviours when playing with their children, than did mothers in AD/HD group.

**Table 3.7: Differences between AD/HD and NAD/HD groups on SoMCI**

MEASURE	AD/HD N = 88	NAD/HD N = 20	F
CHILD			
CHALL	1.77 (0.86)	0.20 (0.62)	2.08
MOTHER			
EXPANS	0.35 (0.72)	0.80 (0.89)	5.85 **
+ IVE PLAY			
PRAISE	0.63 (0.81)	1.25 (1.37)	6.85 ***
AFFECT	0.71 (0.86)	1.65 (1.27)	15.44 ***
- IVE PLAY			
DIRECT	2.42 (2.99)	1.13 (1.48)	3.40 *
CRITIC	0.99 (1.47)	0.45 (0.74)	2.52
PLAY STYLE			
JPLY	90.67 (14.38)	98.50 (3.23)	5.73 **
SPLY	1.47 (3.77)	0.19 (0.43)	2.11

Figures in parentheses are standard deviations, \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

### **3.5.7: Associated between SoMCI and high and low EE in the AD/HD group**

In order to examine variability within the intervention groups, on measures of mother-child interaction, three MANOVA's were conducted for GEE, NEB and PEB using the dichotomous SoPreSS global score at time one as the independent variable and baseline child behaviour scores as the dependent variable. One multivariate differences existed between the groups for NEB,  $F(97,2) = 4.53, p < .001$ . An examination of the univariate differences for NEB, displayed in table 3.8 demonstrated that mothers who made fewer NEB interacted for longer with their children during play and demonstrated significantly more affection, and less direction during play. They also had children who displayed less challenging behaviour during play. The multivariate difference for GEE was marginally significant GEE,  $F(97,2) = 1.92, p < .1$ . An examination of the univariate differences for GEE, complimented the significant findings for NEB. Mothers with low GEE interacted for longer with their children and used significantly more Affection and less direction during play.

**Table 3.8: SoMCI scores for high and low GEE, NEB and PEB**

MEASURE	HIGH GEE N = 52	LOW GEE N = 56	<i>F</i>	HIGH NEB N = 47	LOW NEB N = 61	<i>F</i>	LOW PEB N = 50	HIGH PEB N = 58	<i>F</i>
<b>CHILD</b>									
CHALL	1.61 (4.19)	1.47 (4.82)	0.02	2.71 (6.66)	0.61 (1.25)	5.21 *	2.20 (6.28)	0.94 (2.16)	1.84
<b>MOTHER</b>									
EXPANS	0.36 (0.72)	0.54 (0.83)	1.17	0.43 (0.77)	0.51 (0.81)	0.24	0.40 (0.75)	0.54 (0.83)	0.74
<b>+ IVE PLAY</b>									
PRAISE	0.60 (0.90)	0.82 (1.05)	1.03	0.62 (0.83)	0.83 (1.12)	1.09	0.70 (0.97)	0.76 (1.04)	0.09
AFFECT	0.50 (0.74)	1.07 (1.11)	7.54 **	0.35 (0.68)	1.24 (1.08)	22.01 **	0.78 (0.95)	0.93 (1.09)	0.52
<b>- IVE PLAY</b>									
DIRECT	3.26 (3.69)	1.70 (2.18)	6.80 *	3.22 (3.48)	1.56 (2.18)	8.27 **	2.01 (2.10)	2.52 (3.48)	0.71
CRITIC	1.15 (1.41)	0.78 (1.40)	1.52	1.11 (1.54)	0.78 (1.30)	1.27	1.16 (1.54)	0.72 (1.28)	2.31
<b>PLAY STYLE</b>									
JPLY %	88.68 (16.04)	94.28 (11.24)	4.05	87.36 (17.41)	95.90 (7.62)	10.60 **	91.07 (15.33)	93.18 (11.60)	0.59
SPLY %	1.94 (4.83)	0.74 (2.23)	2.81	2.09 (4.85)	0.49 (1.52)	5.27 *	1.01 (3.20)	1.34 (3.70)	0.22

\*  $P < .05$ , \*\*  $p < .01$ .

### 3.6: Chapter summary

Results of mother-child interaction studies have demonstrated that the interaction style of mothers of AD/HD children is characterised by less positive affect, more conflict and less appropriate directions than mothers of NAD/HD children. SoMCI was designed to assess specific aspects of mother-child interaction. The psychometric properties of the measures were acceptable with good reliability and discriminant validity between AD/HD and NAD/HD groups. For SoMCI measures of hyperactivity were negatively correlated with affection and positively correlated with direction.

Unsurprisingly due to the emphasis on positive affect in mother-child interaction higher warmth and a positive relationship were positively correlated and NEB's were negatively correlated with affection, while maternal mental health was positively correlated with challenging behaviour. When components of SoMCI were examined in relation to high and low scores on SoPreSS, mothers with high scores also displayed less affection, and more negative direction. Having discussed the measurement and utility of EE and mother-child interaction, chapter four will examine treatments for AD/HD. The outcome of psychological approaches to treatment will then be examined using SoPreSS, SoMCI and SoSCP (ENGAGE) as outcome measures.

## CHAPTER 4: TREATMENTS FOR AD/HD

### 4.1: Approaches to treatment for AD/HD

As with most common chronic disorders, a broad variety of treatments have been tried and continue to be widely used for AD/HD (Pelham, Wheeler & Chronis, 1998).

These approaches include one to one therapy, restrictive or supplemental diets, allergy testing, chiropractics, biofeedback, perceptual-motor training, pet therapy, and play therapy. However none of these therapies has been shown to be generally effective in treating AD/HD symptoms. In a review of the empirical literature on successful interventions for AD/HD, Richters, *et al.*, (1995) concluded that only three treatments has been successfully validated as effective short term treatments for AD/HD. i) behaviour modification, usually in the form of parent training; ii) central nervous system stimulants and iii) a combination of the two.

#### 4.1.1: Prevalence of various treatments

In the US, medication and in particular methylphenidate, is the most common treatment for childhood AD/HD. Estimates from Barkley *et al.*, (1990) suggest that 5 percent of all children and 75 percent of children with a clinical diagnosis of AD/HD receive treatment with stimulant medication. Higher rates of medication exist among children enrolled in special education classes, those living in low income areas and males (Safer & Krager, 1988). In most cases medication is the only treatment received by the majority of hyperactive children (Wolraich *et al.*, 1996). In the US behavioural treatments are infrequently used, typical psycho-social treatment consists of physicians' advice about child management, diet, and school placement. Systematic programs of behavioural therapy such as training in child management skills for parents or self control training for children are not common place (Copeland, *et al.*, 1987, cited in Sandberg, 1996). In Europe medication is used less frequently, and rarely as a first treatment as psychological interventions are the preferred option. European clinicians prefer to focus on conduct disturbance and the educational problems of AD/HD, and direct their treatment towards improving parenting practice.

This is usually achieved by addressing disturbances in family functioning and reducing the impact of the child's psycho-educational deficits (Taylor *et al.*, 1991).

#### **4.1.2: Pharmacological treatment**

Psychostimulants have been the drug treatment of choice for children with AD/HD since reports made over sixty years ago, of an immediate and often dramatic improvements in conduct and academic performance of children with behavioural difficulties when they were treated with racemic amphetamine (Elia, Ambrosini & Rapoport, 1999).

#### **4.1.3: Efficacy of methylphenidate**

These early findings have since been confirmed in many controlled, short term trials with children, adolescents and adults. Spenser *et al.*, (1996) evaluated the scope of available drug therapies for AD/HD by reviewing one hundred and fifty five controlled studies of over five thousand children, adolescents and adults. Their results documented the efficacy of stimulant medication in an estimated seventy percent of cases. Specifically stimulants improved abnormal behaviours associated with AD/HD. They also improved self esteem, cognition and social and family function.

Gillberg *et al.*, (1997) examined the effect of amphetamine sulphate on symptoms of AD/HD over a longer period than had previously been reported in the literature. Sixty two children aged between six and eleven participated in their parallel group, randomised double blind, placebo controlled design. The results showed that amphetamine was clearly superior to placebo in reducing attention deficits, hyperactivity and other disruptive behaviour problems. Treatment failure rate was lower, and time taken to treatment failure was longer in the amphetamine group.



#### **4.1.4: Primary effects of methylphenidate**

The efficacy of methylphenidate can be evaluated by examining changes in both overt behaviour and cognition.

**4.1.4.1: Overt behaviour:** Treatment with methylphenidate consistently results in improvements in the core behavioural symptoms of childhood AD/HD. Decreases in levels of activity and increases in overt attention to tasks, are usually accompanied by less behavioural impulsivity (Guervemont, Du Paul & Barkely, 1990). Also medicated children appear more consistent in their behaviour and are judged to be putting more effort into tasks (Pelham *et al.*, 1990). Klorman, (1989) studied forty eight children with AD/HD aged between twelve and eighteen, who had no previous stimulant therapy history. Results of a double blind trial of methylphenidate and placebo over three weeks showed that stimulant treatment significantly reduced teachers' and parents' ratings of hyperactivity, inattention and oppositionality. The major limitation of the effect of methylphenidate on core behavioural manifestations was the rapid re-occurrence of symptoms upon discontinuation of treatment (Standburg *et al.*, 1996).

**4.1.4.2: Cognition:** Clear evidence also exists that stimulant medication improves sustained attention. AD/HD children taking stimulants make fewer omission errors on measures of sustained attention (Vyse & Rapoport 1987). Their performance on the continuous performance task deteriorates less over time (Klorman *et al.*, 1989). However little evidence exists that stimulant medication improves selective attention. Tannock *et al.*, (1993) found preliminary evidence of specific effects of medication on aspects of selective attention using reaction time paradigms derived from information-processing theory. However at the present time it is difficult to draw conclusions from these studies. One primary reason why these effects are difficult to quantify is that simple modifications of the same task generate very different patterns of drug effects. Also unless a particular cognitive task can be linked in some way to the rationale for treatment such as academic underachievement, or co-varies with an important target

behaviour then conclusions about clinical implications are highly speculative (Gadow, 1992).

#### **4.1.5: Secondary effects of methylphenidate**

**4.1.5.1: Academic achievement:** A wealth of studies have shown the beneficial influence of methylphenidate on the classroom behaviour of hyperactive children. Medication results in a reduction in restless behaviour and increased attention to school work (Du Paul & Barkley, 1990). Klorman, (1989) studied 48 children with AD/HD and showed that stimulant treatment significantly reduced teachers' ratings of hyperactivity, inattention and oppositionality. While methylphenidate's effect on classroom behaviour is unquestionable, effects on academic performance are not so clear cut. The lack of early associations of medication and academic improvement were blamed on methodological problems (Pelham, *et al* 1990). Recent studies have shown positive effects of medication on experimental academic tasks. The magnitude of improvement is variable, as it seems better for reading tasks than for spelling or maths (Pelham, *et al* 1990). Elia *et al.*, (1992) recorded the daily academic classroom performance of thirty three hyperactive boys in a hospital day school. A common reading and numeric measures was used to test academic performance during an eleven week double blind placebo controlled, cross over trial of dextroamphetamine and methylphenidate. Children attempted more numeric and reading tasks while on the active drugs. The percent correct and the number of attempted problems on the reading task improved with both drugs while the increased percent correct for the numeric task occurred with dextroamphetamine only.

**4.1.5.2: Social interaction:** The effects of methylphenidate on the social interaction of AD/HD children are immediate and usually dramatic. Stimulant medication reduces the negativistic social interactions of AD/HD children in both structured and unstructured settings (Gadow, 1992). Parents and teachers respond to changes in the



medicated child's social interactions. They are less controlling and less negative towards the child when they are receiving methylphenidate rather than placebo (Barkley & Cunningham, 1979). Medication induced improvements in AD/HD children's behaviour also results in less controlling behaviour by peers and more peer acceptance (Whalen *et al.*, 1989). Despite methylphenidate's positive effect on social interaction, it may not enhance AD/HD children's social judgement, eliminate their negative perceptions of their peers or normalise their behaviour (Sandberg, 1996).

#### **4.1.6: Age effects**

Primary school children consistently show reductions in impulsivity, improved sustained attention and social interaction while being treated with methylphenidate. The effects for pre-school children however are not so promising. Schleifer *et al.* (1975) used nursery observations and tests of cognitive style and motor impulsivity to evaluate 28 AD/HD pre-schoolers and 26 matched controls. The AD/HD group were tested on methylphenidate and placebo. Results showed that methylphenidate reduced hyperactivity at home, but did not improve nursery behaviour or psychological functioning.

#### **4.1.7: Dose effects**

The relationship between dosage and level of response is another salient issue. Parents' and teachers' positive reactions to medication induced changes in the child's behaviour are dose related. These changes are more evident at moderate to high (0.7 mg/kg) than (0.3 mg/kg) doses of methylphenidate (Barkley *et al.*, 1985). However Brown *et al.*, (1984) demonstrated a decrease in performance on cognitive tasks with high dose levels (1 mg/kg) of methylphenidate.

#### **4.1.8: Predictors of treatment response**

While stimulant drugs are effective in adults and children of school age, the few studies on pre-school children have indicated that younger children respond less well

to stimulant therapy (Spenser *et al.*, 1996). This finding led Spenser *et al.*, (1996) to suggest that pre-school children may be less treatment responsive than older children. Characteristics such as ethnicity, gender, family income, family function, and marital status of parents do not predict treatment response.(Elia, Ambrosini & Rapoport, 1999). However co-morbid conduct disorder may influence treatment response. Klein *et al.*, (1997) examined the clinical efficacy of methylphenidate in eighty four children aged between six and fifteen years referred for conduct disorder with and without co-morbid AD/HD. Contrary to their predictions, ratings of antisocial behaviour specific to conduct disorder were significantly reduced by methylphenidate. When the severity of AD/HD was partialled out from the analysis, the significant superiority of methylphenidate on ratings of conduct disorder remained.

#### **4.1.9: Side effects of methylphenidate**

**4.1.9.1: Somatic complaints:** Although many side effects result from treatment with methylphenidate only decreased appetite, insomnia and stomach-aches are more common with methylphenidate than with placebo (Barkley *et al.*, 1990). Side effects which necessitate discontinuation of the drug are much more common in pre-school children than older children. Schleifer *et al.*, (1975) found that 25 out of 28 pre-school children included in a medication study, withdrew after the trial because of side effects such as irritability, clinging, decreases in sociability, poor appetite and insomnia. Barkley, (1988) reported a dropout rate of 33 percent on a medication study involving pre-schoolers. The predominant reasons for this was not somatic complaints but the lack of perceived benefits.

**4.1.9.2: Dysphoria:** Dysphoria, a state of unease or mental discomfort appears to be a common result of treatment with methylphenidate. Dysphoria is characterised by reductions in talking and increases in anxiety, irritability, sadness, and staring (Barkley, 1990). Dysphoria is more common in AD/HD children who present with co-

morbid emotional disturbance. It is a serious enough problem to warrant discontinuation of the treatment (Tannock & Schachar, 1992).

**4.1.9.3: Growth retardation:** Few randomised control studies have ever examined the effect of methylphenidate on the growth of AD/HD children. Evidence does exist which suggests a link between methylphenidate and minor growth suppression. While no evidence exists to suggest that permanent growth suppression results from the use of methylphenidate, children do experience growth suppression while on treatment. This is followed by a compensatory growth rebound once treatment has been discontinued (Klein *et al.*, 1992).

#### **4.1.9.4: Other forms of stimulants**

Two other forms of stimulants are available for the treatment of hyperactive children, i) amphetamines, and ii) tricyclic antidepressants. What limited research there is suggests that methylphenidate and dextroamphetamine have similar treatment results and side effects (Elia *et al.*, 1999). Tricyclic antidepressants are used predominantly for children who fail to respond to methylphenidate. They have been shown to reduce activity levels but have little if any effect on cognitive task performance (Biderman *et al.*, 1992).

#### **4.1.10: Limitations of pharmacological intervention**

Despite the evidence documenting their beneficial short-term effects, several limitations of drug therapies must be noted. Although stimulants positively affect AD/HD during structured parent-child interactions, families of AD/HD children are often dysfunctional in multiple domains including maternal stress, depression, paternal alcohol abuse and inappropriate parental discipline. There is little evidence to suggest that providing stimulant medication to the child will resolve any of these family problems (Pelham *et al.*, 1998).

A second limitation is that studies which have followed children treated with psycho-stimulant medication for periods of up to five years have failed to provide any evidence that the drug improves AD/HD in the long term (Charles & Schain, 1982). Although methodological considerations require careful interpretation of these results all the evidence suggests that treatment effects do not appear to be maintained when psycho-stimulant medication is used as a long term treatment for most AD/HD children. Explanation for this finding are far from clear. Sherman & Hertzig, (1991) conducted a study of all prescriptions in one New York county for one year. The results revealed that the vast majority of AD/HD children for whom physicians had prescribed stimulant medication received only one prescription valid for about two months. Sherman & Hertzig 's interpretation of these results is that parents did not like the effects of medication on their children and so did not bother to have the prescription renewed. If this interpretation is correct then it provides evidence that medication is not being used correctly in the real world despite the evidence for its short term efficacy.

The limited evidence for the efficacy of psycho-stimulants with pre-school children is a major short coming. Also the inability of psycho-stimulants to address family dysfunction and suggestions that they are not being used appropriately provide justifications for an examination of the utility of psycho-social treatments for parents of AD/HD pre-schoolers.

#### **4.1.11: Parent training**

In the U.K Parent Training (PT) is rapidly becoming the preferred treatment for children with mild to moderately debilitating psychological disorders. In this form of treatment, parents routinely receive on going supervision in the use of specialised child management tactics primarily involving contingency management techniques. In some applications of PT counselling parents about AD/HD is also included. When such training is successful parents are better equipped to manage their child's

behaviour especially at times when the effects of medication or other treatments are diminishing or non-existent (Anastopoulos *et al.*, 1993). In general, empirical research has given support for both the efficacy and the efficiency of this approach, as it constrains costs and reduces staff requirements in the long run (Pelham, Wheeler & Chronis, 1998). In a review of the parent training literature Wright *et al.*, (1996) concluded that most PT interventions were didactic in nature and aimed at improving parent skills in providing a therapeutic and growth-conducive environment for their own children. Most techniques focused on the psychological principles and skills parents need to use to deal effectively with their children's behaviour and feelings.

#### **4.1.12: Efficacy of PT**

Graziano & Diament, (1992) reviewed a hundred and seventy five articles on Parent Training and concluded that PT was an effective approach for highly specific and overt behaviour problems such as enuresis, diarrhoea, crying, stuttering, eating, and bedtime phobia, although its use with more abstract or generalised problems such as personality or psychotic disorders remained unclear. Roberts, (1988) found that parent training was an effective method of teaching “time out” and “extinction” procedures in non-compliant children. The addition of a physical punishment contingency was no more effective than a time out session (Day & Roberts, 1983). Van Hasselt *et al.*, (1987) found that PT was successful with parents of developmentally disabled children, as it improved parents’ knowledge and skills as well as children’s self help behaviours. For abusive and neglectful parents, PT reduced the amount of violence directed towards their children (Loeber & Dishion, 1984) irrespective of whether the training was voluntary or court imposed. (Irueste-Montes & Montes, 1988). Evidence also existed for the effectiveness of PT in the treatment of AD/HD children (Pisterman *et al.*, 1989). However only the short term effects of these interventions have been clearly demonstrated (Horn *et al.*, 1987). PT appears to be effective when employed alone or when combined with other treatments. In general the effects of PT tended to

extend well beyond the end of the training period although for AD/HD children this finding was not so clearly demonstrated (Graziano & Diament, 1992)

#### **4.1.12.1: Secondary effects of PT**

Dadds *et al.*, (1987) found little generalisation from home to day care settings. Other studies have reported significant effects of generalisation mostly from home to school. (Webster-Stratton *et al.*, 1988). However the generalisation may depend upon both the nature of the childhood problem being treated and the age of the child.

#### **4.1.12.2: Dose effects**

Wright *et al.*, (1996) researched the issue of training length and number of sessions. Within the literature the shortest training period was two hours used in a study designed to improve children's sex education. The longest session was three years for a training program for parents of children with learning and behaviour problems. The most frequent training period was eight to ten weeks, and Wright *et al.*, (1996) point out that there appears to be no significant correlation between number of sessions and outcome beyond this stage.

#### **4.1.13: Variations in parent training process**

As well as being applied to a wide range of childhood problems, the implementation of PT within research studies has varied hugely. While many PT studies have used home based training for parents, either alone or in combination with clinic visits, few studies have attempted to calculate the unique impact of PT delivered within the home (Wright *et al.*, 1996). Research indicates that families of low socio-economic status (SES) need home-based intervention because they tend not to use clinic-based services or because the form of PT provided within clinics is too abstract for these parents to understand and apply (Christophersen, 1991). There is also some evidence that home based parent training yields superior results for children with extremely



debilitating behaviours such as autism (Graziano & Diament, 1992). However Worland, Carney, Milich & Grame, (1980) found that home-based training did not add significantly to the effectiveness of clinic-based parent training when dealing with minor behaviour problems.

#### **4.1.14: Group versus individual parent training methods**

Research findings from studies which compared the effects of group and individual PT appear inconsistent. In general group based training is more cost effective than individual training (Barkley, 1986). However with some effort and extra training for parents, individual training can be superior to group methods (Eyberg & Matarazzo, 1980), although studies exist which targeted specific childhood problems and report roughly equal results with either group or individual parent training. Worland *et al.*, (1980) studied 20 difficult to manage children, and assigned their parents to one of three training groups,(i) group parent training; (ii) group and individual home-based parent training or (iii) group parent training with home-based observations. For all groups the training was effective in reducing the incidence of target and non-target behaviours. However the addition of an individual home-based training did not add measurably to the effectiveness of treatment.

#### **4.1.15: Demographics of parent training participants**

Three demographic variables can be related to parent training, SES, ethnicity and locality. SES is perhaps the most important as it is associated with non-participation and training drop-out. McCauley, (1982) found that children with aggressive behaviour who came from middle class backgrounds seemed to benefit rapidly from PT, while similar children from lower class backgrounds did not. Strayhorn & Weidman, (1991) reported positive training outcomes from a study working with low income groups, but failed to draw comparisons with middle and high income groups. Where these comparisons have been made no significant effects of SES have been reported (Rogers, *et al*, 1981). While the effects of SES on PT may be confused, its

effects on training dropout are clearer. In general Participants from low SES groups are significantly more likely to drop out of training sessions (Firestone & Witt, 1982; Furey & Basili, 1988). Few studies have considered ethnicity as a variable. Studies which have included ethnicity seem to have restricted themselves to either Mexican (Chicanos) or differences between black ( Negro-Americans) and Whites (European Americans). Hawkins, *et al.*, (1991) reported no significant differences between black and white families response to a PT program designed to moderate their children's aggression problems. Even fewer studies have considered differences between participants from urban and rural areas. Spoth & Conroy, (1993) report that within the area of family skills training, it appeared that factors which often influence families motivation to use a range of family services in rural areas can differ from those that influence their urban counterparts.

#### **4.1.16: Evaluation of combined parent training and pharmacological intervention**

Firestone, Kelly, Goodman & Davey, (1981) examined 43 hyperactive children aged between five and nine years of age, and their families during a three month intervention program. Families were randomly assigned to one of three groups i) parent training while their child was administered a placebo drug, ii) parent training plus methylphenidate, and iii) methylphenidate only. All groups showed improved home and school behaviour. However only with medication were there also gains on measures of attention and impulse control. Greater improvements in the area of academic achievement and classroom behaviour were noted in the medication group as compared with children on placebo. Firestone *et al.*, (1981) found no evidence of significant benefits from the addition of PT over and above the administration of methylphenidate. Horn *et al.*, (1990) used a double blind design to examine the influence of high dose 0.08 Mg/Kg, and low dose 0.04 Mg/Kg of methylphenidate in combination with behavioural PT. Ninety-six AD/HD and twenty-one control children and their families were included in the study, which involved a comparison of drug and behavioural intervention and drug only intervention at both high and low dosage.

There was no superiority of combined drug and behavioural intervention relative to the drug only condition. However limited evidence suggested that a combination of low dose methylphenidate and behavioural intervention could be as effective as high dose methylphenidate.

Ialongo *et al.*, (1993) used a double blind placebo design to evaluate ninety-six AD/HD children aged between seven and eleven years, for the effects of methylphenidate alone and in combination with behavioural PT plus child self control instruction. Results demonstrated main effects for medication at post-test, but no evidence for additive effects of PT. Nine months after the termination of behavioural intervention and the withdrawal of the stimulant medication, limited evidence existed for the hypothesis that the combined condition produced greater maintenance of treatment gain than did the medication only condition.

#### **4.1.17: Evaluation of parent training**

Dubery, O'Leary & Kaufman, (1983) randomly assigned 44 AD/HD children to one of 3 conditions, PT, parent effectiveness or delayed treatment control group. Direct observations of parent-child interactions in a clinic playroom were recorded along with parent ratings of child behaviour at home and ratings of parental attitudes. Although both active treatments were superior to the delayed treatment group in relation to improving problem behaviours, parents in the PT group reported greater satisfaction with the training, and were less likely to drop out. However no significant differences were found between the treatment groups on the direct observation measure.

Boggs *et al.*, (1986) investigated the effects of teaching problem solving skills to parents of AD/HD children. After training in child management skills, parents were presented with a problem solving model consisting of a written flow chart designed to assist parents in analysing problem solving behaviours. As training sessions

progressed, clinic and home observations revealed that the children were more compliant and less disruptive. After problem-solving training children with untreated referral problems also began to show improvement, suggesting that such methods were useful in improving the setting and general behaviour of clinic-based PT. Strayhorn & Weidman (1989) randomly assigned 89 parents of behaviour problem pre-schoolers, many of whom displayed symptoms of AD/HD to either a minimal treatment control group or an extensive training program in child management skills. As well as parent ratings of child behaviour, parents and children were videotaped during a 25 minute free play session, and observers also rated the interactions between mothers and children. The observations were summed into parent and child scores, thereby precluding an interpretation of the effects of PT on specific parent and child behaviours. Nevertheless parent and child behaviours recorded this way were rated as being significantly improved after treatment.

In a more detailed study dealing exclusively with AD/HD pre-schoolers, Pisterman *et al.*, (1989) randomly assigned the parents of 46 AD/HD children to either an immediate or delayed training group. The immediate treatment group received behaviour management training following the program of Barkley, (1990) and Forehand and Mc Mahon, (1981). Direct observations of parent-child interactions were recorded during free play, a compliance task and a parent supervised activity. Following training, parents in the immediate treatment group displayed significant reductions in their use of commands. Significant increases were also noted in parents reinforcement of child compliance, overall positive behaviour toward their children and their use of imperative-type commands. This contrasted with the interrogative or ambiguous commands used before training. These improvements were maintained at a 3 month follow up. However the evaluation of treatment effects indicated no generalisation of treatment effects to behaviours that were not targeted in treatment. This lead Pisterman *et al.*, (1992) to conclude that any attempt to provide

comprehensive treatment for AD/HD pre-schoolers may require the specific targeting of the core characteristics of inattention, impulsivity, and motor restlessness.

Pisterman *et al.*, (1992) recruited 57 families for a 12 session group attention training treatment program. Initial group sessions included the presentation of educational material and discussions of the aetiology, developmental course and treatment of AD/HD. These were followed by compliance training which involved instruction in reinforcing compliance and implementing time out procedure for non-compliance. In the final sessions parents were taught to apply the same behavioural strategies to reinforce increasingly longer periods of on-task behaviour in their children. Using the standard paradigm parents were allocated to either an immediate or delayed treatment group. The results confirmed that parent training was effective in improving compliance in AD/HD pre-schoolers. There was a significant increase in the percentage of compliance and a significant decrease in the time taken to complete the compliance task in the parent training group. Parental behaviour also changed significantly as a result of treatment. Parents issued proportionately more appropriate commands and reinforced compliance more consistently. Parents overall style of interaction improved as they issued fewer directive statements and increased the proportion of positive feedback to their children. The results also provided evidence of improved parenting skills directed at increasing children's attention to tasks. The parents in the treatment group issued fewer directive statements and negative comments during the parent-supervised attention task. This was a desirable change in their parenting style and may well have enhanced their parenting self esteem.

Despite all the significant findings of Pisterman *et al.*, (1992) there was no evidence of a treatment effect on any of the attention measures. These findings have led to the conclusion that parent training may be a potent intervention for children's misbehaviour during the pre-school years. It may also be much less effective with types of behaviour that are more biologically driven. This conclusion according to Pisterman *et al.*, (1992) is consistent with the findings of pharmacological

intervention studies which show that medication appears to be superior to cognitive behavioural intervention in improving attention in older AD/HD children.

Barkley *et al.*, (1992) compared 3 family therapy programs for addressing conflict in adolescents with AD/HD. Sixty one 12 to 18 year olds were randomised to sessions of behavioural management training, problem solving and communication training or structural family therapy. All treatments resulted in significant reductions in negative communication, conflict and anger, improved ratings of school adjustment and decreased maternal depressive symptoms. However, analysis of clinically significant change showed that only five to thirty percent of participants reliably improved following treatment. With behavioural management training resulting in the largest degree of clinically significant change.

#### **4.1.18: Parent training and parent functioning.**

The evidence supporting the effectiveness of PT in improving the home behaviour of children with AD/HD has been examined. For the vast majority of PT studies, the outcome has been exclusively defined in terms of evoking change in child and parent behaviour. It is of equal importance to examine the ability of PT to bring about change in parent functioning. The rationale for expecting such changes stems from the fact that children with AD/HD impose increased care taking demands on their parents throughout childhood and into adolescence (Barkley *et al.*, 1992). Although direct causal links have yet to be established, ample correlational evidence exists suggesting disruption in normal parenting processes may adversely affect parenting functioning.

Pisterman *et al.*, (1992) examined 91 families of AD/HD pre-schoolers who had participated in one of two PT studies which had demonstrated the efficacy of group PT in improving child compliance. The results indicated that group parent training yielded benefits beyond changes in parent and child behaviour. Compared to parents assigned to the waiting list control group, parents who received immediate PT

reported less parenting stress and an increased sense of competence, a composite factor incorporating issues of parenting satisfaction and efficacy taken immediately following treatment and at a 3 month follow-up assessment. In fact, post treatment self reports reflected functioning well within the normal range. However Pisterman *et al.*, (1992) pointed out that their study did not include an attention control group, and so the improvements in parent functioning could have been a result of changes in demand characteristics. However the stability of improvements in the follow-up period suggested that real change had occurred.

Anastopoulos *et al.*, (1993) examined changes in parent functioning resulting from parental participation in a behavioural PT program specifically designed for school age children with AD/HD. When compared with waiting list control children, participants who completed the training program demonstrated significant post treatment gains in both child and parent functioning. In particular there were PT induced reductions in parenting stress and increases in parenting self esteem which accompanied parent reported improvements in the overall severity of their child's AD/HD symptoms.

#### **4.1.19: Empirical support for parent training**

Pelham, Wheeler & Chronis, (1998) examined empirically supported treatments for AD/HD. In order to examine the empirical support for psychosocial treatments of AD/HD, they undertook a review of all treatment outcome studies for AD/HD which they were able to locate. They applied criteria prescribed by Lonigan, Elbert & Johnson, (1998) for the examination of empirical validation of treatments for adult disorders. Studies were classified into two groups, those for which the effects of PT were well established and those for which PT was probably efficacious. According to Pelham & Hoza., (1998) behavioural PT and behavioural classroom interventions both met criteria for empirically supported treatments for AD/HD. However the

behavioural PT for AD/HD only met criteria for well established treatment with 3 liberal interpretations of the criteria.

- i) Psychosocial treatment groups within studies had to be collapsed over medication groups to yield sufficient sample sizes.
- ii) Dependent variables had to be evaluated individually and independently, as uniform effects were not obtained across all measures and decision had to be made about which dependent variables to accept as evidence for efficacy.
- iii) Outcomes had to be combined across studies when post-treatment and follow-up data were published separately.

Pelham & Hoza, (1998) point out that behavioural PT met criteria for probably efficacious treatment without combining across studies. Studies which show clear evidence of the effects of behavioural training employed waiting list control groups rather than contrast treatment groups, which limit their support to the probably efficacious criteria.

According to Pelham *et al.*, (1998) three studies previously detailed in this chapter meet their criteria for well established treatment effects, Firestone *et al.*, (1981) Horn *et al.*, (1990) and Ialongo *et al.*, (1993). The remaining studies which met established criteria for treatment effects were not reported in peer review papers and so were excluded from this discussion. A further five papers previously discussed met criteria for probably efficacious treatment, Anastopolous *et al.*, (1993), Pisterman *et al.*, (1989), Pisterman *et al.*, (1992), Pisterman *et al.*, (1992a), Dubey, O'Leary & Kaufman, (1983).

While Pelham *et al.*'s, (1998) review provided evidence for the effectiveness of psycho-social intervention for children with AD/HD, some interesting conclusions can



be drawn from the results. Two of the studies (Pisterman *et al.*, 1992) and Pisterman *et al.*, (1989) that provided strong evidence for the efficacy of behavioural parent training were conducted on pre-schoolers with mean sample ages of less than four years. The evidence was more variable from studies which involved school age children, while the only study which involved adolescents failed to provide evidence to support the effectiveness of behavioural parent training when compared against alternative treatments.

#### **4.1.20: New forest parent training study (NFPTS)**

In relation to the empirical support for parent training, one final study needs to be reviewed; the New Forest Parent Training Study (NFPTS). The research reported in this thesis was carried out in conjunction with and parallel to the NFPTS; a randomised control trial of two types of parent-based intervention for pre-school children with AD/HD (Sonuga-Barke, Daley, Thompson, Laver-Bradbury & Weeks 1999). The aim of this section is to briefly describe NFPTS, a more detailed account is contained in appendix vi.

Campbell, Endman & Bernfield, (1977) have shown that pre-school children identified as hyperactive were much more likely than other children to be disruptive, inattentive and overactive when they enter school. Longitudinal research has also confirmed that hyperactive children have a poor prognosis for development. Hyperactive children are much more likely than their normal classmates to go on and fail at school, develop low self esteem, and become disruptive, defiant and aggressive. The resulting costs of persisting hyperactivity both for the individual and society in general are therefore extremely high (Lerner, Invi, Trupin, & Douglas, 1985). Problems with the identification and diagnosis of pre-school hyperactive children had meant that intervention has rarely been attempted before middle childhood. By this time the behavioural and academic problems associated with hyperactivity are well established. Given this, it is not surprising that much of the available evidence

indicates that both behavioural and drug treatments are limited in their long term effects (Barkley, 1989). For instance, although children treated with psycho-stimulants often respond well in the short term, follow-up studies suggest that they fare no better in the long term than those who receive no treatment at all.

The rationale for the NFPTS was that intervention before the hyperactive child's behaviour became associated with anti-social behaviour and school failure would provide the best and most effective way to modify its developmental course. The objectives of the NFPTS was to evaluate the efficacy of a training package for parents of hyperactive pre-school children. This was achieved by comparing the effectiveness of parent training, against social support and waiting list control conditions. Furthermore, the impact of the package over the short term and the longer term were compared.

The specific predictions were;

- i) Parent training would lead to decreases in reported and observed AD/HD and associated problems, compared to social support and waiting list conditions.
- ii) Parent training would result in higher levels of parent well being and functioning compared to parents in the social support and waiting list control conditions.

Seventy six three year old children with AD/HD selected from a population sample (N=3051) entered the trial following a rigorous three stage screening process. Children were randomly assigned to either a parent training (PT), a parent counselling and support (PC&S) or waiting list control group (WLC). Both treatment groups received 8 one hour weekly therapy sessions. The PT group received coaching in child management techniques and attention training. The PC&S group received non-

directive support and counselling. Measures of child symptoms and mothers sense of well-being were taken before and after intervention and at a 15 week follow up.

Results demonstrated that AD/HD symptoms were reduced in the PT group compared to both PC&S and WLC by a clinically significant degree. Symptoms of conduct problems also decreased significantly with this treatment. Both PT and PC&S had a beneficial effect on mothers sense of well-being. However, these effects were short lived and had disappeared by follow up.

#### **4.1.21: Predictors of outcome post intervention**

While the successful outcome of parent based intervention has been extensively discussed little attention has been paid to predictors of successful outcome for PT. Webster-Stratton, (1985) examined predictors of outcome in PT for conduct disordered children. Thirty four families with conduct disordered children attended a nine week parent training program. Pre and post training assessments included measures of depression, SES and life stress. Post training assessments were conducted one month and one year after the end of training. Results indicated two significant predictors of outcome, SES and negative life stress. Specifically the more disadvantaged the family was in terms of low income and education and the more negative life stress experienced by mothers, the less likely the family was to benefit from PT.

Webster-Stratton & Hammond, (1990) examined predictors of outcome in PT for families with conduct disordered children. One hundred and one mothers completed a ten week PT program. As with the 1985 study, baseline assessments included measures of depression, SES, negative life experience as well as home observations and measures of marital status. Post training assessments were conducted one month and one year after training. Results showed that pre-treatment levels of depression significantly predicted mothers reports of their children's maladjustment immediately

post-treatment. SES and marital status (married versus single) made the greatest significant contribution to the reduction of mother's critical and negative behaviours immediately post-treatment. Predictors of outcome one year after the end of training demonstrated that negative life stress which had occurred during the year since training accounted for as much variance in outcome as depression. Marital status and socio-economic status were equally significant as predictors at the one year follow up as they had been at one month.

Further support for the implication of SES in parent training came from studies which have examined participation in parenting skills programs. Spoth & Conroy, (1993) examined parents efforts to enhance their parenting skills among a rural American population. Both socio-economic status and level of education were positively associated with information seeking and program attendance. This indicated that parents with higher socio-economic status and more years education were more likely to seek information about parenting and more likely to attend training sessions.

The predictive power of EE is already well stated in the literature, principally in relation to the prediction of relapse for adults with serious psychiatric problems (see chapter two). This combined with the utility of other constructs such as depression or socio-economic status in predicting post training outcome for parents of children with conduct disorder provided the rationale for this study.

## **4.2: Study 3: The predictive power of SoPreSS, SoMCI and SoSCP**

The aim of this chapter is ultimately to examine the predictive power of SoPreSS, SoMCI and SoSCP. Given the utility of depression or SES in predicting the outcome of PT for parents of children with conduct disorder, what might the utility of SoPreSS, SoMCI or SoSCP be in predicting outcome for PT with parents of AD/HD children.

### **4.2.1: Aims of the chapter**

i) The first aim of this chapter was to continue the examination of the validity of SoPreSS, SoMCI and SoSCP (ENGAGE) by investigating the measures sensitivity to change. Sensitivity to change will be examined by examining change in components of the measures as a function of intervention. It was predicted that intervention would result in significant positive changes on three measures in the PT group, some non significant positive improvements in the PC&S group and no change in the WLC group.

i) To assess the ability of baseline measures of EE, child behaviour, maternal adjustment, child solo-play and mother-child interaction to predict outcome post intervention. We predicted that successful outcome for PT would be predicted by low EE, positive mother-child interaction, high engagement and high SES.

Specifically for the PT group the following predictions were made

a) A significant reduction in EE levels as measures by SoPreSS, on both global EE as well as NEB and PEB.

b) A significant reduction in maternal negative play behaviour, and an increase in both positive play behaviour and levels of joint play as measured by SoMCI.

c) With successive presentations of the same toy a reduction in engagement was expected across time, however it was expected that engagement would remain static in the PT group.

The following predictions were made for the PC&S group

a) A trend towards lower levels of EE as measured by SoPreSS on both global EE as well as NEB and PEB, but no actual significant differences.

b) Again a trend towards lower levels of negative maternal play behaviour and higher levels of positive play behaviour and more joint play but not actual significant differences.

c) A trend towards a reduction in engagement, but no actual significant difference.

The following predictions were made for the WLC group

a) No significant change in Global EE, NEB or PEB.

b) No significant change in negative maternal interactions, positive maternal interactions or levels of joint play.

c) A significant reduction in engagement levels.

### **4.3: Method**

While the method was extensively discussed in chapter two, this section outlines the allocation of participants to treatment condition, details about the various treatments, treatment dropouts and clinical significant change.

### **4.3.1: Screening Procedure**

The screening procedure, recruitment of participants and measures have already been described in chapter two. As part of NFPTS the 78 participants whose recruitment was described in chapter two were randomly allocated to one of three conditions. i) Parent training PT N = 30; ii) parent counselling and support PC&S N = 28; and iii) waiting list control WLC N = 20. The full recruitment process for stage 1 and this second stage are depicted in figure 4.2.

### **4.3.2: Treatment dropouts**

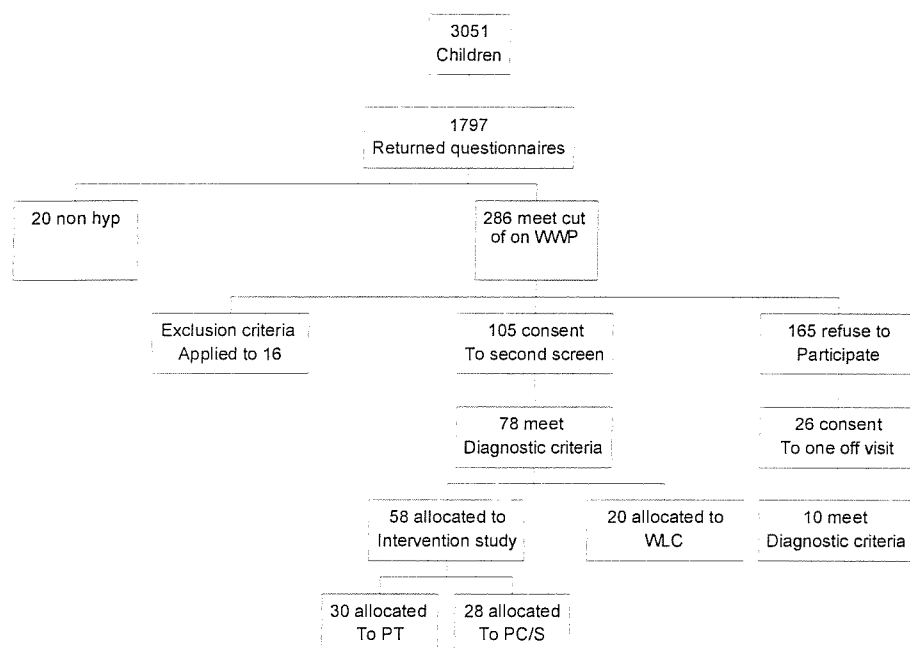
Eight of the original fifty eight mothers recruited for the PT and PC&S groups dropped out during the course of intervention. Five had been allocated to the PC&S group and the remaining three to the PT group. Short telephone interviews were conducted with these parents to determine why they did not wish to continue with the study. The reasons for their withdrawal were summarised into three categories.

i) The treatment didn't meet their expectations, and so they couldn't see the utility in continuing their participation, N = 3.

ii) Mothers were too busy to continue their participation, N = 3.

iii) The child's father no longer wished the child or mother to continue their participation, N = 2. These eight participants withdrew from the study despite reassurances from the treatment team for mothers and fathers, and offers of intervention visits on evenings or weekends.

**Figure 4.1: Recruitment stages 1 and 2**



#### 4.3.3: Design.

This study was a randomised control trial of two forms of parent based intervention for pre-school AD/HD, PT and PC&S. The aim was to compare both PT and PC&S against the WLC group. Parents in the PT group received eight one hour visits from a specially trained health visitor, who advised them on appropriate behavioural management techniques. Parents in the PC&S group also received eight one hour visits from the same health visitors who talked to them in general about child behaviour problems but offered no specific advice on behavioural management. Parents in the WLC group received no visits from the health visitors, but were assessed at the same time points as the other two groups.



#### **4.3.4: Intervention procedure.**

Parents in the treatment groups received eight one hour visits from one of the two specially trained research health visitors. Parents in the PT group received advice on appropriate eye contact, time out, consistency and other behavioural management techniques. A brief summary of the eight week program is presented in table 4.1, a more detailed description is available in the manual for the training of parents with hyperactive children aged three to nine (Weeks, Thompson & Laver-Bradbury 1999). Parents in the Social Support group received the same number of visits but without any reference to behavioural management techniques.

#### **4.3.5: Treatment Integrity**

To examine the integrity of the treatment, a selection of intervention sessions (N = 24) were rated by a blind coder. The blind coder was introduced to the PT and PC&S manuals and asked to make two judgements, i) to estimate whether the parents received parent training or social support. and ii) to summarise the content of each tape. A 96 percent agreement existed for the blind coder's ratings of treatment distinction. To examine the integrity of that distinction a number of goals for each weeks treatment were outlined. These goals were then compared to what the blind coder had described as taking part on the tape. The number of treatment goals are presented in parentheses in table 4.2. Revision of the previous weeks training was not considered a goal. Eleven of the twenty four tapes contained PT sessions, the remainder PC&S sessions. The total number of goals that should have been addressed during these sessions was 23 and the number presented was 17. This represents a rate of 70 percent for treatment integrity. Table 4.2 displays the actual number of goals achieved for each session. As well as verifying that the parent training schedule was delivered the blind coder rated the fourteen social support tapes for the same goals, and found that none of the goals of PT existed on those tapes.

**Table 4.1: Description of PT and PC&S programs**

Wk	PT	PC&S
1	Discussion with parents about child's behaviour and issues of control.	Introduction, assessment, brief introduction to overactive characteristics
2	Importance of clear messages, the use of modelling to help train parents and the value of play interaction (3 goals)	More detailed look at overactive children's characteristics, use of behavioural diary.
3	Approaches to dealing with temper tantrums, the value of distraction techniques, and the importance of dialogue during disputes (3 goals)	Behavioural diary examined, therapists introduced the concept of "caring for yourself".
4	How to implement skills learned during the previous three weeks, and the value of time out. ( 2 goals)	Therapists explored issues related to looking after a hyperactive child.
5	Revision session, conducted without the presence of the child	Therapists used diary to focus on behaviour
6	Observation weeks, which gave the therapist time to observe interactions between parents and children. Feedback was also given on the parents use of behavioural techniques introduced in the first 5 weeks. (one goal)	Detailed assessment of behaviour diary.
7	Observation weeks, which gave the therapist time to observe interactions between parents and children. Feedback was also given on the parents use of behavioural techniques introduced in the first 5 weeks. (one goal)	Therapist focused on changes that needed to be made to improve situation.
8	Messages from previous sessions reinforced, therapist selected one or two examples for discussion.. (one goal)	Therapist revised the salient issues of the eight week program

**Table 4.2: Treatment integrity for parent training sessions**

Tape N = 24	Week No	Number of goal mentioned
1 ( side b)	4	1 out of 2
2 (side b)	4	2 out of 2
6 ( side a)	3	2 out of 3
7 (side a)	3	2 out of 3
10 (side a)	4	2 out of 3
10 (side b)	5	1 out of 1
11 (side a)	4	1 out of 2
12 (side a)	8	1 out of 1
13 (side a)	2	3 put of 3
14 (side a)	2	2 out of 3

#### 4.3.6: Design controls

In order to maximise treatment integrity, each therapist was trained on both PT and PC&S. Therapist 1 trained thirty mothers and Therapist 2 trained Twenty eight. All participants were allocated to treatment conditions by a third party using random number tables. Treatment delivery was validated by continuous monitoring, conducted by the Consultant Psychiatrist who had originally trained the therapists. The integrity of the treatments was checked by listening to a selection or recorded tapes of treatment visits and rating the presence or absence of advice on child management techniques. The integrity of the treatment packages was further enhanced by identifying any groups of friends or relatives within our participant group, and ensuring that they were both allocated to the same treatment group. To control for experimenter bias, the psychologists who conducted all assessment visits was blind to both the content of each treatment package, and also blind to which treatment category children and parents had been allocated. Other design controls included no intervention or telephone support for participants during the follow up period.

#### **4.3.7: Follow up**

Follow up assessment visits were conducted within one week of the end of treatment, and fifteen weeks after the end of treatment. For five participants post treatment assessment was delayed by on average seventeen days, this was due to the illness of the psychologist.

#### **4.3.8: Clinically significant change**

This was established following guidelines from Jacobson & Truax, (1991) for clinically significant change for overlapping populations. For this sample the median point between hyperactive and non hyperactive PACS scores at time 1 was 15.65. This resulted in the creation of two groups of children within each intervention group, those children who demonstrated clinical change (C) and those that did not demonstrate clinical change (NC). Therefore within the PT group children were split into PTC and PTNC, while those in the PC&S group were split into PC&SC and PC&SNC. It is possible that choosing to treat change as a dichotomous variable rather than as a continuous variable may result in the loss of discriminating power. This potential loss of power is more than offset by the opportunity to use clinical significant change scores as a way of demonstrating clinical relevance.

## **4.4: Results**

As SoPreSS scores were only available at Baseline and outcome, comparison data for SoSCP (ENGAGE) and SoMCI were only used from those same data collection points. The aim was to examine change in these measures as a function of intervention, as well as the ability of time one scores on SoPreSS, SoMCI or SoSCP to predict outcome. An examination of change in the measures as a function of intervention would allow an investigation of the validity of the measure in terms of its sensitivity to change. While an examination of predictors of outcome would allow an investigation of the influence of EE, mother-child interaction or solo-play levels on parent training outcome.

### **4.4.1: Analysis strategy for changes in SoPreSS , SoMCI and SoSCP (ENGAGE) as a function of training**

The data points were renamed T1 for baseline and T2 for outcome. One way ANOVA and a one way ANCOVA were used to examine changes in EE status as a function of intervention. The purpose of the ANOVA was to evaluate whether or not the group means on the dependent variable differed significantly from one another. The purpose of the ANCOVA was to examine whether or not adjusted group means differed from one another. In this the group means were adjusted by entering a T1 score into the analysis as a covariate. The ANCOVA allowed an examination of T2 (outcome) scores while controlling for any influence differences at T1 might have had on differences at T2. Subsequent pair-wise comparisons were run on adjusted mean scores. Scores at T2 were adjusted so that the influence of the T1 score was incorporated within the T2 score. This was achieved by running a simple linear regression with the T1 as the dependent variable and the T2 scores as the predictor variable. The unstandardised residuals for each score from the regression were then added to the beta constant coefficient for the regression. The result was an adjusted T2 score which controlled for the value at T1.

One further assumption underlies one way ANOVA

The variance of the dependent variable is the same for all populations. If the population variances differ regardless of whether the sample sizes are equal or unequal, the validity of the  $F$  values could be questioned. Violation of this assumption influences post hoc tests in particular. As no post hoc tests from within ANOVA were used in this analysis, then it is safe to assume that the variance of the dependent variables was the same for all populations.

One further assumption underlies one way ANCOVA

The co-variate is linearly related to the dependent variable within all levels, so that the factor and the weights or slopes relating the covariate to the dependent variable are equal across all levels of the factor. If this homogeneity of slope assumption is violated then the results of the analysis are likely to be misinterpreted. The homogeneity of slope assumption was assessed by evaluating the interaction between the covariate and the factor in the prediction of the dependent variable. A significant interaction term between the covariate and the factor would suggest that differences in groups on the dependent variable might vary as a function of the covariate. The homogeneity of slope assumption was tested by examining between subject effects for general ANCOVA. Results suggested the interaction between the covariate and dependent variable for IS, WAR, NEB and, PEB were not significant IS  $F(5,79) = 1.93, p = 0.86$ , WAR  $F(5,79) = 2.16, p = 0.55$ , NEB  $F(5,79), 3.46 p = 0.63$ , PEB  $(5,79) 2.86 p = 0.63$ . The interaction between the covariate and dependent variable for REL was significant REL  $F(5,79) 3.15, p = 0.02$ . Based on the non significant  $F$  values for most of the components of EE, an ANCOVA was calculated assuming homogeneity of slope. As homogeneity of slope cannot be assumed for the relationship component, results of the ANCOVA for this component will be interpreted with caution.

Tests of normality were applied to the data to examine its parametric status, diagrams of the distributions are presented in appendix vii. Kolmogorov-Smirnov values were

calculated for each value. Kolmogorov-Smirnov values evaluate whether the data is normally distributed and generates an  $F$  and  $P$  values for the degree of difference from a normal distribution. Kolmogorov-Smirnov values for the components of SoPreSS, SoMCI and SoSCP (ENGAGE) were all significantly different from a normal distribution and ranged from 0.11 to 0.44,  $Z > 0.05$ . This indicated non-parametric status for the data. However ANOVA and ANCOVA were still considered suitable tests as they are robust to violation of the parametric assumption. Green, Salkind & Akey (2000) point out that both ANOVA and ANCOVA are robust to violation, even when populations are substantially non-normal when larger sample sizes or more than fifteen cases per cell are used. As the smallest cell size in this study was twenty cases it was decided to proceed with a parametric analysis.

#### **4.4.2: Analysis strategy for predictors of outcome**

In order to determine what variables predicted successful outcome for PT and PC&S, variables for which a significant difference exists between (C) and (NC) on one way MANOVA were entered into two discriminant function analyses, one for PT, and a second for PC&S. Two assumptions are associated with the significance test for discriminant analysis.

i) The quantitative variables are multivariately normally distributed for each of the populations, with different populations being defined by the levels of the grouping variable. According to Green, Salkind & Akey (1997) dependent variables are multivariately normally distributed when each variable is normally distributed ignoring the other variables, and each variable is normally distributed at every combination of values of the other variable. As it is almost impossible to ever meet this assumption, it is reassuring that discriminant function analysis yields valid results in terms of type 1 errors with moderate to large sample sizes.

ii) The population variances and co-variances among the dependent variables are the same across all levels of the factor. This assumption is robust to violation when there

are equal sample sizes. As there are small differences in the sample sizes, this assumption can be tested using box's  $M$ , a test of the null hypothesis of equal population covariance matrix. Unfortunately the  $F$  statistic for Box's  $M$  must be interpreted cautiously as a significant result may be due to a violation of the multivariate normality assumption and a non significant result may be due to small sample size or lack of power. Box's  $M$  statistics for each variable within the analysis indicated that only two variables violated the assumption, DIRECT,  $F(2,78) = 106.89, p < 0.05$ , and EXPAN,  $F(2,78) = 5.90, p < 0.02$ . Given the difficulty in interpreting the significance of the  $F$  statistic in Box's  $M$ , these variables were still entered into the discriminant function.

#### **4.4.3: Validity of SoPreSS, SoMCI and SoSCP (ENGAGE) in terms of sensitivity to change.**

The sensitivity to change will be examined for each measure separately by examining change in the scores for the measure as a function of intervention.

##### **4.4.3.1: Changes in SoPreSS scores as a function of intervention.**

Baseline scores on SoPreSS were examined using a one way MANOVA with group (PT, PC&S, or WLC) as the independent variable and baseline SoPreSS scores as the dependent variable. No significant multivariate difference existed  $F(78,3) = 1.73, p > 0.08$ , but one significant univariate difference existed for NEB. The means and univariate results presented in tables 4.3 and 4.4 demonstrate that PC&S mothers expressed more NEB than their PT or WLC counterparts. With just two data points, and a need to control for differences pre-intervention, a one-way ANCOVA was calculated with group as the between subject variable. This analysis examined differences between the groups post intervention, while controlling for their time one scores. Significant differences existed between the PT, PC&S and WLC for NEB and between both intervention groups and WLC for PEB even when baseline scores were controlled for.



As ANOVA and ANCOVA do not demonstrate the direction of the effect, a series of *t* tests was calculated which examined pair-wise differences between the groups. These pair-wise *t* tests analysed statistical differences between PT & PC&S, PT & WLC and PC&S and WLC. The results of this analysis showed that PT mothers reported fewer NEB and more PEB than did mothers in the PC&S or WLC groups. Despite a trend towards higher mean scores for IS, REL and WAR in the PT group, only the NEB and PEB components of SoPreSS were sensitive to change in the PT group, while PEB was sensitive to change in the PC&S group and no components of SoPreSS were sensitive to change in the WLC group. The results only partially supported the predictions as it was predicted that components of GEE such as IS, WAR and REL would also be sensitive to change in the PT group. It may be that over the relatively short follow up period the beneficial influence of intervention was only evident in PT mothers NEB.

**Table 4.3: Means for SoPreSS scores as a function of intervention**

N = 78 Measure	Time 1			Time 2		
	PT	PC&S	WLC	PT	PC&S	WLC
IS	1.86 (0.68)	1.82 (0.65)	2.09 (0.70)	2.21 (0.52)	2.01 (0.55)	1.82 (0.40)
NEB	5.07 (2.61)	6.67 (2.55)	5.27 (2.53)	1.24 (1.26)	2.25 (2.16)	4.18 (2.99)
PEB	2.82 (1.86)	3.09 (2.16)	2.09 (1.14)	2.04 (1.10)	1.23 (1.27)	1.73 (1.42)
REL	1.89 (0.48)	1.86 (0.49)	2.09 (0.30)	2.30 (0.41)	2.22 (0.38)	2.18 (0.40)
WAR	1.57 (0.72)	1.64 (0.75)	1.91 (0.54)	1.91 (0.64)	1.87 (0.68)	2.27 (0.47)

**Table 4.4: ANCOVA table for intervention across time**

MEASURE, N = 78	DIFF T1 (MANOVA)	DIFF T2 (ANCOVA)	PAIRWISE
IS	0.68	2.44 *	
NEB	4.00**	9.28 ****	PT<PC&S<WLC
PEB	1.09	3.96 **	PT>PC&S, WLC>PC&S
REL	1.00	0.42	
WAR	0.94	1.14	

\*  $P < .1$ , \*\*  $P < .05$ , \*\*\*  $P < .01$  \*\*\*\*\*  $P < .001$

#### 4.4.3.2: Changes in SoMCI as a function of intervention

Baseline scores on SOMCI were also examined in the same way as SoPreSS using a one way MANOVA and are presented in table 4.5. No significant multivariate difference existed  $F(78,3) = 1.23, p > 0.2$ , but one significant univariate difference existed for maternal direction, MDIRECT  $F(78,3) = 2.79, p < .05$ , and a near significant difference for affection, AFFECT  $F(78,3) = 2.79, p < 0.08$ . With just two data collection points, and a need to control for differences pre-intervention, a one way ANCOVA was calculated with group as the independent variable. As with SoPreSS this analysis examined difference between the groups post intervention, while controlling for their time one scores. Significant differences existed between the groups for AFFECT, and JPLY even when their time one scores were controlled for. A series of  $t$  tests examined pair-wise differences between the groups, this analysis and an examination of the means showed that for mothers both affection and joint play were sensitive to change in the PT group, while no components of SoMCI were sensitive to change in the PC&S or WLC groups. While statistically significant these results were not quite in line with the predictions. An examination of the means shows that with the exception of affection, all other components demonstrate decreases across time, but in most cases the decrease is least in the PT group and most marked in the WLC in line with an inverse of the predictions. It is possible that most mothers were making an extra special effort to demonstrate their good parenting skills during

observation at T1 and that only the PT mothers were able to maintain that trend as a function of intervention.

**Table 4.5: Means for SoMCI as a function of intervention.**

MEASURE N = 78	TIME 1			TIME 2		
	PT	PC&S	WLC	PT	PC&S	WLC
CHILD CHALL	1.34 (4.09)	3.36 (7.09)	0.55 (1.23)	1.12 (1.75)	1.80 (2.44)	1.16 (2.25)
MOTHER EXPANS	0.45 (0.83)	0.36 (0.78)	0.35 (0.59)	0.42 (0.71)	0.17 (0.35)	1.06 (2.63)
+ IVE PLAY PRAISE	0.70 (1.02)	0.48 (0.68)	0.70 (0.69)	0.58 (0.76)	0.36 (0.45)	0.50 (0.83)
AFFECT	0.50 (0.67)	0.60 (0.78)	1.05 (1.01)	1.39 (1.51)	0.66 (0.81)	0.76 (0.75)
-IVE PLAY DIRECT	1.41 (4.02)	1.18 (1.90)	0.30 (0.57)	0.72 (1.35)	0.95 (1.21)	2.33 (3.13)
CRITIC	1.24 (1.73)	1.16 (1.54)	0.60 (0.97)	1.35 (1.70)	1.42 (1.57)	0.74 (1.67)
PLAY STYLE JPLY %	93.93 (12.52)	86.95 (16.00)	90.67 (14.32)	91.45 (13.39)	79.63 (25.51)	46.62 (10.71)
SPLY %	0.57 (1.57)	2.14 (5.47)	2.00 (3.34)	0.48 (0.73)	0.64 (0.84)	0.70 (0.92)

**Table 4.6: ANCOVA table for SoMCI as a function of intervention**

Measure N = 78	DIFF T1	DIFF T2 COVAR T1	PAIRWISE
CHILD CHALL	2.08	0.95	
MOTHER EXPANS	0.14	2.63 *	PT&PC&S>WLC
+ IVE PLAY PRAISE	0.53	0.50	
AFFECT	2.79 *	3.86 **	PT>PC&S&WLC
-IVE PLAY DIRECT	3.79	0.03	
CRITIC	1.19	0.52	
PLAY STYLE JPLY%	1.67	12.71 ****	PT>PC&S>WLC
SPLY%	1.32	0.26	

\* p < .1, \*\* p , .05, \*\*\* p < .01. \*\*\*\* p < .001

#### 4.4.3.3: Changes in SoSCP (ENGAGE) as a function of intervention

As engagement was represented as a single variable no Multivariate statistics were calculated. Results of a one way ANOVA, presented in table 5.8 demonstrated no significant differences between the three groups on engagement at T1. A one way ANCOVA with T1 as a co-variate demonstrated a significant difference between the groups at T2 even when T1 scores were controlled for. As with SoPreSS and SoMCI a series of pair-wise *t* tests were used to examine this significant difference at T2. Results of the pair-wise comparisons and examination of the means displayed in table 4.7 demonstrated that both PT and PC&S children has engagement levels which were significantly greater than WLC children. In line with predictions there was an overall reduction in engagement across time, with the smallest reduction in engagement in the PT group, a larger reduction in the PC&S group and a considerable reduction in engagement in the WLC group.

**Table 4.7 : Means for ENGAGE as a function of intervention**

MEASURE N = 78	TIME 1			TIME 2		
	PT	PC&S	WLC	PT	PC&S	WLC
ENGAGE	40.71 (16.64)	39.74 (20.13)	47.92 (25.74)	36.97 (17.16)	31.64 (31.63)	24.20 (15.99)

Figures in parentheses are standard deviations

**Table 4.8: ANCOVA for ENGAGE as a function of intervention.**

MEASURE N = 78	DIFF T1	DIFF T2 COVAR T1	PAIRWISE
ENGAGE	1.07	4.37 ***	PT&PC&S > WLC

\*\*  $p < .05$ , \*\*\*  $p < .01$ , \*\*\*\*  $p < .001$

#### 4.4.3.3: Analysis strategy for contribution of baseline scores to intervention outcome

One way MANOVA was used to evaluate the effects of the two intervention outcomes (C and NC) on measures of child behaviour pre-treatment, for each intervention group

separately. The aim of this analysis was to identify which variables distinguished the (C) group from the (NC) group with a special focus on measures from SoPreSS, SoMCI and ENGAGE.

#### **4.4.4: Contribution of baseline SoPreSS scores to outcome**

One way MANOVA was conducted to evaluate the influence of SoPreSS measures pre-treatment on intervention outcomes (C) and (NC). The means, standard deviations and resulting  $F$  values are presented in table 4.9. A significant multivariate interaction existed for intervention and outcome  $F(58,2) = 2.52, p < .05$ . An examination of the corresponding univariate differences demonstrated no significant differences for the PT group, with one marginally significant difference on WAR, with PT (NC) mothers reporting more warmth than PT (C) mothers. Two significant differences existed for PC&S for REL and NEB. PC&S (C) mothers reported a significantly more positive relationship and fewer NEB than did PC&S (NC) mothers at baseline. A comparison of the mean scores for both the PT and PC&S groups indicated that clinical significant change in the PC&S group only occurred for children whose parents were warm, had a positive relationship and used fewer NEB. In contrast clinical significant change in the PT group didn't require parents to be overtly warm, have a positive relationship or low NEB. In fact an examination of the means in table 4.9 demonstrates that the PT (C) group had lower levels of warmth, and higher NEB than did the PT (NC) group.

**Table 4.9: Showing differences for clinical significant change by group on SoPreSS scores**

SOPRESS	PATIENT		<i>F</i>	PC&S		<i>F</i>
	PTC N = 16	PTNC N = 14		PC&SC N = 11	PC&SNC N = 17	
TS	1.87 (0.62)	1.85 (0.77)	0.06	1.84 (0.70)	1.80 (0.63)	0.03
WAR	1.35 (0.48)	1.83 (0.87)	3.64 *	1.96 (0.74)	1.43 (0.69)	3.72 *
REL	1.93 (0.57)	1.85 (0.36)	0.21	2.13 (0.44)	1.69 (0.46)	6.40 **
NEB	5.63 (2.21)	4.43 (2.95)	1.60	5.35 (2.93)	7.52 (1.91)	5.70 **
PEB	3.30 (1.92)	2.27 (1.68)	2.40	3.85 (1.70)	2.60 (2.32)	2.36

\* =  $p < .1$ , \*\* =  $p < .05$ , \*\*\* =  $p < .01$  Figures in parentheses are standard deviations

#### 4.4.5: Contribution of baseline child behaviour scores to outcome

One way MANOVA was also used to examine differences in child behaviour pre intervention for the (C) and (NC) groups in each intervention group. No significant multivariate difference existed for PT  $F(30,2) = 0.94, P > .05$ , but one did exist for PC&S  $F(28, 2) = 4.23, p < .001$ . An examination of the corresponding univariate differences and means presented in table 4.10 demonstrated no significant differences between (C) and (NC) for the PT group. However four significant differences existed between (C) and (NC) for the PC&S group, PACSHYP, WWP and BCL OA, and BCL EMO. An examination of the means demonstrated that children in the PC&S (C) had less severe symptoms of AD/HD than PC&S (NC) children. However mothers in the PC&S (C) group did report their children as demonstrating significantly greater problems of emotional adjustment than their (NC) counterparts.

#### 4.4.6: Contribution of baseline maternal adjustment scores to outcome

Again one way MANOVA were used again to examine differences in maternal adjustment pre-intervention for the (C) and (NC) groups. No significant multivariate differences existed for either group PT  $F(30, 2) = 0.82, P > 0.6$ , and PC&S  $F(28,2) =$

0.87,  $P > 0.5$ . An examination of the univariate differences and means in table 4.11 demonstrated one significant difference between the (C) and (NC) group for PT, FIQ PF. Mothers in the PT (C) group rated their child as having a greater negative impact on their family than did PT (NC) mothers. One significant difference also existed between the (C) and (NC) groups for PC&S on SES, as mothers in the PC&S (C) group represented higher SES group than did those mothers in the PC&S (NC) group. Again these results demonstrate that those in the PC&S (NC) group represented a less severe or less disadvantaged group than those in the PT group.

**Table 4.10: Contribution of baseline child behaviour scores to outcome**

MEASURE	PATIENT			PC&S		
	PTC N = 16	PTNC N = 14	F	PC&SC N = 11	PC&SNC N = 17	F
AD/HD	20.63 (2.33)	20.36 (3.18)	0.07	19.91 (3.75)	22.71 (3.27)	4.35 *
WWP	30.32 (7.88)	28.15 (5.83)	0.72	23.45 (3.11)	34.17 (6.64)	24.85 **
BCL OA	3.61 (1.39)	3.77 (1.02)	0.12	3.23 (1.25)	4.29 (1.21)	4.92 *
CONDUCT						
PPACS	19.87 (5.46)	22.14 (8.03)	0.84	20.09 (8.41)	21.35 (6.61)	0.20
BCL SOC	4.63 (1.53)	3.86 (1.27)	2.20	3.69 (2.05)	3.87 (1.69)	0.06
OTHER						
BCL SOIL	2.40 (1.96)	1.82 (1.68)	2.48	1.68 (1.79)	1.56 (1.36)	0.04
BCL FEED	1.36 (0.68)	1.81 (1.50)	1.50	2.21 (1.22)	1.27 (0.83)	5.85
BCL EMO	1.06 (1.10)	1.42 (1.32)	0.68	2.69 (1.11)	1.15 (1.17)	11.78 **
BCL SLP	1.59 (1.53)	1.60 (1.58)	0.01	2.21 (1.22)	1.27 (0.83)	0.10

\* =  $p < .05$ , \*\* =  $p < .001$ . Figures in parentheses are standard deviations

**Table 4.11: Contribution of baseline maternal adjustment scores to outcome**

Measure	PT		<i>F</i>	PC&S		<i>F</i>
	PTC N = 16	PTNC N = 14		PC&SC N = 11	PC&SNC N = 17	
GHQ.	9.25 (9.94)	5.14 (5.89)	1.85	6.81 (6.06)	7.29 (7.03)	0.03
PSOC Eff	21.81 (5.86)	22.14 (5.00)	0.09	20.36 (5.87)	21.53 (5.01)	0.32
Sat	23.13 (6.63)	25.00 (6.68)	1.11	25.91 (3.24)	25.47 (4.33)	0.08
FIQ SL	20.31 (7.52)	17.91 (4.54)	1.49	17.18 (5.49)	19.94 (6.67)	1.30
NF	18.19 (3.58)	15.96 (3.59)	2.30	15.74 (2.38)	17.53 (3.50)	2.20
PF	19.38 (3.65)	17.07 (3.25)	5.07 **	17.27 (2.76)	18.11 (3.55)	0.45
MAR	13.48 (3.53)	13.10 (3.43)	0.15	14.00 (2.93)	14.91 (3.45)	0.52
ADD PARENT	4.50 (4.86)	5.50 (3.41)	0.23	7.36 (5.28)	6.00 (3.81)	0.63
HV	1.25 (0.45)	1.14 (0.36)	1.16	1.45 (0.52)	1.41 (0.51)	0.01
OTHER SES	3.27 (1.53)	3.08 (1.44)	0.11	2.27 (1.27)	3.59 (1.18)	7.85 ***

\* =  $p < .1$ , \*\* =  $p < .05$ , \*\*\* =  $p < .01$ . Figures in parentheses are standard deviations

#### 4.4.7: Contribution of baseline mother-child interaction scores to outcome

A further one way MANOVA was conducted to examine differences between the interaction style of mothers and children in the (C) and (NC) groups for each intervention group. No significant multivariate differences existed for either group, PT  $F(30,2) = 1.97, p > 0.1$ , and PC&S  $F(28,2) = 0.78, p > 0.6$ . An examination of the values in table 4.12 demonstrate no significant differences between the (C) and (NC) groups for PT but two significant differences for PC&S on EXPANS and DIRECT. PC&S (C) mothers demonstrated an interaction style characterised by greater expansion and less maternal direction during play. These results provided



further evidence for a link between the success of the PC&S (C) group and less severe symptoms.

**Table 4.12: Contribution of mother-child interaction to outcome**

MEASURE	PT		<i>F</i>	PC&S		<i>F</i>
	PTC N = 16	PTNC N = 14		PC&SC N = 11	PC&SNC N = 17	
CHILD CHALL	2.06 (5.61)	0.57 (0.94)	0.97	4.00 (10.44)	2.94 (4.04)	0.14
MOTHER EXPAN	0.27 (0.59)	0.64 (1.01)	1.53	0.73 (1.10)	0.12 (0.33)	4.63 **
+IVE PLAY PRAISE	0.44 (0.73)	1.00 (1.24)	2.60	0.25 (0.43)	0.63 (0.78)	2.20
AFFECT	0.35 (0.60)	0.67 (0.72)	1.80	0.80 (0.98)	0.41 (0.61)	1.72
-IVE PLAY DIRECT	4.65 (0.78)	2.19 (0.86)	0.51	1.77 (0.97)	3.26 (0.79)	7.53 **
CRITIC	1.51 (1.86)	0.93 (1.59)	0.85	0.90 (1.64)	1.32 (1.49)	0.48
PLAY STYLE JPLY%	91.56 (16.24)	96.48 (6.35)	1.12	87.80 (16.73)	86.40 (16.02)	0.05
SPLY%	0.78 (2.01)	0.33 (0.85)	0.53	0.58 (1.26)	3.16 (6.84)	1.52

\*=  $p < .1$ , \*\* =  $p < .05$ , \*\*\* =  $p < .01$

#### 4.4.8: Contribution of baseline solo-child play scores to outcome

A final one way MANOVA was conducted to examine differences in solo-child play for the (C) and (NC) groups for each intervention group. No significant multivariate difference existed for PT,  $F(30,2) = 0.13$ ,  $p > 0.8$ , while a borderline significant difference existed for PC&S  $F(28,2) = 2.82$ ,  $p > 0.08$ . An examination of the univariate differences and means presented in table 4.13 demonstrate no significant differences for the PT group, but a significant difference in the PC&S for ENGAGE. Children in the PC&S (C) group demonstrated significantly lower levels of engagement than children in the PC&S (NC) group pre intervention. This finding may suggest that children in the PC&S (C) represent AD/HD children who had poor

concentration but fewer problems with motor behaviour or impulsivity. This is because in general they were rated as being less severe AD/HD children despite their poorer engagement levels.

**Table 4.13: Contribution of solo-child play to outcome**

Measure	PT		<i>F</i>	PC&S		<i>F</i>
	PTC N = 16	PTNC N = 14		PC&SC N = 11	PC&SNC N = 17	
ENGAGE	39.32 (18.39)	42.28 (14.92)	0.04	29.45 (15.97)	46.37 (29.49)	5.47 **

\* =  $p < .1$ , \*\* =  $p < .05$ , \*\*\* =  $p < .01$  Figures in parentheses are standard deviations

#### 4.4.9: Highlighting successful predictors of outcome

The discriminant function for PT was not significant,  $PT \Lambda = 0.80$ ,  $\chi^2 = (9, N = 30) 4.54$ ,  $p > 0.8$ . The overall Wilks' lambda for PC&S was significant,  $\Lambda = .12$ ,  $\chi^2 (12, N = 28) 42.03$ ,  $p < .001$ , indicating that overall the predictors differentiated between the two groups. Table 4.14 presents the Wilks' Lambda for each individual predictor for PC&S, as well as the within group correlations between the predictors the discriminant function and the standardised weights. The discriminant function can be named on the basis of the size of the weights for the standardised coefficient. An examination of the weights presented in table 4.14 showed that outcome for the PC&S group is predicted by the presence of maternal expansion, and child problems with emotional adjustment, and the absence of maternal reports of AD/HD symptoms (WWP), maternal direction during play and NEB.. It is possible therefore that this discriminant function represented maternal sensitivity, as the function was associated with the presence of a positive maternal behaviour (EXPANS) and poor emotional adjustment of the child, and the absence of negative maternal behaviours and AD/HD. An examination of the correlations between baseline measures and outcome demonstrate support for the results of the discriminant function. BCI EMO had a large significant coefficient, while EXPANS had a moderately large and marginally significant

coefficient. As clinical significant change was recorded as 1 for (NC) and 2 for (C), these positive correlations showed that children who had greater problems with emotional adjustment and had mothers who incorporated expansion into their play were most likely to experience clinical significant change in the PC&S group. The large negative correlations for AD/HD symptoms, NEB, direction and SES showed that children who had more severe AD/HD scores, mothers who used greater numbers of NEB, more maternal direction or who represented lower SES groups were all less likely to be in the clinical significant change group.

The means on the discriminant function are also consistent with this overall interpretation. The mean for group 1 (NC, = -1.9) was much lower than for group 2 (C = 2.95). As it was hypothesised that the overall discriminant function related to the mother's sensitivity, these group means for the function also demonstrated that the clinical significant change group represented children whose mothers were more sensitive during play than mothers of children in the non change group. Potentially children in the PC&S group who improved did so because their mothers were more sensitive to their needs, particularly needs associated with emotional adjustment. When prediction of group membership was attempted, 96.4% of the children in the sample were able to be classified assuming homogeneity of covariance matrices and 100% not assuming homogeneity. The comparable Kappas were 0.93 and 1.00. The Kappas which take into account chance agreement indicate strong accurate prediction for this model.

**Table 4.14: Discriminant function analysis predicting outcome at T3**

TEST N = 28	WILKS $\Lambda$	STAND COEFF	COR COEFF <sup>1</sup>	NUMBER OF		% CLASS	F
				CSC	CSNC		
AD/HD							
PPACS	0.86	-0.02	-0.38	11	17	96.4	4.35 *
WWP	0.51	-0.85	-0.70 *	11	17	96.4	24.85 **
SOPRESS							
REL	0.80	0.20		11	17	96.4	6.40 *
NEB	0.82	-0.52	-0.42	11	17	96.4	5.69 *
PLAY STYLE							
EXPANS	0.85	0.94	0.39	11	17	96.4	4.63 *
DIRECT	0.78	-0.53	-0.47 *	11	17	96.4	7.53 *
OTHER							
BCL EMO	0.69	0.89	0.56 *	11	17	96.4	11.78 **
BCL OA	0.84	-0.06	-0.39	11	17	96.4	4.92 *
SES	0.77	0.03	-0.48 *	11	17	96.4	7.84 * 7.85

\*  $p < 0.05$ , \*\*  $p < 0.01$

<sup>1</sup> Based on bivariate correlations between clinical significant change rating and baseline values.

#### 4.5: Conclusions

Results from these analysis have examined change in SoPreSS and SoMCI scores as a function of intervention. Results of the one way ANCOVA demonstrated that PT mothers expressed fewer NEB and more PEB than PC&S or WLC mothers post-intervention, even when their pre-intervention scores were controlled for. PT mothers also demonstrated more affection and joint play than PC&S or WLC mothers post-intervention even when their pre-intervention scores were controlled for. However WLC mothers demonstrated significantly more expansions than PT or PC&S mothers. Results of the one way MANOVA conducted to examine differences in pre-intervention scores for the (C) and (NC) groups in each intervention group revealed a consistent pattern. Clinical significant change in the PC&S group was consistently

associated with children and mothers who represented the least severe cases within that group. For PC&S clinical significant change resulted for children with less severe levels of AD/HD, mothers with a more positive relationship and less negativity, a more positive interactional style during play, and families with a higher socio-economic background. The same pattern did not exist within the PT group, as clinical significant change for PT was independent of severity of AD/HD, maternal relationship, negativity, interactional style or SES. Two exceptions existed within the PC&S data as PC&S (C ) children demonstrated lower levels of engagement than PC&S (NC) children despite having lower levels of reported AD/HD. PC&S (C) mothers also reported their children as having greater problems with emotional adjustment. The results of the discriminant analysis for PC&S demonstrated that clinical significant change in the PC&S group occurred for children who had greater problems with emotional adjustment, fewer symptoms of AD/HD and whose mothers used more expansions during play, and fewer maternal directions or NEB. While no significant predictors of outcome existed for the PT group, the results of this study have shown that outcome for PT was independent of severity of behaviour problem, maternal interactional style or EE.

## **CHAPTER FIVE: DISCUSSION.**

### **5.1: Chapter overview**

The discussion section will first present a summary of the research findings from chapters three, four and five. Then the relationship between the research findings and current findings from the literature on EE, mother-child interaction, solo-child play and predictors of outcome will be discussed. Discrepancies between the research findings and the current literature, as well as methodological problems with the current study will be discussed. Finally an examination of future research applicable to the area, will be discussed and a model representing the influence of EE, mother-child interaction, and maternal adjustment on outcome of parent based interventions for pre-school AD/HD will be presented.

### **5.2: Research findings**

To maintain the clarity of the research findings, results for EE, observation and intervention will be dealt with separately before a discussion of the overall meaning of the results is presented.

#### **5.2.1: Expressed emotion**

SoPreSS demonstrated acceptable internal consistency and reliability. An examination of the relationship between components of SoPreSS and measures of AD/HD and oppositional behaviour demonstrated that the more severe the reports of AD/HD and oppositional defiance on questionnaires or interviews the less positive and warm and more negative mothers were on SoPreSS. Similar results existed between SoPreSS

and measures of maternal adjustment. Mothers who had more negative views about the impact their child had on the family were less positive and more negative on SoPreSS.

SoPreSS scores discriminated mothers of the AD/HD intervention groups from the non-AD/HD group. Mothers of non-AD/HD children were warmer, more positive, and less negative. SoPreSS scores also discriminated mothers of AD/HD children who wanted to participate in the study from those who didn't. Mothers who wanted to participate were less warm, less positive about their relationship with their child, but equally as negative as mothers who didn't want to participate.

An examination of differences in child behaviour for children of mothers with high and low EE, showed that mothers with high global EE reported having children with more severe AD/HD and socialisation problems on questionnaires. Similar differences existed for mothers with high negative evaluations of behaviour. Mothers with low positive evaluations of behaviour reported having children with more severe AD/HD on questionnaires, but not having children with socialisation problems. An examination of differences for maternal adjustment for mothers with high and low EE showed that mothers with high global EE were from lower socio-economic groups than were mothers with low global EE. While no significant differences existed between mothers with high and low NEB or PEB, mothers who used low numbers of PEB also represented lower socio-economic groups.

The research findings for EE from this study mirror the findings from previous studies which have examined the relationship between EE and child behaviour. The association between maternal warmth and severity of AD/HD and socialisation problems found in this study are in agreement with Richman, Stevenson & Graham's (1982) and Quinton & Rutter's (1985) findings about the association between lack of parental warmth and child behavioural disturbance. Similar associations between negative evaluations of behaviour and severity of AD/HD and conduct problems mirror previous finding from Hibbs *et al* (1990) and Schwartz *et al* (1990). The finding that SoPreSS scores discriminate between the AD/HD and non-AD/HD groups are in agreement with previous research by Vostanis *et al* (1994), who examined EE ratings in children with conduct, or emotional problems and a non-referred control group matched for sex and age. Maternal warmth differed between the three groups, while criticism distinguished the conduct disordered group from the other two. The association between EE and SES found in this study agrees with Koenigsberg & Handley (1986) who reported modest correlations for mothers' and fathers' criticism and SES among a sample of patients with eating disorders. The results of this study provide further evidence of the importance of examining EE within families of children with behavioural problems in general and AD/HD in particular.

### **5.2.2: Mother-child interaction**

SoMCI demonstrated acceptable internal consistency and reliability. An examination of differences between mothers of AD/HD and non-AD/HD children on SoMCI demonstrated that mothers of non AD/HD children played for longer with their



children, and incorporated more expansion, praise, and affection into their play than did mothers of AD/HD children. The more severe the reports of the child's AD/HD on both interview and questionnaire measures, the less affectionate and more directive their mothers were during play. The relationship between components of SoSCP and maternal adjustment demonstrated that the greater the reports of maternal mental health problems, the more likely the child was to demonstrate challenging behaviour during play. Mothers who reported more negative feelings about the impact their child had on the family demonstrated less affection during play, while their children demonstrated more challenging behaviour. Lastly mothers who reported greater numbers of problems with attention deficits, played for shorter periods with their children. The relationship between SoMCI and SoPreSS showed that mothers who were more affectionate expressed more warmth, a more positive relationship, and fewer NEB.

An examination of differences on SoMCI for high and low EE demonstrated that mothers who expressed high global EE used less praise and more directive behaviours when playing with their children. Mothers who used high NEB displayed less affection and played for less time with their children than did mothers who used less NEB.

The research findings for mother-child interaction for this study mirror the research findings of most other studies which have examined mother-child interaction between mothers and their AD/HD children. The differences in play interaction between mothers of AD/HD and non AD/HD children are similar to those found by Campbell

(1986) who noted that mothers of AD/HD children used less positive Affect, more conflict and fewer appropriate directions than did mothers of non AD/HD children.

Similar findings were reported by Johnston & Mash (1982) who reported more directive and controlling behaviour and less responsiveness and praise in mothers of AD/HD children when compared to mothers of NAD/HD children.

When considering the determinants of interaction, the study results demonstrated some interesting findings. Weissman & Paykel (1974) claim that the helplessness associated with depression interfered with mothers' ability to be warm, seemed questionable due to the absence of any significant association between warmth on SoPreSS and reported mental health despite a moderate association between observed affection and mental health. Similar claims by Fisher *et al* (1989) that depression led to non-acknowledgement from mothers during interaction were also not supported by the research findings. This was due to the absence of an association between mental health and joint or separate play. Further claims by Kochanska (1987) that depressed mothers used strategies which required less cognitive effort were also not supported. This was due to the lack of association between mental health and maternal direction or separate play, the components of SoMCI which would have required the least cognitive effort. However, one determinant of interaction was supported by these findings, the claim by Panaccione & Wahler (1986) that depressed mothers elicited hostile child directed behaviours was supported by the significant association between mental health and challenging child behaviours.

### **5.2.3: Solo-child play**

The psychometric properties of SoSCP also demonstrated acceptable internal consistency and reliability. An examination of differences between mothers of AD/HD and non-AD/HD children on SoSCP showed that NAD/HD children displayed greater levels of engagement and lower levels of fidgeting than did the AD/HD children. The relationship between components of SoSCP and child behaviour demonstrated that the more severe the reports of the child's AD/HD and socialisation problems the lower their level of engagement. Similar relationships between SoSCP and maternal adjustment demonstrated that the more negative the perceived impact the child had on the family, as rated by their mothers, the lower the child's level of engagement. Lastly an examination of relationship between SoSCP and SoMCI demonstrated that mothers who used more praise during play, had children who were able to engage for longer during solo-play. An examination of differences on SoSCP for high and low EE, demonstrated no significant differences for global EE, or NEB, but mothers who used high PEB had children with higher levels of engagement.

The study results for solo-child play support the previous findings of Touwen & Klaverbo (1973) who found that AD/HD children demonstrated lower levels of total play and higher levels of switching behaviour when compared with NAD/HD children. Similar results were reported by Alessandri (1992) who reported that AD/HD children engaged in less overall play and more non-play including shifting from one activity to another. The differences between AD/HD and NAD/HD on engagement support both these previous research findings.

#### **5.2.4: The effect of intervention**

An examination of changes in SoPreSS scores as a function of intervention demonstrated no significant differences between the three groups, pre-intervention. Post-intervention differences existed for NEB and PEB, with PT parents using the least NEB and most PEB. These differences persisted even when the influence of time one scores were controlled for. Changes in SoMCI as a function of training demonstrated one significant difference pre-intervention for affection. WLC mothers displayed nearly twice as much affection as PT or PC&S mothers. Post-intervention, two significant differences existed for affection and joint play, as PT mothers displayed the most affection, and played the longest with their children. Both of these differences persisted even when pre-intervention scores were controlled for.

Changes in SoSCP demonstrated one significant difference between the groups pre-intervention, for fidgeting, as PC&S children fidgeted almost twice as much as children in the other two groups. Post intervention one significant difference also existed for engagement, as PT children displayed higher levels of engagement than children in the two other groups. This difference persisted even when time one scores were controlled for.

While no characteristic pattern emerged for clinically significant change in the PT group, change for PC&S group occurred for children with lower levels of AD/HD who had mothers who were warmer, less negative, less directive and more expansive in their play style and who represented higher SES groups. The differences on SES found on this research agree with McCauley (1982) who discovered that children with aggressive behaviour who came from middle class backgrounds benefited more from

PT compared with children from lower class backgrounds. The differences on warmth and negative evaluations of behaviour concur with Richman, Stevenson & Graham (1982) who reported that maternal expression of criticism, hostility and the absence of warmth were all associated with child behavioural disturbance in non referred pre-school children. Differences for expansion and direction relate to findings from Johnston & Mash (1982) who reported that mothers of AD/HD children were more directive and less responsive in their play than were mothers of non AD/HD children. Similar findings from Campbell (1986) demonstrated that mothers of AD/HD children used less appropriate forms of direction than did mothers of non AD/HD children. The indication from this research is that children who improved in the PC&S group had mothers whose behaviour was more similar to the behaviour of mothers of NAD/HD children.. Differences for severity of child behaviour, support previous findings from Ruma *et al* (1996), who reported that seriousness of child behaviour problem pre-intervention was the best predictor of successful outcome on parent training.

#### **5.2.5: Predictors of the effects of intervention**

Examination of the interaction of SoPreSS and clinical significant change scores for PT and PC&S aimed to examine the importance of EE in determining outcome. Significant change was calculated using PACS scores, the clinical significant change group represented all those cases whose PACS HYP scores at outcome were closer to the mean of the NAD/HD than the AD/HD group at baseline. Outcome demonstrated that mothers in the PC&S group whose children's behaviour improved to a clinically significant degree had the highest warmth, and second lowest NEB of the four groups. A similar pattern emerged with an examination of the interaction of child behaviour

scores and outcome, as again the PC&S group whose children's behaviour changed to a clinically significant degree, reported the lowest levels of AD/HD symptoms of the four groups. In relation to maternal adjustment these same PC&S mothers reported the least negative feelings about the impact of their child on the family, and represented the highest socio-economic groups. In relation to SoMCI these same mothers used the most expansion during play and the least direction of the four groups. Clinical significant change at outcome for the PC&S group was consistently related to children with lower levels of AD/HD problems and mothers with less adjustment problems, higher SES and a more positive play style. An examination of significant predictors of outcome for both groups indicated no significant predictors for the PT group. However for the PC&S group outcome was determined primarily by the presence of problems with child's emotional adjustment and mother's expansions during play and the absence of AD/HD symptoms, maternal direction and NEB. In short PC&S promoted successful outcome only for the children who had elevated problems with emotional adjustment, fewer reported symptoms of AD/HD, mothers who were more expansive and less directive in their play interactions and who used fewer NEB.

These research findings do not concur with Webster-Stratton (1985) and Webster-Stratton & Hammond (1990) who examined predictors of outcome for parent training for conduct disordered children. Socio-economic status and negative life stress in their studies were both significant predictors of outcome. The results suggest that completely different processes underline outcome for PT in families of AD/HD children.. Taylor *et al* (1987) reported that a good response to medication was

predicted by higher levels of inattentive and restless behaviour, impaired performance on tests of attention, clumsiness, and by the absence of symptoms of overt emotional disorder in boys with disruptive behaviour. In essence the results of Taylor *et al* (1987) suggested that increased symptom severity predicted increased response to medication, whereas these results suggest increased symptom severity predict decreased response on a psychological intervention (PC&S).

### **5.2.6: Pre-school AD/HD**

The data from this research will illuminate the debate about the of pre-school AD/HD and issues of co-morbidity. Pre-school children recruited for this study on the basis of their AD/HD symptoms demonstrated considerable deficits in concentration and engagement. Their mothers also demonstrated significant differences in their levels of EE, maternal adjustment and interactional style during play. For children in this study, a research diagnosis of pre-school AD/HD identified more than just a child with concentration deficits, more a whole set of child and familiar characteristics which differed from the expected norm.

### **5.2.7: Relationship between parental EE and AD/HD**

An examination of the relationship between EE and AD/HD symptoms within this intervention study might help to answer questions of causality. Does high EE lead to the development of AD/HD or is high EE a result of AD/HD symptoms? The results of NFPTS have demonstrated significant changes in child AD/HD symptoms with an advantage of PT over PC&S and WLC. Similar analyses for SoPreSS and SoMCI have demonstrated less dramatic effects. Intervention resulted in some changes in

parental characteristics with an advantage of PT over PC&S and WLC for NEB , AFFECT and JPLY. Parents in the PT group expressed fewer NEB's during SoPreSS and demonstrated greater affection and more joint play during SoMCI. An interpretation of these results might suggest that evaluations of behaviour are a reaction to the child's symptoms, while GEE represents a construct more internal to the parent.

Results from a longitudinal study on AD/HD suggest a pathway where EE is a causal factor in the development of AD/HD and conduct problems.(Taylor, Chadwick, Hepinstall & Danckaerts 1996). Parental EE, especially low warmth and hostility predicted the course of AD/HD, as well as the extent that AD/HD children would develop conduct problems between ages seven and sixteen. This only predicted the course and not the cause of AD/HD however Taylor *et al* (1996) argue that the independently predictive significance of critical EE implies that is not acting merely as a marker to the presence of behavioural disturbance in the child. Instead they claim that once EE has appeared it may be responsible for determining the outcome. The results of this study offer partial support to Taylor *et al*'s findings as with the exception of NEB changes in Child behaviour were not accompanied by changes in maternal EE.

If intervention resulted in changes in AD/HD symptoms but not GEE, then this suggests some possible models of influence on the aetiology of AD/HD. If AD/HD is the result of genetic and environmental causes then perhaps a genetic predisposition to AD/HD results in the development of AD/HD in high EE environments. The results



of this study therefore suggest that PT and to a lesser extent PC&S acted like a pharmacological intervention in treating the symptoms rather than the cause of AD/HD. The mode of action for treatment could possibly have been that PT helped parents to help their children in controlling their AD/HD symptoms without really addressing the cause of their child's AD/HD. However these complex questions could only be addressed after a long term follow up of the sample.

### **5.3: Measures not included in the study**

When discussing the findings of this research project, it is important to consider other measures, not included in the study which may have had a bearing on the results. The research study lacked a measure of parenting stress, did not measure fathers' EE levels or their interaction style, and didn't consider the influence of parental genes on the determination of AD/HD. Each of these components will be discussed in turn.

#### **5.3.1: Parenting stress**

A wealth of literature has shown that parenting stress levels can be high among families of children with AD/HD, such stress levels are typically higher than those found among families of non AD/HD children (Anastopoulos, Guevremont, Shelton & DuPaul 1992). While it is not clear if the increased levels of parenting stress are directly related to the behaviour of the child, intuitively the increased care-taking demands associated with looking after an AD/HD child may explain the increased parenting stress levels. To claim that elevated levels of parenting stress results directly from the child's AD/HD would be an over simplification. Problems with defiance and tantrums which co-occur with the existence of AD/HD in pre-school

children also make a potent contribution to parenting stress levels (Tallmadge & Barkely 1983). Parental characteristics can also influence levels of parenting stress, previous research has highlighted depression and other forms of parental psychopathology which occur more often in AD/HD families, and negatively influence parenting stress (Lahey 1988). The higher rates of marital dysfunction in AD/HD families (Befera & Barkley 1985) have also been implicated as a causal factor for increased parenting stress in AD/HD families.

Donenberg & Baker (1993) examined levels of parenting stress in families with children who had Externalising behaviours (AD/HD or aggression), Autism, or no significant behavioural problem. Reports of parenting stress were higher for mothers in the externalising group than the no problem group and comparable with the autistic group.

Anastopolous, *et al* (1992) acknowledged that parenting stress may have originated from multiple sources, and set out to investigate whether parenting stress was related to the child's AD/HD, as well as to various other child, parent and family-environment circumstances. Child variables included aggression levels, peer relations, health status, education status as well as demographic information such as gender, age and ordinal position. Parent and family environment circumstances included maternal mental health, socio-economic status, psycho-social stress, maternal demographics such as age number of years of formal education and job status, as well as family demographics such as number of children in the family, mothers current marital status, and mothers relationship with biological father. Results

of a series of stepwise regressions demonstrated that both the severity of the child's AD/HD and oppositional defiant behaviour, and levels of maternal psychopathology were significant predictors of parenting stress.

Parenting stress has been considered as a predictor of outcome following parent training. Webster-Stratton (1990) reported that negative life stress since intervention was a significant predictor of outcome one year post intervention. Campbell & Ewing (1990) examined the predictors of continuing symptoms for hard-to-manage pre-schoolers. Results demonstrated that children with externalising behaviours at three, and especially those whose problems remained clinically significant at six were more likely to have behavioural problems at age nine. Severity of child behaviour, and family stress predicted the child's current symptoms. While the association between AD/HD and parenting stress can be clearly seen, the utility of parenting stress as a predictor of outcome is less clear.

Parenting stress has been used as a predictor of outcome with conduct disordered and hard-to-manage children. However it has not been examined with a severe pre-school AD/HD group. Rostain, Power & Atkins (1993) assessed parents willingness to pursue treatment for their children with AD/HD. Their results demonstrated that family factors such as socio-economic status, parenting stress and family coping style did not predict parental willingness to pursue treatment for AD/HD. The finding that parenting stress did not predict willingness to pursue treatment may suggest that it would also not influence outcome after treatment. However this issue would need to be examined with an AD/HD sample in a controlled study.

### **5.3.2: Paternal EE**

The lack of paternal measures of EE means that this study is based on a partial measure of family climate. While SoPreSS would have been suitable for paternal as well as maternal EE, it would have proved almost impossible to collect EE samples from fathers, because most fathers were not at home during the time of data collection. The assessment of EE in different interview situations has been examined by Brown & Rutter (1966), who found that interviewing an adult alone or with their spouse showed considerable stability. Lenior, Dingemans & Linszen (1997) used the FMSS to examine EE in mothers and fathers of adolescent schizophrenics. Their results showed no significant correlations between mothers and fathers EE status on the FMSS, and led them to conclude that EE scores for mothers and fathers were independent of each other.

### **5.3.3: Paternal interaction**

As with EE, this study is also based on a partial measure of parental interaction as only mothers were included. While SoMCI would have been a suitable measure to use with fathers, most fathers were not available during the times data was being collected. Results from Tallmadge & Barkley (1983) suggest that few differences existed between mothers and fathers in terms of their interaction style when at play with their AD/HD child. However while few actual differences existed, AD/HD children were significantly more compliant when in interaction with their fathers than when in interaction with their mothers.

### **5.3.4: Genetic influence on AD/HD**

A discussion on the role of genetic mechanisms underlying the expression of AD/HD, could help to explain some of the surprising results of this research. Plomin (1990) stated that inheritance played a major role in selection as shown by twin and adoption studies in humans. Unlike simple genetic characteristics, the genetic variance associated with behavioural disorders such as AD/HD rarely accounts for more than 50 percent of the variance in the phenotype. Multiple genes with small effects rather than single genes appear to be responsible for most of the variance. This means that an examination of both genetic and environmental effects are necessary before a complete understanding of AD/HD can be gained.

Two genes associated with dopamine function, the D4 dopamine receptor, DRD4 and the dopamine transporter DAT1 have been implicated in AD/HD. Research has focused on these genes because of results from drug response, animal model and functional neuro-imaging studies which have suggested an important role for dopamine transmission in AD/HD. Specifically La Hoste *et al* (1996) found that AD/HD children were more likely than controls to have a 7 or 8 repeat variant of A DRD4 allele. Despite these exciting findings several non replications of this findings have been reported (Rowe *et al.*, 1998).

The genetic component in liability to AD/HD is best assessed through twin studies which allow researchers to differentiate the effect of nature and nurture in a way which is just not possible in family studies. Stevenson (1992) discussed the two different heritability estimates which are produced from twin studies. An individual

differences heritability estimate refers to the extent to which genetic factors contribute to normal variation in a continuous trait. The group heritability estimate is calculated from the mean differences between groups and refers to the heritability of an extreme group membership, such as children who meet diagnostic criteria for disorders. Early twin studies by Goodman & Stevenson (1989) obtained parent and teacher ratings on the Rutter questionnaire as a measure of AD/HD. Heritability estimates ranged from 54 percent to over 100 percent, which indicated that over half of the variance in ratings of AD/HD could be accounted for by genetic factors.

If a strong genetic influence on AD/HD exists, it might be argued that there is little validity in using psycho-social intervention to try and moderate its developmental course. Rutter & Plomin (1997) argue against this idea, and point out that even a heritability estimate as high as 90 percent carries no implications that environmental effects will not bring about changes. Rutter & Plomin (1997) cite height as an example which carries a heritability of about 90 percent but where there has also been a large increase in height during this century, predominantly due to improvements in nutrition. However due to the complex interaction of genetic and environmental influences on AD/HD (a discussion of which is beyond the scope of this document), genetics may help to explain differences in response to and outcome for psycho-social interventions for AD/HD.

Twin and adoption studies have both demonstrated how individual and group heritability estimates can be calculated for specific groups. In the absence of twin or adoptive data, genetic effects for AD/HD could only be examined at the phenotypic

level. This would involve an examination of the existence of AD/HD in parents and close family members of children from the NFPTS. Results of family studies do suggest that AD/HD is a highly familial condition (Thapar, Holmes, Poulton & Harrington 1999). Biederman, Faraone, Keenan, Knee & Tsuang (1990) discovered increased rates of AD/HD and anti-social problems in the first degree relatives of children diagnosed with AD/HD. Similar results were reported by Faraone, (1995). Studies by Mc Guffin *et al* (1994) have demonstrated that full siblings of AD/HD children show higher rates of AD/HD than do half siblings. However Rutter, Silberg, Simonoff & O'Connor (1999) are cautious about the interpretation of genetic effects from family studies as these studies cannot adequately differentiate genetic and environmental influences. Despite the limitations of family genetic studies including problems with the definition of the phenotype (Rutter *et al*, 1999), an examination of genetic effects at the phenotypic level for this study might help to explain some of the findings. For example, genetic influences might be the hidden predictor of outcome for the PT group. If PT (NC) had more relatives with AD/HD problems than PT (C), then perhaps level of genetic influence on the phenotype influenced response to treatment. A simple measure of maternal ADD was collected during this research, and the results of this are far from clear. Mothers in the PT (C) group had the lowest levels of self reported ADD, supporting the hypothesis of a genetic influence on outcome. However mothers in the PC&S (C) group had the highest level of self reported ADD. Conversely health visitors judgements about whether mothers displayed behavioural signs of ADD rated PT (C) mothers as being slightly more likely to be ADD than PT (NC), while PC&S (C) and (NC) were rated as being almost

equally likely to be ADD. However it is worthwhile Bearing in mind Rutter *et al*'s, (1999) warning about careful definition of the phenotype.

As well as considering the genetic influences on AD/HD, evidence now exists which suggests a genetic influence on family environment. Deater-Deckard, Fulker & Plomin (1999) examined estimates of genetic and environmental components of variance in parent and child reported measures of their family environment. Family environment was assessed using a modified version of the Family Environment Scale (FES), which assessed family cohesion, expressiveness, conflict, achievement orientation and control. Parents and children completed the FES when the child was aged 10, 11 and 12 year old. Individual heritability estimates of between 26 and 38 percent existed for parent-reported negativity and warmth. More substantial heritability estimates of 52 percent were found for child-reported low achievement orientation. In contrast negligible genetic variation existed for parent-reported inconsistent discipline and child reported positivity. Deater-Deckard *et al* (1999) claimed that the results of their study corroborated with the findings of a number of twin studies showing evidence for genetic influences on measures of family environment. With evidence to suggest a genetic influence on family environment, it is plausible to consider similar genetic influence on EE.

#### **5.4: Future research**

As with all research the result of this study is more questions than answers. The results of this research reveal the need for further examination of issues related to



AD/HD, parents based intervention, EE and mother-child interaction in a number of domains.

#### **5.4.1: Predictors of outcome for PT**

The absence of significant predictors of outcome for the PT group remains an issue which would require future research. As discussed previously in this chapter, perhaps a measure of parenting stress would have been illuminating in explaining why some children's behaviour changed while others didn't. During the course of this study a wide range of measures of child behaviour, maternal adjustment and interaction have been examined. However characteristics of the therapist have not been examined, and perhaps they might prove interesting in explaining clinical significant change in the PT group. It may just be that information about slight differences in approach to training, or the amount of effort put into the training sessions might proved predictive of outcome. A replication of NFPTS is currently being conducted which includes a qualitative examination of issues surrounding parent training from both the parents' and therapists perspective. Unfortunately the results of this study are not yet analysed.

#### **5.4.2: Long term outcome**

The short term benefits of parent training have been clearly demonstrated by the results of the NFPTS. However any clinical intervention must produce positive changes which are maintained over a reasonable period of time. Several studies have demonstrated that behavioural changes in children were maintained over periods ranging from two months to six months. (Pisterman *et al* 1992, Ialongo *et al* 1993). For ethical reasons, control groups are usually offered treatment immediately

following the post-assessment period of the experimental group, and therefore the long term advantages of parent training over other forms of intervention or no treatment have never been clearly established. The effectiveness of the parent training package used in the NFPTS cannot be assumed to hold in the long term. Parents in the PC&S and WLC were offered PT once the study was concluded and most families accepted. It would be impossible to evaluate the long term efficacy of PT without controlling for the amount of contact with health services during the intervening years.

Any proposed investigation would have to

(i) To assess the long term effectiveness of a parent training package used during the New Forest Parent Training Study (NFPTS), delivered to mothers of pre-school hyperactive children between 1995 and 1997. The assessment will focus on children's behaviour at home and school, mothers mental health, sense of competence and parenting stress levels and the amount of contact with health care professions sought as a result of their child's behaviour.

(ii) To establish the additive savings associated with early intervention for pre-school hyperactive children.. This will involve establishing the cost of childhood behaviour problems in groups of children with similar levels of activity problems at three whose parents received or didn't receive early intervention training on the NFPTS.

(iii) Assess the cost of AD/HD.

Assessment of the costs of hyperactivity for both groups would have to be calculated following the guidelines set out by Netten, Dennett & Knight (1999) in their manual on the unit cost of health and social care. This manual would allow the calculation of the cost of each groups school attendance, use of health, educational and social services. Similar work is already in progress on calculating the cost of anti-social behaviour in children with conduct problems, Scott & Henderson (1998).

#### **5.4.3: Examination of fathers**

Due to the difficulty of collecting measures from fathers who work outside the home, most studies (including this one) have excluded them from their analysis. However most fathers do play a considerable role in the rearing of their child. Future studies into predictors of outcome for parent based intervention must include assessment measures of paternal characteristics. It is easy to imagine that these uncharted paternal characteristics play both a protective and destructive role in the efficacy of any parent based intervention.

#### **5.4.4: Psychometric properties of SoPreSS**

During the course of this research considerable effort has been made to examine the psychometric properties of SoPreSS. However further studies are necessary to fully evaluate these properties. One simple study would be to examine the similarity of SoPreSS scores and CFI scores for a group of parents with young AD/HD children. This would indicate how well SoPreSS was at evaluating EE in parents. A second simple study would be to conduct a content analysis on baseline SoPreSS scores from

NFPTS. It would be interesting to examine exactly what parents said during the speech sample, about themselves and their child. This would also act as further validation of the categories in SoPreSS.

#### **5.4.5: Genetic family study of children in NFPTS**

As mention previously, the only suitable method from examining genetic influence on the results of this study, would be through a family study on the incidence of AD/HD among relatives of children on NFPTS. While the problem with family studies is that the design cannot differentiate genetic from environmental transmission. However with some measures representing shared environment (SES for example) and others representing the unshared environment (SoPreSS for example), a family study of transmission would be informative about potential genetic influences.

#### **5.5: Concluding remark**

The findings of this study failed to identify significant predictors of outcome for PT. However new and interesting measures of EE and mother-child interaction have been developed. The advantage of PT over PC&S has been reinforced by the findings that significant outcome for PT was independent of child and maternal factors such as temperament, maternal interactional style, severity of symptoms or expressed emotion status.

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## Appendix i

### SoPreSS instructions to parents

“I would like to hear your thoughts and feelings about **[insert child’s name]** in your own words without me interrupting with any questions and comments. When I ask you to begin, I would like you to speak for five minutes. Tell me what sort of child **[insert child’s name]** is and how the two of you get along together. During the five minutes I would prefer if there were no other interruptions for questions, but do you have any questions before we begin?”

*Once any questions had been answered*

“ I would now like you to relax, collect your thoughts and start when ever you feel that you are ready”

## Appendix ii

### SoPreSS coding manual

#### 1) Initial Statement: Based on content

Positive:

Negative:

Neutral:

This is the very first statement the mother makes about the child, along the lines of Johnny is a ..... . It must be a statement in the present tense, which relates to some component about the child.

E.g. He is very loving, Johnny is a difficult child, Jack is a very active child, katie has a great sense of humour.

A positive rating is made when both the content and tone is positive.

A negative rating is made when both the content and tone is negative

A neutral rating is made when it is impossible to make another rating, i.e. ambiguity.

It is possible for the rating of the initial statement to be contradicted later in the speech sample, e.g. it is possible for a mother to make a positive initial statement and yet receive a negative rating for relationship, warmth etc.

#### 2) Statement of Relationship:

When the mother talks about their relationship what sort of statements does she make.

i.e. "We get on well together" or " She makes me laugh"

When the mother doesn't specifically talk about their relationship what does she say about the joint activities they engage in. In this section it is important to look for some description of joint activity and some indication that the mother enjoys the joint activity

i.e. Catherine loves to help me in the kitchen; I enjoy it when she tries to help me bake

or She's always in my way when I'm trying to get the dinner, I will give her some vegetables to peel so that she can help but it's always more trouble than it's worth.

When the relationship isn't addressed a neutral rating is assigned it is safe to do this because initial instructions to the mother ask for information about their relationship.

#### 3) Emotional Over Involvement:

i.e. over protective behaviours

This is rated high moderate or low but does not exist with in most of the data. There is plenty of evidence of parental concern because their children won't go to play

school or won't mix or are frightened of strangers etc. but few parents exhibit over protective behaviours.

#### 4) Warmth:

A) Tone: This is crucial to a rating of warmth, Warm tone is like pornography no body can define it but everyone knows it when they see it!.

B) Spontaneity: In this context this is when a mother mentions a particular child trait, which in turn acts as a memory cue for a whole series of connected statements

e.g.: She likes drawing, she's always bringing me home pictures from playschool, in fact last week she drew me this picture of a castle, it was very well drawn, I was very proud of her, so we stuck it up in prime location in the kitchen, and I've been showing it to everyone who has called.

This contrasts with a mother who just lists the child's likes and dislikes and then runs out of things to say.

Alternative Evidence

A) Sympathy: I know she likes watching video's but she just can't seem to keep still long enough to watch them, it must be terrible wanting to do something but not being able to.

B) Concern or Empathy: It is possible to combine evidence of concern into a rating of warmth, usually this will be concern for the child when they go to school, as this is the next important milestone for these children.

C) laughing : Do not attach any relevance to mothers laughing in general, only when the laugh has been promoted by some positive statement about the child. Be careful to distinguish this from nervous laughter.

Do not code for

A) Warmth of respondents personality

B) Comparisons with warmth shown towards others

C) Depression

D) Criticism or Hostility

E) Stereotyped Endearments such as "pet"

#### 5) Positive evaluations of behaviour

This is a statement of praise, approval or appreciation. The majority of these will be descriptive words which indicate a positive trait which the child processes e.g. intelligent, loving, mature, generous, sociable, creative. Tone must be attended to as it is possible that all these words could be used in a sarcastic way. Also some mothers with poor vocabulary may choose to talk around these issues rather than use descriptive work. Care must be taken in inferring a positive remark for a piece of



descriptive text. Also included are descriptions of the child's positive behaviour such as he's so helpful, he's so grown up now,

Only code once for each positive remark, e.g. he's a very sociable child, always very sociable with other children. This would count as one positive remark.

More than one positive remark can be counted if a different word is used e.g. She's very intelligent, She's a bright child. This would count as two positive remarks.

Coded by frequency count defined by context

Do not rate

- A) Any Praise coined in the negative
- B) Qualified Comments i.e. " Pretty Good"
- C) Statements made in the past tense

## **6) Negative evaluations of behaviour**

- 1) Critical Comments
- 2) Dissatisfaction
- 3) Annoyance/personal distress.

Within the Speech Sample it is unlikely that mothers will actually display criticism, but negative comments about the child are more likely to occur. Like positive evaluations of behaviour, negative evaluations of behaviour are mostly descriptive words relating to negative attributes of the child. E.g. Horrible little girl, nightmare in the supermarket, is such hard work, Janes abusive, is argumentative. Also included in this category are just descriptions of the child's behaviour if they are negative behaviours e.g. spits at me, throws his food.

Tone is as always important, to be a negative remark it should be said in a negative tone. Also as with negative remarks, there is a difference between repeated remarks which are scored once and remarks which are related but different and so are each scored.

**Appendix iii**  
**SoPreSS coding sheet**

<b>Participant</b>	<b>Code</b>	<b>Notes</b>
IS	P	
	NL	
	N	
WTH	H:	
	M	
	L	
EOI	H	
	M	
	L	
REL	P	
	NL	
	N	
NEB	Frequency:	
PEB	Frequency:	

## Appendix iv

### Southampton solo-child play coding system SoSCP

#### *Switching:*

- 1) Ramp: this includes all of the ramp, including the clowns mouth, except for when the child plays with the clowns mouth without playing with the ramp first.
- 2) Ferris wheel: Includes steps to reach wheel
- 3) Planes: includes steps.
- 4) Floor: This includes visit to shops, including all floor bases behaviours no directed at returning cars, people to the toy.
- 5) Other behaviours: This is where the child is judged to be off task or engaging in tasks which may be considered on task but do not involve interacting with components of the toy. e.g. fixing toy etc.

#### *On task*

- 1) Playing with toy as it was designed to be played with including: fixing toy, removing Ferris Wheel to reveal slide, incorporating other toys.

#### *Off Task*

- 1) Looking away, not playing with toy, destroying toy, tidying toy away, playing with other toys, sitting on sofa etc.

#### *Fidgeting*

- 1) Body: Playing with hair, picking nose, feet, touching skin, taking off clothes.
- 2) Object: Fidgeting with toys, clothes once taken off, pieces of furniture.
- 3) Squirming: Wriggling around on floor, tapping feet, moving body as if the child can't get comfortable.

## Appendix v

### Southampton mother-child interaction coding manual SoMCI.

#### **i) Challenge**

Includes any challenging behaviour exhibited by the child. This includes both physical and verbal forms of defiance, non-compliance, aggression, taunting, screaming. It can be independent or in response to an action by the mother.

#### **ii) Expansion**

A question or comment which expands on play, i.e. introduces something new which is not already present in play. Does not include switching to a part of the toy that has not been used before.

#### **iii) Praise**

A comment of praise spoken by the mother and aimed at the child. Care must be taken to distinguish between praise aimed at the child and praise aimed at the toy. If the mother repeats the comment then it is coded again.

e.g. “well done”  
“That was good”  
“That’s right”  
“yes, good girl”

Not “Isn’t it clever” when talking about a component of the toy

#### **iv) Affection**

Episodes of physical affection such as cuddles, or play fighting, tactile displays of affection, or verbal episodes such as joint laughter or other obvious expressions of affection. Tone of voice is very important and must be positive. Affection may also be expressed in the tone of voice used when making other comments but since this is subjective it is not included in this category.

#### **v) Direction**

Any direct command given to the child, in a negative tone of voice. The mother is attempting to forcibly control the direction of play or the actions of the child. The command must specify something the child has to do.

e.g. “Come around here”  
“Now put that back properly”  
“Give me a reason”  
“Go and get that man”

#### **vi) Critical comments**

A comment made by the mother which is critical of the child or something the child has done. Care must be taken to make sure the comment is directed towards the child and not the toy

e.g. “That wasn’t very good”

#### **vii) Joint play**

The amount of time the mother spends engaged in the same activity as her child. This involves verbal involvement such as questions, suggestions, and comments about play as well as physical displays of play with the child. This is the default category and is therefore active at the beginning of the session.

#### **viii) Separate play**

Mother and child play simultaneously, but separately. For example mother and child play with different parts of the toy. This includes coding any switch made by the mother that is not followed by the child as an episode of separate play. The coding key should be activated as soon as it is clear that the child has not followed the mother to give an accurate duration count.

## Appendix vi

### Description and results for the New Forest Parent Training Study.

Parent Based Therapies for Attention Deficit/Hyperactivity Disorder; A Randomised  
Controlled Trial

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## Summary

Introduction Attention Deficit/Hyperactivity Disorder (AD/HD) is a disabling disorder of childhood with a substantial genetic component and poor prognosis. The treatment of first choice is psycho stimulant medication. Despite evidence of its efficacy many parents and professionals are uneasy about the use of medication to control children's behaviour. Unfortunately, the evidence for the efficacy of alternative psycho-social interventions, with school aged children, has not been convincing. Early intervention should maximise the effectiveness of non-pharmacological therapies for AD/HD. The present study evaluated two parent based psycho-social therapies for AD/HD displayed in the pre-school years.

Method 76 three year old children with AD/HD selected from a population sample (N=3051) entered the trial following a rigorous three-stage screening procedure. Children were randomly assigned to either a parent training (PT), a parent counselling and support (PC&S) or a waiting list group (WLC). Both treatment groups received 8 one hour weekly therapy sessions. The PT group received coaching in child management techniques and attention training. The PC&S group received non-directive support and counselling. Measures of child symptoms and mothers' sense of well-being were taken before and after intervention and at 15 weeks follow up.

Findings AD/HD symptoms were reduced in the PT group compared to both PC&S and WLC by a clinically significant degree. Symptoms of conduct problems also decreased significantly with this treatment. Both PT and PC&S had a beneficial effect on mothers sense of well-being. However, these effects were short lived and had disappeared by follow-up.

Interpretation This study provides evidence for the clinical value of PT in the treatment of pre-school AD/HD children. Furthermore PT and PC&S had a

positive impact on mothers' sense of well-being. PC&S had little effect on children's behaviour. Improved maternal functioning, although desirable, is not a sufficient basis for therapeutic effects of the intervention on the children's behaviour. Constructive training of parenting strategies seems a necessary condition for the success of parenting interventions.

### **Introduction**

Attention Deficit/Hyperactivity Disorder <sup>1</sup> is a disorder of childhood and adolescence characterised by a pattern of extreme, pervasive, persistent and debilitating inattention, overactivity and impulsiveness. It is associated with educational under achievement, social isolation and anti-social behaviour during the school years<sup>2</sup>. Psychiatric disorder, criminal activity and substance abuse are all common in the post school years<sup>3,4</sup>. Psycho stimulants (e.g. Methylphenidate, dextroamphetamine) are the preferred treatment for this disorder. Double blind placebo controlled trials have shown beneficial effects on school performance, social skills and interaction, as well as on behavioural symptoms<sup>5,6</sup>. Despite this evidence many parents and professionals are uneasy about this approach to treatment. There is concern about side effects<sup>7</sup> and lack of evidence for its long term effectiveness. There are also ethical or political objections to the use of medication to modify children's behaviour and intellectual style<sup>8,9</sup>. Finally it is argued that medication needs to be complemented by psychological interventions if the short-term improvements in behaviour are to persist into the long term and improve eventual outcome<sup>10</sup>.

Unfortunately, given these concerns, the evidence for an effective contribution of psycho-social approaches to the treatment of AD/HD is somewhat limited<sup>11</sup>. In the recent large scale NIMH Multi-modal, multi-centre study of treatment<sup>12</sup> for AD/HD even an intensive psycho-social programme extended over a period of 18 months had little value when compared to methylphenidate.



Further this package added little to psycho stimulant medication in a combined treatment condition<sup>13</sup>.

Given the genetic basis of AD/HD this pattern of results is perhaps not surprising. On the other hand most studies of psycho-social intervention in AD/HD have been limited to school aged children. In this age group AD/HD symptoms have usually become compounded by a range of complications associated with school failure and social exclusion<sup>14</sup>. Thus by this time the disorder may have become particularly resistant to psychological approaches. For this reason the pre-school years may offer a better opportunity to intervene in order to modify the condition before the downward spiral has been established<sup>15</sup>. In pre-school the most appropriate vehicle for intervention is the parent. Two approaches seem to be currently popular, parent training (PT) and parent counselling and support (PC&S)<sup>16</sup>. In PT parents are given behavioural strategies to modify their children's behaviour and re-establish positive relationships within the family. In PC&S parents have the opportunity to reflect on the parenting process in a supportive and non-threatening setting. PT has the strongest empirical support as a treatment for childhood behaviour problems. There have been a number of randomised controlled trials of parent training in AD/HD<sup>17-20</sup>. Of these those with pre-school children have been most successful<sup>15</sup>. However, these studies do not establish clinically significant change on key outcome variables either because of design weaknesses (e.g. no waiting list group) or small effect sizes. The present paper reports a randomised controlled trial of PT and PC&S with three-year-old AD/HD children selected on clinical measures from a full population sample.

## **Patients & Methods**

### **Subjects**

76 three year old children entered the trial. They were identified at their three year developmental check from a population of 3051 children born between

January 1992 to September 1993. There was a three-stage screening procedure. All children who scored more than 20 on the Werry-Wiess-Peters Activity Scale<sup>21</sup> (N=286) were included in an initial sample. Those who had parents who regarded their children's condition as being serious enough to warrant clinical intervention (N=105) and who met clinical cut-offs on the Parental Account of Childhood Symptoms<sup>22</sup> (PACS) AD/HD scale (N=78) were included in the trial.

### Design

The present trial used a randomised controlled design. Children who met inclusion criteria were randomly assigned to either one of the two treatment groups (PT,PC&S) or a waiting list control group (WLC). Before intervention the battery of measures was taken (T1). Measures were taken once again at week 8 (T2) when intervention was complete. The final set of measures were taken during week 23 (T3). WLC children received no contact with clinical services during the 23 weeks of the trial. No child had contact with clinical services between weeks T2 and T3. Data was collected by a psychologist independent of the health visitor therapists and unaware of group membership.

### Treatments

Both treatments consisted of a structured eight week programme involving 8 one hour weekly visits by one of two specially trained health visitor therapists. Children in either treatment group were randomly assigned to one or other health visitor. Treatment manuals are available for both interventions<sup>23</sup>.

Parent Training - Parents were educated about AD/HD and introduced to a range of behavioural strategies for increasing attention and behavioural organisation and reducing defiant and difficult behaviour. Progress was monitored on a weekly basis and there was regular revision of previously covered

issues and strategies. In order to facilitate this parents completed a behavioural diary.

Parent Counselling & Support - Parents received no training in behavioural strategies. Parents were given the opportunity to explore issues of concern to them and to discuss their feelings about their child and the impact which the child had on the family in a non-directive non-threatening environment. In order to maintain dialogue over the 8 weeks there was a programme of themes that helped the therapists structure the interactions. Once again parents completed a behavioural diary.

Treatment integrity was assessed by analysing a sample of audio-taped treatment sessions. First, a coder blind to the status of the session was asked to indicate whether it was PT or PC&S. In 96% of cases the correct designation was made. Following this the coder was asked to summarise the content of each session. These summaries were then rated against a treatment schedule. There was a high consistency between schedule and summaries.

### Outcome Measures

Measures of child behaviour and maternal well being were taken at all three time points. The primary outcome measures was AD/HD symptoms and behaviour. Both clinical interview (PACS) and direct observation of task related behaviour were employed. The PACS is a structured clinical interview which gives estimates of severity and frequency of symptoms of AD/HD and conduct/oppositional problems. The observational index of AD/HD was derived from the patterns of attention to and switching from one activity to another during independent play with a standard toy. High scores represent more attention and less switching. Two measures of maternal well-being were used. The General Health Questionnaire<sup>24</sup> (GHQ) is a 30 item scale measuring maternal mental health. The Parental Sense of Competence<sup>25</sup> (PSOC) scale is a 17 item questionnaire with two scales - efficacy and satisfaction.

## Procedure

Questionnaire measures were posted to mothers prior to assessment visits. Assessment visits at all three time points followed a standard format. Each visit began with the PACS interview and ended with the observation of the child's independent play. The interview lasted approximately one hour. The solo play took 10 minutes. During this time the child played with the 'Fisher price Fun Park' toy. This toy has a number of activity zones and the duration of attention to and rapidity of switching between these were coded. During the observational period the mother was present in the room but asked to refrain from helping her child.

## Results

Attrition was low (7 children withdrew during treatment). Drop outs were usually for personal or domestic reasons rather than dissatisfaction with treatment. Intention to treat was the basis for the inclusion of cases in the analysis and missing data at T2 or T3 was replaced by the worst score in each group. Table 1 compares the T1 scores for children in the trial with a group of non AD/HD controls selected from the same population. AD/HD children differed significantly from the control children on all outcome measures. AD/HD children had high levels of oppositional defiant symptoms themselves and mothers with worse mental health and a lower sense of parenting competence than controls.

Table 2 reports outcome as a function of treatment type. Analysis of change was based on an ANCOVA model with Treatment (PT v PC&S v WLC) as the between subject variable and T2 and T3 scores as the repeated measure. T1 score was the covariate. In this design an interaction between Treatment and Time would represent a change in the effect of Treatment between T2 and T3. One would expect such an interaction if an effect was established at T2 but disappeared by T3. Table 3 summarises the ANCOVA statistics.

There was a significant effect of Treatment on interview and direct observation measures of AD/HD symptoms. There were no effects of Time and

no interaction between Time and Treatment. In order to identify which treatment was effective post-hoc pair wise comparisons were performed by the three groups with T1 scores as a covariate. PT produced significant reductions in AD/HD (both interview and direct observation) compared with WLC and PC&S. PT also significantly reduced conduct problems relative to both PC&S and WLC. Table 4 shows the effect sizes and odds ratios for clinical significance at T3 for AD/HD symptoms. When clinical and normal distributions overlap clinical recovery is adjudged to have occurred when scores cross the clinical threshold at the mid-point between the means of the clinical and the normal populations. Only PT produced significant levels of recovery by the end of the trial.

When parental measures were introduced as dependent variables a different pattern of results emerged. There was a significant main effect of Treatment on satisfaction with greater improvement associated with PT than PC/S and with PC/S than WLC. There were also interactions between Treatment and Time on GHQ and satisfaction. In both cases improvements associated with PT and PC/S found at T2 did not persist to T3.

### **Discussion**

This study provides evidence for the clinical value of parent training in the treatment of AD/HD. In doing so it challenges the assumption that psycho-stimulant medication is a necessary component of treatment for this disorder particularly as it presents during the pre-school years. One important strength of the current results is the finding of improvement on both clinical and direct observational measures of AD/HD. Although the clinical interviewer strives for objectivity such measures inevitably include a subjective element. Without information from a second independent source it would be difficult to show that child's behaviour and not just parents' perceptions had changed following intervention.

The effects of PT were maintained for 15 weeks following treatment. This contrasts to the effects of psycho-stimulant medication which produce short lived effects on symptoms. There is little evidence for long term beneficial effects of medication on either behaviour or psychological functioning<sup>26,27</sup>. There is no way of knowing without additional data collection whether the PT package used in the present study was effective in the longer term. School entry is likely to be a particularly challenging time for these children disposed as they are to AD/HD. It is hoped that by providing a basis for more effective parenting this treatment would help both the child and the family to cope better with the transition from home to school and therefore avoid the negative cycle linking behavioural difficulty and school failure so common among children with AD/HD<sup>14</sup>.

There was little evidence for the value of PC&S in reducing AD/HD symptoms. This would suggest that while a supportive context and a willing listener are no doubt valuable aspects of parenting support they are not sufficient in themselves to produce behavioural change in an AD/HD child. Conversely, the current results should not be interpreted as implying that behavioural strategies, although necessary, are sufficient either. PT was set in a supportive context and this is probably crucial. Indeed both treatments were associated with improvements in parental well-being. Although striking the drop in GHQ scores and the increase in satisfaction were both short lived. The transient nature of these effects and the fact that they were dissociated from behaviour change in the child, suggests that they were tied closely to actual contact with the therapists and were probably due to the increased support associated with visits and the opportunity to discuss problems. The current analysis do not allow us to identify what role, if any, parental well-being plays in mediating behavioural change. However, it is clear that improvements in parental well-being are not sufficient in themselves to produce a reduction in AD/HD symptoms.

The value of the package as a primary care intervention will depend on identifying the components of the existing training which are particularly effective as well as any additional provision that might complement these. It is particularly likely, for instance, that the package would be more effective in the longer term if top-up sessions were added following the eight week programme. In addition, given the

heterogeneous nature of the disorder a considerable variation in treatment response is inevitable. A considerable minority of AD/HD children do not respond positively to psycho-stimulant medication<sup>28</sup>. In the present study just over fifty percent of subjects responded to the intervention to a clinically significant degree. It is important to explore the factors associated with a positive response to treatment in AD/HD. One possibility is that treatment response is determined by the degree to which an individual's disorder is genetically based. Parent training might be best targeted at modifying those children with a 'less genetic' form of the disorder. Finally, it will be important to show that the benefits of this package generalise from the very experienced and motivated therapists used in the present study to primary care professionals in general.

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Table 1; mean scores for AD/HD and control children on behavioural measures and maternal adjustment.

Outcome	Method	Hyp Mean	Norm Mean	F value
<u>Child</u> ADHD	PACS	20.94 (6.36)	13.25 (5.82)	1.09.81 ***
	Observation	42.64 (19.9)	97.73 (54.5)	31.08 **
Conduct	PACS	20.59 (6.36)	13.25 (5.82)	10.61 ***
<u>Mother</u> Well Being	GHQ	6.67 (7.31)	2.33 (5.05)	4.16 *
		Efficacy	21.90 (4.96)	
	Satisfaction	25.04 (5.38)	30.53 (5.82)	11.99 ***

\* =  $P < 0.05$  \*\* =  $P < 0.01$ ; \*\*\* =  $P < .001$ .

Table 2: Child behaviour and maternal adjustment scores for children in the three groups as a function of intervention.

Outcome	Method	Time 1			Time 2			Time 3		
		PT	SS	WLC	PT	SS	WLC	PT	SS	WLC
Child										
ADHD	PACS	20.50 (2.71)	21.60 (3.67)	21.33 (3.29)	15.31 (5.75)	19.11 (5.02)	20.69 (5.60)	15.2 (6.29)	17.2 (6.09)	20.23 (4.97)
	Observe	40.71 (16.7)	39.74 (20.1)	42.28 (20.8)	42.15 (10.8)	33.87 (10.7)	40.54 (19.0)	36.96 (17.6)	31.64 (11.2)	24.20 (16.1)
Conduct	PACS	20.93 (6.75)	20.86 (7.24)	17.81 (5.40)	16.96 (7.1)	18.43 (7.91)	18.80 (5.91)	16.96 (5.79)	18.43 (5.49)	18.80 (6.79)
Mother										
Wellbeing	GHQ	7.33 (8.43)	7.11 (6.56)	4.85 (6.35)	1.27 (1.82)	2.23 (3.00)	4.45 (3.72)	4.33 (5.88)	6.20 (7.32)	4.06 (4.12)
Efficacy	PSOC	21.96 (5.38)	21.07 (5.30)	24.87 (3.29)	24.88 (4.52)	22.33 (4.30)	24.27 (2.51)	23.74 (4.75)	22.68 (4.94)	21.90 (6.24)
Satisfaction	PSOC	24.00 (6.60)	25.64 (3.87)	25.96 (4.07)	30.80 (5.18)	26.99 (3.81)	24.77 (4.46)	27.10 (5.13)	26.55 (5.26)	26.25 (5.46)

Note; Figures in parentheses are standard deviations.

Table 3; Ancova statistics for measures of child behaviour and maternal adjustment.

Outcome	Method	Treat F		Treat x Time F value	Time 2	Time 3
Child ADHD	PPACS	7.49 ***	PT<PC/S&WLC	0.46	-	-
	Observe	4.39 *	PT<PC/S&WLC	2.92	-	-
Conduct	PPACS	3.38 *	PT<PC/S&WLC	1.35	-	-
Mother Wellbeing	GHQ	2.70		3.47*	PT&PC/S>WLC	NSD
Efficacy	PSOC	2.15		1.34	-	
Satisfaction	PSOC	11.59 ***	PT>PC/S>WLC	3.98 *	PT>PC/S>WLC	NSD

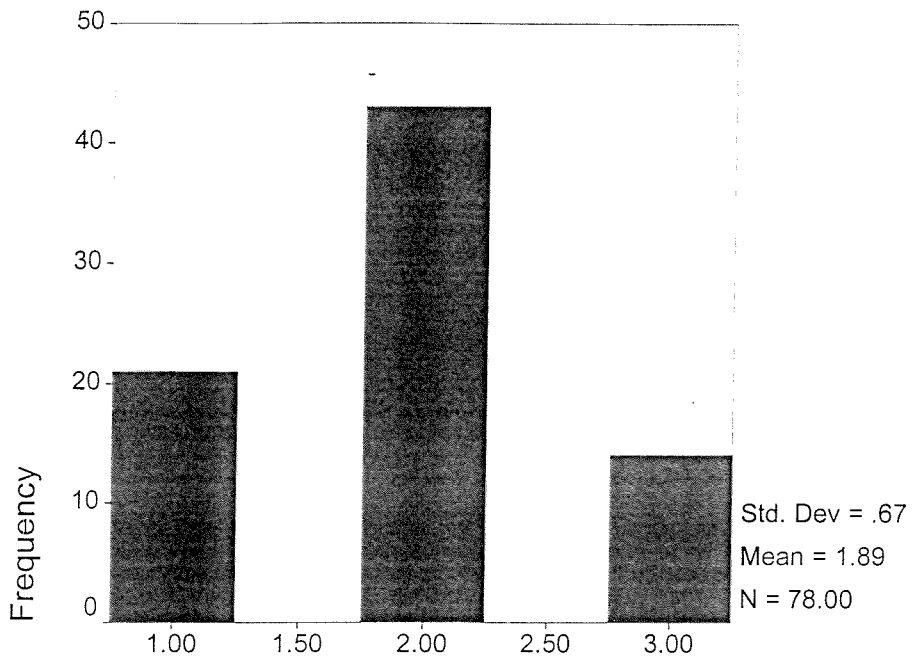
\*=P<0.05 \*\*=P<0.01 \*\*\*=P<0.001; NSD = No significant difference on pairwise comparison.

Table 4; Effect sizes and recovery rate for PT and PC&S groups.

Group	% recovered	Effect size	Odds ratios T3
PT	53	0.76	3.42
PC/S	38	0.59	1.83
WLC	n/a	n/a	n/a

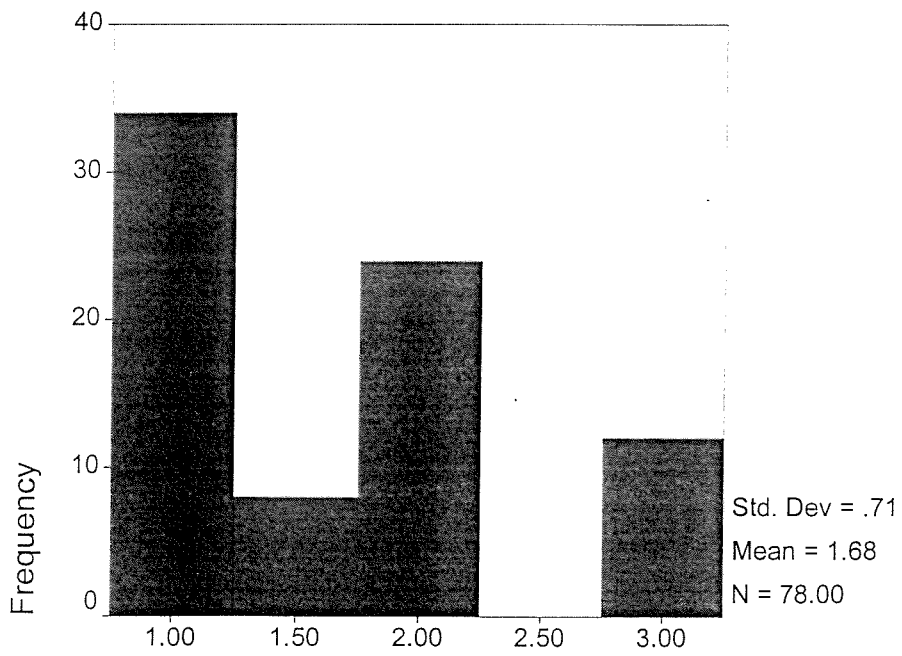
n/a = not available

### SoPreSS IS



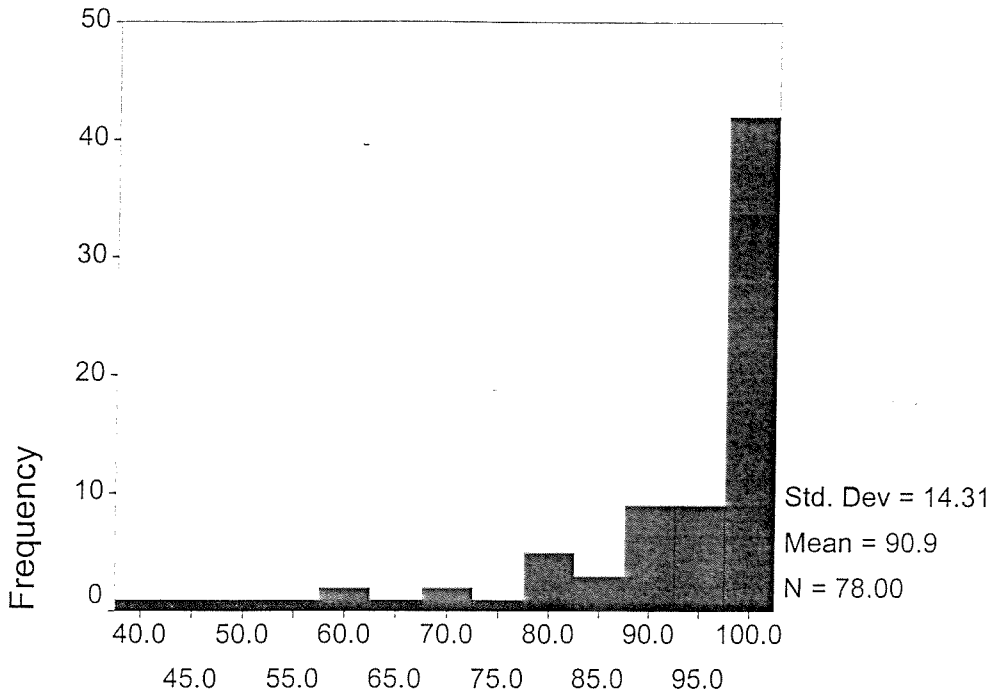
### FMSS1IS

### SoPreSS WAR



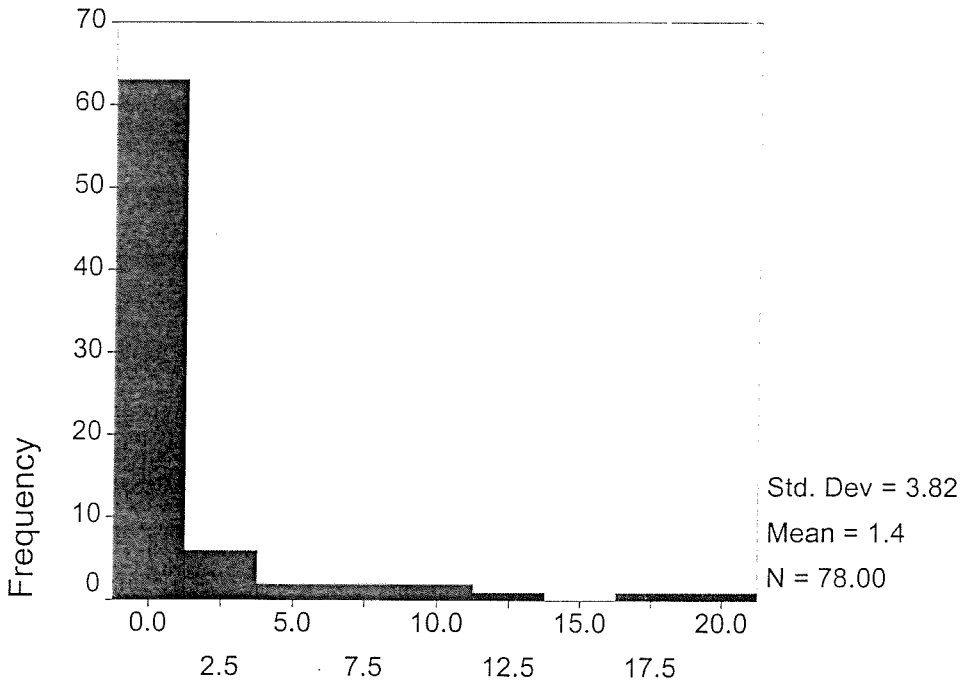
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### SoMCI JPLY



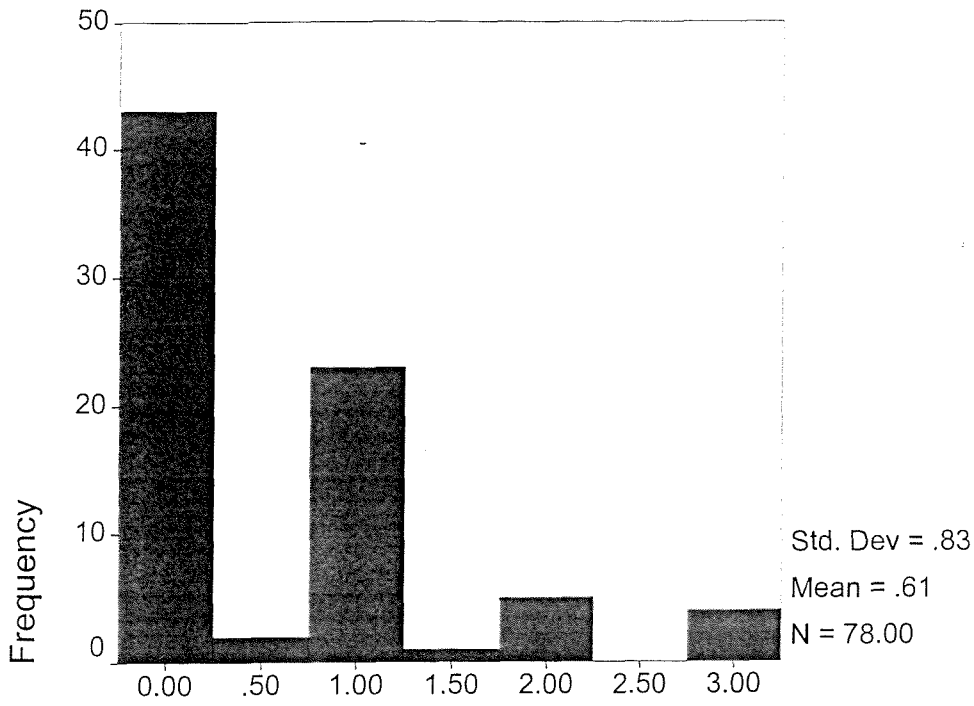
total duration of joint play as a percentage

### SoMCI SPLY



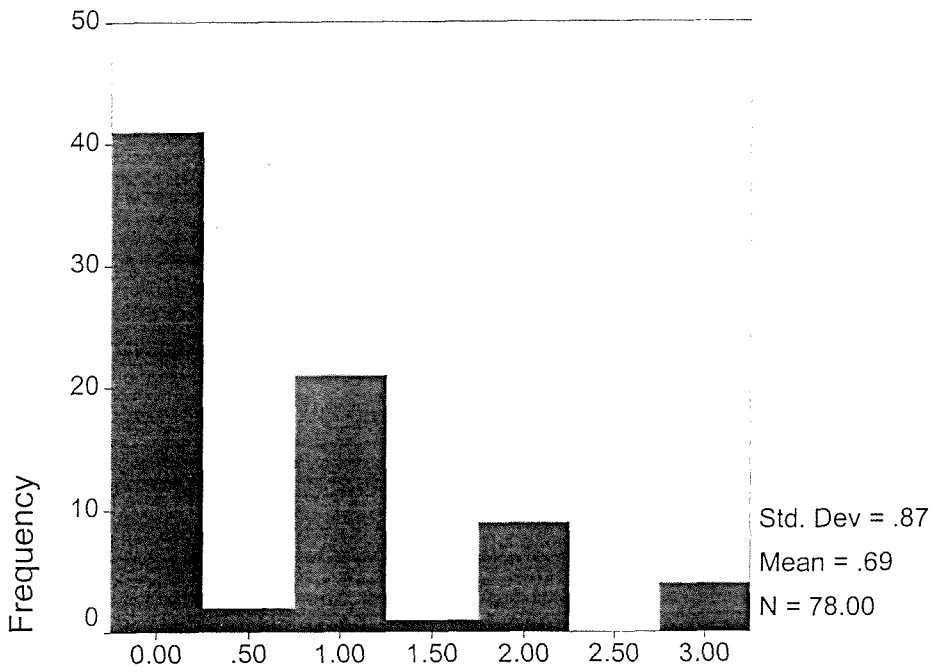
total duration of separate play as a percentage

# SoMCI PRAISE



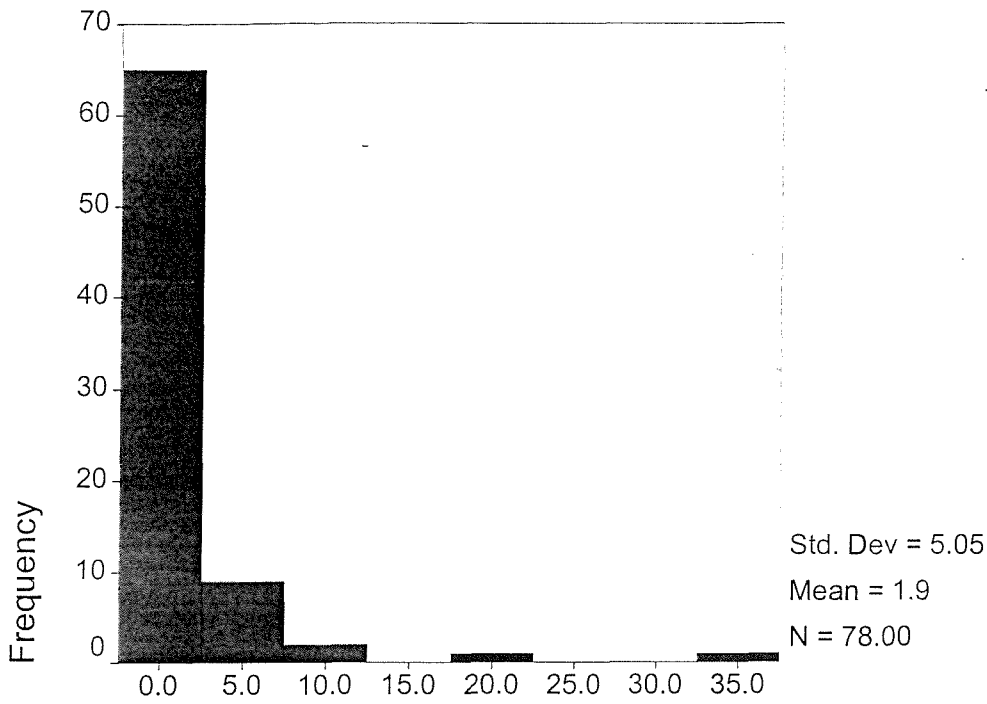
frequency: praise from mother

# SoMCI AFFECT



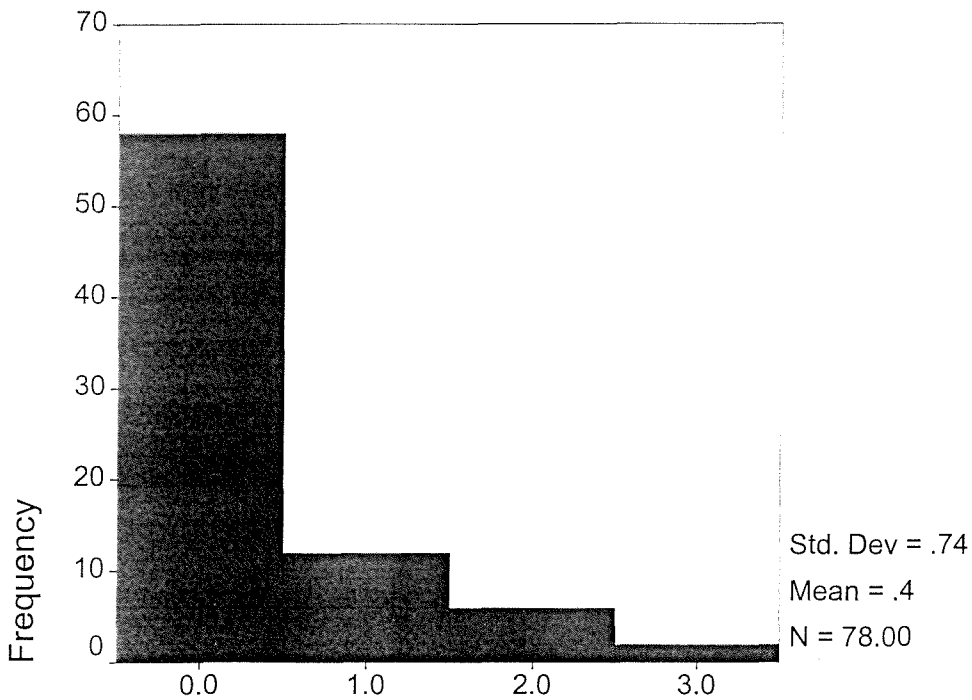
frequency : affection

## SoMCI CHALL



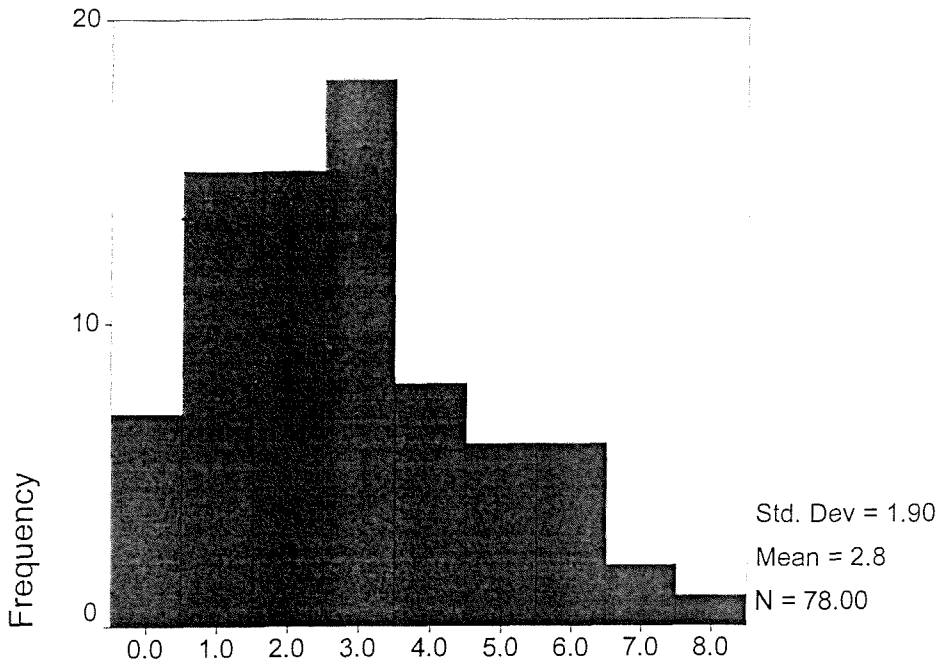
frequency : challenging behaviour by child

## SoMCI EXPANS



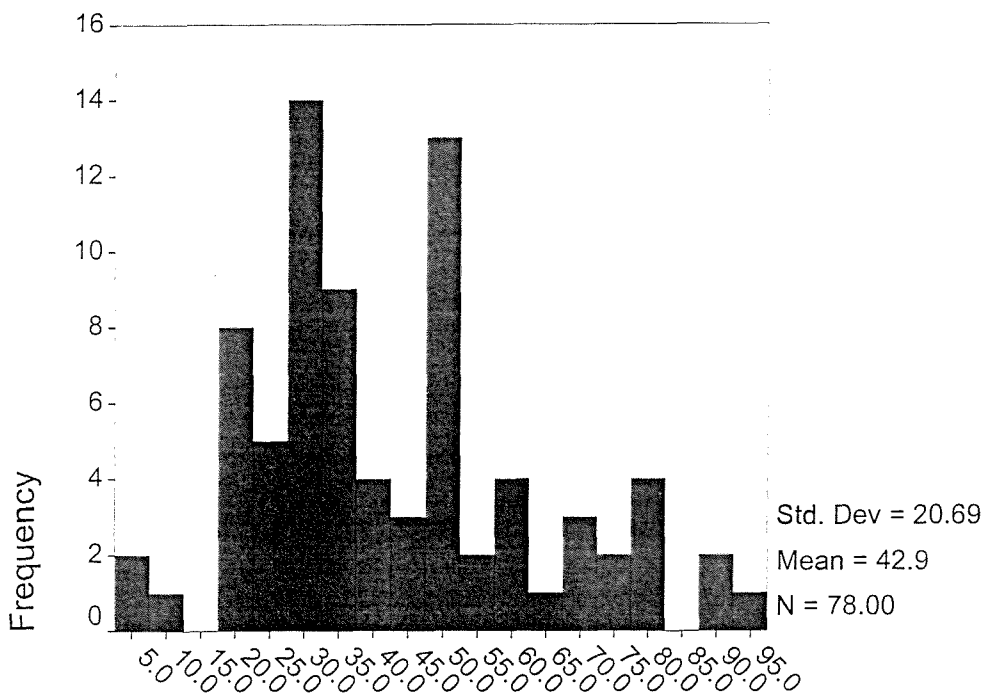
frequency: mothers expansions in response to child

### SoPreSS PEB



### FMSS1PC

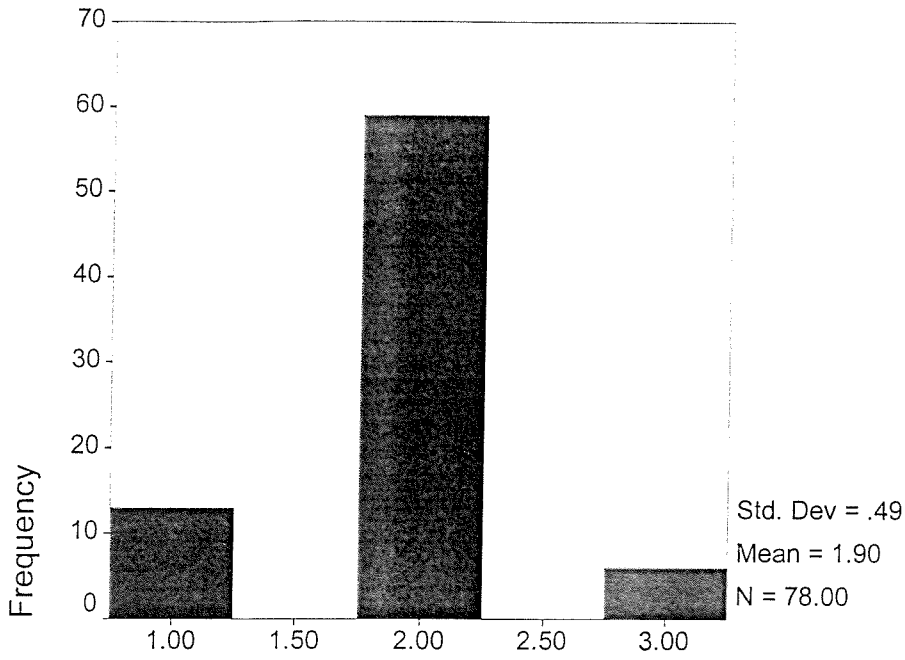
### SoSCP ENGAGE



### ENGAGE1

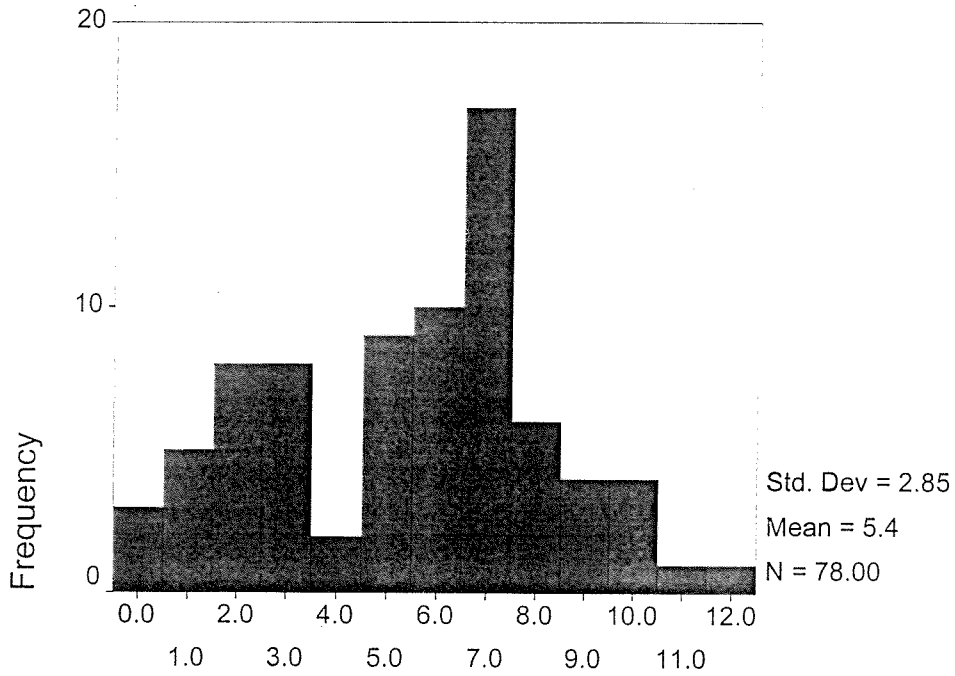


### SoPreSS REL



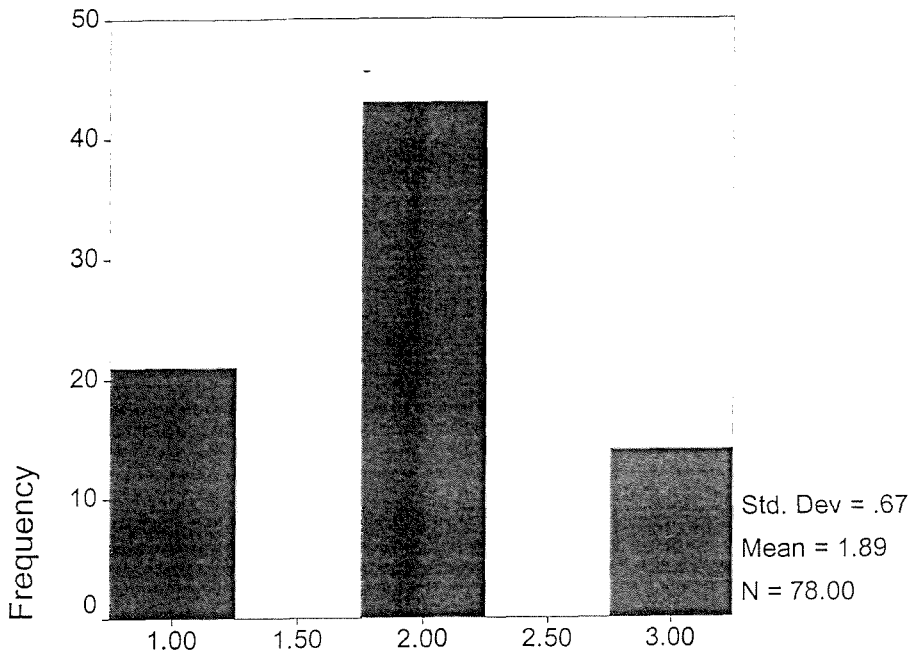
### FMSS1REL

### SoPreSS NEB



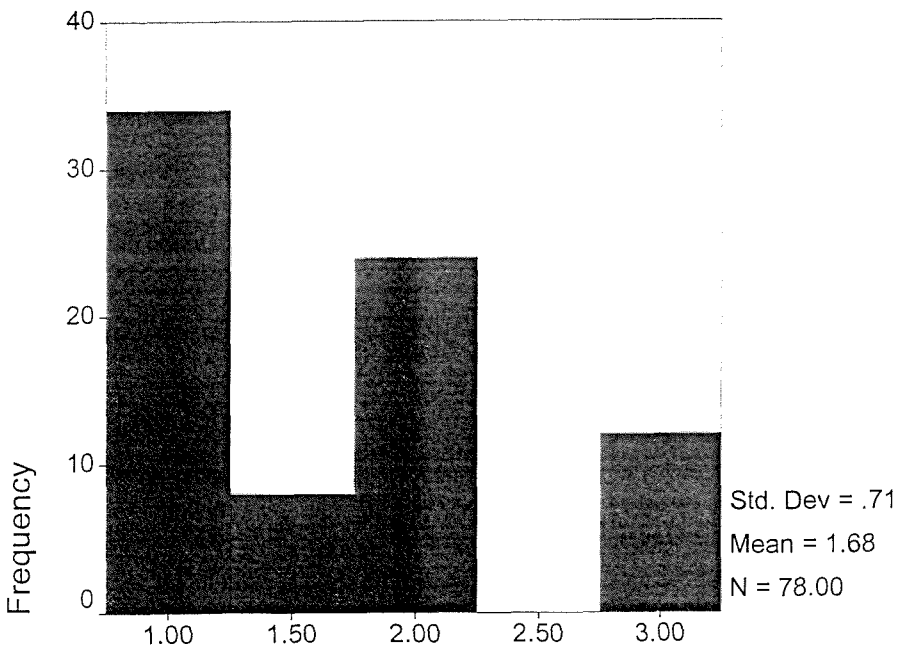
### FMSS1NC

### SoPreSS IS



### FMSS1IS

### SoPreSS WAR



### FMSS1WAR