

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

# **Reconceptualising Toddler Aggression**

A thesis presented in partial fulfilment of the requirements  
for the degree of Master of Education at  
Massey University  
Palmerston North  
New Zealand

**Christopher Maurice Orange**

2005

## ABSTRACT

This study used sorting techniques and Multidimensional Scaling analyses (MDS) to interrogate the comprehensiveness of a toddler aggression construct - Aggressive Behavior (AGG) - as empirically defined by the Child Behavior Checklist for Two and Three-year-olds (CBCL/2-3). MDS provided a way of unravelling the latent dimensional structures of the checklist item set and creating an inter-item semantic-like map. This map acted as a tool in the summary of patterns in sets of archival CBCL toddler data to reveal latent coherence or dimensional consistency across toddlerhood with specific regard to the aggression or aggressive-like behaviour construct – the main research goal of the present study.

First New Zealand participants (N=70,  $\bar{x}$ =30 years) completed four independent semantic-like matching tasks by sorting CBCL/2-3 checklist items according to their "face value". MDS algorithms transformed individual data into a map and hierarchical trees (h-trees) showing inter-item proximities. After validation of the map clusters sets of archival CBCL data were represented and interpreted in the 5-dimensional MDS solution (P=5) as vectors using PROFIT analysis. A measure of the stability of the vector components in terms of the amount of common variance captured across 24 to 42 months - of - age, demonstrated better fit than CBCL subscale stability for the first three dimensions. Candidates for dimensional stability across toddlerhood indicated by the MDS analyses and map were suggested.

Replication of the toddler map, the second objective, involved creating an expanded item set that included items from the CBCL/4-18. The new Combined item set was then sorted following identical procedures by a different group (N=49,  $\bar{x}$ =30). PROFIT analyses of archival 4-18 data on the rotated Combined configuration was compared with stability of Achenbach's CBCL/4-18 subscales between 60-months- and 72-months-of-age but correlations were no better than chance. Additional analyses were undertaken that revealed the archival CBCL/4-18 items had little variance when interpreted in the MDS solution.

This study succeeded in identifying alternative candidates for continuity of aggressive - like behaviour across toddlerhood in patterns in raw CBCL data that may contribute to

the reported CBCL/2-3 Aggressive Behavior construct stability. Three alternative constructs are suggested: a construct which features high frustration, anger and resistance to control - believed to interact with punitive or restrictive parenting practices, and central in theories of the development of coercive parent-child relationships; a construct which appears to index insecure attachment styles; and a construct reflecting toddlers' developing ability to control their attention and behaviour.



## ACKNOWLEDGMENTS

Thank you to my supervisor John Kirkland for all his support, advice and tremendous inspiration in thinking about the way we learn. I am also especially grateful to David Bimler for his assistance in the analysis. Also thanks go to Daniel Shaw for providing the archival data.

A special thanks goes to Massey staff, especially the administration at the College of Education. A big Thank You goes to Toni Floyd for the formatting assistance. The help of distance library administration as well as the Library staff at Albany was especially important for me as a distance student.

To the participants, especially parents at Herne Bay and Swanson Playcenters, and my neighbours at Earthsong Eco-village, the SES workers and students who contributed their valuable time and without whom this study would have been impossible, I owe great thanks.

Appreciation also goes to my colleagues at the University of Waikato LI who have supported my professional development.

My children, Dominique and Emmanuel, both toddlers at different times during this study, have been an inspiration and I thank them for their patience during the long journey their father had to make towards completion of this work. Both my parents and my parents-in-law have been unfailing in their support and encouragement and willingness to act as sounding boards. Jennifer and Peter, thanks for your help in so many ways.

This work is dedicated to Jose, my wife, whose encouragement, criticism and love and understanding have been central to the success of this work.

## TABLE OF CONTENTS

	Page
<b>Abstract</b> .....	i
<b>Acknowledgements</b> .....	iii
<b>Table of Contents</b> .....	iv
<b>List of Appendices</b> .....	viii
<b>List of Figures</b> .....	ix
<b>List of Tables</b> .....	x
 <b>CHAPTER ONE: Introduction</b> .....	 1
Problem and aims of research.....	1
Delimitations.....	4
Significance of the study.....	5
Thesis overview.....	5
 <b>CHAPTER TWO: Literature Review</b> .....	 7
<b>Part One: Description of the Child Behavior Checklist</b> .....	7
The Child Behavior Checklist /4-18 and 2-3 and the Aggressive Behavior Syndrome (AGG).....	8
Model origins: conceptual categories and quantitative assessment.....	10
Validation process.....	11
The Broad-band Scales: a dimensional model of childhood emotional and behaviour problems.....	12
 <b>Part Two: Taxonomies of child disruptive and antisocial behaviour</b> .....	 13
The DSM and aggression.....	13
The CBCL Aggressive Behavior Syndrome (AGG).....	16
 <b>Part Three: Theoretical concerns</b> .....	 20
Developmental definition of aggression in toddlerhood and early childhood.....	20
Stability of aggression.....	25
The CBCL and concepts of stability and continuity.....	27
Models of the development of child aggression and antisocial behaviour .....	30

Child characteristics.....	32
Parental characteristics.....	35
Parent-child relationship characteristics.....	35
<i>Coercive relationships</i> .....	36
<i>Attachment</i> .....	36
Integrative models.....	38
Parent-temperament interactions.....	40
Ethological studies.....	41
Dynamic systems research.....	42
 <b>Part Four: Methodological concerns</b> .....	 43
Concerns with parent report measures.....	43
Concerns about sample selection.....	45
Methodological concerns.....	46
Syndrome derivation.....	47
Concerns about covariance between scales .....	48
Comprehensiveness of the CBCL item set.....	48
Integrating information from multiple informants.....	52
Threshold setting and scale discriminant validity.....	53
Concerns with replicability and coherence of the CBCL syndrome model.....	55
Summary of methodological concerns.....	56
 <b>Part Five: Conceptual overlap with personality structure dimensions</b> .....	 58
Ego-undercontrol/Ego-overcontrol Model.....	59
Extraversion.....	60
The Five Factor Model: Agreeableness and Conscientiousness.....	61
Frustration and Surgency.....	61
Resistant Temperament.....	62
Inhibitory Control and Effortful Control.....	63
Attachment and temperament.....	63
Summary of Part Five.....	64
Summary of Literature Review.....	64

<b>CHAPTER THREE: Methodology</b> .....	66
Research Objectives.....	66
Stimuli.....	67
Participants.....	67
Ethical considerations.....	68
Research Procedures.....	68
Similarity data.....	68
Tasks One and Two.....	68
Task Three.....	69
Ranking data.....	69
Task Four.....	69
Ratings data.....	70
Task Five.....	70
Participants.....	71
Rationale for use of procedures.....	71
Analytical method: Multidimensional Scaling (MDS).....	73
Rationale for use of MDS.....	74
Applications.....	75
Multidimensional Scaling.....	75
Canonical correlation.....	76
Limitations.....	77
Procedures.....	77
Analytical methods.....	77
Communication of results.....	78
Analyses.....	78
Hierarchical clustering and Mapping.....	79
Vector Analyses.....	80
Summary.....	81
<b>CHAPTER FOUR: Results</b> .....	82
Part One: Multidimensional scaling analysis of the CBCL/2-3 items set.....	82
Results of Method of Triads (MoT) validation of map structure.....	89
Part Two: Validation of mapgroups and dimensions.....	90

Regression Analysis 1. (MOSS data).....	92
Part Three: Integration of archival raw CBCL/2-3 data into the map of the CBCL toddler problem domain.....	94
Regression Analysis 2. (CBCL subscale scores).....	95
Part Four: Multidimensional scaling analyses of Combined (CBCL/2-3 and CBCL/4-18) item set.....	97
Part Five: Integration of archival raw CBCL/4-18 data into the map of the Combined (CBCL/2-3 and CBCL/4-18) item set.....	101
Additional analyses.....	101
<b>CHAPTER FIVE: Discussion and Concluding Remarks.....</b>	<b>103</b>
Part One: Discussion of the MDS analysis of the Child Behavior Checklist for 2- and 3-year-olds (CBCL/2-3).....	103
Dimension 1.....	104
Dimension 2.....	108
Dimension 3.....	109
Dimension 4.....	111
Dimension 5.....	111
Discussion of Method of Triads (MoT) validation of map structure.....	111
Part Two: Discussion of the analyses for validation of map clusters.....	112
Part Three: Discussion of integration of archival raw CBCL/2-3 data into the map of the CBCL toddler problem domain.....	113
Section One: Vector Analysis.....	113
Section Two: Candidates for independent forms of dimensional consistency across toddlerhood.....	114
Section Three: Comparison between dimensions and CBCL/2-3 subscales..	118
Summary.....	120
Part Four: Discussion of MDS analysis of the Combined (CBCL/2-3 and CBCL/4- 18) item set.....	121
Part Five: Discussion of integration of archival raw CBCL/4-18 data into the map of the Combined (CBCL/2-3 and CBCL/4-18) item set.....	125
Concluding Remarks.....	126
APPENDICES .....	130
REFERENCES.....	162

## LIST OF APPENDICES

Appendix A:	Description of the CBCL/2-3 and CBCL/4-18 development and specifications.....	130
Appendix B:	Items forming the CBCL/2-3 Aggressive Behavior Syndrome Scale and the CBCL/4-18 Aggressive Behavior Syndrome Scale..	136
Appendix C:	CBCL/2-3 item set.....	137
Appendix D:	CBCL subset of 39 items for MoT.....	140
Appendix E:	Combined item set numbering key.....	141
Appendix F:	Instruction sheet for GOPA sorting and sheet for recording GOPA data.....	145
Appendix G:	Method of Triads: Sorting instruction sheet and data recording sheet.....	147
Appendix H:	Sheet for recording Method of Successive Sort (MOSS) data: criterion sort: e.g. aggressive.....	149
Appendix I:	CBCL/2-3 H-tree.....	150
Appendix J:	Mapgroups in the MDS map of the CBCL/2-3 item set and list of items not clustered.....	151
Appendix K:	MoT results for CBCL/2-3 subset of 39 items.....	154
Appendix L:	H-tree for the Combined item set.....	155
Appendix M:	Mapgroups in the MDS solution for the Combined (CBCL/2-3 and CBCL/4-18) item set.....	158

## LIST OF FIGURES

Figure 1	Child Behavior Checklist/2-3 (CBCL/2-3) multidimensional scaling solution (D=5) (spatial map) view of three-dimensional PLOT configuration (D1-D2 view): Items loading on subscales on the MDS map with subscale identifiers and item numbers.....	83
Figure 2	CBCL/2-3 MDS map view of three-dimensional PLOT configuration: D1-D2 view with clustered items linked showing abbreviated item descriptors.....	84
Figure 3	CBCL/2-3 MDS map view of three-dimensional PLOT configuration: D1-D2 view showing numbered and summarized clusters.....	85
Figure 4	CBCL/2-3 MDS map view of three-dimensional PLOT configuration: D1-D3 view showing numbered and summarized clusters.....	86
Figure 5	Parent criterion sorts overlaid on CBCL/2-3 MDS map.....	93
Figure 6	CBCL subscale clusters in the MDS map.....	96
Figure 7	Combined item set MDS map: D1-D2 view showing numbered and summarized clusters and individual item numbers.....	97
Figure 8	Combined item set MDS map D1-D3 view showing numbered and summarized clusters.....	98

## LIST OF TABLES

Table 1	Items loading on the CBCL/2-3 and CBCL/4-18 Aggressive Behavior scales.....	17
Table 2	Items that are scored in more than one scale on the CBCL/4-18..	49
Table 3	Dimension 1.....	87
Table 4	Dimension 2.....	88
Table 5	Dimension 3.....	88
Table 6	Dimension 4.....	89
Table 7	Dimension 5.....	89
Table 8	Criterion sorts: results, indicating common items.....	91
Table 9	Parent Criterion MOSS data: results of regression on MDS coordinates for each of the first 3 dimensions.....	92
Table 10	Student Criterion MOSS data for 'Aggression' and 'Disobedient': results of regression on MDS coordinates for each of the first 3 dimensions .....	93
Table 11	Canonical Correlation components of CBCL/2-3 vectors at 24- and 42-months.....	94
Table 12	Canonical Correlation components for the 6 narrow-band CBCL/2-3 subscales at 24- and 42-months.....	94
Table 13	Results of regression analyses relating CBCL subscale score to dimensions.....	95
Table 14	Combined item set MDS analysis results: Dimension 1. ....	99
Table 15	Combined item set MDS analysis results: Dimension 2.....	100
Table 16	Combined item set MDS analysis results: Dimension 2.....	101
Table 17	Labels for the five dimensions showing suggested CBCL/2-3 scale placement.....	120
Table 18	Comparison of dimensions for the Combined item set with those from the CBCL/2-3, revealed by MDS, with dimensions labelled, Achenbach's subscales (numbered and in brackets) for the purpose of discussion, and mapgroups in parentheses.....	124



## CHAPTER ONE

### INTRODUCTION

#### *Problem and aims of research*

Recent findings of genetic effects (Eley, Lichtenstein, & Stevenson, 1999; Koot, Van Den Oord, Verhulst, & Boomsma, 1997) that account for continuity and stability of aggression and antisocial behaviour in early childhood are problematic. In the first place there is little agreement on a definition of a general construct of child psychopathology (Achenbach & Dumenci, 2001; Lengua & Sadowski, Friedrich & Fisher, 2001). Of the two philosophically very different taxonomies into which developmental psychopathology is tied - the DSM (American Psychiatric Association, 1994) and the Child Behavior Checklist (Achenbach, 1991a, 1992), the psychiatric disorder model lacks empirical validity and has few categories for early childhood disorders, and the psychometric model lacks validity at the item level and – despite the dimensional approach - utilizes cutpoints that do not describe or detect differences in behaviour within the normal range – an application for which it is, nonetheless, often used (Granic & Lamey, 2002). Rapprochement between the two taxonomies does not appear to be immanent despite efforts at integration (Lengua *et al.*, 2001; Achenbach, Dumenci, & Rescorla, 2001; Jensen, Watanabe, Richters, Roper, Hibbs & Salzberg, 1996, for a review).

Comparing findings from psychometric approaches like the CBCL in twin studies (Eley *et al.* 1999; Koot *et al.*, 1997) and path analyses (Achenbach, Howell, McConaughy & Stanger, 1995), with developmental approaches that assess within-individual change and continuity and more comprehensively assess behaviour in community samples, reveals convergent results: considerable stability of continuity in antisocial and aggressive behaviour from around age 4 (Achenbach *et al.*, 1995; Connor, 2002). Closer reading of the different approaches however suggests that, in their conceptualization as a global trait, the psychometric aggression and antisocial behaviour constructs conceal diverse etiology (Hinde, 1985; Coie & Dodge, 1998), clearly documented by developmental studies. Given the current focus by geneticists and psychopharmacologists on traits in

personality, a clear understanding of the psychometric conceptualization – its strengths and limitations - is pressing to avoid miscommunications (Caspi, Harrington, Milne, Theodore & Moffitt, 2003).

In older children stability has been found for an early onset antisocial construct from pre-school age (Patterson, 1982, cited in Moffitt, 1993; Patterson, 2002). Age of onset of antisocial behaviour problems is the single best predictor of antisocial behaviour in adults and adult criminal outcomes (Robins, 1966, 1978 cited in Moffitt, 1993). There is much evidence that this construct, operationally defined as Externalizing problems on the CBCL/4-18, effectively distinguishes between referred and non-referred populations (Achenbach, 1991a; Drotar, Stein & Perrin, 1995). The CBCL broad-band scales – Externalizing (EXT) and Internalizing (INT) - however are also highly correlated with each other and the issue of covariation or comorbidity has yet to be properly addressed (Keily, Lofthouse, Bates, Dodge & Petite, 2003). The different subscales that define EXT are much less successful at distinguishing individual differences in behaviour. While discriminant validity has amassed at the broad-band level, at the subscale level for the CBCL/4-18 - for which some scales overlap and are thus highly correlated with each other- there is much less support (Lengua *et al.*, 2001; Macmann & Barnett, 1993).

Attempts to extend downward the scales of the CBCL to assess individual differences in emotional and behavioural problems in early childhood and infancy – for example the Child Behavior Checklist for Two- to Three-year-olds (CBCL/2-3, Achenbach, 1992) and the Child Behavior Checklist for One and a half- to Five-year-olds (CBCL/1½-5, Achenbach & Rescorla, 2000) raise the concern of whether continuity is feasibly assessed by simple stability coefficients at an age when intraindividual continuity of such behaviours is so low (Coie & Dodge, 1998). Many of the problems with the validity of the CBCL/4-18 are also evident in the toddler checklist: the lack of consensus across taxonomic paradigms on a definition of general child psychopathology which continues to frustrate research; issues around the representativeness of the original samples used in deriving and standardizing the checklist and the use of these samples in lieu of comparison groups for research (Drotar, Stein & Perrin, 1995); scales with cutpoints that are not informative in the normative range; slight evidence of efficient discrimination among a broad range of clinical diagnoses (Jensen, Watanabe, Richters, Roper, Hibbs., Salzberg. & Liu, 1996; Lengua *et al.*, 2001) high correlations

between the subscales (Lengua *et al.*, 2001; Macmann & Barnett, 1993; problems with content validity- for example 'aggressive behaviour' scales that include few items that explicitly describe aggressive behaviour (Loeber & Hay, 1997); problems replicating the CBCL factor structure (Hartman, Hox, Auerbach, Erol, Fonseca, Mellenbergh, Novik, Oosterlaan, Roussos, Shalev, Zilber & Sergeant, 1999 ; Heubeck, 2000; Lengua *et al.*, 2001).

Conceptual overlap between constructs in psychopathology and constructs in studies of personality structure, as reported in the literature (Caspi., Block, Block, Klop, Lynam, Moffitt, & Stouthamer-Loeber, 1992; Moffitt, 1993; John, Caspi, Robins, Moffitt & Stouthamer-Loeber, 1994; Huey & Weisz, 1997; Bates, Pettit, Dodge, and Ridge, 1998; Rothbart & Putnam, 2002; Shiner & Caspi, 2003) present an opportunity to increase our understanding of behaviour patterns and test conceptual assumptions at an item and dimensional level.

This study aims at clarifying the theoretical and empirical basis for the psychometric conceptualisation of toddler aggression. This will be achieved by examining patterns in archival CBCL/2-3 data with regard to their latent coherence over toddlerhood- specifically to reveal dimensions underlying the reported consistency of patterns of aggressive-like behaviour and thus allow an interrogation of the comprehensiveness of the Aggressive Behavior syndrome (Achenbach, 1992).

The key research question is whether a distinct aggression construct is supported by Multidimensional Scaling analyses of the CBCL/2-3 problems domain. What can an item-level exploration of patterns in toddler checklist data contribute to our understanding of the comprehensiveness of the CBCL Aggressive Behavior (AGG) construct?

The aims of the present study are furthered by innovative sorting methods in Multidimensional scaling (MDS; Kruskal, 1964a, 1964b; Coxon, 1982) which will provide a map of the similarity structure within the CBCL/2-3 (Bimler & Kirkland, 2001a, 2002). This map is to act as a tool in the summary of patterns in sets of archival CBCL data to reveal latent coherence or dimensional consistency between age-bands with specific regard to the aggression or aggressive-like behaviour construct. Validation

and labelling of clusters emergent in the map is facilitated by an additional sorting method, an adaptation of the Method of Successive Sorts (MOSS, Block, 1961). The resulting criterion sorts by three groups of participants, both expert and lay, are used for validation of clusters and for checking the robustness of the map. Archival CBCL/2-3 raw (Likert) data will be integrated into the resulting map using Property fitting analysis (PROFIT; Carroll & Chang, 1970) and the vector solution compared for component stability over an 18-month period. This will provide a measure of the variation in the archival longitudinal data explained by the set of dimensions or vectors that result from the MDS analysis. This will also enable comparison with Achenbach's subscale approach at the level of amount of common variance captured between the two times.

The present study also undertakes to replicate the structure of the toddler item set with a superset of items, for validation purposes, but also to examine underlying common dimensions and thus facilitate exploration of the domain specifically with regard to inter-age band instrument coherence. This will be achieved by repeating the whole data elicitation process and MDS analysis, this time with an item set made up by combining CBCL/2-3 and selected CBCL4-18 items. The resulting MDS solution is anticipated to reveal item correspondence and overlap of dimensional structure between the CBCL/2-3 and the CBCL/4-18. A measure is then made of the stability of vector components resulting from PROFIT analyses of archival CBCL/4-18 data on the rotated Combined configuration compared with stability of Achenbach's CBCL/4-18 subscales, in terms of the amount of common variance captured. Once the aspects of aggression-related toddler behaviour have been reconceptualised in the broader framework of behaviour right across childhood (i.e. interpreted in the Combined map dimensions) inter-instrument stability of the constructs may be examined. Comparison of the amount of common variance between different age-samples captured by the subscale approach on one hand and the spatial method on the other will then be possible. This will facilitate exploration of issues of comprehensiveness of the CBCL Aggressive Behavior syndrome.

### ***Delimitations***

This is not predictive validation study of the CBCL/2-3. It does not examine whether CBCL scales converge with other measures. Instead, construct validity of its empirically-derived syndrome: Aggressive Behavior will be examined and assessed

from an item level. The design of the present study does not include profiling though this may be desirable in future investigations. Girls' archival raw CBCL data was not available to the author at the time of the study; otherwise it would have been included in the analyses. While sex differences in rates of aggression between boys and girls are not generally found in toddlerhood, the map of the CBCL toddler problem item set may prove effective in revealing patterns in girls' case data if and when it becomes available for reanalysis. Analysis at the level of group differences is thus not undertaken in the present investigation.

### *Significance of the study*

As far as is known no attempt has been made to analyze the CBCL item sets as a coherent domain (Weller & Romney, 1988) examinable in terms of its structure of judged similarity. It is anticipated that similar, if not homologous dimensions in toddler and older child checklist data will be revealed, based, not only on Achenbach's research but also on similarity found in personality measures across childhood and into adolescence (Caspi, Block, Block., Klop, Lynam, Moffitt & Stouthamer-Loeber, 1992; Rothbart & Bates, 1998). It is hypothesized that data from both checklists will be amenable to analysis at the low-dimensional item level and that an MDS analysis will reveal alternative dimensions underlying the CBCL domains that may help explain some of the findings of stability of the Aggressive Behavior syndrome in the literature on toddler behaviour. If validated, the resulting map of the toddler CBCL problems domain may serve as a tool for future studies and advance conceptualization of the domain.

### *Thesis overview*

Chapter Two highlights some of the difficulties noted in the literature in establishing the validity of an aggression construct in toddlerhood in parent-report checklists that rely on factor analyses of large amounts of standardized ratings data. Part One is an overview of the development of the CBCL measures and outlines the origin of the dimensional model of child emotional and behavioural problems. Part Two addresses the two major paradigms in child psychopathology – the DSM and the CBCL in relation to assessment of child aggression. Theoretical concerns are addressed in Part Three: definitional issues are examined, the current conceptualisation of stability and continuity familiar in the child developmental psychology literature is compared with alternative

developmental conceptualizations, and an overview of current models of development of aggression and antisocial behaviour in childhood is undertaken especially as they may relate to AGG across the age-periods examined in this study. Issues around the CBCL methodology are then investigated in detail in Part Four. Part Five addresses the overlap between concepts in child psychopathology and dimensions emergent in studies of the structure of child temperament and personality. Chapter Three, the Methodology section, discusses the research aims, procedures for data collection and strategies for analysis, including the rationale for their use in the present study, and the limitations of these procedures and strategies. Chapter Four presents the results of analyses. Results are then discussed in detail in Chapter Five in relation to theories of the development of aggression reported in the literature. Implications of the study are considered, as are possible contributions made by the study to theories of the development of aggression and personality psychology. The present study, which investigates patterns in CBCL data through an MDS approach, may help to clarify, at the conceptual level, our understanding of the domain of emotional and behaviour problems in toddlerhood and suggest alternative strategies in assessment that better respect the heterogeneity of toddler aggression.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

This review of the literature begins with a description of the development of the CBCL and supplements and the Aggressive Behavior (AGG) scales. The origins of Achenbach's model are discussed and the conceptualization of validity of the broadband two-factor model is then described. In the second part the conceptualization of aggression and related behaviour in the DSM - disorder model or taxonomy of aggression – are compared with the CBCL AGG construct. The third part examines the current developmental literature on toddler aggression, addresses theoretical concerns around definition, problems with the conceptualization of continuity and stability of aggression and antisocial behaviour and examines developmental models of aggression in childhood. Methodological concerns with the CBCL factor structure are discussed in the fourth part: issues around the covariance between scales and the resultant problems establishing meaningful cutpoints for research; issues about the comprehensiveness of the CBCL item sets; concerns with parent report measures; methodological concerns; concerns around replicability and coherence of the CBCL Aggressive Behavior syndrome and CBCL syndrome model. Correspondences of items and factors between the CBCL/2-3 and CBCL/4-18 are then examined. Finally, in the fifth part the conceptual overlap of the CBCL dimensions with dimensions found in studies of personality structure is discussed and constructs with dimensional consistency across toddlerhood and into later childhood, that may lie behind the reported stability of the AGG construct, are collated and examined.

#### **Part One: Description of the Child Behavior Checklist**

Our understanding of aggressive behaviour has recently been shaped by theoretical and clinical concepts associated with an empirical taxonomy of behaviours to which Achenbach with his Child Behavior Checklist (CBCL, 1991a; 1992) and supplementary instruments has been a major contributor. The introduction over a decade ago of standardized, multiple-informant measures using quantitatively-derived rating scales based on problems that co-occur in diagnoses has driven research on a wide range of child emotional and behaviour problems.. The origin of the CBCL model and its



approach to construct derivation and validation are discussed in this section (see Appendix A for detailed description of the CBCL/2-3 and CBCL/4-18 development and specifications).

### **The CBCL/4-18, CBCL/2-3 and the Aggressive Behavior Syndrome**

The Child Behavior Checklist for ages 4 to 18 (CBCL/4 -18) is the most popular ratings measure used to evaluate outcomes in children and adolescents (Achenbach, 1991a) and the version for ages 2 to 3 (CBCL/2-3) is now widely used by practitioners to assess conduct and behaviour or emotional problems of toddlers (Achenbach, 1992). These checklists, plus the Teacher Report Form/5-18 (TRF, Achenbach, 1991b), the Youth Self-Report/11-18 (YSR, Achenbach, 1991c), and the latest version of the Child Behavior Checklist for ages 1½ to 5 (CBCL/1½- 5, Achenbach & Rescorla, 2000) are part of an endeavour by Achenbach to create an empirical taxonomy of behaviours that distinguish between children with and without behavioural disturbances. A large number of research studies - 5,500 in the 2005 edition of the Bibliography of published studies - cite the CBCL on topics that include diagnostic categories, treatment, outcome evaluations, special education, ethnicity, family characteristics, medical conditions, abuse and cross-cultural research (Berube & Achenbach, 2004). The toddler version, the CBCL/2-3, is a ratings form consisting of 99 problem items, - compared with the 118 problem items in the CBCL/4-18 - of which 59 were adapted from, and are almost identical to the CBCL/4-18, plus another 40 items which were specifically designed for toddlers. Judgments are based on the preceding 2 months, compared with the older version's 6 months, which is intended to reflect the fast pace of development in toddlers (Achenbach, 1992). Unlike the checklists for older children the toddler version does not have scored competence items.

The Aggressive Behavior syndrome for toddlers is derived in a similar manner to the Aggressive Behavior syndrome for older children and adolescents. That is to say, it is one of six syndromes, or narrow-band factors - compared with 8 on the CBCL/4-18 - identified by principal components analysis of the behavioural problems of referred toddlers. A major difference between the post-1991 checklists is that, while in the derivation of syndromes for the toddler version only parent and caregiver ratings were utilised, the CBCL/4-18 included ratings from two supplementary instruments - the



Teacher Report Form (TRF) and the Youth Self-Report Form (YSR). "Cross-informant syndromes" were identified from principle components analyses of data from all three instruments. (See Appendix A for details). For both checklists, however, higher loadings on the Aggressive Behavior scales and multiple high loading for many items meant that items were retained that loaded  $> 0.30$  for each syndrome except Aggressive Behavior which had a cutpoint of  $> 0.40$ . Seven items that loaded  $> 0.40$  on the Aggressive Behavior scale and  $> 0.30$  on a second scale were retained for the second scale only. In the derivation of CBCL/2-3 factors no item was retained on more than one scale, unlike the CBCL/4-18. This also means that, for the toddler instrument, no items are included in both the Internalizing and Externalizing groupings. The CBCL/4-18, however, has four items that are scored on more than one scale. The items are listed in Table 1. The implications of double-scoring will be discussed later in this section.

Four syndromes identified in parents' ratings of their toddlers' behaviour have counterparts in syndromes found for older children in the CBCL/4-18. This is despite differences in the original collection of items for analysis and in the precise composition of the syndromes. Syndromes identified on the CBCL/2-3 are *Withdrawn*, *Anxious/Depressed*, *Somatic Complaints*, *Sleep Problems*, *Destructive Behavior* and *Aggressive Behavior* (Achenbach, 1992). Syndromes for the CBCL/4-18 are listed as *Withdrawn*, *Somatic Complaints*, *Anxious/Depressed*, *Social Problems*, *Thought Problems*, *Attention Problems*, *Delinquent Behavior* and *Aggressive Behavior*. A *Sex Problems* syndrome may also be scored from the CBCL/4-18 (Achenbach, 1991a). The checklist for older children thus has three more syndrome scales than the version for toddlers. A large number of items - 25 on the CBCL/2-3 and 32 on the CBCL/4-18 - are scored as "Other Probs."; that is, they are scored, but not on any subscale.

The Child Behavior Profile is a set of scoring scales for the CBCL/2-3 and CBCL/4-18 that are standardized for both sexes. Scales are derived from principal components analysis of CBCL data from clinically referred children and then normed on community samples. The CBCL/2-3 syndromes can be scored on raw scores, normalized T scores and normal, borderline or clinical cutpoints identical to the CBCL/4-18. The toddler version also reveals broad-band internalizing and externalizing groupings (Achenbach, Edelbrock and Howell, 1987; Achenbach, 1992). Principal factor analyses, with varimax rotation used to extract the two largest factors in each solution, yielded, on the

factor termed Internalizing: *Withdrawn, Somatic Complaints* and *Anxious/Depressed*, and on the factor termed Externalizing: *Aggressive Behavior* and *Destructive Behavior*. The Externalizing scale for older children distinguishes Aggressive Behavior and Delinquent Behavior while the toddler version parses Aggressive and Destructive Behaviors.

### **Model Origin: Conceptual categories and quantitative assessment**

Achenbach and others' pioneer attempts to find empirically supported constructs that could replace the DSM and other diagnostic categories led to the development of "objectively identified" syndrome scales recovered from a questionnaire or checklist of items rated by parents about their children's behaviour (Achenbach & McConaughy, 1987; Achenbach, 1991a, 1992). Achenbach and McConaughy designed their system of empirical assessment to follow psychometric principles, including "standardisation of procedures, multiple aggregated items, normative-developmental reference groups and establishment of reliability and validity" (1987, p. 24). (See Appendix A for details of the early version of the CBCL).

Achenbach justified the use of the CBCL dimensional classification system in both pragmatic and conceptual terms. In clinical diagnosis, it is argued, problems of concern are related to severity, evidence in multiple situations or presence of other problems. Achenbach proposed that syndrome scales are more useful to the clinician than traditional data with its preconceptions about diagnostic categories because they capture quantitative variations in intensity of problems (1992). Diagnostic information, by contrast, provides only an indication as to whether or not a particular problem is present or absent (Achenbach, 1992). The other reason they claim that quantitative assessment is important is that it addresses an information-processing bias in categorizing information (Achenbach & McConaughy, 1987; Achenbach, 1991a). Because our use of categories is based on sets of features not perfectly correlated with each other and not fully shared by all members of a category they propose an alternative view. A conceptual category consists of a set of imperfectly correlated features known as a "prototype" or "core syndrome" and category membership can be computed in terms of overlap between the features of a case and the prototypic features that define a category. "Purest cases of a category have the most prototypical features and borderline cases do

not have many more features of one category than of others” (Achenbach & McConaughy, 1987, p. 24).

One of the major innovations of the revised Child Behavior Checklist /4-18 was the use of multiple informants and scales standardized across the different informant-measures (CBCL, TRF, YSR). Achenbach and McConaughy examined the degree of consistency between different informants and reported substantial (overall mean=0.60) correlations between similar informants in similar situations (e.g. teacher-teacher) and modest (overall mean=0.22) correlation between different types of informants in different situations (e.g. teacher-parent). Because different informants give different information they propose that the “assessment of children should be viewed in terms of multiple axes that explicitly preserve different types of data as well as revealing discrepancies between them” (p. 26). The “cross-informant syndrome scales” (Achenbach & McConaughy, 1987) reflect this for the CBCL/4-18. The CBCL/2-3 has no cross-informant scales, however multiple-informant assessment is recommended and the supplementary computer program can display scores from up to five informants for comparison.

### **Validation process**

The CBCL syndromes – including the Aggressive Behavior syndrome - are empirically derived constructs. Achenbach defines the word syndrome as referring to problems that tend to occur together (Achenbach, 1992). Rather than consisting of items selected to redundantly measure a hypothetical construct, the CBCL syndromes are “empirically derived from covariation among items selected to be nonredundant” (1992, p. 54). Because his variables lack standard operational criterion Achenbach describes the construct validity of his syndromes in terms of a “nomological network of interrelated procedures intended to reflect the hypothesized variables in different ways” (1991a, 1992). Importantly Achenbach acknowledges the scarcity of analogous instruments that show convergent validity for a general construct of problem behaviours among 2 and 3-year-olds (1992). Construct validity was initially assessed for the CBCL/4-18 through correlating scale scores with scores from counterpart scales of the Conners Parent Questionnaire and the Quay-Peterson Revised Behavior Problem Checklist. Checklist correlations ranged from 0.59 to 0.88 with analogous scales (See Appendix A).

Construct validity of the toddler syndromes was similarly demonstrated through convergence of CBCL/2-3 scale scores with scores from counterpart scales of the Richman Behaviour Checklist (BCL). Correlations with the BCL scales ranged from 0.58 to 0.77 for different situations and informants. Discriminant validity for the toddler checklist was evidenced through the CBCL/2-3's independence of developmental measures (Achenbach, 1992) (See Appendix A for details).

### **The Broad-band scales: A dimensional model of childhood emotional and behaviour problems**

Achenbach and others' early attempts to derive syndromes empirically from multivariate analysis of behaviour problems reported by parents and mental health professionals used cluster analysis which revealed distinct Internalizing and Externalizing clusters of the profiles of clinically referred children (Edelbrock & Achenbach, 1980, p. 467). Using hierarchical clustering, clusters of children's profile types (6-11 years, & 12-16 years) were found that were characterized by patterns of high scores on Internalizing scales and low scores on Externalizing scales (p. 453). Other profile types combined into a cluster with high scores on the Externalizing scales and low scores on the Internalizing scales. These patterns were found in all the groups studied. While a Mixed profile cluster was identified among girls (10-13 years old) and the two broad-band factors varied with age and sex the empirical evidence validated findings in other dimensional studies for the two contrasting factors. The Internalizing dimension has been called overcontrolled, inhibited, shy-anxious and personality disorder and typically includes fearfulness, somatic complaints and unhappiness. The Externalizing dimension has been called undercontrolled, aggressive, acting out and conduct disorder since it includes fighting, destructiveness and disobedience (Achenbach, 1982). The CBCL/4-18 standardization study showed mean correlation between the broad-band scales of 0.54 for referred and 0.59 for non-referred samples (Achenbach, 1991a). Correlation between Internalizing and Externalizing scales of the CBCL/2-3 was high at 0.70 in the referred sample and higher at 0.76 for the nonreferred sample (Achenbach, 1992).

## **Part Two: Taxonomies of child disruptive and antisocial behaviour**

In this section problems presented by the DSM taxonomy for understanding aggression and antisocial behaviour in childhood are collated, focusing on problems with the categorization process itself. Justification for applying a mental disorder model given the limitations of our knowledge is evaluated. The relationship between diagnostic categories and symptom scales is considered. Evidence for a distinct AGG dimension from community, twin and clinical studies is reviewed.

### **The DSM and aggression.**

Aggressive behaviours and other conduct problems in children have typically been viewed and treated as symptoms of underlying mental illnesses: “the disruptive disorders”- Oppositional Defiant Disorder (ODD), Conduct Disorder (CD), Attention Deficit Hyperactivity Disorder (ADHD) and Antisocial Personality Disorder (ASPD). Most aggressive children however, do not suffer from a psychiatric illness, and the majority of children with mental disorders are not aggressive. The conceptualisation of aggression in the psychiatric taxonomy presents some problems for understanding the development of aggression. Limits associated with the categorical nature of the taxonomy, lack of attention to the environmental context in which the behaviours occur, the obscuring of meaningful subtypes, developmentally-specific symptoms and comorbidity by single- category disorders are obstacles which the psychometric taxonomy hoped to avoid. There are also few categories that describe specific child disorders.

The DSM-II categorized antisocial behaviour as conduct disorders and segregated subtypes into socialized aggressive and non-aggressive versus undersocialized aggressive and non-aggressive conduct disorder. The presence or absence of repetitive violence against others was the criteria distinguishing between the aggressive and non-aggressive types. However because aggressive behaviours have extremely low base rates there are problems in the reliability of measurements and it was never clear that distinctions such as those made in the DSM-II represented actual psychiatric disorders (Achenbach, 1992).

With the publication of studies using the new standardized checklists new understandings of childhood behavioural disorders are suggested where Achenbach's syndromes do not converge with the diagnostic categories of the DSM. For example factor analysis did not substantiate the DSM-III-R's two separate syndromes Aggressive Conduct Disorder and Oppositional Defiant Disorder (Achenbach & McConaughy, 1987). Both were listed together as counterparts of the CBCL's Aggressive Behavior syndrome. The suggestion here was that some DSM categories may mainly represent mild verses more severe versions of similar problems.

Achenbach criticizes the DSM diagnostic categories and the diagnostic criteria as not being geared to 2- and 3-year-olds. In the CBCL/2-3 Manual Achenbach (1992) discusses the origins of the term *diagnosis* and contrasts the narrow sense of the word, as meaning matching a child's pattern of problems to the criteria for disorders specified in nosology (a system for classifying diseases), with the broader meaning concerning diagnostic formulations which involves investigation of cause or nature of some phenomenon and the diagnostic process of gathering information about a case (1992). The practitioner must make a forced choice between DSM disorders. Using the CBCL/2-3 by contrast, diagnostic formulations and intervention plans may be based on the child's entire pattern of scores on all the syndromes.

While Conduct Disorder is the prototypical diagnostic category for aggression in children and adolescents, it is accepted that "there is no single aggression diagnosis for all aggressive individuals" (Conner, 2002, p.112). In the DSM-IV aggressive behaviour in children and adolescents is associated with attention-deficit hyperactivity disorder (ADHD), conduct disorder (CD), and pervasive developmental disorders (PDD) (Weller Rowan, Elia, & Weller, 1999). Comorbidity is an issue however, since, for example, ADHD children often have comorbid oppositional defiant disorder or conduct disorder. According to DSM-IV criteria, the characteristic patterns of behaviour in patients with CD fall into 4 main groups: aggression toward people or animals, non-aggressive destruction of property, covert aggression - deceitfulness or theft, and serious violations of rules. Since only 3 symptoms out of 4 characteristic patterns must have been present in a 12-month period, aggression is not mandatory for a diagnosis of conduct disorder (Weller *et al.*, 1999).



Reviewing studies that have explored the relationship between symptom scales and diagnostic categories-all have directly examined the relationship between the CBCL and structured diagnoses - Jensen *et al.* (1996) point out that because there is "no single "gold standard" against which any of the various measures of psychopathology can be compared" (p. 152), the question as to which may be superior is difficult to answer. Because the two types of variables require different statistical approaches comparing categorical diagnostic information with dimensional measures of severity and impairment is difficult (Jensen *et al.*, 1996).

Rather than subscribing to the hypothesis that antisocial behaviour in childhood is necessarily attributable to an underlying disorder, as implied by the DSM model, some have applied Wakefield's harmful dysfunction concept of disorder which requires that first, cultural definitions of harm or deprivation are used as standards in judgments of diagnosable conditions, and second that the condition is the consequence of an "inability of some internal mechanism to perform its natural function, wherein a natural function is an effect that is part of the evolutionary explanation of the existence and structure of the mechanism" (cited in Richters & Cicchetti, 1993, p. 8). Focusing on aggression as a symptom of a categorical psychiatric diagnosis may neglect the environmental context in which it occurs – the function of the behaviour, and conceal information on whether the behaviour observed is adaptive or maladaptive. In their review of plausible candidates for the dysfunction hypothesis applied to Conduct Disorder, Richters and Cicchetti (1993) draw attention to the limitations in our knowledge of the "extent to which dysfunction can account for the antisocial behaviour of children diagnosed with CD" (p. 15). "Our incomplete knowledge of the most relevant underlying mechanisms, the tentative, speculative nature of our knowledge about the causal status of identified variables, and our limited ability to operationalise and measure many of the constructs we believe to be most relevant" (p. 15).

On the whole, with the exception perhaps of the Attention scale (ADHD- Biederman, Monuteaux, Greene, Braaten, Doyle and Faraone, 2001) and the Delinquent Behavior scale (Conduct Disorder- Biederman *et al.*, 2001) and possibly the Anxious /Depressed scale (anxiety disorder) CBCL subscales do not discriminate among clinical diagnoses in an efficient manner. In addition, the CBCL subscales that do distinguish diagnoses are often correlated with more than one disorder (Jensen *et al.*, 1996).

### **The CBCL Aggressive Behavior Syndrome (AGG)**

With the broadened study of child and adolescent aggression in the context of antisocial behaviour Achenbach's CBCL/4-18 and supplements emerged as key instruments parsing individual differences in antisocial behaviour, operationally defined as externalising or undercontrolled behaviour, Aggressive Behavior (AGG) on the one hand, and Delinquent Behavior (DEL) on the other. Aggressive behaviour during childhood has come to be considered by Achenbach and others as part of a larger taxonomy of antisocial behaviours in childhood which taken together – as CD – or CD-like- behaviour - is one of the strongest predictors of adult antisocial behaviour (Achenbach *et al.*, 1995), with 25-40% of children with CD going on to a diagnosis of adult antisocial personality disorder (ASPD) (Robins, 1966, cited in Connor, 2002). Empirical research has identified two separate but related components: aggressive and non-aggressive antisocial behaviour (Achenbach, 1991a). This distinction has been variously phrased as overt and covert, conduct disorder and socialized delinquency and aggression and delinquency. Overt aggression is defined as an “openly confrontational act of physical aggression” and examples include “physical fighting, bullying others, using weapons in hostile acts and open defiance of rules and authority figures” (Connor, 2002, p. 10). Covert aggression is defined as any “hidden, furtive, clandestine act of aggression”. Examples include “stealing and truancy, and fire setting and running away from home” (p. 10). Support for this dimension comes from multidimensional scaling meta-analyses by Loeber & Schmalting, 1985, (cited in Connor, 2002) and Frick, Lahey, Loeber, Tannenbaum, Van Horn, Christ and Hanson, 1993 (cited in Frick, 1998). Internal validity of the aggression-delinquency subtypes is also supported by further factor studies across different samples (6-16 years) by Achenbach and others (Achenbach, Conners, Quay, Verhulst & Howell, 1989, cited in Connor, 2002). The CBCL/4-18 AGG scale contains 20 aggressive, destructive and oppositional behaviour descriptors, while the CBCL/2-3 distinguishes aggressive behaviours (Aggressive Behavior - AGG) from destructive behaviours (Destructive Behavior - DES) and is comprised of 15 aggressive and oppositional behaviour descriptors. (See Table 1).



**Table 1. AGG scale items for the CBCL/2-3 and the CBCL/4-18, showing common items highlighted \* (See Appendix B for item numbers).**

<b>15 items forming the CBCL/2-3 Aggressive Behavior syndrome scale (AGG)</b>	<b>20 items forming the CBCL 4-18 Aggressive Behavior syndrome scale (AGG)</b>
Defiant Demands must be met immediately Disobedient * Easily frustrated Easily jealous * Gets in many fights * Hits others Angry moods Punishment doesn't change his/her behavior Screams a lot * Selfish or won't share. Sudden changes in mood or feelings * Temper tantrums or hot temper * Unusually loud * Whining	Argues a lot. Bragging, boasting. Cruelty, bullying, or meanness to others. Demands a lot of attention. Destroys his/her own things [from Des to Agg] Destroys things belonging to his/her family or others. [from Des to Agg] Disobedient * Disobedient at school. Easily jealous * Gets in many fights * Physically attacks people(not part of any CBCL/2-3 scale) Screams a lot * Showing off or clowning. Stubborn, sullen, or irritable. [from With to Agg] Sudden changes in mood or feelings * Talks too much. Teases a lot. Temper tantrums or hot temper * Threatens people Unusually loud *

Achenbach's path analyses have provided convergent evidence for the distinctness of the antisocial dimensions. Achenbach (1995) used multiple regression analysis to test predicative paths across different developmental periods in a longitudinal analysis of the narrow- and broad-band syndromes. The study examined the ability of CBCL syndromes scales to predict emotional and behaviour problems on a 6-year longitudinal study. Both Aggressive Behavior and Delinquent Behavior predicted Delinquent Behavior, pointing to a strong role for aggression in the etiology of conduct problems with perhaps different developmental paths for delinquent and aggressive behaviour. He identified a trait-like aggressive construct, measurable from age 4 on the CBCL/4-18

(AGG) that is partly responsible for later childhood Conduct Disorder (Achenbach *et al.*, 1995).

The long-term stability of CBCL scales has been evaluated by Biederman, Monuteaux, Greene, Braaten, Doyle and Faraone, (2001) using a well-researched clinical sample of ADHD-diagnosed boys longitudinally assessed. They predicted that given the stability of the CBCL and the stability of the diagnosis in their sample the scales would exhibit high long-term stability. Results showed no statistically significant change for intraclass correlation coefficients (ICCs) a measure of stability over time within individuals.

External validity for the distinct antisocial dimensions has been found in twin studies that have shown evidence for greater heritability of aggressive behaviour compared with delinquent behaviour. Eley, Lichtenstein and Stevenson (1999) compared MZ and DZ twin pairs from 2 studies (1022 Swedish 7-9 year-olds and 501 British 8-16 year-olds) on CBCL /4-18 Aggressive Behavior (AGG) and Delinquent Behavior (DEL) scales. They found heritability, in terms of additive genetic factors, accounted for the variance in individual differences in aggressive (AGG) symptoms in both sexes. Shared environment accounted for most of the variation between MZ and DZ twins' Delinquent (non-aggressive behaviour) especially in boys. Most of the variance in girls', but less so in boys' Delinquent Behavior was predicted by genetic influence. For boys, shared environment played the greatest role in Delinquent Behavior. Correlations between AGG and DEL were accounted for by both genetic and shared environment influences but the former accounted for the majority in girls and the latter for the majority in boys.

The Aggressive Behavior syndrome (AGG) has recently been tested as a predictor of ODD in a family study and Conduct Disorder (CD) in older children. A Dutch twin study by Hudziak, van Beijstreveldt, Bartels, Rietveld, Rettew, Derks & Boomsma, (2003) of the genetic and environmental contributions to Aggressive Behavior from 3- to 10-years-old) supported the Eley *et al.*, (1999) findings and reported that boys were rated as more aggressive (AGG) than girls at all ages by parents and teachers but also that mothers report more symptoms of AGG than fathers, who report more symptoms than teachers. Also AGG was found to be as common in girls as it is in boys for children 3-10 years-old. Clinically deviant scores ( $t > 67$ ) on AGG were more common than on other behaviour problem scales. This study estimated the prevalence of AGG

using cross-sectional analyses and found between 4% and 9% of boys and girls were reported to have scores in the clinical range. Aggressive Behavior (AGG) in community samples has been found to be “a common and stable condition” and in childhood it is a “stable characteristic that persists into adulthood” (Hudziak *et al.*, 2003, p. 576). Aggressive Behavior (AGG) was found to be a strong marker for ODD (Hudziak, *et al.*, 2003). Despite the high heritability factor found for AGG in the Hudziak *et al.* study across age, gender and informant, the authors also emphasize that moderate environmental influences on AGG were found in all cases.

Not all factor replication studies have found support for the cross-informant construct representation of the CBCL however. Hartman, Hox, Auerbach, Erol, Fonseca, Mellenbergh, Novik, Oosterlaan, Roussos, Shalev, Zilber, and Sergeant (1999) used CFA to evaluate construct representation of the cross-informant model based on 13,226 parent ratings of the CBCL/4-18 and 8893 teacher ratings on the TRF across seven different countries. Inadequate empirical support for the cross-informant syndromes and their differentiation was found, and the construct validity of these dimensions questioned.

Koot, Edwin, Van Den Oord, Verhulst and Boomsa (1997) found three distinct sub dimensions to the externalizing factor in a factor analysis of Dutch translated CBCL/2-3 items. Oppositional, Aggressive and Overactive factors constituted the Externalizing scale. Two-year test-retest stability coefficients for the community sample were calculated for the CBCL/2-3 with the corresponding CBCL/4-18 Internalizing, Externalizing and Total Problems scale scores at follow-up. On average the scores were .41, .54, and .60 respectively. They concluded that the Dutch CBCL/2-3 has comparable properties to the American CBCL/2-3 and that its cross-cultural validity is supported.

Research by Achenbach and others has reported that the AGG construct has trait-like properties in the distribution of scores and this is supported by heritability estimates in twin studies. AGG appears to be life-course persistent and to be more influenced by genetic factors (Moffitt, 1993) than Delinquency which appears to be more influenced by environmental factors and social learning in adolescence (Eley, Lichtenstein & Stevenson, 1999). The CBCL/4-18 and CBCL/2-3 Externalizing scales have been widely used as outcome measures, however, fewer have examined the checklists’

construct representation at the item or dimensional level. Those that have done so often find alternatives to the original factor studies. Concerns with factor replicability are discussed further in Part Four along with other methodological concerns. Before this however, Part Three examines the literature on toddler aggression from a developmental perspective and identifies possible contributors to AGG that may help explain the findings of stability noted above.

### **Part Three: Theoretical concerns:**

Although prediction of later conduct problems using measures of early aggression - parent-report as well as observation - is moderate to strong our understanding of the roles of child characteristics- temperament and gender, for example; characteristics of the environment - especially family stressors; and characteristics of the child's important social relationships - parent characteristics, parenting and attachment, in the development of aggression, is less advanced and not particularly furthered by summary score variance on ratings checklists like the CBCL. There is general consensus that aggression in childhood has diverse etiology (Hinde, 1985; Coie & Dodge, 1998). To background the work in the present investigation, which explores the dimensional basis of AGG at the item level, a summary review of developmental definitions of aggression and antisocial behaviour, of concepts of stability used in the study of these constructs, and current models of the development of aggression in childhood especially in regard to possible influences on AGG, will be undertaken

#### **Developmental definition of aggression in toddlerhood and early childhood**

Conduct Disorder (CD), the prototypic categorical diagnosis in the psychiatric disorder model associated with aggression and antisocial behaviour in childhood obscures developmental trends (Connor, 2002). The variation of symptoms with age, the way less severe behaviours emerge first- important in assessing severity - is not considered in the criteria for presence of this disorder. The psychometrically defined AGG and DEL constructs - the overt and covert externalizing subtypes respectively- appear to have discriminatory validity and predictive power from as early as 4 years, however transparency in what mechanisms are involved in development is lacking. Research

points to a possible genetic basis for AGG. Separating out cognitive and motivational processes from any behavioural response or style has proved impossible in the area of trait and personality theory however, (Prior, 1992) and most current developmental models feature a complex, probabilistic interaction of child, environment and relationship characteristics. Studies of age-differences in the form and function of aggression and life-course models of individual differences have only recently begun to address the development of the behaviour with reference to continuity and change, differentiation of behaviours, and consolidation of pre-existing tendencies (Coie & Dodge, 1998). Distinguishing maladaptive from adaptive aggression across any stage of development requires rigorous longitudinal studies that must address each of these aspects (Loeber & Hay, 1987). This section reviews definitional aspects of aggression and antisocial behaviour, the reported stability of the constructs, and the models of which they are part, in order to background the dimensional foundation of the AGG construct.

In terms of frequency of behaviours toddlers and preschoolers are the most 'aggressive' humans (Campbell, 2002; Rubin *et al.*, 1998). Opportunities for aggressive conflict increase with physical maturation in toddlerhood. With increased mobility and coordination the toddler has the capacity to range further and explore spatially. This new physical ability is typically not well-matched by cognitive progress towards understanding other perspectives. The parent-child relationship also undergoes developmental changes between 1 and 2 years, that typically lead to an "ego devaluation crisis" (Ausubel cited in Shaw *et al.*, 2000, p 399). On the one hand, as self-concept emerges, the 1-year-old toddler develops increased intensity of emotion around objects and possessions and engages in more frequent aggressive conflicts with peers, and on the other parents discover an emerging need to set limits and establish rules (Shaw *et al.*, 2000). "As parents begin to exert their will in the second year, expecting at the same time, greater self-regulatory control, noncompliant and aggressive behaviours increase and even more so in the third year" (Shaw, Winslow, Owens, Vondra, Cohn & Bell. 1998, p. 99). At once, the egocentrism of the child is challenged - and parental stress is greater with increased involvement in control. Developmentalists and clinicians have long appreciated that the sense of basic social trust established in infancy must not be undermined by "meaningless and arbitrary experiences of shame and early doubt" as the toddler experiments with the "two simultaneous social modalities: holding

on and letting go” (Erikson, 1977, p. 226). Parental response to subsequent child negativity and tests of authority in the following preschool years is hypothesized to be salient in the theory of coercive social interaction (Patterson, 2002). “Goal-corrected partnerships” in toddlerhood and warm but authoritative parenting are believed to be important in allowing the toddler “the gradual and well-guided experience of the autonomy of free choice” (Erikson, 1977, 226).

Compared with the conceptualisation of adult problems, the definition, course, outcome and treatment of child problems is made difficult by factors such as chronological age, level of cognitive and social development and family background (Campbell, 1998). Age of the child determines problem definition since what are considered problem behaviours at one age (e.g. bed-wetting in school-aged children) may be thought of as typical at another (i.e. toddlers). There is also the perception, as noted above, that behaviour is distinct from intention when perspective-taking - dependent on stage of cognitive development - does not yet allow a child to connect his/her behaviour (e.g. hitting) with its effect on others (i.e. hurting) (Campbell, 1998, p.4). These age-stage factors influence perception of problem behaviour and concerns are additionally attenuated when models (e.g. early verses late onset) suggest recognised problem trajectories. Early but normative disruptive or aggressive-like behaviours have been termed externalizing however, rather than antisocial, in children 5 years-old and under, despite the association with later serious forms of antisocial behaviour (Shaw & Winslow, 1997).

While aggression in toddlerhood is generally considered to be statistically normative (Campbell, 2002), individual differences in the extent to which toddlers engage in aggressive acts have been studied and arguments for a disorder model of aggression during toddlerhood have been explored in part because there appears to be a sensitive period for the development of life-course persistent aggressive behaviour between the ages of one- to three (Patterson, 2002; Moffitt, 1993; Shaw, 2003) ; because predictors of conduct problems in toddlerhood and those related to conduct problems later in childhood and adolescence are similar ; and because interventions with younger children appear to be more effective than with older children (Shaw *et al.*, 2000).



While overactivity, poor regulation of impulses and noncompliance, (e.g., Koot, Van Den Oord, Verhulst, & Boomsma, 1997) are normative and transient behaviours frequently seen in infancy and toddlerhood - periods of transition in development and parenting - (Campbell, Shaw & Gilliom, 2000; Shaw & Winslow, 1997), they are also central in definitions of ADHD, ODD, and CD. The form of children's aggression changes as they develop: from early strategies of physical (hitting) and instrumental aggression (grabbing), to later more verbally mediated aggression. Differentiating adaptive and maladaptive behaviours involves a clear appreciation of the developmental context from which the behaviour emerges.

In the development of measures for the assessment of emotional and behavioural problems of young children attempts to resolve this problem include: considering developmental status, and temperament; considering context and informant in addition to the behaviours that are traditionally considered of concern- externalizing and internalizing problems and problems with regulation -(sleeping and eating) and behaviours that are problematic when exhibited too frequently or too infrequently, as well as markers of trajectories considered deviant (Achenbach, 1991a, 1992; Carter, 2003). Campbell has suggested that the "frequency, intensity, and constellation of symptomatic behavior is relevant to a determination of whether a clinically significant problem exists, as is the wider family and social context of the behaviour" (Campbell, 2002, p.70-71). She proposed that "clinically significant problems are most likely to be evident when a young child shows a constellation of co-occurring problems that are relatively frequent and severe, that cut across domains of functioning (e.g., social, cognitive), are evident across situations (e.g., home and child care), and are expressed with different people (parents, peers, caregivers). Moreover, problems are most likely to persist in the context of family dysfunction and stress" (Campbell, *et al.* 2000). Assessment has thus focused on behaviours that co-occur across time and context- clusters or constellations- rather than individual behaviours, as "symptoms" or "signs of disturbance" (Achenbach *et al.*, 1995; Carter, 2003).

The CBCL /4-18 overt-covert aggression dimension- AGG and DEL- as discussed in the last section, has currently amassed the most empirical research evidence to support its validity. A destructive- non-destructive dimension also has been found in a meta-analysis of 60 factor analyses of conduct problem behaviours in a combined sample of

28,401 children (Frick *et al.*, 1993, cited in Frick, 1998). Orthogonal to the overt-covert dimension parsed by the CBCL/4-18 AGG and DEL syndrome scales a second bipolar dimension – destructive-nondestructive – was found. Other subtypes of aggression have been made according to antecedents and outcomes or goals. Intentionality is a central aspect of most modern developmental definitions of aggression (Maccoby, 1980, cited in Coie & Dodge, 1998; Shaw *et al.*, 2000; Connor, 2002) - though not all (see Loeber & Hay, 1997). It may be possible to characterize persons as reactively or proactively aggressive. Reactive aggression appears to be an angry reaction to a perceived threat (Conner, 2002, p.15) – a response to goal-blocking and features hostile, interpersonal acts. Proactive aggression, on the other hand may occur in “anticipation of self-serving outcomes” (Coie & Dodge, 1998, p.784), such as obtaining a desired reward, and may be influenced by social learning. This reactive-proactive subtype has been found in mainly community samples, predominantly with the age-range 6-12 years-old (Connor, 2002, p.25).

In addition to the role of child cognitive, social and affective development in determining which children are perceived and labelled as *problems*, definitions of aggression and antisocial behaviour are also likely to be influenced by culture, gender and ethnicity. Classification of behaviour as aggressive may be also determined differently depending on the characteristics of the judge, aggressor and victim (Coie & Dodge, 1998). The definition of maladaptive behaviour as “harmful dysfunction”(Wakefield, 1992 cited in Richters & Cicchetti, 1993; Connor, 2002) requires researchers to examine different patterns and subtypes of aggressive behaviour in the context of developmental changes and the influence they have on the way in which the individual responds to key developmental tasks. Developmental changes – especially in toddlerhood- are not always discernable in discrete stages. Identification is necessary, however, before it can be decided whether these behaviours are adaptive or maladaptive. For example, within groups of “aggressive” children considerable variability of behaviour has been found (Tremblay, 2002). Results from a longitudinal study (Tremblay, Chalebois & Gagnon, 1989, cited in Tremblay, 2002) of disruptive prosocial and disruptive nonprosocial boys indicated a more optimistic prognosis for the former. Considering both aggressive or antisocial behaviours and prosocial behaviours in the same children appears to be necessary despite the scarcity of the practice in research thus far.



Aggressive behaviour is understood to be very complex and contemporary theories and subtypes of antisocial, disruptive or aggressive behaviour do not address all aspects of development equally well (Coie & Dodge, 1998). The contemporary developmental psychopathological study of aggression and antisocial behaviour is probabilistic. The lack of an integrating theory or model, however contrasts with the apparent progress made by Achenbach and others towards development of standardized assessment tools that enable comparison with peers across contexts. Achenbach argues that the CBCL syndromes are a-theoretical and thus are best suited to contribute to theory development (1991a, 1992). It is countered, however, that the CBCL represents only behaviour of extreme samples (Macmann & Barnett, 1993) and its dimensions are not precise enough in their characterization of young children's problems to act as a basis for diagnosis and interventions (Campbell, 2002). The analysis of problems of concern as constellations of behaviours that co-occur in referral raises concerns about the discriminant validity of items in the derivation of construct scales, and practical problems for research resulting from the CBCL focus on convergence of multiple sources of information (Macmann & Barnett, 1993). In addition, the overt-covert subtype has yet to show utility in guiding a framework for intervention (Connor, 2002).

### **Stability of aggression**

Although relative aggression appears to decrease over time, longitudinal investigation of individual differences in aggression and antisocial behaviour suggest stable continuity in interpersonal aggressive behaviour for a small minority of boys studied in high-risk samples (Shaw *et al.*, 2000; Coie & Dodge, 1998). Age of onset however, rather than specific kind of antisocial behaviour - aggression for example - is the strongest predictor of later problems. This section examines reports of stability and continuity of aggression and antisocial behaviour in the literature on child developmental studies and compares the variable-centered approach to assessment popular in the psychometric tradition with person-centred assessment approaches.

Most studies indicate overall decreasing aggressive-like behaviour across childhood, due, ostensibly, to cognitive growth but also successful socialization (Shaw *et al.*, 2000). In the Shaw *et al.*, (2000) study whose data the present investigation reanalyses,

for example, a general decline was reported in mother-reported aggressive behaviour rates (means) from age 2 to 5 among 300 low-income boys (Shaw *et al.*, 2000, p. 399). Toddlers learn to control early non-compliant, aggressive and impulsive tendencies as language, cognitive abilities and self-regulation increase.

The clearest individual difference emerging from studies is that of boys and girls. Cummings, Iannotti and Zahn-Waxler (1989) in an observation study of peer interaction of 43 children, found that relative aggressiveness tends to remain stable despite declines in the frequency of aggressive behaviour for both girls and boys between 2-5 years of age. This was true especially for dimensions of physical aggression and among boys. They suggest that one explanation for decreases in bodily aggression and initiations of aggression with age is normatively successful socialization. Girls' aggression has been found to have moderate stability, though not as high as boys'. A greater role of temperament in the continuity of boy's aggression is suggested or differences in early socialization practices (Cummings, Iannotti and Zahn-Waxler, 1989). Clear sex differences in problem behaviour do not emerge until about 4 years of age. Then the increasing divergence has been attributed to a "more consistent decline or lack of increase in problem behaviours for the majority of girls, whereas the majority of boys demonstrate a less consistent decline or in some cases an increase in problem behaviour" (Keenan & Shaw, 1997, p.95). By school entry rates of boys' externalizing disorders are up to 10 times higher than girls', although rates of internalizing behaviour are similar (Keenan & Shaw, 1997, p.95). The differences in level of problem behaviour remain stable until adolescence when girls' rates of internalizing behaviour (anxiety and depression) increase and exceed those of boys.

Much research on the relationship between childhood maladjustments and later outcomes in adulthood focuses on the empirical finding that differences in antisocial behaviour-especially aggressive antisocial behaviour in boys, of all the individual difference constructs studied, are the strongest predictors of antisocial and criminal behaviour in later childhood and adulthood. Olweus (1979, cited in Connor, 2000, p.51) reviewed 16 longitudinal studies of aggressive behaviour in males 2- to 18 years of age, three that included direct observation and thirteen that used teacher ratings, and found stability coefficient to be 0.81 and 0.79 respectively. While antisocial behaviour in childhood appears to be a prerequisite for later problems- studies show that this is the

situation for only a minority of persons. Most antisocial children do not become antisocial adults (Robins, 1978, cited in Moffitt, 1993). Patterson's research however provided evidence of a relationship between stability and extremity of aggressive behaviour (Patterson, 1982, cited in Moffitt, 1993) – the most aggressive 5% of boys in the study were also the most persistently aggressive. Loeber's study (1982, cited in Moffitt, 1993) supported this finding and also ascertained that the most persistently antisocial persons also demonstrated this behaviour across the widest range of situations. Moffitt hypothesized two types of antisocial individuals, often confounded in studies of delinquency: the life-course persistent antisocial type who "engages in antisocial behaviour of 1 sort or another at every life-stage", and an adolescent-limited antisocial type, who is antisocial only during adolescence (1993, p. 674).

More recently, research into aggression in early childhood has found stability of clinically elevated scores, on the CBCL, comparable to that found in older children. Shaw *et al.* (2000) reports that "68-88% of those identified with clinically elevated scores at age 2 continued to maintain clinical status 3 to 4 years later" (p. 400). Age of onset of antisocial behaviour problems is the single best predictor of antisocial behaviour in adults and adult criminal outcomes (Robins, 1966, 1978 cited in Moffitt, 1993). Examining the evidence Connor concludes that "The predictive power of aggression appears to be contained in a young age at onset of CD-like behaviours and not in the type of antisocial behaviours displayed by the child" (Connor, 2002, p. 98). Shaw reports that "If children do not show high rates of aggressive behaviour within the first three years, very few of them will proceed to show elevated rates from age 5 onward....The vast majority of children who exhibit high levels of aggression at school entry are likely to begin demonstrating this pattern by early childhood" (Shaw, 2003, p. 1).

### **The CBCL and concepts of stability and continuity**

Reported stability of symptoms over time and context is considered important in the valid diagnosis of emotional and behavioural psychopathology in childhood. Construct stability is reported in a number of ways in the CBCL literature. Stability is commonly conceptualised as rank stability (Pearson correlations) over time of scores on continuous

scales like the CBCL. Test-retest stability coefficients are often reported between scores at different times (e.g. Achenbach, 1991a, 1992; Koot *et al.*, 1997).

In research extending across the age-ranges specified by the CBCL Achenbach recommends using scales made up from items in both checklists. The Shaw *et al.*, (2000) study, for example, whose data the present investigation re-analyses, utilizes an aggression scale made up of five items of aggressive behaviour that are common to the CBCL/2-3 and CBCL/4-18 (see Table 1) (Shaw *et al.*, 2000, p. 399). The psychometric thresholds, however, currently lack discriminatory validity for the normative range. The CBCL was developed to assess psychopathology – rather than describe or detect individual differences in normal behaviour. Convergent validity is typically assumed when psychometric results correlate with or predict clinical levels of disorders. However the criteria for presence of a disorder – in the DSM paradigm, for example - are not defined empirically. Continuity is typically not differentiated from stability in much research into child behaviour problems and is often assumed when the mean level of the behaviour of interest is constant across the period assessed (Smith, Calkins, Keane, Anastopoulos & Shelton, 2004).

Achenbach's Child Behavior Checklist and supplements, though not initially designed for research purposes, are widely used measures in research on child behaviour and the toddler version typifies the current state-of-the-art empirical assessment of child problem behaviour with its variable-centered approach to stability definition. Nomothetic models, like Achenbach's, posit linear relations between variables. Numerous predictive studies using the CBCL have found linear continuities across wide age-ranges (Achenbach, 1991a, 1992, 1995). Studies typically focus on extreme cases however and "presume linear associations between indices of aggression or disruptive behaviour and indices of social adjustment across the full range of aggression or disruptive behaviour scales" (Vaughn, Vollenweider, Bost, Azria-Evans & Snider, 2003, p. 272-3). The child developmental literature, in contrast, suggests multiple pathways to later externalizing and antisocial behaviour problems (Loeber & Hay, 1997; Patterson, 2002; Shaw, Gilliom, Ingoldsby, and Nagin, 2003; Owen & Shaw, 2003)

Nomothetic models have not been the only methods providing a window to the empirical world. It has been asked, however, whether our theoretical thinking has been

overly influenced by these methods and models for data treatment (Bergman, Eklund & Magnusson, 1991). In conceptualizing the development of disruptive or antisocial behaviours in childhood the literature reveals two fundamentally different approaches, clearly articulated by Bergman, *et al.*, 1991, p. 8). Is behaviour best conceptualized, and developmental continuity demonstrated, by “considering the same variable, measured at different points in time as different but related variables” (Bergman *et al.*...1991, p. 8), an approach typified by ratings scales, or by measuring “indicators of relevant (and partly different) concepts at the different ages”.

The reason for this divergence in approach is related to recent methodological developments that have consequences for both research and theory development. The development of ratings scales in the study of individual differences over the last 20 years, while facilitating more studies on both normative and abnormal child behaviour and subsequent increased confidence in the validity of the instruments and constructs they measure associated with vast accumulation of studies, has served to reinforce a variable-centred, trait-like view of child problems. In addition, because questionnaires and rating scales yield weaker effect sizes, compared with observation or interview measures, sample size generally needs to be higher to obtain comparable percentage of significant effects (Rothbaum & Weisz, 1994). This has, in turn, attenuated the trend towards large sample sizes (Napier, 1972).

It is argued however, (Ozer & Gjerde, 1989) that variable-centered studies offer “little insight into the dynamics of personality change” (p. 484). Whereas with standardized rating scales, individuals are implicitly compared with other individuals on each attribute- producing a variable-centered description - with, for example, Q-sorts, each attribute is compared with other attributes within the same individual- producing an ipsative, or person-centred description (Caspi *et al.*, 1992). Thus morphogenic continuity describes stability in configurations of personality traits within an individual across time (Caspi, 2000). The latter approach is exemplified by ideographic models such as Block’s (1980; 1995).

An ideographic approach posits stability not as the rank order of individuals’ scores – or inter-individual - but as the “constancy of type membership” – or intraindividual stability. Continuity is conceptualized as coherence between different forms of problem

behaviours over time or heterotypic continuity. "Personality continuities are not expressed in the constancy of behaviour across time and diverse circumstance but through the consistency over time in the ways persons characteristically modify their changing contexts as a function of their behaviour" (Caspi, 2000, p. 168). In contrast to the AGG studies which find linear continuities, Moffitt, for example, draws on the concept of heterotypical continuity in the conceptualization of life-course persistent antisocial behaviour (1993) to explain how different kinds of child-parent interaction promote continuity and pervasiveness and produce different kinds of consequences in the life course.

Coie and Dodge (1998), in their review of aggression and antisocial behaviour in childhood, note that reports of inter-individual continuity, mostly derived from parent-reports (rather than observer), alone provide most of the evidence for continuity of the constructs. Despite the "weak intraindividual continuities, the weak factor structure continuity, and process continuity and societal or generational continuity" (Coie & Dodge, 1998, p. 787) – the complex antisocial construct that has emerged in the literature persists.

In sum, studies of high-risk samples suggest that interpersonal stability of aggression is relatively high for the most aggressive children, beginning in early childhood, using observation as well as global ratings measures (Shaw, *et al.* 2000). The methods of analyses – the variable-centered stability coefficient- however, promote a trait-like view of overt aggression that is not supported by person-centered studies which posit multiple trajectories to antisocial behaviour. Evidence for continuity of antisocial behaviour also suggests that discontinuity of aggression and antisocial behaviour is normative for the majority of children. The next section discusses in greater detail the major models of development of aggression and antisocial behaviour in childhood as they may account for dimensional consistency of aggressive or aggressive-like behaviour across toddlerhood.

### **Models of the development of child aggression and antisocial behaviour.**

The development of aggressive behaviour is believed to be mediated by both parent and child factors and characteristics of the parent-child relationship. The association



between risk factors and later aggression and delinquency is stronger for children living in adverse conditions. This implies that there are many different causal factors in operation among children identifiable with CD and antisocial behaviour (Shaw, 2003; Richter & Cicchetti, 1993). In this section factors hypothesized as influential on the course of childhood aggression are identified.

Laboratory research on aggression has typically under-represented the construct. The teacher/learner, essay evaluation, competitive reaction time game, and Bobo modelling paradigms deal only with situations of retaliation which have been sanctioned by the experimenter and by limiting the participants' choice of response to physical forms of harm-doing. Most importantly the intentions and motives of the subjects typically go unmeasured although recent research on coercion has a social-interactionist focus (Tedeschi & Quigley, 1996).

Contemporary models of aggression and antisocial development draw on a range of theories: social learning, or social interactionist theory (Patterson, 2002); social and cognitive processing (Coie & Dodge, 1998); trait theories of psychopathology (Frick, 1998); attachment theory (Greenberg, 1999); and ethological theory (Vaughn *et al.*, 2003). These models compete to describe and explain the development of aggression and antisocial behaviour in childhood, and each has different operational definitions of the construct. The contemporary developmental, psychopathological approach is probabilistic such that different combinations of risk factors, both biological and environmental, may lead to the same disorder. "In the expression of most common mental disorders in childhood no single cause may either be necessary or sufficient" (Greenberg, 1999, p.472). Different theories stress either genetic influences or psychosocial risk, but most involve multiple risk factor models and interactions among risk factors (Connor, 2002). Developmental psychopathology promotes the view that understanding of development is best informed by studying pathways leading to both adaptation and maladaptation, studying both risk factors and protective factors (Shields & Cicchetti, 1997). Recently an organisational approach which conceptualizes "development as the increasing differentiation and hierarchical integration of biological and psychological systems" (Shields & Cicchetti, 1997, p. 906) is more often adopted.



In an examination of studies of parent-child interactions in the etiology of early anti-social behaviour Shaw & Bell (1993) reviewed criteria for a truly developmental approach. It must be reciprocal - not a model of unidirectional influence but complex reciprocal influences within a family where the influence of the child is at least as important. Studies that identify indirect effects (e.g. child influences on parenting) as salient in the prediction of individual differences in later child antisocial behaviour, support a reciprocal approach (Shaw *et al.*, 1998). The models must be transactional - "out of the continual interplay of parent and child behaviour outcomes emerge that are not attributable to either participant alone" (Shaw & Bell, 1993, p. 2; Caspi, 2000).

In addition to the reciprocal moderation of child and parent influences and the transactional nature of the influences, changes in the form of the behaviour of interest must be considered. Transformational, epigenetic or heterotypic change - "developmental changes arising from other sources than interaction may also take on forms not shown in previous stages" (Shaw & Bell, 1993, p. 2) "Change is the hallmark of development, constant and unrelenting, from the infant who is working on the attachment process to the toddler who is engaged in differentiation and development of a self concept to the preschooler learning to function in a peer group" (p. 2). In addition to "nearly continuous universal maturational change in the individual child there is also maturation specific to an ethnic group or family lines" (Shaw & Bell, 1993, p. 2). A transformational approach thus calls for consideration and inclusion of earlier behaviour in any assessment process.

In the next section possible contributors in the literature, to the continuity of the antisocial construct – latent dimensions of AGG – are surveyed. Predictors of early externalizing and later aggression and antisocial behaviour are examined when the literature suggests they are salient to an understanding of dimensional consistency across toddlerhood that may underlie the AGG findings.

### ***Child characteristics***

Aspects of child temperament including negative emotionality or difficulty are often investigated as potential predictors of early externalizing behaviour (e.g. Chess & Thomas, 1984, cited in Owens & Shaw, 2003; Rothbart & Bates, 1998; Bates, Pettit, Dodge and Ridge 1998). Research on temperament suggests that aggression is related to

'difficult' temperament but is strongly influenced by environmental factors (Proir, 1992). Olweus (1980) found for example, that stability of aggression in boys is related to temperamental level of activity and intensity, but only in combination with other environmental factors which include negativism in the basic emotional attitude of the principle caregiver *plus* mother's permissive attitude towards aggression *plus* parental discipline using power assertion rather than negotiation or reasoning *plus* boy's temperamental level of activity and intensity interacted with mother's negativism (cited in Meadows, 1986).

Findings from the Australian Temperament Project similarly suggest that throughout childhood children with difficult temperament are at increased risk for behavioural problems but only when combined with other variables such as mother's perception of the child as difficult, prematurity, and early developmental problems. In this study hostile aggressive behaviour in preschool and primary- aged children correlated significantly with the temperament factor of inflexibility and with 'difficult temperament' (Prior, 1992).

Boys and girls have different social learning experiences depending on their temperamental characteristics. For example girls may be socialized into feeling guilt and shame about aggression. Keenan and Shaw (1997) have investigated how girls' early problem behaviour is directed into predominantly internalizing problems during the school age period. Prior also points out that strong socio-cultural and social class influences make it impossible to generalize temperament research findings from one population to another. Different types of hostility are linked to family background- the social desirability of 'moderate aggression' and its cultural definition (1992).

The important lesson here is that a problematic temperament is not absolute but depends on the context in which it finds expression (Prior, 1992). This is indicated in the moderate environmental influences on AGG – which always accompany the robust genetic influences - found in twin studies such as the one noted in the previous section (Hudziak *et al*, 2003).

Current developmental theories of emotional and behavioural problems focus on reciprocal interactions between environmental correlates and child characteristics.

Moffitt (1993, p. 679), for example, attributes the origins of life-course persistent antisocial behaviour to interaction between “neurophysiological vulnerabilities and criminogenic environments”. Moffitt indicates that “Individual variations in nervous system health provide material for subsequent person-environment interaction”.

Caspi (2000) has reviewed the different ways that personality interacts with environment, termed “personality transactions”, and the way they contribute to continuity: “Social, cognitive and behavioural processes underlying continuity take place in the context of new interpersonal interactions with different people in different developmental settings: parents, siblings, peers, co-workers, and partners are variously drawn in at different points in the life course as accomplices in the maintenance of continuity”(p. 169). Reactive transactions between person and environment are those where different individuals respond differently to the same experience; evocative transactions are those where distinct responses are evoked depending on personality characteristics of the individual; and proactive transactions involve the selection or creation of environments (Caspi, 2000; Shiner & Caspi, 2003; Caspi *et al.*, 2003).

There is support for linkages between infant negative emotionality and subsequent level of externalizing problems, as measured by maternal report (e.g. Chess & Thomas, 1984, Shaw, Vondra, Hommerding, Keenan & Dunn, 1994, cited in Owens & Shaw 2003; Bates *et al.*, 1998). Owens and Shaw illustrate three ways that negative emotionality may be implicated in the development of externalizing problems: direct effects - individual differences in negative emotionality, where one is temperamentally predisposed to the development of externalizing behaviour; indirect effects- high levels of negative emotionality may evoke caregiver responses – e.g. explosive or rejecting behaviours hypothesized as salient factors in the development of externalizing behaviour; or latent biological processes may be complicit in both concurrent negative emotionality and the later behaviour problems (Owens & Shaw, 2003).

While it appears almost impossible to distinguish between early difficult temperament and early externalizing problems (Olson, Bates, Sandy and Lanthier, 2000), in older children conceptual parallels appear to exist between the study of the structure of temperament and personality and the study of psychopathological levels of child emotional and behavioural problems. Empirical evidence of association between

dimensions of child temperament and aggression will be discussed in detail in Part Five where the conceptual overlap between dimension emergent in personality structure and externalizing problems are examined. Studies that have examined growth curves - relations between temperament and increases in rates of externalizing behaviour, rather than merely level of problems - will be discussed in the section on models of the development of aggression and externalizing behaviour.

### ***Parental characteristics***

Parental characteristics, including psychopathology, interparental conflict, criminality, and mood disorders, for example maternal depressive symptomatology (Shaw, Gilliom, Ingoldsby & Nagin, 2003), have been hypothesized as contributors to child aggressiveness. Sources of family stress: marital conflict over child-rearing practices; and quality of maternal social support outside the family, have been identified as salient correlates of child disruptive and antisocial behaviour (Shaw *et al.*, 2000). The present review focuses on theories that describe or explain behaviour within the dyadic system. Wider influences on behaviour are discussed as mediated by the parent-child system. Chronic family adversity in the form of multiple family stressors is the strongest environmental correlate for aggression and antisocial behaviour (Shaw *et al.*, 2000). Given that normative socialization is widely believed to be responsible for the overall reductions in aggression over early childhood, family adversity is likely to affect child behaviour most through compromised parenting. It is generally agreed that children do not need aggressive models to learn aggressive behaviour. Infants are often physically aggressive when angry, and children appear to develop aggressive play-fighting spontaneously (Tremblay, 2002). Instead, early aggressive behaviour problems and externalizing problems are believed to develop out of the early interaction between the child and his or her social environment (Tremblay, 2002).

### ***Parent-child relationship characteristics***

Parenting has been studied as a risk factor for child behaviour and emotional problems. Coercive family interactions (Patterson, 2002) feature aggression. Individual differences in infant security of attachment include patterns that are associated with coercive child behaviour and that predict clinical levels of externalizing behaviour in later childhood (Lyons-Ruth, 1996). Parenting factors reported in studies in the

literature on the development of aggression and externalizing problems include maternal responsiveness (e.g. rejecting and accepting parenting) (Shaw *et al.* 2000), discipline practices and power-assertive parenting practices (Tremblay, 1995), including punitive parenting and lack of positive parental involvement (Petite & Bates, 1989, cited in Olson *et al.*, 2000), and recently - maternal perception of child's responsiveness (Olson *et al.*, 2000). These developmental studies report transactional processes and heterotypic continuities in their findings of significant temperament or personality/parenting interactions.

### *Coercive relationships*

In Patterson's model of early starter aggression infant and caregiver exchanges are embedded in a contextual matrix and reflect complex processes. The influence of biological processes-birth complications, genes - or intrusions-divorce, depression and maternal stress on child behaviour is mediated by characteristics of the infant-caregiver exchanges (Patterson, 2002). Patterson's social interactionist model of early starter aggressive behaviour posits relations between coercive discipline and childhood aggression. An overall family process emerges early on in which "parental lack of social competence, parental antisocial trait, and child difficult temperament are risk factors that predict a larger family context where the coercive child has not learned the prosocial skills necessary to form close relationships with parents or peers, was not taught to engage in disciplined effort and had not learned to accept critical feedback" (Lyons-Ruth, 1996, p. 65). This results in "early peer rejection, and the omission of critical peer learning experiences in how to socialize and form intimate relationships" (p. 65). Many studies support this model (e.g. Rothbaum & Weisz, 1994) and place coercive parenting in the broader context of "rejecting parental behaviour characterized by the absence of warmly approving, autonomy respecting and contingent parental responsiveness" (Lyons-Ruth, 1996, p. 65).

### *Attachment*

The growth of goal-corrected partnerships which characterizes the shift from Phase III to IV in Bowlby's model of attachment formation and development (Bowlby, 1982 cited in Ainsworth, 1990) may be potentially relevant to understanding development of aggression and externalizing behaviours. Kochanska's research (1991, 1995, 1997 cited in Rothbart & Putnam, 1998) demonstrated that attachment security is important in

the development of conscience in relatively fearless 4-years-olds. Attachment researchers have hypothesized that the nature of attachment undergoes evolutionary-endowed developmental changes. With increased mobility infants need signal behaviours that ensure proximity of the attachment figure, and a "goal-corrected homeostatic mechanism that leads him actively to seek to maintain a tolerable degree of proximity" (Ainsworth, 1990, p. 467). Goal-corrected partnerships are facilitated by the 'package' of interrelated developmental changes that take place during toddlerhood including cognitive advances - development of language, perspective -taking and the ability to negotiate shared plans of action – and changes in attachment behaviour itself: "ability to tolerate separation from attachment figures for a longer time with less distress, contentment upon reunion with mere presence of and interaction with an attachment figure rather than requiring close bodily contact, and advances in locomotion that enable the child to venture farther away from home base to explore the world and link up with playmates" (Ainsworth, 1990, p. 467).

Disorganized infant attachment behaviours appear to be precursors to coercive child behaviour (Lyons-Ruth, 1996). Disorganized refers to the "apparent lack of or collapse of a consistent strategy for organising responses to the need for comfort and security when under stress" (Lyons-Ruth, 1996, p. 67). Lyons-Ruth *et al.*, (1993?) found three summary measures of maternal and infant functioning in a low-income sample at 18 months, as well as measures of cumulative demographic risk and gender, predicted deviant levels of hostile aggression towards peers in kindergarten (p. 68): infant security of attachment, serious maternal psychosocial problems and maternal hostile-intrusive behaviour towards the infant at home. "Preschooler with highly hostile behaviour were six times more likely to have been classified as disorganized in their attachment relationships in infancy than to have been classified as secure" This disorganized behaviour included a high level of avoidance (Lyons-Ruth, 1996, p. 68).

The preschool analogue of Disorganized behaviour, termed controlling-disorganized, has been related to aggressive behaviour in two cross-sectional studies of clinically-referred preschoolers (Geeenberg, Speltz, DeKlyen & Endriga, 1991; Spelt, Greenberg & DeKlyen, 1990, cited in Lyons-Ruth, 1996). Oppositional children were significantly more likely than those children in the control group to show insecure attachment patterns, with a majority of oppositional children classified in the controlling-



disorganized category (Lyons-Ruth, 1996, p. 69). Lyons-Ruth, Esterbrooks & Cibelli (cited in Lyons-Ruth, 1996) found that a deviant level of externalizing behaviour at school at age 7 was correctly predicted in 87% of cases from infancy assessments (p. 69). Disorganized infant behaviour is related to "parent unresolved fear transmitted through behaviour that is frightened or frightening to the infant" (p. 69). One dimension, on the Adult Attachment Inventory that has predicted aggressive behaviour in young children is mothers' insecure-unresolved attachment to their own caregivers (Olson *et al.*, 2000).

Lyons-Ruth relates that "a heightened incidence of distress and dysphoria seems to characterize many children with early onset aggression from infancy onward". In infancy this is seen in "helpless, apprehensive or depressed infant behaviours, that contribute to the disorganized behaviour classification, in the heightened incidence of distress among disorganized infants when observed at home and around separation and reunion episodes with parents in the laboratory" but also in the "mixed patterns of internalizing and externalizing symptoms displayed by oppositional children in preschool" (Lyons-Ruth, 1996, p.70). "Attachment theory would trace this dysphoria to the disruptions in functioning of the child's primary attachment relationships, which leave the child without an organized, relationally oriented strategy for regulating felt security" (Lyons-Ruth, 1996, p. 70).

### ***Integrative models***

In addition to the coercive family process model and the attachment model, in developmental psychopathology a number of other models follow children at risk for aggression and antisocial behaviour over time and attempt to predict, through developmental trajectories, desistance and persistence of the behaviour of interest. Shaw and Bell's (1993) criteria for a truly developmental approach to early antisocial behaviour are not always met by these models however, and some contribute to a sense of the problem being 'in the child', but they are described briefly here.

Loeber, Keenan, Lahey, Green and Thomas (1993, cited in Connor, 2002), based on findings from their longitudinal Pittsburgh Youth Study, have proposed a two-pathway model that maps an orderly sequence in the emergence of Conduct Disorder (CD). Beginning in infancy and early childhood a normative pathway depends on "slow



process of socialization under the influence of normative and appropriate parenting and school pressures” which results in a lessening of oppositional and defiant behaviours from around 6 years of age (1993, cited in Connor, 2002, p. 250). A deviant pathway however, initially also involves normative individual differences in temperament – specifically oppositional and difficult temperament - stubbornness and defiance - but then, with the influence of child risk factors, and peer factors, parenting and family characteristics, leads to covert aggression, overt aggression, property damage and violence.

Lahey, Waldman, and McBurnett’s probabilistic model (1999, cited in Connor, 2002) defines a construct “antisocial propensity”, a characteristic of the individual based on individual difference studies, that interacts with environmental variables over the course of development and allows an estimation of the individual’s risk for the expression of antisocial behaviour. Temperament, parenting and peer factors are integrated in this study.

Loeber and colleagues also propose a multiple-pathways model (Loeber & Hay, 1997) that attempts to account for the apparent progression from minor aggression to violence between childhood and early adulthood. Based on age trends that suggest minor forms of aggression and antisocial behaviours generally precede more serious forms but that there is a general decrease in prevalence of physical aggression, the model demonstrates three different paths for different types of aggressive and antisocial behaviours: an authority conflict path, a covert pathway and an overt pathway (Connor, 2002). Loeber and Hay suggest that there is an orderly sequence of aggressive acts of increasing severity over time through which individuals progress (Loeber & Hay, 1997). The authority conflict pathway begins earliest with stubbornness and defiance and leads eventually to behaviours like truancy. By itself this pathway has benign outcomes, but some boys also engage in, or commence either covert or overt (or both) aggressive behaviours. The model shows that different combinations of pathways are stronger indicators of more serious outcomes; especially when boys fit criteria for all three at once, or the dual covert-overt or authority conflict-covert pathways.

Working from a model that attempts to bridge attachment theory and learning theory in an integrated developmental theory of aggression in childhood, Shaw and colleagues

have found interactive effects in the caregiver-child relationship as significant in explaining individual differences in externalising behaviour (Shaw & Bell, 1993; Shaw *et al.*, 1998; Patterson, 2002). Researchers have found that especially for boys, the combinations of maternal responsiveness and infant persistence at an early age, and child noncompliance and maternal rejection or hostility during toddlerhood are salient reciprocal and interactional effects in parent-child relationships that feature externalizing behaviour as reported by mothers (Shaw *et al.* 1998; Shaw, Gilliom, Ingoldsby, & Nagin., 2003).

### ***Parenting/temperament interactions***

Maternal acceptance of child behaviour has been hypothesized as having indirect effects on the decrease of externalizing problems in infancy and toddlerhood. Acceptance may enhance the parent-child relationship and thereby increase the effectiveness of socialization attempts. In addition or alternatively, acceptance may “positively influence child self-esteem, both of which may decrease the likelihood of future behaviour problems” (Owens & Shaw, 2003, p.576). Recent study demonstrated that the frequency of positive interaction among mothers and preschool children with conduct problems - specifically amount of time spent in joint play at age 3 – is associated with improvement in conduct problems at age 4 (Gardner, Sonuga-Barke & Sayal, 1999, cited in Shaw, 2003)

Discipline practises and power-assertive parenting practices are implicated in development of aggression, and externalizing problems (Tremblay, 1995), and development of conscience (Kochanska (1991, 1995, 1997, cited in Rothbart & Putnam, 2002). Punitive parenting which involves toddlers in restrictive interaction with their mothers is associated with later externalizing problems (Bates *et al.*, 1998 cited in Rothbart & Putnam, 2002, p. 31). Parenting practices however are moderated by child temperament characteristics, discussed later in the review in the section on overlap of temperament dimensions and psychopathological dimensions. Positive parental involvement appears to be a protective factor in that toddlers who experience warm and supportive interaction with parents tend to display the lowest levels of externalizing behaviour in preschool and middle childhood (Bates *et al.*, 1991, cited in Olson *et al.*, 2000).

While factors associated with aggression in preschool and early school years have been identified, association of these factors with contemporaneous individual differences in aggression in toddlerhood have also been explored. Rubin , Hastings, Chen, Stewart & McNichol (1998) found mother-rated dysregulated temperament, and mothers' use of warmth and negative dominance during interactions with their children predicted toddler aggression and mother-rated externalizing problems. Children with relatively poor emotional self-regulatory skills and who had mothers who used high rates of aversive and controlling behaviour were most likely to behave aggressively towards their peers. Girls' aggressive behaviour, however, was mainly associated with poor self-regulatory abilities. Both parent provision of structure and regulation to social experiences, as well as opportunities to practice emotional self-regulation are indicated as elements in reducing risk for aggressive and antisocial behaviour. Emotional regulation " involves the altering or moderating of affective reactions within eliciting situations, such that appropriate and adaptive responses to such situations are more likely" (Thompson, 1990, cited in Rubin, *et al.*, 1998 ). Emotional dysregulation is thought to underlie the dispositional component to toddlers' tendency to start conflict.

### ***Ethological Studies***

The dominant view in current theories and studies on aggression and disruptive behaviour in peer settings in childhood tends to characterize such behaviours as necessarily maladaptive, antisocial and dysfunctional (e.g. Coie & Dodge, 1998; Rubin *et al.*, 1998). Ethological studies have long maintained that social context is important in understanding aggression. They have noted that social dominance issues are often resolved by episodes of aggression, and argued that established dominance relations function, in the long term, to reduce the overall level of group conflict (Vaughn *et al.*, 2003).

Recent ethological approaches to the study of aggression in children go further in suggesting that aspects of aggressive behaviour considered by most theorists to be maladaptive, and this includes verbal aggression, may instead be adaptive in the sense that they contribute to social competence (Vaughn *et al.* 2003). In the study by Vaughn *et al.* (2003) associations were investigated between three Q-sort ratings measures of "aggressive" preschool children derived from observation of 3 and 4-year-old preschoolers using - coercive, dominant and brittle behaviours - which were

demonstrated to cohere with direct observation of initiated negative interaction - and a composite measure of seven broad-band, direct-observation measures of social competence that “reflect children’s social behaviour with peers leading to attainment of social goals” (p. 249). In two samples – a Head Start sample and a community sample, the authors found a number of the negative behaviour/aggression variables correlated positively with social competence and the “dominant” variable correlated positively with all seven social competence indicators. Higher rates of initiating negative interaction – akin to “assertion” – as well as characteristics of the “dominant” variable - testing and stretching boundaries set by adults, feistiness, and willingness to share possessions - characterized socially competent children. Often central figures in their groups, these children frequently use pro-social strategies and interact positively. However, they are also verbally and physically dominant in relation to peers and use aggressive tactics to attain their social goals. The authors found: “They are more aggressive and more pro-social than their peers, and are also more pro-social than they are negative in their initiated interactions” (p. 270). The normative expectation that more aggressive behaviour and initiation of negative interactions would be observed in younger children than older ones was confirmed. Higher scores on the “dominant” scale disconfirmed the evidence in the literature in that aggressive children are disliked by peers. The implication of aggression in certain contexts being indicative of social competence is that a focus on diversity of motivation and meaning, rather than an assumption of linear relationship with indices of social adjustment – as implied by the CBCL approach – is appropriate.

### ***Dynamic systems research***

The present review focuses on theories that describe behaviour within the dyadic system. Wider influences on behaviour are considered as mediated by the parent-child system, but acknowledgement must be made of studies that draw on theories of change within wider systems. Transactional approaches have been applied to conceptualizing individual differences in behavioural change as a result of interchanges within the dyadic system but also to individual differences in dyadic behaviour. Dynamic systems theory (DS) research suggests that differences in parental responses - increase in hostility to aversive child behaviour - are implicated in the phenomenon of covarying externalizing and internalizing scores on emotional and behaviour problem measures like the CBCL (Dumas & Lafreniere, 1995; Granic & Lamey, 2002). Recent studies

have begun to tease apart the sequences, or "temporal patterning" of parent-child behaviours that may differentiate groups of predominantly "pure" externalizing verses covarying externalizing and internalizing older children (Granic & Lamey, 2002).

In this section developmental theories of aggression in childhood were examined, and models that may contribute to our understanding of the reported consistency of aggression and the AGG construct were identified. Although path analyses (Achenbach, 1995) and twin studies (Eley, *et al.*, 1999) suggest AGG taps into a early-starting life-course persistent aggression construct, predictive of later socio-emotional problems, the difficulties experienced establishing which mechanisms are involved in the predictive power of the AGG and DEL and DES constructs, and evidence from developmental studies indicating that indirect effects and reciprocal, transactional models rather than main-effect models may be the most salient, raise questions about whether, in fact, the description of AGG as a homogenous trait-like construct is deserved. Methodological concerns will be addressed in detail in Part Four.

#### **Part 4: Methodological concerns with the CBCL**

In addition to theoretical concerns a raft of concerns with the CBCL methodology is evident in the literature. This section collates the main concerns.

##### **Concerns with parent-report measures**

Parent-reports like Achenbach's CBCL take advantage of the unparalleled closeness or intimacy of the informant to the subject- a huge advantage in researching toddlers - to gather information. This is especially important in the assessment of behaviours like aggression which have low base rates. The issue of informant "bias" however, is important in examining construct validity of the CBCL Aggressive Behavior syndrome. One of the major innovations of the checklist developers (Achenbach and McConaughy (1987) was to use multi-informants to increase the ecological validity of the measure. In clinical settings and, for the CBCL/4-18, in conjunction with the TRF and YSR this is possible. Participant "bias" is then an important source of information according to Achenbach, since, for example in assessment for child abuse, with the assumption that data from multiple participants will be collected and compared, inflated scores from one source may indicate knowledge or involvement (Achenbach, 1992, p. 161).

However, the reliance on questionnaires and checklists in research into early childhood emotional and behavioural problems, especially in the study of the influence of parent behaviour on child outcomes, has received criticism. Most importantly the results themselves are often contradicted by those from other kinds of measures, for example observation, suggesting a confound between mothers' perception and child behaviour. After over a decade of intensive use of questionnaire measures in the individual differences field the emerging evidence of observer bias inflating the magnitude of relation when parental reports are used to assess both child characteristics and later outcomes, suggests a confound between parent's perception of their child and the child's actual behaviour (Shaw & Winslow, 1997; Rothbaum & Weisz, 1994). Mothers of children with behaviour problems have been found to report more depressive symptomatology. Depressed symptoms, however, are related to parental perception of behaviour problems which confounds observed associations (Zahn-Waxler, 1990). Given that ninety-five percent of the respondents for the normative sample used in the CBCL/2-3 were parents and that the CBCL/2-3 is not adjusted for social desirability (Achenbach, 1992), rater bias is a likely issue despite research reported in the CBCL/2-3 manual that implies otherwise. Achenbach claims that elevated problem scores on the CBCL obtained from depressed mothers do not necessarily indicate "biases" because studies show that scores reflect more actual problems in their children than among the control group (1991a, 1992). Research studies of the relationship between maternal affect and discrepancies in maternal reports of child symptoms are divided in their findings but many report that maternal affect has a role in both increases in child symptomatology and maternal reporting distortions (Briggs-Gowan, Carter & Schwab-Stone, 1996). Williams and Carmichael (1991, cited in Howe, 1995, p. 176) for example, found that "depressed mothers perceived more behavioural problems in their 4-year-olds than mothers who were not depressed, even though the children were in fact no worse behaved than their contemporaries".

It is recognized that parenting behaviour moderates the stability of children's behaviours (Campbell, 1998). One explanation that has been made for the observed decrease in aggressive behaviour over childhood, for example, has been the forces of socialization in the home (Shaw, 2003a, p.2). Studies that utilize only parent ratings of behaviours or child characteristics – e.g. both temperament (infant difficulty) and later problem



behaviours (externalising) and also maternal reports of depression and child behaviour problems, have shown low correlations with observational measures (Shaw & Winslow, 1997, p. 151). The parent's stable perception of the child, rather than the child's behaviour, is indicated as the main influence on the relation between infant temperament and later externalising problems. This observer bias may be important to a child's outcome, however, "by influencing the relationship between the parent and the child and ultimately increasing the use of parenting techniques that may promote externalising behaviour problems (e.g. harsh discipline, uninvolved, permissiveness" (Shaw and Winslow, 1997, p. 151).

In sum, the confound between parent perception of their child and the child's actual behaviour is an issue unaddressed by the CBCL. Parent report measures, however are an invaluable source of information on the dyadic relationship and may conceal latent dimensions of the indirect, reciprocal effects understood to be central in the development of later antisocial behaviour.

### **Concern about sample selection**

Issues around sample selection in research with young children and the interpretation of data from different samples in psychometric research have been identified as threats to the validity of instruments like the CBCL (Drotar, Stein & Perrin, 1995; Weisz *et al.*, 2003). The lack of agreement on a general definition of psychopathology in young children makes investigation of association between early externalizing behaviour and later outcomes problematic since no diagnostic criteria exist for identifying children with externalizing behaviour problems at a young age. In addition the practice of sampling based on assessment of children at a single time point may lack validity given the rapid rate of development in early childhood.

The way both the CBCL's clinically-referred and normative samples were drawn, means that relying on these norms instead of a comparison group may be problematic. Clinically referred children are a "particular sub-group of children among a much larger group who demonstrate high rates of psychological symptoms in a particular community" (Drotar *et al.*, 1995, p. 128). The CBCL clinical sample was not recruited from a representative sample of all American children referred for mental health



services – but from a range of child services, including university and hospital clinics, for example. These referred children may demonstrate behaviours that, compared with their age-mates, are irritating to parents – problems of concern – yet their age-mates may have levels of behaviour problems that are similar – but they are not referred (Drotar *et al.*, 1995). As a result, the rates of prevalence of disorders in a particular community as assessed by the CBCL may be very different from the rates reported for the clinical samples of the checklist. In addition it is clear in reviewing the literature that parental tolerance (Campbell, 1990, p.10) and characteristics of the parent- child relationship influence referral for evaluation and ultimately the diagnostic process.

In a similar way the CBCL normative sample was formed by excluding children who had been referred to mental health services and children who were developmentally retarded/delayed (Achenbach, 1991a 1992). Comparing a particular sample with the standardization sample, which lacks representativeness, consequently may result in speciously high frequencies of behavioural symptoms (Drotar *et al.*, 1995).

### **Methodological concerns**

The question of whether the methodology is adequate and the “degree to which ‘core syndromes’ or ‘prototypical features’ of individual difference dimensions have been identified” is seldom raised (Macmann & Barnett, 1993). The difficulties reported by reviewers of the CBCL/2-3 appear to reflect issues with factor analysis (FA) used to identify its syndrome dimensions. Doll points out that the CBCL’s roots in empiricism represent both “its greatest strength and its most striking weaknesses” (Doll *et al.*, 1998, p. 220). Despite the relative advantages of ratings scales their application over the past decade in the study of individual differences within the dyadic tradition in developmental psychopathology has been tied in to assumptions about samples that do not match the current theories. “Most of our current research methods and analytic techniques (e.g. regression analysis, t tests, path analyses) rely on strategies that aggregate overtly similar subjects into one group or another (e.g. aggressive or non aggressive children) to conduct group-level statistical analyses” (Granic & Hollenstein, 2003, p. 642). Although the recent focus on aggression in childhood has been on heterogeneity the variability “cannot be systematically addressed because multivariate analytic strategies carry an a priori assumption of within-group homogeneity” (Granic & Hollenstein, 2003, p. 642). Exploratory factor analysis can often simplify and make reportable huge amounts of otherwise incomprehensible data. However, when

interpreting the results afforded by factor analysis, “one must be mindful of the ways in which the method may suggest more than is supportable” (Block, 1970). Most importantly the decisions implicit in any analysis must be transparent and supported by conceptual argument in addition to empirical work. Exploratory factor analysis (FA) has been used to ascertain syndrome validity (e.g. Hartman *et al.*, 1999) but this procedure itself comes with numerous caveats (Block, 1995).

Because syndromes are derived by principal component analysis of the behaviour problems of referred children their titles, although appropriate to group patterns of behaviour, may not be accurate for a particular child’s individual profile. The user, Doll cautions, must “examine carefully the meaning of a syndrome score given the items endorsed for that child”.

The two major innovations of Achenbach’s CBCL and supplements – the prototype-matching approach to syndrome derivation and the convergence of multiple– informant data – are problematic for construct derivation and the investigation of dimensionality. These issues will now be addressed.

## **Syndrome derivation**

### ***Concerns about covariance of scales and setting of cut-points***

Shared variance resulting from items scoring on more than one scale raises correlations between supposedly different constructs and compromises the discriminatory power of the scales, making conventional research approaches untenable. Overlap of items between scales on the CBCL/4-18 is of major concern for both research and clinical practice. Covariance is often unexamined or unreported.

Unlike the toddler checklist (CBCL/2-3) a number of items are meant to be scored in more than one scale on the CBCL/4-18. (See table 2.) Achenbach suggests using the “problems and patterns manifest in the profiles” (1991a, p. 186) for clinical and research applications. However, the double scoring of items, which inflates correlations between scales, compromises the discriminant validity and hence the utility of the checklist. It is necessary to approach scoring knowing “the discriminant validity of each individual item and then counting items on one scale only” (Heubeck, 2000, p. 447). In clinical practice with individual clients “considerable caution will continue to be necessary in the interpretation of intraindividual profile differences” (Heubeck, 2000, p.

447). While items are not scored in more than one scale on the most recent version of the CBCL 6-18 (Achenbach & Rescorla, 2001), covariance is under-studied.

The CBCL was not developed to identify specific predictors or course of a syndrome and many argue that the overlap in scale items is a major obstacle to examining comorbidity issues (Lengua *et al.*, 2001; Macmann & Barnet, 1993). The broad-band scales are highly correlated with each other and the subscales are often more highly correlated with each other than results across informants.

**Table 2. Items that are scored on more than one scale on the CBCL/4-18 (Achenbach, 1991a).**

#47.(originally #45) <i>Nervous, high-strung, or tense</i> is scored in both the Anxious/Depressed and Attention Problems subscales
#56.(originally #62) <i>Poorly coordinated or clumsy</i> is scored in both the Social Problems and Attention Problems subscales
#77. <i>Stares into space or seems preoccupied</i> (#80 <i>Stares blankly</i> on the CBCL/4-18) features on three subscales- Withdrawn, Thought Problems and Attention Problems.
#90 (#103 on the CBCL/4-18) <i>Unhappy, sad or depressed</i> is scored on both the Withdrawn and Anxious/Depressed subscales.

Note: Renumbering used in the present investigation is given with original numbering in brackets.

#### ***Concerns about the comprehensiveness of CBCL item set***

In addition to shared variance due to overlapping scales, another issue – relevant to both checklists – is the inclusion of factorially complex items meaning some items are included in scales they are not intended to measure. Content validity of the CBCL was approached by comparing scores obtained by clinically referred children with demographically matched nonreferred children. Because significantly ( $p<.01$ ) higher

scores were obtained by clinically referred children on nearly all the problem items, Achenbach argues that the checklist measures problems of clinical concern to parents and mental health workers as intended. Achenbach admits, however, that referral status is not an infallible criterion of children's needs (1992).

Many researchers of aggressive behaviour disagree that syndrome scales are useful in capturing the salient features of aggression (Loeber & Hay, 1997). The items of the checklist describe a very broad array of specific emotional and behaviour problems initially collected from parents and a range of mental health professionals. Parents are requested to rate each item that describes the child currently or within the last 6 months (2 months on the CBCL/2-3) on a Likert or three step response scale (0, 1, 2), circling 2 if the item is very true or often true of their child; 1 if the item is somewhat or sometimes true of their child and 0 if the item is not true of their child. One criticism of the definition of aggression in global measures like the CBCL is that they contain too few aggressive behaviour items and these are often combined with many items describing other behaviours. Tremblay notes that the "stretched definition of aggression is observed in the extensively used CBCL" (Tremblay, 2002, p.72) since only 3 out of 23 items on the aggression scale describe physically aggressive behaviours. They rely on aggression scales that are externalizing scales or disruptive behaviour scales neither of which are rigorous in the way they operationalise aggressive behaviour such that better studies and diagnoses may result (Tremblay, 1991). Some researchers, concentrating on objectively verifiable effects, for example Loeber & Hay (1997), have defined aggression without the "intent" aspect and devised models that exclude "studies based on aggression scores derived from factor analyses that often include other problem behaviours as well" (Loeber & Hay, 1997, p. 372).

Achenbach's preference is for (continuous) syndrome scales which, unlike DSM diagnostic categories, capture quantitative variations in intensity of problems (1991a, 1992). Ratings methods can reflect behavioural context and are sensitive to coherence over time in the context of underlying behavioural change, when items describe the organization of behaviour and include situational factors. The use of rating checklists that conceptualize traits as general tendencies to display certain behaviours, however, removes contextual variation. The CBCL asks respondents to recall how often a behaviour occurs over a specified period of time. Many items refer to frequency-

*Screams a lot, Plays with own sex parts too much*, and many are context-free - *Hits others*. Others imply context - *Seems unresponsive to affection* but aggregate and focus attention on behaviour tendencies rather than context. It was in reaction to the behavioural approaches of the 1960's and 1970's that emphasized determinants of specific behaviours that Achenbach developed standardized measures that facilitate comparison of data for a particular child with those for reference samples of peers of the same sex and age, as rated by the same type of informant (Achenbach, 1991a, 1992). However, for all the CBCL focus on convergence of multiple-informant data, comparing results from multiple informants does not alone reveal how participants' judgments relate to actual behaviour (Wright, Zakriski & Drinkwater, 1999). Achenbach's use of ratings scales that access global tendencies as traits limits the comprehensiveness of the measure since syndrome scores that focus on frequency appear to primarily measure overall behavioural output (Macmann & Barnett, 1993).

Criticism of the ability of the concept of externalizing – internalizing to comprehensively describe personality can be found in the literature. Block and Block criticised the concept as being “imprecisely specified and without a position in a theoretical system” (Block and Block, 1980, p.45). Although writing prior to the formal conceptualisation of the concept by Achenbach they noted that “it appears to be concerned with whether need tensions are discharged via external, action modes of expression or whether needs are routed internally into cognitive and visceral channels of discharge” (p.45). The direction of a motivated response “carries no necessary implication regarding the immediateness of, or the controls on, that motivated response” (p.45), concepts that are central to the model of ego-functioning (Block & Block, 1980), which conceptualises dimension and styles of personality based on Freud's theory of the ego.

Studies that have included situational factors confirm that measures of conduct problems in childhood that focus on the broad-band dimensions - externalizing and internalizing - may confound important subtypes. A study of prevalence and stability of antisocial behaviour in a normative sample of preschoolers, for example, found support for conceptualizing antisocial behaviour in early childhood as consisting of both overt and covert dimensions where overt behaviour involved direct confrontation with others

and covert behaviour involved explicitly avoiding confrontation (Willoughby, Kupersmith & Bryant, 2001).

It has been argued that questionnaires and global ratings may not be sensitive enough to capture the dynamics within relationships that affect behaviour (Granic & Lamey, 2002). Recent research by Wright, Zakriski and Drinkwater (1999) that takes a conditional approach to personality and focuses on if-then contingencies between contexts and people's responses to them, suggests serious limitations to the comprehensiveness of standardized checklists. They tested the hypothesis that groups made up using the broad-band scales of the TRF would conceal distinct groups differing in the "patterning of their responses to social contexts and in the likelihood of encountering them". Their results demonstrated a confound between person and environment influences and suggest that checklists obscure differences between children. The authors call instead, for personality constructs that "express with some fidelity the organization of behaviour, not just its overall likelihood of occurrence" (p. 106). The use of syndrome scales may create "empirical gryphons" or distortions by aggregating children who differ in the processes that contribute to their behaviour" (Wright & Zakriski, p. 526). The claim is that standardized child behaviour checklists "systematically obscure information about the social context in which children's behaviour occurs. Important information about the meaning of the child's behaviour problems, and situational factors contributing to the child's difficulties, are lost, potentially contributing to the conclusion that the behaviour problem is 'in the child' rather than being a product of both the child's behaviour and the surrounding social environment" (Zakriski & Wright, n.d.).

Reviews of the CBCL reflect these concerns. On the efficacy of the response scale (0/1/2) to describe behaviours that, for example, are of extreme concern and lower prevalence in the same way as other behaviours that are not, Furlong and Wood advise that "Administrators need to get a sense of the caregivers' understanding of these categories in terms of their implied frequency and tolerance/intolerance of the specific behaviors" (Furlong and Wood, 1998, p. 222).

Problems in the measurement of the CBCL narrow-band syndromes mean that "correlations among supposedly differentiable dimensions of problem behavior as rated



by informants can be extremely high" (Macmann & Barnett, 1993, p. 2). There is concern at the ability of items that were included based on "descriptions of problems that are of concern to parents and mental health professionals" (Achenbach, 1992, p. 10), to contribute in the identification of meaningful dimensions (Block, 1995; Macmann & Barnett, 1993).

Despite Achenbach's claim that the syndromes were "empirically derived from covariation among items selected to be nonredundant" (1992, p. 54), the "problems that are of concern to parents" may be factorially complex and have substantial correlations with more than one factor (Macmann & Barnett, 1993, p. 2). Criticizing the inclusion of descriptions derived from lay persons, in another approach to personally description - the Five-Factor Model, Block (1995, p.193) points out that because the terms "are used by often inarticulate or language-insensitive raters, their redundancies are great. Consequently, their factorial equivalencies may only testify to the reliability and coherence of the ratings made of the subject". Wright *et al.* clarify the implications: "The principle problem with uncontextualized trait measures is not that they detect too little, but that they detect too much, and in unknown amounts. Such scores can be stable and enduring yet have little to say about the person they claim to assess" (Wright, Zakriski & Drinkwater, 1999, p. 106).

### **Integrating information from multiple informants**

The usefulness of the CBCL's focus on the analysis of convergence, especially in the field of design and evaluation of intervention plans, given the vagaries inherent in the process of assessment and intervention has also been questioned (Macmann & Barnett, 1993). The use of the odds-ratio statistic, for example, as quoted in the CBCL Manuals (1991a, 1992) as an index of cross-informant agreement has been criticized as potentially misleading. Macmann & Barnett (1993) claim that the checklist developers systematically neglect to report the within-source and off-diagonal correlations associated with analyses of convergence such that "it is possible that the within-source - source-specific - variance may exceed the across-source - construct -variance" (p. 4).



### **Threshold setting and scale discriminant validity**

The Externalising and AGG scales are commonly used as outcome measures, to assess different levels of symptoms within the normal range, and to form research samples - high-risk and community samples, for example. The CBCL was designed to assess psychopathology, however, and the instrument was validated on discriminating between referred and non-referred children, rather than between children with different levels of normalcy. Scores that do not reach the borderline clinical cutpoint of T=67 are compressed so that the instrument has little sensitivity to differences in levels or changes in symptoms within the normal range (Drotar *et al.*, 1995). The recommended cut-points do not inform as to co-morbid scoring. A major concern is that the scales show weak discrimination between DSM-based diagnoses.

All scores below the borderline clinical threshold of T=67, or 69<sup>th</sup> percentile, are given the same score. The CBCL T scores thus have little value in research into children with sub-clinical levels of symptoms. Achenbach recommends using raw scores instead, a method which retains all distinctions but loses the ability to compare data across age and sex. In addition, interpreting the meaning of raw score differences is problematic since the validity of variations in sub-clinical scores on the CBCL has not been established empirically (Drotar *et al.*, 1995).

Gould, Bird & Jaramillo (1993), comparing the relative validity of the alternative approaches-CBCL/YSR and DSM-III- to classification and assessment in a community sample found significant correlations between narrow-band syndromes and DSM-III diagnoses, however many scales correlated with two or more diagnoses. Many diagnoses correlated significantly with both Internalizing and Externalizing scores.

With some exceptions the CBCL narrow-band subscales show little discrimination among the range of clinical diagnoses. One attempt to create an alternative scoring system, using CBCL items to measure dimensions analogous to child symptomatology, had experts rate CBCL /4-18 items as to whether they indicated one of 14 symptom categories. CFA was then used to evaluate dimensions using correlated and uncorrelated scales. (Lengua, Sadowski, Friedrich & Fisher, 2001).

Recently Achenbach has published findings on correspondences between syndromes and psychiatric diagnoses (Achenbach, Dumenci & Rescorla, 2000; 2001), included DSM-

oriented problem scale profiles with norms in the new edition of the checklists (Achenbach & Rescorla, 2000) and discussed how to use both types of profile to aid diagnosis and research (Achenbach & Rescorla, 2001). The issue of comorbidity between disorders has yet to be properly examined however and the validity of comorbid constructs established empirically (Keiley, Lofthouse, Bates, Dodge and Pettit, 2003). Covarying EXT and INT correlates of both have been found and Mixed problems found to be more similar to Externalizing than Internalizing (Keiley *et al.*, 2003). Ultimately the undertaking to evaluate measures of child symptomatology rationally as well as empirically is limited by the lack of an overarching theory and specific definitions of the dimensions of psychopathology (Lengua *et al.* 2001).

Granic and Lamey, (2002) have recently explored alternative thresholds on the CBCL and TRF. They attempted to differentiate subtypes of aggressive children by examining differences in the mother-child interactions of "pure" externalizing (EXT) children verses "mixed"- or "co-morbid" internalizing and externalizing children (MIXED) using case-based Dynamic System techniques. Participants were 36 boys between 8-12 years recruited from two treatment programs for aggressive children. The children were classified into two distinct groups based on scores on the CBCL and TRF :a pure externalizing (EXT) group in which the boys were required to score at or above the clinical cutoff ( $T \geq 70$ ) on the externalizing scale of either measure and below this cutoff on the internalizing scale on both the measures. A "Mixed" Externalizing and Internalizing (MIXED) group formed from boys that scored at or above  $T \geq 70$  on the Externalizing scale of either the CBCL or TRF and score above this cutoff on the Internalizing scale on either the CBCL or TRF. T-test comparisons showed no significant group differences on the Externalizing scales, but strong differences on the Internalizing scales on both the CBCL and TRF. The authors hypothesized that "unique parent-child processes may correspond to different clusters of childhood symptomatology" (p. 266). A perturbation was introduced and a case-by-case state space grid analysis of parent-child behaviours was undertaken. Differences between dyadic subtypes were found only after interactions were perturbed: the MIXED and not EXT, dyads changed their interaction patterns after the perturbation. Both MIXED and EXT dyads tended towards the permissive region of the state space before the perturbation, but only MIXED dyads shifted to the mutually hostile region afterwards.

To recap, the CBCL thresholds reflect the fact that it was not developed for research purposes. Sub-clinical and sub-borderline T-scores are compressed within an undifferentiated range (Drotar *et al.*, 1995). Studies that have explored the covariance, or comorbidity of CBCL syndromes suggest the CBCL seriously under-represents the heterogeneity of child behaviour. Reporting of both EXT and INT scores would be a first step towards understanding covariance at the broad-band level. Alternatively, covariance may eventually be found at the sub-scale level.

### **Concerns with Replicability and Coherence of the CBCL syndrome model**

Studies assessing the factor-structure continuity or replicability of the CBCL factors have typically used Confirmatory Factor Analyses (CFA) to test the convergent validity of the items across models and countries. While the CBCL/4-18 8-factor cross-informant model has received mostly support from studies using confirmatory factor analysis (CFA) with USA, Dutch and Australian samples, the cross-cultural identifiability of some factors has been questioned (Heubeck, 2000). Tests of a 1-factor model question the discriminant validity of the CBCL and suggest either a “basic psychopathology factor, a higher order factor or indiscriminant reporting by parents” (Heubeck, 2000, p. 445). Specifically, comparing two US models, a Dutch model and an Australian model, Heubeck (2000) found problems of item validity for the attention factor. In addition a significant shift in the meaning of the social problems factor from the original US model was indicated. The author found correlation ranging from 0.17 to 0.45 indicating three underlying behaviour problem factors measured on the CBCL: an emotional acting out factor (Aggressive Behavior Syndrome) that points to an emotion-regulation deficit interpretation, a mean, aggressive and destructive factor (Social Problems Syndrome) and an evasive, delinquent factor (Delinquent Behavior). Additional loadings for Crying, Sulking and Impulsive were found for the Aggressive Behavior factor.

In the Hartman *et al.*, (1999) study the construct representation of the cross-informant model of the Child Behavior Checklist (CBCL/4-18) and the Teacher Report Form (TRF) was evaluated using confirmatory factor analysis. Samples were collected in seven different countries. The adequacy of fit for the cross-informant model was established on the basis of three approaches: conventional rules of fit, simulation, and comparison with other models. The results indicated that the cross-informant model fits

these data poorly. These results were consistent across countries, informants, and both clinical and population samples. Since inadequate empirical support for the cross-informant syndromes and their differentiation was found, the construct validity of these syndrome dimensions is questioned.

Exploratory and confirmatory studies of the CBCL/2-3 are scarce but Koot, Edwin, Van Den Oord, Verhulst and Boomsa (1997) tested the cross-cultural validity of the CBCL/2-3 in three Dutch samples - clinical, community and twin-using a translated item set. They used principal-factors analyses to identify syndromes in each sample and across samples found a six factor solution to be robust: oppositional behaviour, aggression, over-active behaviour constituted an externalizing grouping and anxiety and withdrawal, made up an internalizing grouping. Sleep problems were identified as a separate syndrome, but Somatic problems was not robust enough to be retained as a scale. The items constituting each scale differ from Achenbach's original scales, since different factor-analytic techniques were used and differently composed samples. An item was included in a scale when its loading on the factor exceeded 0.30 in two of the three samples. The item was not allowed to load on more than one other factor above an absolute value of 0.30 (p. 190). Regression analyses indicated that, on the basis of having a Total Problems score above the 85th percentile cutpoint, 73.3% of the children could be correctly classified as being referred. The authors express surprise at finding a distinct overactive syndrome, indicative of hyperactivity and attention problems.

As we have seen in this review of methodological concerns while ratings studies report inter-individual continuity for AGG, support for factor-structure continuity (Coie and Dodge, 1998) is weak since even studies that have used similar methodology to derive the scales (Koot *et al.*, 1997) as well as those that have examined the domain using uncorrelated scales (Lengua *et al.*, 2001) reveal alternative factor structures.

### **Summary of concerns**

Early aggression and externalizing behaviours are robust predictors of serious antisocial outcomes. However, as is evident from this review, progress toward consensus on, or even a working definition of a general construct of child psychopathology appears to be impeded by different ideals. Between the ideal of developing standardized measures, that allow comparison with peers across contexts, and the realization of this ideal in an

assessment tool that can comprehensively represent the variety of behaviour in different contexts – natural e.g. communities as well as artificial, but also in consideration of assessment – problem definition, the treatment decisions and outcomes for individual children (Macmann & Barrett, 1993) lie a host of issues involving taxonomy, assessment, and epidemiology, that are relatively unaddressed.

There is general agreement among developmentalists that heterotypic continuity of externalizing behaviours is likely, which means that behaviours cannot be measured in the same way at different ages. Consequently assessment should reflect the developmental changes in form and function across different periods. This review has compared the psychometric variable-centered conceptualisation of stability and continuity with alternative, person-centered concepts in the literature on aggression and externalizing behaviours. Assumptions, implicit in the trait-like view of AGG that has emerged from CBCL studies, have been examined. Factors associated with the development of aggression and externalizing behaviours and predictors of early externalizing and later antisocial behaviour problems were discussed and models examined. Following theoretical concerns this review examined methodological issues – the lack of evidence to support the validity of variations in sub-clinical scores, concerns with sample selection, with the over-reliance on factor analytic methodology in the prototype – matching approach, with the inclusion of factorially complex items in the derivation of syndromes, and with shared variance of scales. Subtypes of externalizing behaviour emerging from studies of comorbidity of CBCL syndromes, and those that investigate the function of aggression and externalizing behaviours by exploring different cutpoints, suggest the CBCL may conceal alternative dimensions. Further evidence of this is provided in the alternative factors recovered in replication studies, questioning the validity of the “core syndromes” and the focus on convergence of multiple-informant scores.

Further review of the literature suggests that the conceptual similarities between constructs in child psychopathology- like EXT, and dimensions of personality may hold the key to unravelling the high stability reported of the AGG construct that has resisted rational explanation. These similarities will be collated in the next section.

## **Part 5: Conceptual overlap with personality structure research**

In addition to cognitive development, one factor in the gradual decline in aggression and externalizing behaviours over early childhood, reported in the review of the literature, is normative socialization. The longstanding focus on maximally successful socialisation practices assumed that all children were affected similarly by parental and societal influences (Rothbart & Putnam, 2002). Recent research, however, has revealed predictable divergence in the way different children respond to similar socialisation attempts and emphasises the role individual child characteristics, especially personality characteristics, play in shaping pathways to both successful and unsuccessful outcomes.( e.g. Bell & Chapman, 1986 , cited in Tremblay, 1995).

Theorists of temperament and those of personality have not always been in agreement over the relative influence of biology and environment. Recently however general acceptance is evident among developmentalists that even the earliest expressions of temperament are influenced by environment (Prior, 1992). With this new understanding of temperament, particularly with definition of temperament from the work of Rothbart - grounded in constitutionally - based differences in reactivity and self-regulation (Rothbart & Putnam, 2002) - the overlap between the constructs of temperament and personality is now clearer. Temperament describes the “processes evident early in life from which social adaptations to environmental conditions develop” (Rothbart & Putnam, 2002, p.19).

The resurgence of interest in personality structure and development over the last two decades (Block & Block, 1980; Eysenck, 1981; Caspi, Block, Block, Klopp, Lynam, Moffitt & Stouthammer-Loeber, 1992; Moffitt, 1993; Robins, John & Caspi, 1994, cited in Huey & Weisz, 1997; John, Caspi, Robins, Moffit & Stouthammer-Loeber, 1994) includes a focus on the construct of antisocial behaviour and patterns of psychopathology in children. A number of personality instruments appear to mirror externalizing behaviours familiar in the literature on child emotional and behaviour problems. From the literature review above a dimensional interpretation of the interaction between personality characteristics of children and parenting styles is indicated that may increase our understanding of the CBCL constructs. This section



collates and identifies candidate dimensions in the personality literature that may be homologous to the AGG construct and that may explain the reported stability of AGG from toddlerhood.

### **Ego-undercontrol/Ego-overcontrol Model**

While Achenbach and others' work on the classification of psychopathology in children is a distinct area of research, nominal and conceptual parallels with personality dimensions are evident. The Ego-control-Ego-resiliency model (J.H. Block & Block, 1980) has nominal overlap between the Ego-control and the two CBCL broadband behaviour dimensions: Achenbach has used the terms undercontrol and overcontrol to describe internalizing and externalizing behaviour problems respectively (1987;1991; 1992), and Ego-control, which relates to level of expression of impulses, posits Ego-undercontrol and Ego-overcontrol as opposite ends of the Ego-control continuum. The models may also overlap conceptually since behaviours that load on the externalizing scale, including aggression, hyperactivity and distractibility, reflect what are believed to be homologous latent dimensions - impulsivity and self-control deficits - of Ego undercontrol (Huey & Weisz, 1997).

Exploring relations between two models of personality, the Ego control- Ego resiliency model (J. H. Block & Block, 1980) and the Five-Factor Model of Personality (FFM; Robins, John & Caspi, 1994, cited in Huey & Weisz, 1997), in groups of clinic-referred children, aged 7-17 years, rated on the CBCL/4-18 and TRF (Achenbach, 1991a) for behavioural and emotional problems, Huey and Weisz found correlates of problem dimensions and personality: Ego-undercontrol predicted externalizing problems, and Ego brittleness and Ego-undercontrol made equal contributions in the prediction of internalizing problems (Huey & Weisz, 1997).

Caspi *et al.* (1992) used caregiver, self-report and teacher Q-sorts to describe groups of boys composed according to external measures of delinquency, disruptive behaviour and broad-band Externalizing and Internalizing and found the item "Is aggressive" correlated significantly with behaviour problems. Caspi *et al.*, (1992) also found that that externalizing or internalizing problems in children 5-15 years of age, as measured on the TRF both feature the experiencing of difficulty in forming good and close relationships and the tendency to "freeze up" under stress. This inflexibility, ego-



brittleness or lack of resilience is central in the definition of *ego-resiliency* the second characteristic of ego functioning in the Block & Block model (Block & Block 1980, p.48). Externalizing problems reported by teachers correlated with Q-item correlates of caregiver and self-report of disruptive behaviour: boys with externalizing problems “try to be the centre of attention, try to take advantage of others, are restless and fidgety, and have unpredictable moods. In addition they show little concern for what is right and what is wrong, do not pay attention, are not obedient, fail to plan things ahead, and cannot be trusted”(Caspi et al.1992, p. 521) A boy with internalizing problems is an “emotionally constricted and socially inhibited boy who is insecure and easily intimidated”(p. 521).

### **Extraversion**

Childhood extraversion is associated with antisocial behaviour. Individual differences in physical arousability are believed to account for the fact that some children are more easily socialized than others. Gray (1970, 1980, 1981, cited in Tremblay, 1995) hypothesized that extraversion was a product of two orthogonal dimensions, corresponding to two behavioural systems: impulsivity – an aspect of the Behavioral Activation system (BAS), and anxiety – an aspect of the Behavioral Inhibition System (BIS). Gray posits extraversion –described by high impulsivity and low anxiety, as central to understanding problem behaviour. This is an extension of Eysenk’s (1964; Eysenk & Gudjonsson, 1980, cited in Tremblay, 1995) hypothesis that extraverted children need more, or better, parental control over them than introverted children and that, because they have lower physical arousability, they are thus less easy to condition and are less easily socialized, and less susceptible to punishment (p. 140). Gray’s hypothesis includes the suggestion that extraverts are more susceptible to rewards than introverts. It has also been suggested (Bell, 1979, cited in Tremblay, 1995) that responsive parents adjust their behaviour to the child’s behaviour, with an “adequate mix of rewards and punishment” (Tremblay, 1995, p.140). A study by Tremblay (1995) supported the child-effect paradigm (Bell, 1989, cited in Tremblay, 1995) proposing that “mothers with extraverted sons should react in a controlling way to reduce the intensity of their sons’ behaviour, while mothers with introverted sons should react by stimulation to increase the intensity of their behaviour” (Tremblay, 1995, p. 149).

### **The Five Factor Model: Agreeableness and Conscientiousness**

The Five Factor Model (Robins, John & Caspi, 1994, cited in Huey & Weisz, 1997) comprises five theoretically distinct dimensions: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. In a sample of adolescent boys John, Caspi, Robins, Moffit & Stouthammer-Loeber (1994) found that externalizing children commonly displayed symptoms implying a “pattern of low Agreeableness and low Conscientiousness, whereas symptoms of internalizing children appear to reflect high levels of Neuroticism, or Negative Emotionality, and low levels of Extraversion” (Huey & Weisz, 1997, p. 405). In the study by Huey and Weisz (1997) Extraversion and Agreeableness were independent predictors of externalizing problems. Neuroticism alone predicted internalizing problems.

Shiner and Caspi (2003) describe research that distinguishes between irritable distress and disagreeableness- the lower end of the Agreeableness superfactor (Robins, John & Caspi, 1994, cited in Huey & Weisz, 1997; Laursen, Pulkkinen, Adams, 2002) which includes selfish, aggressive, rude, spiteful, teases others, stubborn and manipulative trait descriptors (Shiner & Caspi, 2003, p. 8-9). While it is possible for children to frequently feel angry, frustrated and irritable without “directing those feelings at others and behaving in a hostile manner....aggressive and disagreeable children may be those whose strong feelings of anger and frustration are not tempered by good self-control” (p. 9). The authors suggest that Irritable distress may, with age, be as strongly related to Agreeableness as much as it is to Negative Emotionality (p. 7).

### **Frustration and Surgency**

Evidence to suggest that early-emerging strong approach tendencies and high levels of irritable distress may constitute risks for developing aggressive behaviour has been reported in a study which found these temperamental traits, in infants, predict parent-reported aggression at age 7 (Rothbart, Derryberry & Hershey, 2000, cited in Rothbart & Putnam, 2002). Both approach tendencies - an aspect of Surgency, a superfactor similar to Extraversion/Positive Emotionality - and aspects of Negative Emotionality/Neuroticism are implicated in problem behaviours of opposition, physical aggression and anger/frustration (Shiner & Caspi, 2003). The different levels of surgency in different individuals is apparently based on “sensitivity to cues of reward and manifested as orientation to and exploration of novelty, as well as expressions of

positive affect” (Rothbart & Putnam, 2002, p. 27). The blocking of rewards may lead to aggressive behaviour to overcome obstacles. Rothbart and Putnam discuss research that points to the role of approach tendencies and high activity levels in children’s anger and frustration (Rothbart & Putnam 2002, p. 31). Anger/frustration is more related to approach tendencies than it is to fear or the lack of fear. Fear and frustration, differentiable aspects of the negative emotions, have unique as well as common origins. While anger/frustration is related to high approach, and activity level -and “can invigorate approach tendencies, fear involves a more consistent inhibition of approach”. (p. 32). Fear has been found to be “one of the major control systems in the developing child” and has been associated with models wherein an “anxiety-related behavioral inhibition system inhibits an approach-related behavioral activation system” (p. 33) with adaptive and protective results.

### **Resistant Temperament**

When the surgency/approach system dominates over behavioural inhibition it has been proposed that a number of clinical disorders are emergent (Rothbart & Putnam, 2002). That both surgency and negative affectivity may be implicated in the development of externalizing problems is supported in research into the interaction between resistant temperament - aspects of approach, negative affectivity and low Effortful Control - and parental restrictive control (Bates *et al.*, 1998 cited in Rothbart & Putnam, 2002, p. 31). Resistant temperament was more strongly related to externalizing problems in two samples of elementary school children whose parents had low restrictive control (the relative absence of behaviours meant to stop or punish the child such as negative commands, removing objects, scolding or spanking) compared to parents who were highly controlling. Bates *et al.* (1998) report that one reactive element of resistance to control, may be a “relatively strong attraction to rewarding stimuli, accompanied by excitement” (p. 983). This is an aspect of Surgency. In addition, the authors suggest there may be “a weak level of basic social agreeableness or warm, trusting helpful responses to people”; a weak fear-inhibition response to threats of punishment; and /or “difficulties in the effortful control of attention” which “produces differences in the ability to inhibit actions” (p. 983).

### **Inhibitory Control and Effortful Control**

A lower-order trait subsumed by the Constraint dimension (FFM, McCrae & Costa, 1999, cited in Shiner & Caspi, 2003, p. 8), which develops in toddlerhood, encompasses, at the lower end, the tendency to be incautious, careless and undercontrolled. Distinct from inhibited-uninhibited behaviour associated with approach tendencies or levels of fear or other negative emotions, this trait is seen as involving voluntary control of behaviour. It is not a reactive trait like Surgency or Negative Affectivity, rather it reflects children's emerging capacities for executive control (Shiner & Caspi, 2003, p. 8) and includes along with Inhibitory Control, measures of attention and perceptual sensitivity to low intensity stimuli from the external environment (Rothbart & Putnam, 2002). Rothbart and colleagues (2001) have found a similar superfactor in toddlers, labelled Effortful Control, which is related to "infant orienting tendencies and capacities to enjoy and be comforted by low-intensity stimulation" (Rothbart & Putnam, 2002, p. 22). Effortful Control, in early childhood, has been found to predict better self-regulation of positive and negative emotions later in childhood. Kochanska and colleagues (2000, cited in Rothbart & Putnam, 2002, p. 36) have found stability for this trait dimension from 2 years - of - age in toddlers who "voluntarily regulate their emotional state by deploying their attention, and can suppress initial reactive tendencies to conform to situational demands successfully" (Rothbart & Putnam, 2002, p. 36). An important finding in relation to issues around aggression in toddlerhood is the link between effortful control at this age and internalization of parental and societal rules and standards, development of social competencies and lack of misbehaviour (Rothbart & Putnam, 2002). More recently studies of parental influence on effortful control suggest links between sensitive, responsive parenting and effortful control. (ibid)

### **Attachment and temperament**

While traditionally there exists a conceptual division between attachment security and temperament based around whether "factors regulating the expression of affect are intrinsic to the child (temperament) or are emergent properties of the child-adult relationship (attachment)", (Vaughn, Stevenson-Hinde, Waters, Kotsafis, Lefever, Shouldice, Trudel & Belsky, 1992, p.464) overlap is evident in their measurement. Because assessment of both domains most often occurs within the social context of parent report, the influence of one psychological domain on the other – i.e. parent-child

relationship on temperament scores or vice versa - might be expected. A study by Vaughn *et al.*, 1992, p.469) found only modest redundancy between measures of attachment and temperament. One factor, however, emerged in the study of correlations between parent-report Q-sorts for infant and toddler attachment security and principal component analyses of temperament data – emotional reactivity.

### **Summary of Part Five**

A growing number of studies report parent-child temperament transactions as salient in predicting externalizing problems (Bates *et al.*, 1998; Kochanska, 2000, cited in Rothbart & Putnam, 2002). At the level of personality type, the Ego-Control-Ego-Resiliency model (Block & Block, 1980) describes dimensions based on ego-functioning that appear to be homologous to these reactive-regulative dimensions and that also predict externalizing problems. From the above review of the literature on personality structure dimensions – when defined as intraindividual organisation of personality variables - it is anticipated that mapping the toddler CBCL problem domain will reveal dimensions indexing transactions between children and their environments that are latent in the stability of externalizing, disruptive behaviours like those characteristic of AGG.

### **Summary of Literature Review**

The CBCL may well assess problems of concern, including aggression, but Achenbach's description of AGG as a homogenous, trait-like construct responsible for CD (Achenbach *et al.*, 1995), receives support mainly from variable-centered, inter-individual, studies. The examination of concerns with the CBCL undertaken in this review suggests caution in assuming that indices of social adjustment correlate in a linear fashion across the entire AGG scale, and across periods of development. Developmental models of aggression and externalizing behaviour in childhood reveal heterogeneity in profiles and trajectories of aggressive children. Overlap of dimensions or themes between the CBCL and personality research, apparent in the literature, may be indicative of underlying homogeneity. In the next section a methodology is introduced that first investigates two different components of ratings data – objective and subjective – in order to explore patterns in sets of CBCL case data, at the item level. This design is

intended to expose latent heterogeneity in toddler aggression and provide a test of the comprehensiveness of the AGG construct.

## CHAPTER THREE

### METHODOLOGY

Chapter Three is divided into three sections. First the research objectives, stimuli and participants are described. Research procedures follow, with justification for methodologies and a discussion of their limitations. Finally, the analytic strategies are described.

#### **Research objectives:**

This study is directed by three research objectives. The overall, primary objective is to examine the comprehensiveness of an empirically derived construct or syndrome “Aggressive Behavior” identified by the Child Behavior Checklist for Ages 2 to 3 (CBCL/2-3, Achenbach, 1992). This will be attempted through an exploration of the structure of the item set using Multidimensional Scaling analyses (MDS), and creation of an inter-item semantic-like map. It will act as a tool to advance the main research goal of the present study - the summary of patterns in sets of archival CBCL data to reveal latent coherence or dimensional consistency between age-bands with specific regard to the aggression or aggressive-like behaviour construct.

Objective one is an analysis of the CBCL/2-3 item set aiming at the identification, and validation of possible latent structure. Achenbach’s subscale stability is to be examined by comparing results of both correlation and vector analysis from longitudinal archival data. The second objective - the production of an integrative composite map with which to identify and explore the invariant structure of the CBCL/2-3 and CBCL/4-18 and investigate the item and dimensional correspondences between the instruments is to be accomplished by repeating the entire Multidimensional Scaling analyses procedure with an item set of combined CBCL/2-3 and CBCL/4-18 items. The third objective is to provide an estimation of inter-instrument and inter-age band stability or coherence of the aggression construct and outcome correspondence for the CBCL/2-3 and CBCL/4-18. In addition, this study will review accounts of and developmental explanations for aggression as well as examine possible frameworks for assessments and interventions indicated by the results of the current study.



Anybody engaging in rating tasks brings to the situation some form of mental representation. To obtain reliable assessments these views have been entrained, so that what is observed or noticed can be documented accurately. One way to begin then is to find out which items do tend to group with which other ones on a semantic basis. A multidimensional scaling approach first establishes a map or depiction of group consensus about the way items are organized - as a tool for interpreting target-descriptive data (Kirkland *et al.*, 2004). Two traditions in MDS inform the methodology in the present study, corresponding to two identified aspects of data. Innovative sorting techniques aim at collecting information about the objective structure of the items. This is then used as a filter to extract layers of meaning in individual cases in a reanalysis of archival (published) data.

### **Stimuli**

The stimuli are two item set decks based on the CBCL family of questionnaires. The item set for Achenbach's CBCL/2-3 consists of 99 numbered emotional and behaviour problem descriptors (Appendix C), printed separately on small cards (35 x 75mm) for sorting. A subset of 39 items of the CBCL/2-3 item set was then used for validation of the map's structure (Appendix D).

The second deck is based on a combination of the item sets for the CBCL/2-3 and the CBCL/4-18, similarly printed for sorting. Totalling 162 item-statements, this deck included the 59 unique items plus a single instance of duplicated ones, common to both decks. Readers familiar with the CBCL items should note renumbering; many of the original item tags have been changed. (See Appendix E for key to the renumbering schedule.)

### **Participants**

Participants involved with the semantic mapping phase were adults mostly recruited from childcare centres or English as a Second Language (ESL) classes. None were already familiar with the card-sorting and matching tasks. Although not pursued in the present study, one anticipated outcome is a new scale which, procedurally, will empower untrained parents or caregivers with a way of assessing their children's behaviour by tapping underlying dimensions that are shared by experts.

### ***Ethical Considerations:***

The semantic sorters were responding to the “face value” of item statements and not applying these to any children. Where parents did provide other-report data confidentiality of information is somewhat secured since these were anonymous archival U.S. CBCL/2-3 sets. Procedurally the resulting new scale will empower untrained parents or caregivers with a way of assessing their children’s behaviour by tapping underlying dimensions that are shared by experts.

### **Research Procedures**

To ensure robustness of the map produced by MDS a range of validity checks were introduced: different types of data were collected involving various collection procedures. Both similarity as well as ranking data were collected along with archival ratings from a US study. It is to be noted for the record that the items reported in this thesis are copyright and were used here only for mapping purposes and not applied to any children.

### ***Similarity data***

#### ***Tasks One and Two***

Two procedures were used to elicit data about the similarity of the toddler checklist items-that is ‘objective data’ - one for map construction and the other for map validation. The first procedure, an extension of the Method of Sorting (Coxon, 1999; Weller & Romney, 1988) included four independent sorting procedures termed GOPA-sorting where the acronym stands for Grouping, Opposite, Partitioning and Adding (Bimler & Kirkland, 2001a, 2002). The purpose of these procedures, which have been developed over the last decade, is to elicit from subjects the maximum possible amount of information about the (dis)similarities they perceive amongst descriptors (Bimler & Kirkland, 1998; Kirkland, Bimler, Drawneek, McKim & Schoelmerich, 2000).

For this activity, participants begin by shuffling the deck of item-statement cards, reading each one and sorting them into groups by placing similar items together, using “face value” only(G-phase)( Bimler & Kirkland , 1999; Kirkland *et al.*, 2000). This procedure is also known as Free Sorts (Coxon, 1982). Single-item groups are acceptable, but limiting the total number of groups to 20 is suggested for the smaller decks.

Participants are then requested to identify up to three pairs of opposite groups from the G-phase arrangement (O-phase). This is followed by the Partitioning phase where participants are asked to subdivide the G-phase groups, by asking themselves which, if any, of the groups of three or more items could be further divided (P-phase). Finally, the Addition phase invites participants to identify pairs of the most similar groups and merge them into progressively larger groups, with necessarily more relaxed similarity requirements, until the original G-phase arrangement is reduced to three or four supergroups (A-phase). While the sorting procedure is taking place the participants are asked to record their results on a response sheet (Appendix F). They are not required to explain the reasons for their grouping arrangements. It takes just under an hour to complete these sorting procedures depending on the number of items in the deck. Around 30 sets are typically needed to ensure a stable inter-item structure, however 70 sets were collected from different participants for both the CBCL/2-3 (Task One) and 49 for the Combined item set (Task Two) to check robustness of the anticipated latent structures (Bimler & Kirkland, 1998; 2001a; Kirkland, *et al.*, 2004)

#### *Task Three*

The other method of eliciting similarity data, this time for the purpose of validating the toddler map generated from Task One, was the Method of Triads (MoT) (Coxon, 1982; Weller & Romney, 1988). Typically, a stratified subset of items is created by using either the map - and selecting items scattered evenly around the “semantic space”, or the hierarchical tree (h-tree) - selecting every third item. Both map and dendrogram are described below. Shuffled items from the resultant deck of 39 (see Appendix G) are then presented to participants in groups of three (triads), from which they are asked to choose the ‘odd-one-out’; that is, the item least similar to the other two. Depending on the number of items and repetitions this procedure takes less time than GOPA. (Bimler & Kirkland, 1991a, 1991b, 2004; Kirkland *et al.*, 2002, 2004; Bimler, Kirkland & Jameson, 2004)

#### ***Ranking data***

##### *Task Four*

Two procedures were used when collecting ‘subjective’ data, for external validation of mapgroups or clusters on the one hand, and for reanalysis on the other. A variation of

the Method of Successive Sorts (MOSS) (Block, 1961) was used for collecting criterion-descriptive ranking data for validation of clusters emergent as constructs in the map and as indicators of external (convergent) validity across a range of expert and lay participants.

In typical MOSS applications items are progressively ranked into eight groups by how well they describe the target individual or criterion. The participants first sort the items into one pile of those which apply more, a second pile of less-applicable items. An adaptation of the MOSS sorting asks participants to initially sort into a third pile irrelevant items which are thereafter no longer considered in the procedure (“remainder”). The advantage here is that items that are “off the scale” for that participant do not receive an arbitrary score (Kirkland *et al.* 2004). The procedure is repeated on each pile and on the 4 subsequently created piles until the items are in eight applicability-ranked groups. Piles can be numbered +3.5 down to -3.5 (Bimler & Kirkland, 2001). In the present study participants ranked the CBCL/2-3 99 items according to how aptly they described each of six identified areas of psychological meaning in the map. Because the goal here was to validate alternative clusters emergent in the map, only the first pile- more applicable- was subsequently divided and only items in the *most applicable* (e.g. *very aggressive*) and *second most applicable* (e.g. *somewhat aggressive*) piles were recorded (Appendix H).

Two groups of lay participants and a group of SES experts separately grouped items towards the same criteria and these sorts were used for validation of procedure, validation of clusters emergent in map(different participants, different procedures, same instrument) and as indicators of external or discriminant validity (different participants, same procedures, same instrument).

### ***Ratings data***

#### ***Task Five***

Archival CBCL raw data from a longitudinal study by Shaw, Bell & Gilliom, (2000) were reanalyzed using methods described below. Likert checklist data, collected from USA participants in the Shaw *et al.* study were integrated into the results of analysis of Task One and Task Two data. Precisely 307 sets of CBCL/2-34 data from 24- and 42-

months as well as around the same number of CBCL/4-18 data from 60- and 72-months were reanalyzed in the present study.

### ***Participants***

*Task One:* Similarity data was collected from two groups of parents (a) 39 New Zealand parents and (b) 41 USA parents followed the GOPA-sorting procedure.

*Task Two:* A different group of 49 participants provided similarity data using identical GOPA-sorting procedures but with the Combined item set.

*Task Three:* A subset of 39 items was then created, by selecting items scattered evenly around the “semantic space”, and (c) 26 New Zealand parents, repeated the sorting process twice providing a total of 78 tables of Method of Triads (MoT) data.

*Task Four:* Ranking data was provided by 15 New Zealand parents sorting towards 6 hypothetical toddler constructs emergent in the map using Method of Successive Sorts (MOSS). Also 7 Special Education Service (SES) experts provided lists of items they felt described negative toddler behaviours. Another New Zealand group, international students participating in an English as a Second Language (ESL) program this time, provided 13 sets of MOSS data targeting two clusters emergent in the map.

The Shaw *et al.* (2000) study provided longitudinal raw CBCL data for around 307 cases from ages 24-, 42-, 60- and 72-months. Not all the data sets were complete however and totals are reported in the Results chapter separately for each study. This was a longitudinal study which explored antecedents of early onset conduct problems, operationalised by especially overt, but also eventually covert antisocial activity as measured by the CBCL (Shaw, Bell & Gilliom, 2000, p. 161).

### ***Rationale for use of procedures***

The GOPA data collection procedure, developed from the Method of Sorting, (Coxon, 1999; Weller & Romney, 1988), and the analyses described below, have been specifically developed around the requirements of constructing models for large data sets (Bimler & Kirkland, 1999; 2001). The procedures have been refined to make the sorting procedure less arduous and more transparent for the participants (Kirkland *et al.*,

2004). Advantages of the GOPA and MoT data collection procedures include participants not having to be knowledgeable about the constructs being investigated or having to articulate the reasons for their sorting choices; the ease of comprehensibility of the elicitation steps; the option of individual or group participant settings for collection; the option of anonymity of the data once collected and, finally the range of techniques available for data reduction and analysis. Agreement of better than 0.70 on the bivariate correlation between respective inter-point distances between solutions obtained from different data sets has been found in previous studies (Kirkland *et al.*, 2004), and if obtained in the present study will serve as evidence that the same latent model is being accessed by participants. The Method of Sorting is therefore considered the preferred data elicitation procedure for the 99-item and 162-item sets of the present study. The Method of Triads (Coxon, 1982; Weller & Romney, 1988) has been used recently in MDS studies of colour vision (Bimler & Kirkland, 2004; Bimler, *et al.*, 2004). The different algorithm involved provides a test of the method and a means to check the robustness of the solutions that result.

A number of procedures exist for using maps or MDS solutions to organize and interpret ranking or rating data. In Concept Mapping (Trochim, 1989), and related MDS methods, item statements, in addition to being sorted according to similarity or dissimilarity, are also typically rated on some dimension described in a rating focus statement. The average value of the ratings across participants for each statement is obtained and overlaid graphically on the map. In Task Four of the present study a variation of the Method of Successive Sorts (MOSS, Block, 1961) is used to collect data to validate clusters emergent within the map and for external validation purposes (Coxon, 1999). Its abbreviated form lends itself to rapid data collection with reduced demands made on the participants. The adapted MOSS procedure shares many of the advantages associated with Q-sort methods. Q-sort methods typically utilize expert criterion sorts to operationalise constructs of interest. Ranking items towards criterion descriptions is described by Block (1961) and is an established Q-methodology procedure. Typically experts provide criterion sorts or prototype sorts against which the individual Q-sorts may be compared and interpreted. Waters & Deane (1985) report some of the advantages of Q-sort procedures and analytic methods over conventional ratings methods. These include the convenience that participants do not need advance knowledge of the constructs to be derived from the data they provide or the norms for

each item in the statement set. The items are scored in the context of the set of other items, and sample norms are not part of the scoring so data from different samples may be compared directly. Additionally the possibilities for data reduction and analysis are greater when items include highly specific content (as is usually the case), than rating procedures which summarize in a single score a wide range of information.

#### **Analytical method: Multidimensional Scaling Analysis (MDS)**

Multidimensional scaling (MDS); Kruskal, 1964a, 1964b; Coxon, 1974, 1982, is the methodology used in this study. The major assumption of MDS is that “subjects have a “cognitive map” or “internal representation” of a set of stimuli” (Coxon, 1974, p. 165). The method accepts data which conforms to the requirement that phenomena are from a given zone of coherence, or concourse (Stephenson, 1953). A zone must have a common, defined domain, a bounded territory, with distinctive items (Kirkland *et al.*, 2004). It is assumed that “psychological distance or similarity (between concepts, constructs, persons, traits, social episodes, national stereotypes, etc.) can be represented and analysed in terms of Euclidean distance formulations” (Forgas, 1979, p. 144). Thus proximity or (dis)similarity data can be reduced through mathematical scaling to reveal meaningful underlying dimensions. The ‘problem’ of MDS is “to find  $n$  points whose interpoint distance matches in some sense the experimental dissimilarities of  $n$  objects”(Kruskal, 1964a, p.59) The “obverse of reading distances from a map” in MDS we are given the distances and have to draw the map (Carroll & Wish, 2002, p. 403).

MDS represents data spatially in a P-dimensional, geometrical configuration of points (Kruskal, 1964a, 1964b; Shepard 1974). Advantages for application are discussed in the next section.

Although MDS and Factor Analysis (FA) share the goal of increasing understanding through measurement, and are applied to similar types of research questions, they are fundamentally different methods. Justification for the use of MDS in the present study is examined in the next section.



### *Rationale for use of MDS*

MDS offers advantages which serve the aims of the present study over and above FA. The decisions implicit in any analysis must be transparent and supported by conceptual argument in addition to empirical work. Recent innovations to MDS procedures (Bimler & Kirkland, 2001) provide such transparency in first establishing an objective structure before interpreting subjective data.

MDS, unlike FA, does not require multivariate normal data structure with linear relationships. MDS requires only that the distance-ordering be meaningful.

Although exploratory FA can often simplify and make reportable huge amounts of otherwise incomprehensible data, in interpreting the results “one must be mindful of the ways in which the method may suggest more than is supportable” (Block, 1995). While more factors are typically extracted by FA, its reliance on variance to identify appropriate solutions may result in oversimplification. In FA rotation criteria such as Varimax may result in oversimplification since selection of a set of factors is arbitrary. Individual-difference MDS models (Carroll, 1972) search for an optimal alignment, that is non-arbitrary rotation of the item sets. This means the axes do not generally have to be rotated to obtain an interpretable solution “in terms of presumably fundamental perceptual dimensions” (Carroll & Wish, 2002, p. 413) (INDSCAL, Carroll & Chang, 1970). Another difference is that in FA participants must first rate stimuli on some listed attributes, while MDS, a method not dependent on variability, allows subjects to assess similarities between stimuli directly (Kruskal, 1964a).

The measure of how well the MDS configuration reproduces the observed distance matrix, or the ‘Goodness-of-fit’, is found in the computation of the sum of squared deviations of observed distances (or some monotone transformation of those distances) from the reproduced distances and is called stress. Aid in deciding number of dimensions is supported by Kruskal’s Goodness-of-fit table (1964a, p. 61) and analytical interpretation of dimensions is possible through multiple regression techniques like Carroll & Chang’s PROFIT analyses (1970).

Property-fitting (PROFIT; Carroll & Chang, 1970) is a multiple linear regression application which seeks to detect structure in the MDS solution by summarizing

independent or external aspects or properties of the solution as vectors drawn through the solution space and pointing the direction in which higher values of the external properties occur.

Because MDS is more effective in revealing latent dimensional structure and offers a number of options for data reduction and analysis, it is the indicated methodology for the present study which targets the latent dimensional structure of the CBCL.

### **Applications:**

#### ***Multidimensional scaling***

MDS application has a number of advantages. Its geometric configuration parsimoniously and economically summarizes data, simultaneously yielding information about the stimuli and about individual differences in the participants who made the judgments (INSCAL, Carroll & Chang, 1970).

MDS illuminates the dimensions underlying perception of the items (Carroll & Wish, 2002). The method presents participants, in a clear, concise, intuitively appealing and informative manner, a spatial representation of their judgments to which they can ascribe meaning.

MDS procedures accept data that are judgments of preference, similarity or relatedness, about psychological stimuli or other complex objects. Item sets are typically generated by ‘free-listing’ (Weller & Romney, 1988). For example, Bimler and Kirkland’s recent (2001a) MDS study of truancy involved collecting reasons for truancy from brainstorming sessions with teachers, parents, principals and students.

On the other hand pre-existing sets of particulars about which people make judgments can also be used as input in MDS studies. For example Bimler & Kirkland (2002) and Kirkland *et al.*, (2004) used MDS approaches with the Attachment Behavior Q-set (AQS). The MDS method thus allows reanalysis of archival data as long as it conforms to the requirements noted above.. These points are most pertinent to the present study given the domain under investigation and the available archival data.

It has been found that, although robust (Kirkland *et al.*, 2004), the inter-item dimensional structure is neither constrained by nor limited to existing items. Parallel sub-decks can be selected and different items used each time to avoid stereotyped responses. This is also more efficient since the sorting time is reduced. Repeated assessments can be undertaken in close succession with different sub-sets. In addition, the use of different sub-decks enables easy verification of observer reliability.

Both subsets and supersets of items have been found to reveal the same spatial structure (Bimler & Kirkland, 2002; Kirkland *et al.*, 2004). This independence of support from all items increases the flexibility of the procedure since items may be added or deleted without affecting the inter-item structure. Additional items may be inserted into the map by including them in stratified sub-decks and following the sorting procedures outlined above.

Other instruments or versions of the original instrument which capture similar domains may be integrated into the map and a composite map generated. This may be accomplished either by a 'piggy-backing' procedure, where items from the other version or instrument are 'placed' using corresponding groups in the h-trees, or by mapping the other domain and rotating its solution to align axes homologous to axes in the original solution. Alternatively as in the present study, where the overlapping items sets allowed a combined item set of manageable size to be created for sorting and mapping, the entire MDS procedure can be repeated and the new map used to explore and organize patterns in the archival CBCL data.

### ***Canonical correlation***

Canonical correlation (CANCOR) is typically used to explain relationships between sets of variables where there may be more than one linear correlation or dimension by which the independent set is related to the dependent set. Canonical correlation finds the linear combination of variables that produces the largest correlation with the second set of variables (?). A measure of the strength of relationship between two latent variables it is also useful in determining the minimum number of dimensions needed to account for the relationship. It is recommended that number of cases exceed number of variables by at least 20 times. A dimension will be of interest if its canonical correlation is .30 or higher, corresponding to about 10% of variance explained. In the present study

Canonical Correlation (CANCOR) is used to explore the relationship between two sets of vectors, revealed in PROFIT analyses, for cases over time, and to provide comparison with the relationship between values for CBCL subscales over the same period. Because the sub-scales of interest in the present study are highly correlated - often higher than the test-retest correlations - Pearson correlations between the two assessment periods do not reveal the number of ways the two sets of vectors or subscale measurements are independently related. The number of independent forms of stability and consistency may, however, be estimated using canonical correlation, which also provides a means of testing significance of the dimensionality of the consistency (Bimler, personal communication, August 11, 2003).

## **Limitations**

### ***Procedures***

The CBCL items are short, pithy statements describing a broad range of behaviour and often implying frequency. It is possible that the item content may affect the wide range of data analytic methods typically available with ranking data. Many of the concerns raised in the Literature Review about the comprehensiveness of ratings checklists, that they appear to primarily access behavioural output for example, suggest caution in assuming success of an MDS approach.

Descriptors are context-dependent and content validity for the Combined map could also be an issue since although there are 59 common items they were originally selected as having meaning for different age-ranges. Despite items coming from more than one checklist, however, it was anticipated that the super-set could be considered, and GOPA-sorted, as a description of the common domain of child emotion/problem behaviours.

### ***Analytical methods***

The MDS procedure relies on the assumption that a 'true' underlying or semantic structure exists, despite uncertainty implicit in models reconstructed from 'noisy' data such as GOPA (Bimler & Kirkland, 1999). Significance tests, commonly available for statistical methods, are not available for MDS, and this keeps the degree of uncertainty

unknown. The present study utilizes longitudinal comparison of stability of components to enable significance testing (CANCOR).

Deciding on the appropriate number of dimensions is a negotiated process involving the researcher balancing the minimization of stress with the minimization of dimensions and as such is based on subjective choice. Interpretation of underlying dimensions is again based on subjectivity.

While the model generates an inter-solution index for two independent spatial models it is unable to state a 'true value'. Confounding of the level of discrepancy (high vs. low) of the two collated models, and their latent significance to each other is a concern.

The focus of the present study is on a checklist which produces Likert data. While Kirkland *et al.* have recently demonstrated the efficacy of MDS and MOSS integration in the area of attachment assessment (Bimler & Kirkland, 2002; Kirkland *et al.*, 2004) and truancy (Bimler & Kirkland, 2001a), it is appreciated that the application of this method to the item set of the CBCL/2-3 and archival data is novel. There is no guarantee that interpretable dimensions will be recovered.

### ***Communication of results***

The h-trees are two - dimensional representations of multidimensional outcomes and as such are limited in their communicative power. The two – dimensional representations of the three-dimensional spatial map projections are restricted to a center-sphere view. The PLOT program, developed by Andrew Drawneek (<http://www.suchandsuch.biz/plot>) illustrates items as points projected radially onto the surface of a hollow notional sphere. Although it is still limited by the center - sphere perspective it is a great advantage in visualizing the present study's multidimensional solution.

### ***Analyses***

The mapping stage utilizes algorithms developed at Massey University (Bimler & Kirkland, 2001b, 2002; Marshall *et al* 2002).

### ***Hierarchical clustering and Mapping***

By treating the CBCL/2-3 item set as a coherent domain of knowledge or “concourse of statements that can be made with greater or lesser accuracy depending upon who they describe” (Bimler & Kirkland 2001, p. 76) similarity data may be collected. GOPA data collected in Task One using CBCL/2-3 item-statements is converted into hierarchical trees (h-trees) using Hierarchical Clustering Analysis (HCA). HCA provides another way to represent the similarity structure of the item set: a dendrogram is a two-dimensional representation of the item structure. H-trees portray a consensus of the individual sorting data and the “stages of similarity data collection can be considered as slices taken though a tree at different horizontal levels”(Kirkland *et al.*, 2004,p. 710) In hierarchical trees the items are grouped conceptually as leaves and the lengths along the branches between items maps the similarity ‘distance’ between them. The branches thus have meaning or values and the grouping are comparable to the dimensions of the geometric model (Coxon, 1999).

A multidimensional scaling approach is applied to the CBCL/2-3 GOPA data collected in Task One to map its semantic structure. Multidimensional scaling (MDS) algorithms create a geometric model, a spatial “map” representing a summary of its structure as dimensions (Kruskal, 1964a). Areas of psychological meaning described by clusters in the map are identified, and labels used in Task Four criterion sorts.

In Task Three items are then selected from the h-tree clusters to create a representative sample or a stratified sub-deck of 39 items. This sub-deck is sorted with The Method of Triads (Weller & Romney, 1988), analyzed with MDS and a separate map created from the triadic data to check that the same underlying dimensions or structure emerge (Bimler & Kirkland, 2001).

Collated data from the criterion studies are compared using graphic overly on the map which allows assessment to be made as to the convergence of methods and participants regarding the clusters emergent in the map (Trochim, 1989). External validity for the clusters will in this way be assessed by matching the patterns in the MOSS data contributed by different participant groups sorting towards a number of salient constructs.

GOPA data from Task Two sorting of the Combined item set of 162 items (CBCL/2-3 & CBCL/4-18) is then mapped with non-metric MDS. The inter-item structure is able to be rotated to decide upon meaningful dimensions without affecting the goodness-of-fit. Use of software that can represent the solutions as a three –dimensional spatial map is advised. Examination of items at the bipolar ends of axes may reveal plausible dimensional labels and attention to clusters of points or patterns aids interpretation. The locations of the CBCL/2-3 items in the Combined map are compared with locations of the same items in the toddler map. This method builds on earlier work by Bimler and Kirkland (Bimler & Kirkland, 2002; Kirkland *et al.*, 2004) that utilizes enlarged item sets for validation purposes and heuristic goals. The structure of the enlarged map is “required to reflect the ‘functional similarity’ of items from both versions” (2002, p. 3). The establishment of the invariant structure and identification of dimensions of the Combined map is the second goal of the present study.

### ***Vector Analyses***

Criterion-descriptive ranking data from Task 4 is used again and regressed on MDS coordinates to establish some external validity, and also check for robustness for the constructs emergent in the map of the toddler item domain. Once sorting data collection (Task One and Two) and MDS analysis to identify the latent dimensional structure of the toddler checklist is accomplished the map can be used as a tool for interpreting CBCL case data. These first tasks need not be repeated in future studies once this ‘objective’ or consensus structure has been established. Archival data or data from future studies may then be integrated into the map to explore patterns using Property fitting analysis (PROFIT; Carroll & Chang, 1970) vector analysis. In the present study properties of the correlations matrices of archival CBCL/2-3 data sets for two ages are regressed on the coordinates of the MDS solution for the GOPA data – the CBCL/2-3 map. Correlations between the resulting vector sets are calculated and then the vector sets are analyzed with CANCOR to examine their dimensional consistency, or the stability of the instrument’s dimensions. Results are interpreted with regard to the geometric information in the spatial solution – the map dimensions of the toddler data

Once the aspects of aggression-related toddler behaviour have been reconceptualised in the broader framework of behaviour right across childhood (i.e. interpreted in the Combined map dimensions) inter-instrument stability may be examined. The two MDS



solutions will first be compared (CANCOR) to check location of 59 common items. Both maps will then be explored as to their ability to summarize patterns in the raw longitudinal CBCL case data. Specifically, sets of archival CBCL/4-18 raw (Likert) data will be integrated into the resulting Combined item set map using PROFIT (Carroll & Chang, 1970) and the vector solutions compared longitudinally for component stability using CANCOR to check significance of correlations. Different kinds or forms of stability across time periods are expected to be represented in results of these comparisons, the meaning of which (if any) may be illuminated by identifying candidates for high stability among the map dimensions and clusters. This will also enable comparison with Achenbach's subscale approach on amount of common variance captured between the two times.

Achenbach's suggestion to use the items of AGG scale for assessment of children whose ages span the two instruments may then be examined by comparing the amount of common variance between different age samples captured by the subscale on the one hand and the spatial method on the other.

### ***Summary***

This section presents and discusses the research aims, data collection procedures and analytic strategies used in the present study. It explains the justification for their use and also cautions as to the limitations of the present study. The next section will present the results.

## CHAPTER FOUR

### RESULTS

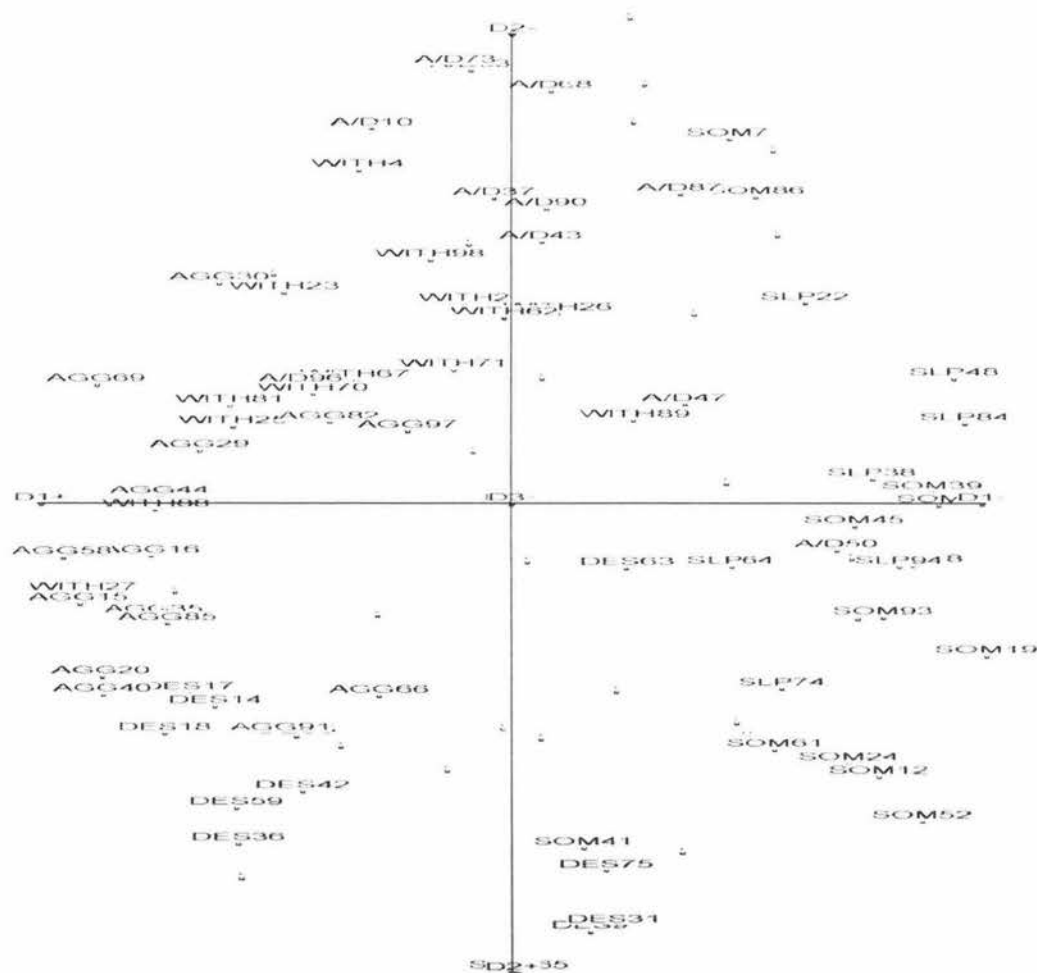
By way of overview, results from the MDS analysis of GOPA CBCL/2-3 data are presented first (*Task One*) along with results of the analysis of MoT data (*Task Two*). In Part Two analyses of criterion sorts, for validation purposes, (*Task Three*) are reported and results overlaid on the map image. Results from PROFIT analysis of raw archival CBCL/2-3 data on the MDS coordinates are reported in Part Three, and component stability compared with correlation analyses of subscale stability. In Part Four results of MDS analysis of the GOPA-sorted combined item sets (*Task Two*) are presented. The structural equivalency of the two MDS solutions is established next and correlations reported. Part Five reports PROFIT analysis results for CBCL/4-18 data regression on the Combined MDS solution (*Task Five*). Finally results from additional exploratory analyses are reported.

#### **Part One: Multidimensional scaling analysis of CBCL/2-3 item set**

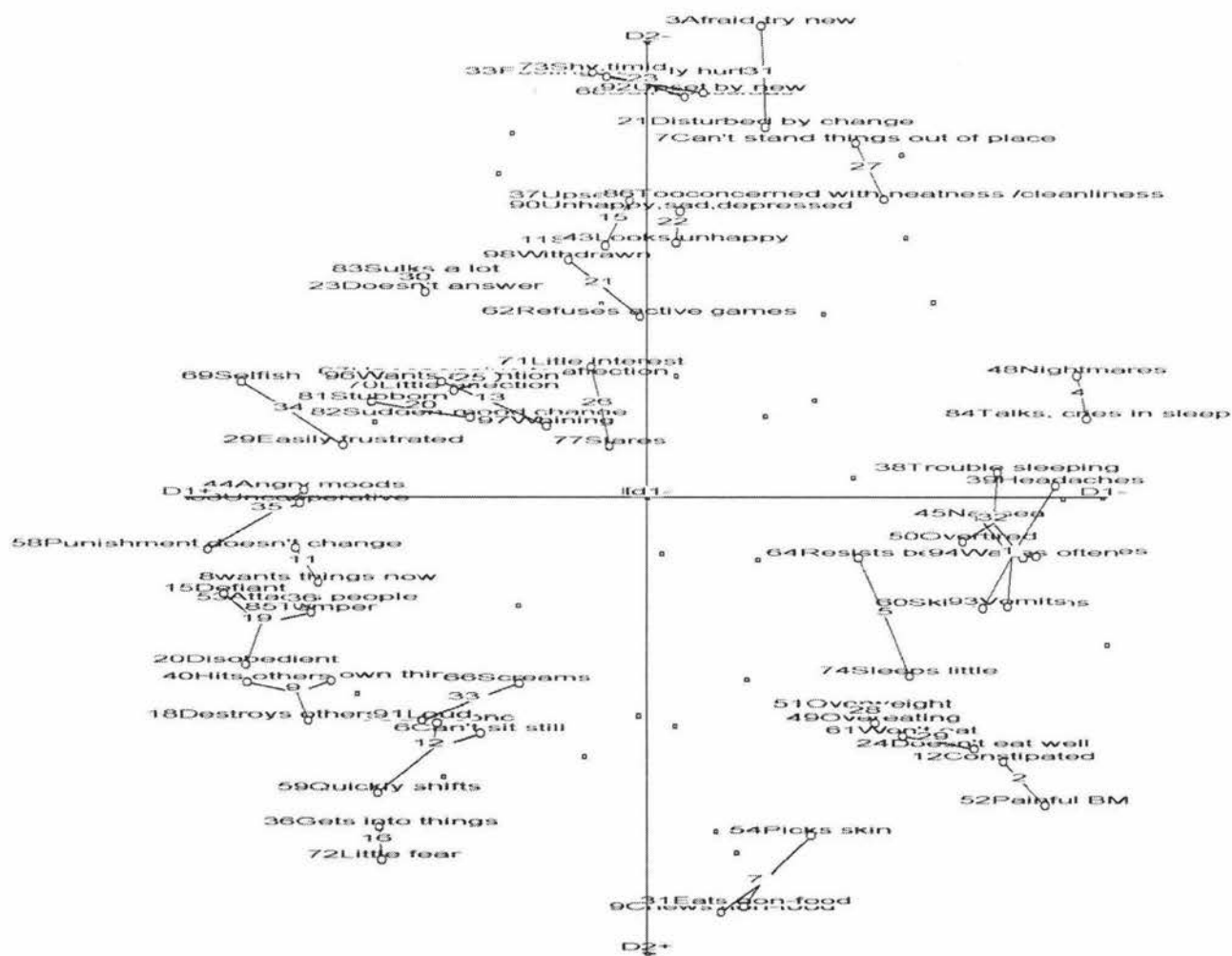
The matrix of estimated dissimilarities among the statements was analyzed with non-metric MDS (Kruskal, 1964b) resulting in a spatial map. The 99 points in the model represent these statements and are organized to reflect the (dis)similarity between them. Items at extreme ends of the axes have the least semantic correspondence since the distance between them is the greatest. Clusters of items at the extreme ends may be interpreted to reveal psychological meaning and facilitate labelling of dimensions. Computer software (PLOT) that models the solution in three dimensions can improve identification and interpretation of the configuration. Up to three dimensions may be represented on this software. Further dimensions must be interpreted from lists of items generated in the MDS analyses. In the present study dimension and cluster identification was aided by PLOT.

Items are illustrated as points projected radially onto the surface of a hollow notional sphere. A five-dimensional MDS solution was obtained ( $P=5$ ) for the GOPA sorting data. The data results are represented in two different conventions (1) as two-

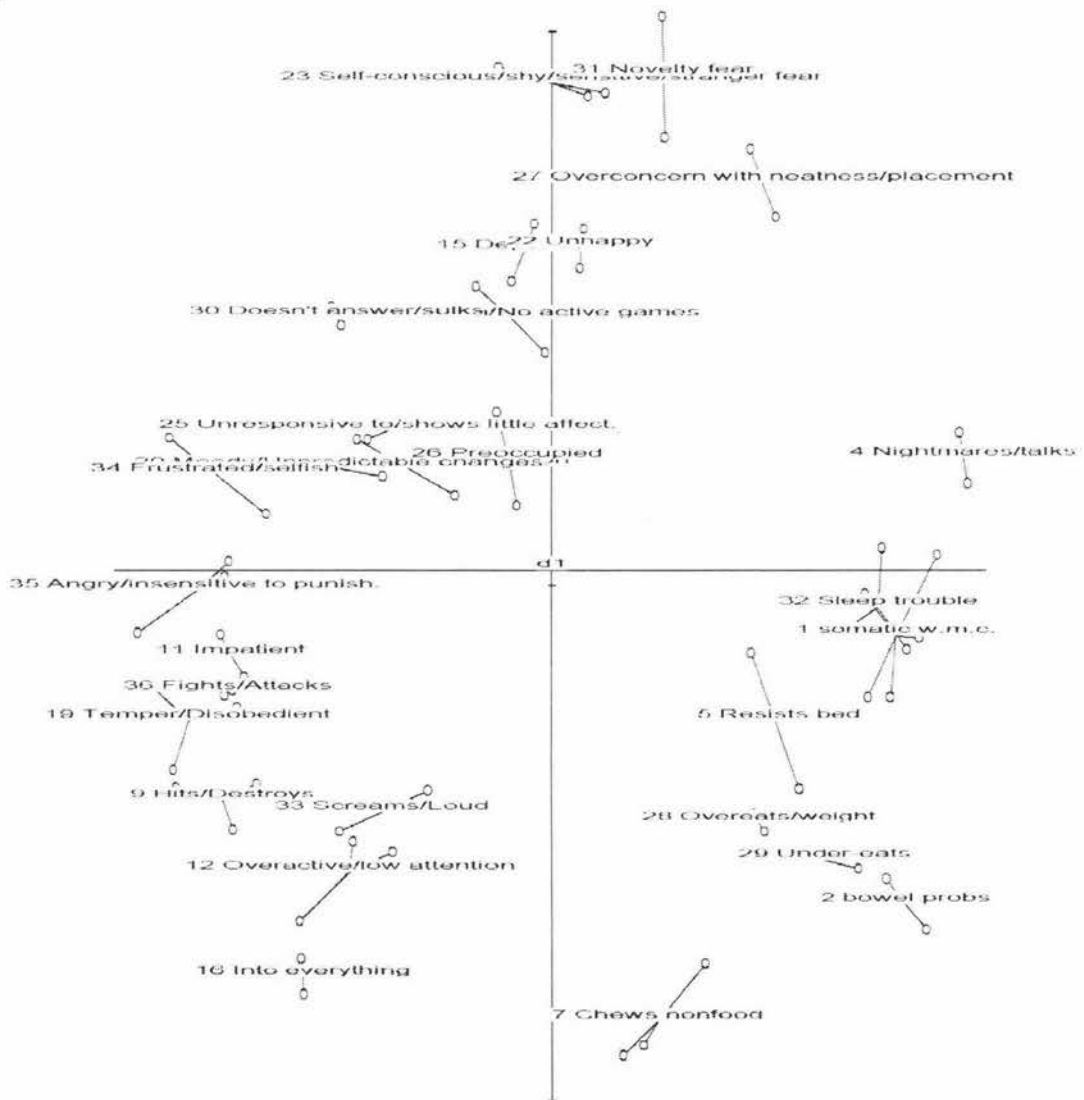
dimensional hierarchical trees (h-tree) (Appendix I) and (2) as three-dimensional spatial maps generated by PLOT software (Figs.1-4). The maps in Figure 1 are renderings in two dimensions of a 3 dimensional map, generated by PLOT software, of the MDS solution for CBCL/2-3 GOPA data collected in Task One. The first three figures show dimension 1 and 2 most clearly. The fourth figure shows dimensions 1 and 3. Overlaid on the first figure are those items that load on CBCL subscales with their subscale labels and item numbers.



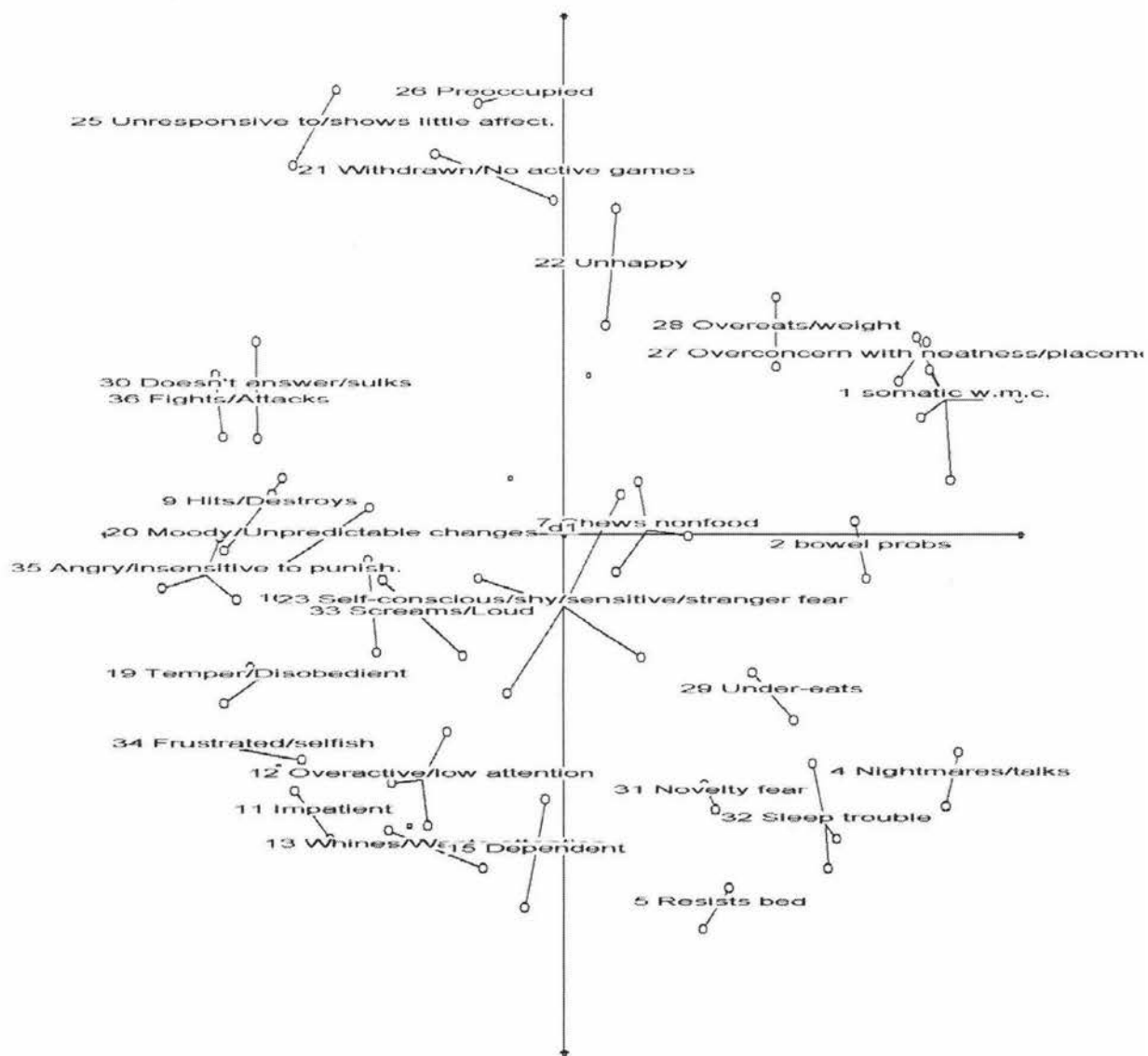
**Figure 1. Child Behavior Checklist/2-3 (CBCL/2-3) multidimensional scaling solution (D=5) (spatial map) view of three-dimensional PLOT configuration (D1-D2 view): Items loading on subscales on the MDS map with subscale identifiers and item numbers. Key: AGG: Aggressive Behavior; DES: Destructive Behavior; A/D: Anxious/Depressed; WITH: Withdrawn; SLP: Sleep Problems and SOM: Somatic Problems.**



**Figure 2. CBCL/2-3 MDS map view of three-dimensional PLOT configuration: D1-D2 view with clustered items linked showing abbreviated item descriptors.**



**Figure 3. CBCL/2-3 MDS map view of three-dimensional PLOT configuration: D1-D2 view showing numbered and summarized clusters.**



**Figure 4. CBCL/2-3 MDS map view of three-dimensional PLOT configuration: D1-D3 view showing numbered and summarized clusters.**

The Tables below collate the clustered items or points for each dimension emergent in the map and Achenbach’s subscale factor loadings follow, indicated in brackets. Each cluster is numbered and labeled (see Appendix J for complete list).

Table 3. Dimension 1

D1+ “antagonistic and hard-to-manage”	D1- “somatic problems”
<p><b>Group 35 Angry/insensitive to punishment</b></p> <p>44. <i>Angry moods</i> [Agg]</p> <p>58. <i>Punishment doesn't change behavior</i> [Agg]*</p> <p>88. <i>Uncooperative</i> [With]</p> <p><b>Group 36 Fights/attacks</b></p> <p>35. <i>Gets in many fights</i> [Agg]</p> <p>53. <i>Physically attacks people</i> [----]</p> <p><b>Group 19 Temper/disobedient</b></p> <p>15. <i>Defiant</i> [Agg]</p> <p>20. <i>Disobedient</i> [Agg]</p> <p>85. <i>Temper Tantrums</i> [Agg]</p> <p><b>Group 9 Hits/destroys</b></p> <p>17. <i>Destroys his/her own things</i> [Des]</p> <p>18. <i>Destroys things belonging to his/her family or other children</i> [Des]</p> <p>40. <i>Hits others</i> [Agg]</p> <p>27. <i>Doesn't seem to feel guilty for misbehaving</i><sup>a</sup></p>	<p><b>Group 1 Somatic problems without medical cause (w.m.c)</b></p> <p>39. <i>Headaches w.m.c.</i> [Som]</p> <p>45. <i>Nausea w.m.c.</i> [Som]</p> <p>78. <i>Stomach aches w.m.c.</i> [Som]</p> <p>93. <i>Vomiting, throwing up w.m.c.</i> [Som]</p> <p>60. <i>Rashes or other skin problems w.m.c</i> [----]</p> <p><b>Group 2 Bowel probs</b></p> <p>12. <i>Constipated, doesn't move bowels</i> [Som]</p> <p>52. <i>Painful bowel movements</i> [Som]<sup>a</sup></p> <p>19. <i>Diarrhea or loose bowels when not sick</i><sup>a</sup></p>

Notes: \* Item #58 *Punishment doesn't change behavior* [was among the three strongest referral-predictor items for both sexes, in the discriminant analyses Achenbach used to establish validity (Achenbach. 1992, p. 71).

<sup>a</sup> Items that didn’t cluster but were nonetheless indicated as salient in the MDS



**Table 4. Dimension 2**

D2+ self-distracting/soothing [voids]	D2 - highly sensitive to change/social stimulation
<b>Group 7 Chews non-food</b> 9. <i>Chews on things that aren't edible [Des]</i> 31. <i>Eats or drinks things that are not food [Des]</i> 54. <i>Picks nose, skin, or other parts of body [---]</i> 91. <i>Unusually loud [Agg]<sup>a</sup></i> 75. <i>Smears or plays with bowel movements [Des]<sup>a</sup></i> 65. <i>Resists toilet training [Som]<sup>a</sup></i>	<b>Group 23 Self-conscious/shy/sensitive/stranger fear</b> 33. <i>Feelings are easily hurt [Anx/Dep]</i> 68. <i>Self-conscious or easily embarrassed [Anx/Dep]</i> 73. <i>Too shy or timid [Anx/Dep]</i> 92. <i>Upset by new people or situations [---]</i>  <b>Group 31 Novelty fear</b> 3. <i>Afraid to try new things [---]</i> 21. <i>Disturbed by any change in routine [---]</i>

<sup>a</sup> Items that didn't cluster but were nonetheless indicated as salient in the MDS

**Table 5. Dimension 3**

D3+ overcontroller/avoidantly attached/ low activity / low positive anticipation	D3- undercontroller/ambivalently attached/high activity [voids]
<b>Group 26 Preoccupied</b> 71. <i>Shows little interest in things around him/her [With]</i> 77. <i>Stares into space or seems preoccupied [---]</i>  <b>Group 25 Unresponsive to/show little affect</b> 67. <i>Seems unresponsive to affection [With]</i> 70. <i>Shows little affection towards people [With]</i> 80. <i>Strange behavior[---]<sup>a</sup></i> 63. <i>Repeatedly rocks head or body [Des]<sup>a</sup></i>  <b>Group 21 Withdrawn/no active games (outlier)</b> 62. <i>Refuses to play active games [With]</i> 98. <i>Withdrawn, doesn't want to get involved with others[With]</i>	<b>Group 5 Resists bed</b> 64. <i>Resists going to bed at night [Slp]</i> 74. <i>Sleeps less than most children during day and/or night [Slp]</i>  <b>Group 13 Whines/wants attention</b> 96. <i>Wants a lot of attention [Anx/Dep]</i> 97. <i>Whining [Agg]</i>  <b>Group 11 Impatient</b> 8. <i>Can't stand waiting: wants everything now[---]</i> 16. <i>Demands must be met immediately [Agg]</i>  <b>Group 15 Dependent</b> 11. <i>Constantly seeks help [---]</i> 37. <i>Gets too upset when separated from parents [Anx/Dep]</i>  <b>Group 32 (outlier) Sleep trouble</b> 38. <i>Has trouble getting to sleep [Slp]*</i> 50. <i>Overtired [Anx/Dep]</i> 94. <i>Wakes often at night [Slp]</i>  <b>Group 4 (outlier) Nightmares/talks</b> 48. <i>Nightmares [Slp]</i> 84. <i>Talks or cries out in sleep [Slp]</i>

Notes: <sup>a</sup> Items that didn't cluster but were nonetheless indicated as salient in the MDS; \* Item

#38 *Has trouble getting to sleep* was among the three significant referral-predictor items for both sexes, in the discriminant analyses Achenbach used to establish validity.(Achenbach. 1992, p. 71)

**Table 6. Dimension 4**

D4+ <b>emotion-regulation deficits/unhappy/aches/sulks</b>	D4- <b>Low Effortful Control/Low concentration</b>
39. <i>Headaches (without medical causes) [Som]</i>	5. <i>Can't concentrate, can't pay attention for long [Des]</i>
1. <i>Aches and pains (without medical cause) [Som]</i>	95. <i>Wanders away from home [---]</i>
90. <i>Unhappy, sad, or depressed [Anx/Dep]</i>	59. <i>Quickly shifts from one activity to another [Des]</i>
43. <i>Looks unhappy without good reason [Anx/Dep]</i>	54. <i>Picks nose, skin, or other parts of body [-- -]</i>
83. <i>Sulks a lot [---]</i>	46. <i>Nervous movements or twitching [---]</i>

**Table 7. Dimension 5**

D5+ <b>Obsessive/compulsive behavior</b>	D5- <b>Sleep problems</b>
57. <i>Problems with eyes (without medical cause) [---]</i>	74. <i>Sleeps less than most children during day and/or night [Slp]</i>
7. <i>Can't stand having things out of place [Som]</i>	48. <i>Nightmares [Slp]</i>
86. <i>Too concerned with neatness or cleanliness [Som]</i>	62. <i>Refuses to play active games [With]</i>
55. <i>Plays with own sex parts too much [---]</i>	50. <i>Overtired [Anx/Dep]</i>
41. <i>Holds his/her breath [Som]</i>	56. <i>Poorly coordinated or clumsy [--]</i>

***Results of Method of Triads (MoT) Validation of map structure:***

The agreement, in terms of the inter-distance correlation between the CBCL/2-3 map derived from GOPA and the one derived from MoT was modest at 41%. Appendix K. displays the h-tree results for this analysis.

## Part Two: Validation of mapgroups and dimensions:

The Method of Successive Sorts (MOSS) (Block, 1961) was applied to all CBCL/2-3 items using labels for hypothetical toddlers as criteria in order to verify map groups. To validate particular clusters emergent as constructs dimensionalized within the map three groups - Special Education Service professionals, parents, and students of English as a Second Language- MOSS-ed the CBCL/2-3 item set: towards labels: Aggressive, Disobedient(Disobedient, rule-breaker, oppositional), Active, Assertive, Shy/Quiet and Demanding (See Appendix H for example sorting form). Lists were compiled of items selected on the basis of 60% agreement. Not all labels were given to each group of participants. External validity was provided for the mapgroups where SES and parent groups agreed on the meaning of items (indicated by [\*] in Table 8 below), and these overlapped with clusters in the map (see Figure 5). Student MOSS data was collected only for Aggressive and Disobedient labels. Common items across all three participant groups are also indicated by [♦] in Table 8.

Table 8. Criterion sorts indicating items common to SES and parent MOSS results (\*), and items across all three participant groups (♦).

Special Education Service professionals (N=7)	Parents (N=15)	Students (N=13)
<b>Active</b>	<b>Active</b>	
5. <i>Can't concentrate, can't pay attention for long</i>	6.* <i>Can't sit still or restless</i>	
6.* <i>Can't sit still or restless</i>	8. <i>Can't stand waiting: wants everything now</i>	
36.* <i>Gets into everything</i>	16. <i>Demands must be met immediately</i>	
59.* <i>Quickly shifts from one activity to another</i>	36.* <i>Gets into everything</i>	
	59.* <i>Quickly shifts from one activity to another.</i>	
<b>Shy/Quiet</b>		
4.* <i>Avoids looking others in the eye</i>	38. <i>Has trouble getting to sleep</i>	
10. <i>Clings to adults or too independent</i>	74. <i>Sleeps less than most children during day and/or night</i>	
23.* <i>Doesn't answer when people talk to him/her</i>		
68.* <i>Self-conscious or easily embarrassed</i>	<b>Shy/Quiet</b>	
73.* <i>Too shy or timid</i>	4. <i>Avoids looking others in the eye</i>	
92.* <i>Upset by new people</i>	32. <i>Fears certain animals,</i>	

<p>98.* <i>or situations</i> <i>Withdrawn, doesn't want to get involved with others</i></p> <p><b>Fearful</b></p> <p>28. <i>Doesn't want to go out of home</i></p> <p>32. <i>Fears certain animals, situations, or places</i></p> <p>37. <i>Gets too upset when separated from parents</i></p> <p>87. <i>Too fearful or anxious</i></p>	<p>37. <i>situations, or places</i> <i>Gets too upset when separated from parents</i></p> <p>68.* <i>Self-conscious or easily embarrassed</i></p> <p>73.* <i>Too shy or timid</i></p> <p>92.* <i>Upset by new people or situations</i></p> <p>98.* <i>Withdrawn, doesn't want to get involved with others</i></p> <p><b>Fearful</b> <i>(Label not provided to participants)</i></p>	
<p><b>Aggressive</b></p> <p>14.* <i>Cruel to animals</i></p> <p>15. <i>Defiant</i></p> <p>18.* <i>Destroys things belonging to his/her family or other children ♦</i></p> <p>35.* <i>Gets in many fights ♦</i></p> <p>40.* <i>Hits others ♦</i></p> <p>44.* <i>Angry moods</i></p> <p>53.* <i>Physically attacks people ♦</i></p> <p>85.* <i>Temper tantrums or hot temper</i></p> <p><b>Demanding</b></p> <p>8.* <i>Can't stand waiting: wants everything now</i></p> <p>11. <i>Constantly seeks help</i></p> <p>16.* <i>Demands must be met immediately</i></p> <p>22. <i>Doesn't want to sleep alone</i></p> <p>29. <i>Easily frustrated</i></p> <p>66.* <i>Screams a lot</i></p> <p>96.* <i>Wants a lot of attention</i></p> <p>97. <i>Whining</i></p> <p><b>Disobedient</b></p> <p>17. <i>Destroys his/her own things.</i></p> <p>20.* <i>Disobedient ♦</i></p> <p>58.* <i>Punishment doesn't change his/her behavior</i></p> <p>64. <i>Resists going to bed at</i></p>	<p><b>Aggressive</b></p> <p>14.* <i>Cruel to animals</i></p> <p>16. <i>Demands must be met immediately</i></p> <p>17. <i>Destroys his/her own things.</i></p> <p>18.* <i>Destroys things belonging to his/her family or other children ♦</i></p> <p>35.* <i>Gets in many fights ♦</i></p> <p>40.* <i>Hits others ♦</i></p> <p>44.* <i>Angry moods</i></p> <p>53.* <i>Physically attacks people ♦</i></p> <p>58. <i>Punishment doesn't change his/her behavior</i></p> <p>85.* <i>Temper tantrums or hot temper</i></p> <p><b>Demanding</b></p> <p>8.* <i>Can't stand waiting: wants everything now</i></p> <p>16.* <i>Demands must be met immediately</i></p> <p>66.* <i>Screams a lot</i></p> <p>85. <i>Temper tantrums or hot temper</i></p> <p>96.* <i>Wants a lot of attention</i></p> <p><b>Disobedient</b></p> <p>15. <i>Defiant</i></p> <p>16.* <i>Demands must be met immediately</i></p> <p>17. <i>Destroys his/her own</i></p>	<p><b>Aggressive</b></p> <p>8. <i>Can't stand waiting: wants everything now</i></p> <p>16. <i>Demands must be met immediately</i></p> <p>17. <i>Destroys his/her own things.</i></p> <p>18.* <i>Destroys things belonging to his/her family or other children ♦</i></p> <p>20. <i>Disobedient</i></p> <p>35.* <i>Gets in many fights ♦</i></p> <p>40.* <i>Hits others ♦</i></p> <p>42. <i>Hurts animals or people without meaning to</i></p> <p>53.* <i>Physically attacks people ♦</i></p> <p><b>Disobedient</b></p> <p>6. <i>Can't sit still or restless</i></p> <p>14. <i>Cruel to animals</i></p> <p>20.* <i>Disobedient ♦</i></p> <p>40. <i>Hits others</i></p>

88.* <i>night</i> <i>Uncooperative</i>  <b>Unusual</b> 4 7 14 21 32 54 63 67 70 71 72 75 79 80 95	18. <i>things.</i> <i>Destroys things</i> <i>belonging to his/her</i> <i>family or other</i> <i>children</i> 20.* <i>Disobedient ♦</i> 27. <i>Doesn't seem to feel</i> <i>guilty for misbehaving</i> 40. <i>Hits others</i> 53. <i>Physically attacks</i> <i>people</i> 58.* <i>Punishment doesn't</i> <i>change his/her</i> <i>behavior</i> 85. <i>Temper tantrums or</i> <i>hot temper</i> 88. <i>Uncooperative</i>  <b>Assertive</b> <i>(this label was not</i> <i>provided to SES)</i>  16. <i>Demands must be met</i> <i>immediately</i> 36. <i>Gets into everything</i>	
--	---	--

**Regression Analyses 1 (MOSS data)**

Regressing the parent criterion MOSS data (*Task Four*) on the MDS coordinates revealed patterns in the parent data for each of the first three dimensions(Table 9 and Table 10).

**Table 9. Parent Criterion MOSS data: results of regression on MDS coordinates for each of the first 3 dimensions**

Criterion label	Aggressive	Disobedient	Shy/Quiet	Assertive	Demanding	Active
D1	1.2954	1.2873	-0.2671	0.4857	0.9036	0.5832
D2	0.4618	0.3106	-1.2697	0.1327	0.2757	0.5641
D3	0.2108	0.4052	-0.1963	0.4579	1.1014	0.9957

Regressing ESOL student criterion MOSS data on the MDS s coordinates reveals similar direction of correlation for Aggressive and Disobedient labels (Table 10).

Table 10. Student Criterion MOSS data for ‘Aggression’ and ‘Disobedient’: results of regression on MDS coordinates for each of the first 3 dimensions.

Criterion Label	Aggressive	Disobedient
D1	0.9699	0.8213
D2	0.6258	0.3389
D3	0.2263	0.3085

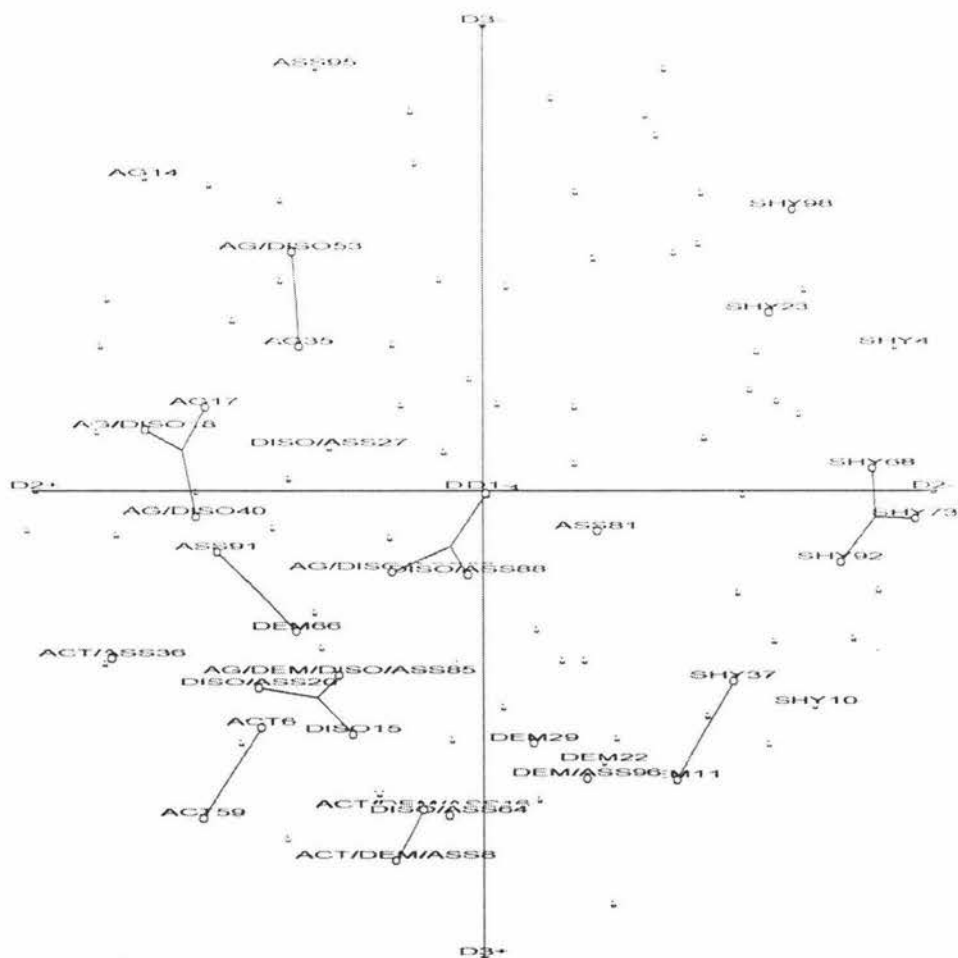


Figure 5. Parent criterion sorts overlaid on CBCL/2-3 map.

**Part Three: Integration of archival raw CBCL /2-3 data into the map of the CBCL toddler problem domain.**

The PROFIT analyses involved regressing the properties of the correlation matrices from the US archival CBCL/2-3 rating data on the 5-dimensional MDS solution derived from CBCL/2-3 items GOPA data. Each case is then represented as a 5-D vector within that solution. Comparing the pattern of the resulting set of 5-D vectors for 24-months to the set of vectors for 42-months using Canonical Correlation (CANCOR) yields the six components presented in Table 11.

**Table 11. Canonical Correlation components of CBCL/2-3 vectors at 24- and 42-months**

Component	CANCORR
1	.694*
2	.579*
3	.464*
4	.326*
5	.253*
6	.201*

\*p < 0.001. (N=255)

For comparison with Achenbach’s narrow-band subscales, the Pearson’s correlations between the 24- and 42-month values for each subscale were tested using CANCOR.

**Table 12. Canonical Correlation components for the 6 narrow-band CBCL/2-3 subscales at 24- and 42-months**

Component	CANCORR
1	.665*
2	.538*
3	.406*
4	.334*
5	.315*
6	.239*

\*p < 0.001. (N=255)



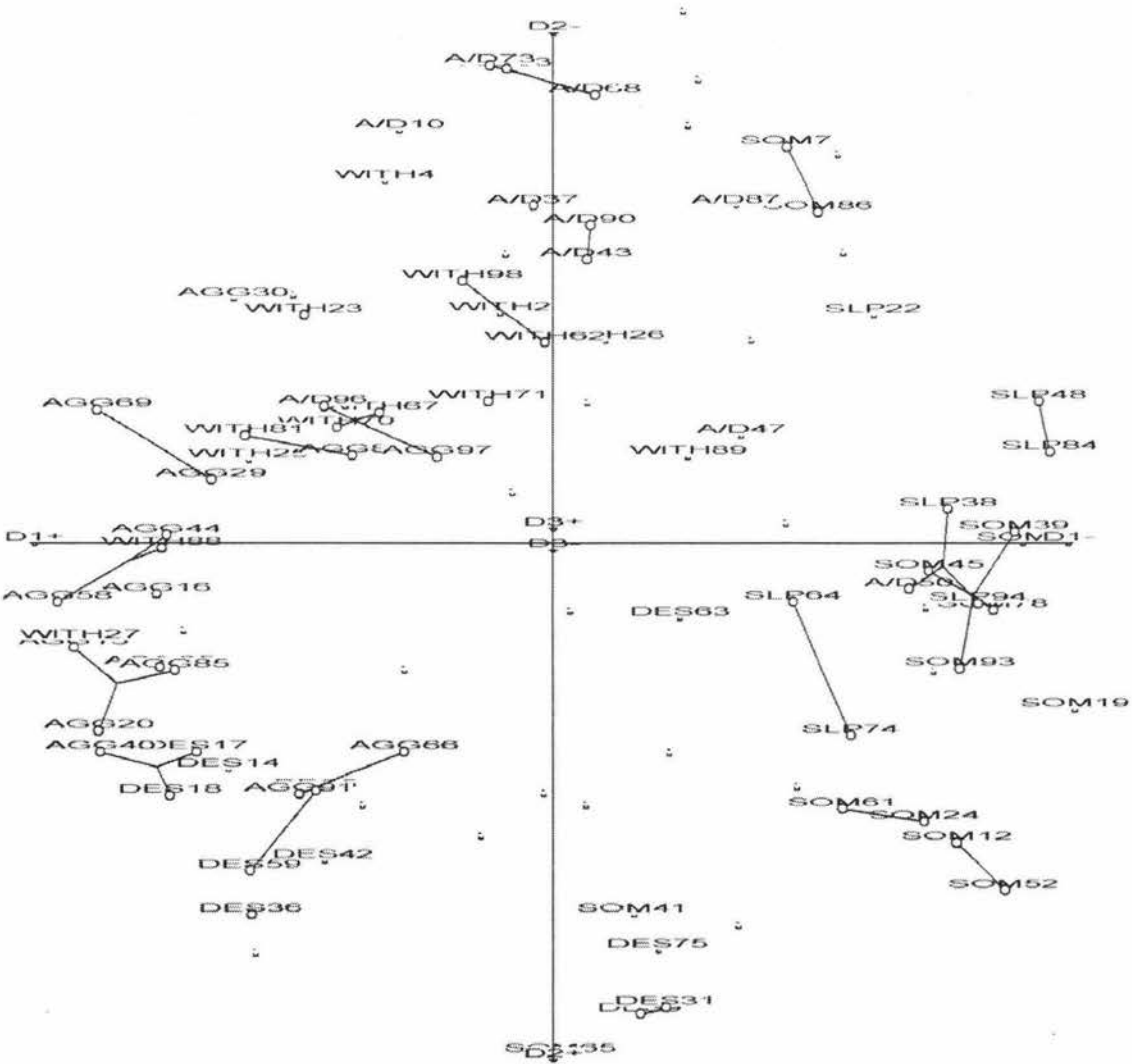
**Regression Analyses 2, (CBCL subscale scores)**

The results of regression analysis that relate the scores on the CBCL second-order (sub) scales to dimensions in the map are presented in Table 13: Key: AD= Anxious Depressed; WD= Withdrawn; slp= Sleep Problems; smp= Somatic Problems; AB= Aggressive Behavior; DB= Destructive Behavior

**Table 13. Results of regression analyses relating CBCL subscale scores to dimensions showing best predictors underlined.**

D1 ~ = -.101 AD + .284 Wd - .363 slp - .307 smp + <u>.757 AB</u> + .218 DB  The value of the first-dimension component is best predicted by the score on the [AB] Aggressive Behavior subscale.
D2 ~ = <u>-.759 AD</u> - .267 Wd + .033 slp + .140 smp + .414 AB + <u>.618 DB</u> The 2nd-dimension component is best predicted by the negative of the [AD] Anxious-depressed score, and a positive [DB] Destructive-Behaviour score.
D3 ~ = -.207 AD + <u>.419 Wd</u> - .429 slp - .041 smp - <u>.727 AB</u> + .040 DB  The 3rd-dimension component is best predicted by the negative of the [AB] Aggressive Behavior score, a positive [Wd] Withdrawn score, and negative [slp] Sleep-problem score.
D4 ~ = -.155 AD + .116 Wd - .196 slp + .280 smp + <u>.758 AB</u> - <u>.704 DB</u>  The 4th-dimension component is best predicted by the [AB] Aggressive Behavior , and [DB] Destructive Behavior scores.
D5 ~ = .026 AD - <u>.341 Wd</u> - <u>.613 slp</u> + .178 smp + .261 AB + .101 DB  The 5th-dimension component is best predicted by the negative of the [slp] Sleep-problem, and [Wd] Withdrawn scores.

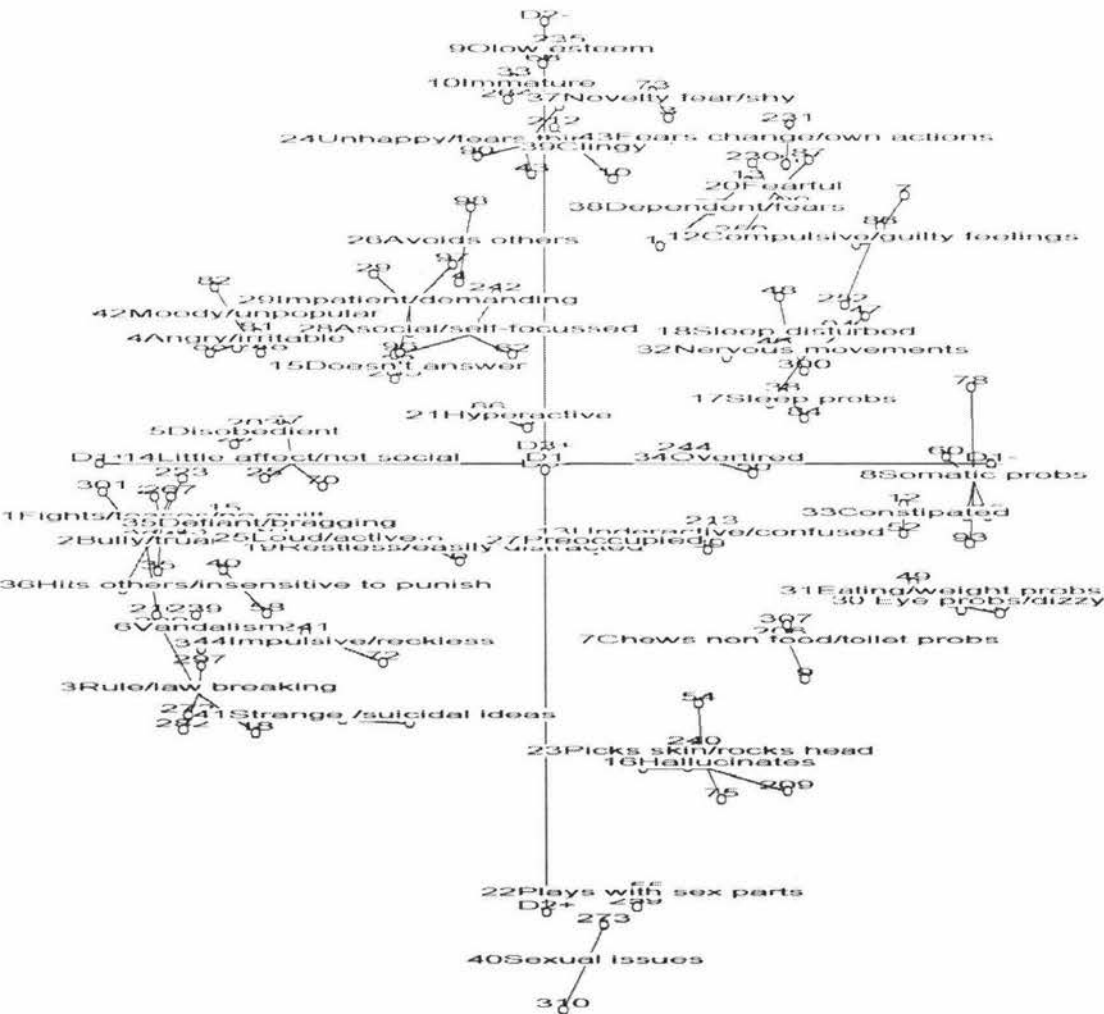
CBCL subscales that show dimensional consistency in the MDS map are those that cluster or form part of a cluster. Overlaid on Figure 6 below are those items that load on CBCL/2-3 subscales with their subscale labels and item numbers.



**Figure 6: CBCL subscale clusters in the MDS map. Key: AGG: Aggressive Behavior; DES: Destructive Behavior; A/D: Anxious /Depressed; WITH: Withdrawn; SLP: Sleep Problems and SOM: Somatic Problems.**

**Part Four: Multidimensional scaling analyses of Combined CBCL/2-3 and CBCL/4-18 item sets**

The matrix of estimated dissimilarities among the 162 statements was analyzed with non-metric MDS (Kruskal, 1964b) resulting in a spatial map. Items are once again illustrated as points projected radially onto the surface of a hollow notional sphere. A 5-dimensional MDS solution was obtained (P=5) for the sorting data. The data results are represented (1) as two-dimensional hierarchical trees (h-tree) (Appendix L) and (2) as three-dimensional spatial maps generated by PLOT software (Figs.7 & 8).



**Figure 7. Combined item sets MDS map: D1-D2 view showing numbered and summarized clusters and individual item numbers.**



**Table 14. Combined item set MDS analysis results: Dimension 1**

D1+ aggressive/oppositional/ insensitive to punishment	D1- somatic problems
<b>Group 1 Fights/teases/no guilt</b>	<b>Group 8 Somatic Probs</b>
27. <i>Doesn't seem to feel guilty for misbehaving [With-none]</i>	60. <i>Rashes or other skin problems (without medical cause) [Other-Som]</i>
35. <i>Gets in many fights [Agg-Agg]</i>	45. <i>Nausea, feels sick (without medical cause) [Som-Som]</i>
223. <i>Disobedient at school. [none-Agg]</i>	39. <i>Headaches (without medical causes) [Som-Som]</i>
294. <i>Teases a lot. [none-Agg]</i>	1. <i>Aches and pains (without medical cause) [Som-Som]</i>
<b>Group 36 Hits others/insensitive to punishment</b>	93. <i>Vomiting, throwing up (without medical cause) [Som-Som]</i>
40. <i>Hits others [Agg-none]</i>	78. <i>Stomach aches or cramps (without medical cause) [Som-Som]</i>
58. <i>Punishment doesn't change his/her behaviour [Agg-none]*</i>	<b>Group 33 Constipated</b>
<b>Group 35 Defiant/bragging</b>	12. <i>Constipated, doesn't move bowels [Som-Other]</i>
15. <i>Defiant [Agg-none]</i>	52. <i>Painful bowel movements [Som-none]</i>
207. <i>Bragging, boasting [nne-Agg]</i>	<b>Group 30 Eye problems</b>
<b>Group 5 Disobedient</b>	57. <i>Problems with eyes (without medical cause) [Other-Som]</i>
20. <i>Disobedient [Agg-Agg]</i>	251. <i>Feels dizzy. [none-Som]</i>
203. <i>Argues a lot. [none-Agg]</i>	<b>Group 31 Eating/weight problems (outlier)</b>
<b>Group 4 Angry/irritable</b>	49. <i>Overeating [Other-Other]</i>
44. <i>Angry moods [Agg-none]</i>	51. <i>Overweight [not on prob scale-Soc]</i>
81. <i>Stubborn, sullen, or irritable [With-Agg]</i>	
88. <i>Uncooperative[With-none]</i>	

Notes: \* Item #58 *Punishment doesn't change behavior* was among the three strongest CBCL/2-3 referral-predictor items for both sexes, in the discriminant analyses Achenbach used to establish validity.(Achenbach. 1992, p. 71)

**Table 15. Combined item set MDS analysis results: Dimension 2**

D2+ Sex problems	D2- "anxious/fearful distress" (Negative Affect)
<b>Group 40 Sexual Problems</b> 273. <i>Sexual problems. [none-Sex]</i> 310. <i>Wishes to be of opposite sex [none-Sex]</i>	<b>Group 10 Immature</b> 33. <i>Feelings are easily hurt [Anx/Dep-none]</i> 264. <i>Prefers being with younger kids [none-Soc.]</i>
<b>Group 22 Plays with sex parts</b> 55. <i>Plays with own sex parts too much [none-Sex]</i> 259. <i>Plays with own sex parts in public. [none-Sex]</i>	<b>Group 9 Low self-esteem</b> 68. <i>Self-conscious or easily embarrassed [Anx/Dep-Anx/Dep]</i> 235. <i>Feels worthless or inferior [none-Anx/Dep]</i>
<b>Group 23 Picks skin/rocks head</b> 54. <i>Picks nose, skin, or other parts of body [Other-Other]</i> 63. <i>Repeatedly rocks head or body [Des-none]</i> 75. <i>Smears or plays with bowel movements [Des-Other]</i>	<b>Group 37 Novelty fear</b> 3. <i>Afraid to try new things [Other-none]</i> 73. <i>Too shy or timid. [Anx/Dep-With]</i>
	<b>Group 24 Unhappy/fears/depressed</b> 43. <i>Looks unhappy without good reason [Anx/Dep-none]</i> 32. <i>Fears certain animals, situations, or places [...]</i> 90. <i>Unhappy, sad or depressed [Anx/Dep-With]*</i>
	<b>Group 39 Clumsy</b> 10. <i>Clings to adults or too independent [Anx/Dep-Soc]</i> 212. <i>Complains of loneliness. [none-Anx/Dep]</i>
	<b>Group 38 Dependent/fears</b> 11. <i>Constantly seeks help [Other-none]</i> 22. <i>Doesn't want to sleep alone. [Slp-none]</i> 13. <i>Cries a lot. [Other-Anx/Dep]</i>

Note: \* item #90 *Unhappy, sad or depressed*(originally #103) was among the three strongest referral predictor items for all 4 sex/age groups in Achenbach's discriminant analyses used to establish validity for the CBCL/4-18 (Achenbach, 1991, p. 106).

**Table 16. Combined item set MDS analysis results: Dimension 3**

	D3+ “underactive”		D3- Voids/ Overactive/Attention problems
	<b>Group 27 Preoccupied</b>		<b>Group 21 Hyperactive</b>
77.	<i>Stares into space or seems preoccupied [Other-none]</i>	5.	<i>Can't concentrate, can't pay attention for long [Des-Atten]</i>
217.	<i>Day-dreams or gets lost in his/her thoughts. [none-Atten]</i>	66.	<i>Screams a lot. [Agg-Agg]</i>
	<b>Group 28 Asocial/self-focussed</b>		<b>Group 19 Restless/easily disturbed</b>
71.	<i>71. Shows little interest in things around him/her. [With-none]</i>	6.	<i>Can't sit still or restless. [Other-Atten]</i>
62.	<i>62. Refuses to play active games. [With-none]</i>	59.	<i>Quickly shifts from one activity to another. [Des-none]</i>
242.	<i>242. Would rather be alone than with others. [none-With]</i>		
	<b>Group 13 Underactive/confused</b>		
89.	<i>Underactive, slow moving, or lacks energy. [With-With]</i>		
213.	<i>Confused or seems to be in a fog. [none-Atten]</i>		

**Part Five: Integration of archival raw CBCL /4-18 data into the map of the Combined (CBCL/2-3 and CBCL/4-18) item set.**

The PROFIT analyses involved regressing the properties of the correlation matrices from the US archival CBCL/4-18 rating data on the 5-dimensional MDS solution derived from GOPA data for the combined CBCL/2-3 and CBCL/4-18 item sets (Combined item set). Each case is then represented as a 5-D vector within that solution. However, comparing the pattern of the resulting set of 5-D vectors for 60-months to the set of vectors for 72-months using Canonical Correlation (CANCOR) yielded correlations no better than chance.

***Additional analyses:***

Factors analysis of the some 1000 cases (307 sets of 24-, 42-, 60- & 72-months) of raw archival CBCL/4-18 data showed very little item variance. An additional analysis was undertaken to explore the geometrical locations of the Combined item set items. A matrix



of inter-item correlations was calculated for the archival CBCL/4-18 data and subject to MDS. Comparison (CANCOR) with the MDS solution derived from GOPA data showed that the two MDS solutions shared only a single mutually-recognisable dimension. The archival data was also regressed on the MDS solution derived from the matrix of inter-item correlations for the archival CBCL/4-18 data but showed a poor fit.

## CHAPTER FIVE

### DISCUSSION

This chapter discusses the results of analyses and is divided similarly to the Results section. First results of the MDS analysis of the CBCL/2-3 item set are interpreted and each emergent dimension discussed. Results of MDS analysis of the triadic data (MoT) are then reported. In Part Two results from criterion sorts (*Task Three*) are compared with clusters emergent in the map, with graphic overlay on the map image to aid interpretation. In Part Three a measure is made between component stability revealed in results from PROFIT analysis of raw archival CBCL/2-3 data on the MDS coordinates across an 18-month period, and stability revealed in correlation analyses of CBCL subscales. Additional information on the dimensional consistency of the toddler checklist is provided by regression analyses that relate the dimensions to scores on the CBCL second-order (sub)scales. CBCL syndrome scale items are also overlaid for comparison with validated clusters emergent in the map. This information is then used in an evaluation of subscale consistency, and implications for the toddler AGG syndrome validity are discussed. In Part Four results of MDS analysis of the GOPA-sorted combined item sets (*Task Two*) are discussed. Part Five considers the results of PROFIT analysis for CBCL/4-18 data regression on the Combined MDS solution (*Task Five*). Finally results from additional analyses are considered, limitations of the present study are acknowledged and implications for future studies suggested.

#### **Part One: Discussion of MDS analysis of the Child Behavior Checklist for 2- and 3-year-olds (CBCL/2-3)**

Items, in 28 identifiable clusters, bunched in at least six groups, are fairly evenly spread throughout the spatial map. An optimal rotation was chosen and the groups appear to be parsed by at least four dimensions with lower rates evident at D2+.

Good face value is demonstrated by the even spread of Achenbach's CBCL scale items (Figure 1). Achenbach's original scales for the CBCL/2-3 (1992), however, appear to be only partially emergent in terms of dimensional consistency, in the mapping results.

## Dimension 1

The D1 dimension parses the two largest groups of items. The cluster of mapgroups in the upper, and mainly left quadrant of the map (Figures 1-4) include items from the Aggressive Behavior, Anxious/Depressed, Withdrawn, Destructive Behavior subscales. The lower, mainly right half of the map features Somatic Problems subscale items, including eating problem items and Sleep Problems subscale items.

The h-tree (Appendix I) appears to exhibit two similar major groupings of items with two major subgroups in the second group. The smaller group is composed of Somatic/food problems/sleep problems; the second appears to have two subgroups: 2a(i).fearful and 2a(ii) unresponsive and 2b(i) low concentration and impatient; 2b(ii) demanding and 2b(iii) angry and aggressive-like behaviours. As noted above, D1 parses the two largest groups of items in the map (Table 3). In terms of psychological meaning the area described by D1 appears to be one of antagonistic and hard-to-manage behaviours familiar in the literature on children's problem behaviours (Bates *et al.*, 1998; Caspi, 2000).

At D1+ items are tightly clustered and are mostly associated with Achenbach's Aggressive Behavior subscale [AGG] but also with the Withdrawn [WITH] and Destructive Behavior [DES] subscales. The map groups at D1+ are labelled "antagonistic and hard-to-manage" and are identified as Achenbach's Aggressive Behavior marker. This result confirms that the sorters who contributed data for Task One were tapping into the same structure revealed by factor analysis (FA) in Achenbach's original research (1992). Items not from the Aggressive Behavior scale are few but include: #88 Uncooperative and #81 Stubborn, sullen or irritable which load on the Withdrawn subscale and #17 Destroys his/her own things and #18 Destroys things belonging to his/her family or other children which load on the Destructive Behavior subscale.

Although mapgroups at the opposite dimensional end, D1- , load high on Achenbach's Somatic Problems scale [Som], and somatic problems are often included in the category of internalizing problems, (e.g. in the CBCL/4-18) this dimension cannot be interpreted as Achenbach's Internalizing, because it lacks many definitional aspects, especially withdrawal and anxiety.

On one level D1 illustrates parents' evaluation of children's emotional and behavioural problems in terms of manageability. This dimension appears to be a variant of Osgood's Evaluation dimension commonly extracted in his semantic differential technique (SD) (Osgood, 1971).

Manageability is an aspect of the temperament superfactor Agreeableness, one of the factors typically extracted in Five Factor Model studies of personality (FFM, Robins, John & Caspi, 1994, cited in Huey & Weisz, 1997) and at D1+ are clustered descriptors which suggest an imbalance in temperamental reactivity and control. The items describe a frustrated, angry and non-compliant child whose uncooperative behaviour, irritable and unpredictable mood changes, and lack of responsiveness to punishment are perceived to be extremely antagonistic and difficult to manage.

In Chapter Two the nominal and conceptual overlap between CBCL broad-band-externalizing and internalizing- dimensions and the Ego-control Ego-resiliency model (Block & Block, 1980; Huey & Weisz, 1997) was highlighted. AGG is the factor with highest loadings on the externalizing scale (EXT) which has been called undercontrol (Achenbach, 1992). The apparent high approach tendencies, and lack of response to punishment aspect of this dimension resemble the negative affectivity found in studies of Extraverts or children high in Surgency who are sensitive to reward cues, rather than punishment, and who may exhibit aggressive actions to overcome obstacles when rewards are blocked (Rothbart & Putnam, 2002). Long – term stability of surgency or high approach, has been reported in a study by Caspi and Silva (1995) where high approach rated in 3-year-olds predicted the description: impulsive, spontaneous , careless and reckless, at age eighteen (Rothbart & Putnam, 2002).

Agreeableness has been noted as a prominent feature of two global personality types - resilient and undercontrolled - identified by Block (1971). Agreeableness was also a feature of three personality types - undercontrolled, inhibited and well-adjusted - found by Caspi (2000) to have stability from 3 to 23 years-of-age (Laursen *et al.*, 2002). At three, undercontrolled children were described as irritable, impulsive, emotionally labile, impersistent on tasks and in addition, were found to be difficult to manage throughout childhood (Caspi, 2000).

While many of the items at D1+ load high on Achenbach's Aggressive Behavior sub-scale (AGG), notably Groups 35 angry and insensitive to punishment; 36 fights and attacks; 19 temper tantrums and obedience problems and 9 destructive behaviour, some aspects of the AGG subscale are missing. Attending to the arrangement of items around the extreme ends of D1+ the more temperamental descriptors- Group 33 Loud; Group 34 Frustrated; Group 11 Impatient; Group 13 Whining/demanding and Group 20 Moody - aspects of AGG - play a less important role in the antagonistic/hard - to - manage toddler construct than the more serious problem behaviours. Nor indeed do the impulsive, hyperactive or distractible aspects characteristic of the undercontrol or externalizing dimension appear to play as important a part.

The presence of Withdrawn subscale items #88 *Uncooperative* suggest that this item may be one of the seven descriptors that Achenbach found in the development of the instrument that loaded both high (>40) on the AGG scale and high (>30) on the Withdrawn scale and was retained for operational definition only for the latter (Achenbach, 1992, p.14). Other items that load high on AGG and high on other scales are suggested: #17 *Destroys his/her own things*; #18 *Destroys things belonging to his/her family or other children* and #27; *Doesn't feel guilty for misbehaving*.

In the original factor study (CBCL4-1, 1991) Achenbach's Withdrawn syndrome was placed together with Anxious/Depressed to make up the Internalizing factor. However, it also loaded 0.50 on the Externalizing factor, with one item loading .46 on the Aggressive Behavior factor (#81 *Stubborn, sullen or irritable*) (Achenbach, 1992, p.38). (see D3) Achenbach informs that "problems comprising the CBCL/2-3 Withdrawn syndrome are less exclusively of an internalizing nature than is true for the Withdrawn syndrome on the CBCL/4-18, TRF, and YSR" (1992, p. 38).

At D1- are somatic pain descriptors included in the Internalizing dimension in the instrument for older children and adolescents (CBCL/4-18, Achenbach, 1991) and usually accompanied by depressed mood, upset sleep patterns and/or decreased activity level. Family stress is a common cause of somatic complaints. Why might these somatic problems cluster at the opposite end to behavioural problems? One interpretation is that the sorters differentiated between those behaviours that are easily observable, more easily identified because the child complains about them- the somatic problems-, and those that

they do not have such a good idea about - the acting-out problems- and which are not as clearly signalled. Rashes, headaches, stomachaches, vomiting, nausea, painful bowel movements and sleep disruptions may also seem more tolerable than psychological reasons for children's misbehaviour. Walker, Garber & Van Slyke (1995) found that parents excuse the misbehaviour of children with "medically explained physical complaints, and to a lesser extent that of children with unexplained physical complaints and symptoms of depression" (p. 344)

Weisz, Suwanlert, Chaiyasit, and Weiss (2003) found very similar Somatic Complaints syndromes in Thai and US boys and they suggest that while across diverse cultures various types of somatic complaints may co-occur similarly, another explanation for the similarity may be that physical problems "may stand out distinctively- in the minds of parents-from the more psychological problems in other syndromes" (p. 384). The "physical-psychological distinction may be more consistent across cultures than the distinctions among different types of psychological dysfunction"(p. 384). Interestingly, where there were differences in the Somatic Problems factors they showed "a more purely somatic syndrome in Thai children versus a more "somatic-psychological" mix in American children"(p. 384). The authors suggest that part of the answer may lie in the fact that the confounding of physical and psychological symptoms is greater in American pop psychology than most countries.

To sum up, interpretation of the MDS map suggests that D1 describes a manageability dimension, an aspect of Agreeableness, "which holds the strongest environmental component of the Big Five traits" (Laursen, Pulkinen & Adams, 2002, p. 592). An environment-person interaction dimension is suggested. Estimates of environmental contributions for Agreeableness are high: shared environmental contribution accounted for 21% and non-shared environmental contributions 67% (Laursen, Pulkinen & Adams, 2002, p. 592). Aspects of Negative Affectivity/Neuroticism, frustration in particular, that are hypothesized to result when children high in Surgency/Extraversion and reward-oriented motivation experience blocking of goals, are represented in D1. These hard-to-manage behaviours are hypothesized to have direct and indirect effects in predicting externalizing behaviour problems (Bates *et al.*, 1998; Olsen *et al.*, 2000). This dimension also appears to index the impulsive characteristics of the Ego – undercontrol or Type E personality style (Block & Block, 1980).

## Dimension 2

At D2- is a mapgroup of items that load high on Achenbach's Anxious/Depressed scale (ANX/DEP): Group 23, which includes both low sociability and shyness as well as other inner-focused negative emotions (Table 4). The other group at this end of dimension 2 is Group 31, reflecting novelty fear (Rothbart & Bates, 1998) but not including #87 *Too fearful or anxious*, which did not cluster (see Figures 1-3).

Aspects that are missing which otherwise might have argued for this dimension being a strong marker for ANX/DEP scale include: the dependent aspects: #10 *Clings to adults*, #37 *Gets too upset when separated from parents*, #96 *Wants attention*; the dysphoric aspects: #43 *Looks Unhappy without reason*, #90 *Unhappy, sad or depressed* and anxious elements: #47 *Nervous, high-strung or tense* (didn't cluster) and #50 *Overtired*.

The dimension at D2+ is somewhat void of items, apart from mapgroup 7 *Chews/eats non-food*, which includes two Destructive Behavior scale (DES) items that describe eating non-food, item #91 *Unusually loud* (AGG), item #65 *Resists toilet training* and another DES item #75 *Smears or plays with bowel movements*. The item void at D2+ indicates that the construct is not comprehensively represented by items in the CBCL set of descriptors. The Destructive Behavior scale is discussed in more detail in the description of Dimension 4, and also the discussion following regarding the CBCL subscales.

A Potency dimension (deep-shallow) is suggested by the groups at extreme ends of D2 (Osgood, 1971). While D2- illustrates inner-focused aspects of overcontrol, D2+ describes a number of obsessive-compulsive behaviours that instead focus on the body.

This dimension appears to reflect aspects of the temperament dimension Negative Affectivity/Neuroticism that are summarized under the heading "anxious/fearful distress". Rothbart and Bates (1998) distinguished between two related but distinct lower-order traits: "irritable distress" and fearful or "anxious distress" (Shiner & Caspi, 2003). Anxious distress "appears to tap inner-focused distress, including a child's tendency to withdraw fearfully from new situations" (Shiner & Caspi, 2003, p. 7). As mentioned above, fear, or fearful inhibition, is seen by many as adaptive in inhibiting the approach-related behavioural activation system (BAS). Rothbart and Putnam have suggested that it



may be possible to disentangle reward-oriented approach from fear-based withdrawal (2002) and the first two dimensions may parse these constructs.

Kochanska (1991, 1995, 1997, cited in Rothbart & Putnam, 2002) found a role for temperamental fear in development of conscience, related to different responses of temperamentally fearful children to rearing techniques. Fearful children show lower levels of conscience when “highly power assertive” parenting discipline is used and higher levels of conscience when parental discipline is based on low power assertion, at 3 and 4 years but not at 5 years. It is suggested that other sources of socialization such as peers or the emergence of effortful control might explain this change (Rothbart & Putnam, 2002).

In older children fearfulness or the lack of it has been differentiated from trait anxiety. Frick, Lilienfeld, Ellis, Loney, & Silverthorn, (1999) distinguish between two constructs – fearfulness and trait anxiety- (p. 384) in older children (6-13 years). Fear is “typically conceptualized as a sensitivity to cues of impending danger and loads on the higher-order personality dimension of constraint” (p. 384). Trait anxiety, in contrast, is related to negative affectivity (NA) and “is typically conceptualized as distress resulting from the perception that impending danger and negative consequences are inevitable” (p. 384).

Structural studies of personality in childhood in the literature suggest a temperamentally reactive negative affectivity basis for the aspects of overcontrol found here (Shiner & Caspi, 1998; Rothbart & Putnam, 2002). It is possible that the D2+ pole items represent ways that toddlers self-distract or sooth themselves contrasting with, at D2-, one of the main aspects of negative affectivity: problems they have settling or soothing themselves when aroused (Shiner & Caspi, 1998). Specifically this dimension appears to capture aspects of fear and discomfort with change and social stimuli.

### **Dimension 3**

A number of mapgroups cluster at D3- that appear to be part of the large group around the fearful/anxious distress dimension at D2- (see Figure 4), but portray a disinterested – (Group 26 Preoccupied) - physically unresponsive and inexpressive character – (Group 25 Unresponsive/shows little affect) - who is low in positive anticipation and activity levels (Table 5). (Note #89 *Underactive, slow-moving or lacks energy* did not cluster). One study found Block’s (1971) inhibited over-controller or (C) type (Caspi & Silva, 1995,

cited in Rothbart & Putnam) in toddlers. This features brittle, impermeable ego-boundaries, associated with impulse repression, and inhibition of affect and action similar to the characteristics that make up this D3 dimension.

No mapgroups are identified as D3+ and it is somewhat void of items, although the semantic consistency of groups closest to the extreme end –Group 11 Impatient, Group 15 Dependent and Group 13 Whines/wants attention, when compared with D3-, resemble Block's Ego-overcontrol-ego-undercontrol dimension. Items in Group 11 Impatient - #8 *Can't stand waiting, wants everything now* and #16 *Demands must be met immediately* - are similar to prototypical California Child Q-set (CCQ) items for Ego-undercontrol (Huey & Weisz, 1997).

The descriptors at D3- show some dimensional consistency in terms of Achenbach's Withdrawn (WDN) subscale in that it includes items that describe lack of affect and low positive anticipation - the four highest loading items on the WDN scale - without, however, the uncooperative, moody and irritable aspects which feature in D1+ (#88) and D5+ (#81) and which appear to also load on the AGG scale. (See discussion on WDN in D1+ above)

Osgood's Activity factor (1971) is salient here and D3 can be viewed as an aspect of the Activity universal. The CBCL/2-3 does not have an Activity scale. Principle components analysis studies of data from measures of emotional and behavioural adjustment problems have revealed a Withdrawn-Low Energy dimension that loads along with Socially Reticient, on a second-order factor Underactive (Lutz, Fantuzzo and McDermott, 2002).

An alternative interpretation is to see this dimension as capturing anxious attachment types. The overlap, noted previously, between temperament dimensions and attachment found in an infant and toddler study– the emotional reactivity factor (Vaughn et al., 1992) – may be emergent here. D3+ features highly controlled expression of affect which could reflect the anxious behaviours (Type A) of an avoidantly attached toddler (Colin, 1996). At the other end of this dimension anxiety about availability of caregiver - #37 *Gets too upset when separated from parents*, and the demanding tenor of the D3- behaviours suggest a history of relationship interactions that has not been smooth. Items that

concentrate at D3- support an interpretation that this pole describes ambivalent (Type C) anxious attachment styles.

#### **Dimension 4**

Dysphoric behaviours #43 *Looks unhappy without good reason*, #90 *Unhappy, sad or depressed* feature in the D4+ pole which, along with #83 *Sulks a lot* suggest a temperamental negative affect interpretation (Table 6). While D2 features items that describe reacting negatively to social stimuli, D4 appears to capture the trait anxiety mentioned earlier. Heubeck (2000), in CFA studies of the CBCL/4-18 item set however, found sulking loaded on an aggressive factor and suggested an emotion-regulation deficit basis for the acting out aggressive factor interpretation. D4- appears to feature attention deficits and over-active behaviours.

#### **Dimension 5**

The compulsive behaviours described by this dimension (Table 7) share aspects of ego-overcontrol familiar with Type C, vulnerable overcontroller (Caspi & Silva, 1995). At D5- are descriptors suggesting voluntary overcontrol and at D5+ less voluntary aspects of overcontrol.

#### **Discussion of Method of Triads (MoT) validation of map structure**

The modest inter-item distance correlation of 41% between the two maps, one from the GOPA and the other from the MoT is surprisingly low given findings from similar studies that use the MoT that typically find agreement in the 70%-85% range (Kirkland *et al.*, 2004; Bimler & Kirkland, 2001). The result suggests that the toddler problems domain, the nature of the items may make it hard for participants to make odd-one-out decisions reliably. Because they might not use consistent criteria in their decisions the data contain more noise than is typical in studies that use the MoT (Bimler personal correspondence).

## **Part Two: Discussion of analyses for validation of map clusters**

Lists of items selected on the basis of  $\geq 60\%$  agreement between participants sorting towards a range of semantic areas in the map using MOSS, show considerable overlap between groups. The majority - 87.5% (7/8) of the items MOSS-ed by SES professionals showing  $\geq 60$  agreement on the Aggressive label are also listed in the parent MOSS. On other labels overlap is 75% Active; 71.4% Shy/Quiet; 50% Demanding and 80% Disobedient/Rule breaker. The ESOL group Aggressive list overlapped 50% with SES and 60% with the parent Aggressive lists. This convergence (different participants, same procedures, same instrument) provides external or discriminant validity for the emergent constructs.

Patterns emergent in the criterion MOSS data, for the different groups of participants who sorted CBCL/2-3 item statements towards a range of semantic areas in the map (Table 8), are compared for validation against the clusters that emerged in Part One. The SES criterion MOSS data for Active provided validity for D4-; Shy/Quiet for Group 23 Self-conscious/shy/sensitive/stranger fear; Aggressive for Group 36 Fight/attacks; and Group 9 Hits/destroys and Group 19 Temper/disobedient; Demanding for Group 11 Impatient and Group 13 Whines/wants attention; Disobedient for Group 35 Angry/insensitive to punishment; Unusual for Group 25 Unresponsive to/shows little affect.

Figure 5 shows the patterns for the parent participant criterion sorts overlaid on the CBCL/2-3 map. Parent MOSS data for Active provided some convergent validity for Group 11 Impatient and for D4-; Shy/Quiet for Group 23 Self-conscious/shy/sensitive/stranger fear; Aggressive for Group 35 Angry/insensitive to punishment; Group 36 Fight/attacks; and Group 9 Hits/destroys. Demanding for Group 11 Impatient; Disobedient for Group 35 Angry/insensitive to punishment, Group 19 Temper /disobedient and Group 9 Hits/destroys; Assertive for Group 35 Angry/insensitive to punishment, Group 19 Temper /disobedient and Group 11 Impatient.

Some of the items were considered to be characteristic of more than one criterion. In the Parent MOSS Group 35 Angry/insensitive to punishment is represented in both Aggressive, Disobedient and Assertive criterion sorts. Group 11 Impatient features in

Active, Demanding and Assertive criterion sorts. Group 9 Hits/destroys is in Aggressive and Disobedient sorts and Group 19 Temper /disobedient is in Assertive and Disobedient sorts. Criterion sorts by a third group –students of ESOL– sorting towards just two of the labels: Aggressive and Disobedient, revealed common items across procedures: Gp.19 and Gp.35 are partially emergent across all three groups for the Aggressive sorts.

Two methods and three different groups of participants were involved in providing external validity for the clusters in the map. That the criterion sort results converge with the results of GOPA sorting in Part One demonstrates that the clusters are as meaningful in a contextual sense as they are for participants using GOPA sorting procedures. As well as validation of clusters emergent in the map (different participants, different procedures, same instrument) this convergence provides further support that the procedures (GOPA, MDS) are robust.

Aggregated MOSS data from each of the six criterion sorts was also regressed on the MDS solution coordinates (using LINEST) to check convergence in a broad sense of the contextual data with the dimensions revealed through MDS. Results (Table 9 & Table 10) for separate dimensions and criteria help in interpreting the different areas of the map and provide further external validity since participants were different from the GOPA sorting groups and the methodology was MOSS. Results are discussed below in the section on candidates for dimensional stability.

### **Part Three: Discussion of integration of archival raw CBCL /2-3 data into the map of the CBCL toddler problem domain.**

#### **Section One: Vector analysis**

Regressing the properties of the correlation matrices from the 399 sets of US archival longitudinal CBCL/2-3 rating data on the 5-dimensional MDS solution derived from CBCL/2-3 items GOPA data resulted in sets of 5-D vectors for 24-months and 42-months. These were analyzed and correlations examined. The six large-to-moderate resulting components from Canonical Correlation (CANCOR) indicate that the dimensions (Table 11) and the subscales (Table 12) capture a comparable amount of

common variance across the time period sampled. The values for the first three components are larger than the subscale values. This indicates that for these constructs more information may be extracted from a dimensional approach than a subscale approach.

In the discussion on Part One results candidates for stable toddler constructs were anticipated. A number of likely constructs were suggested by the MDS map and MOSS criterion sorting and the subsequent vector correlations confirm that six independent forms of stability are identifiable. The results of the vector analysis confirm the usefulness of the geometric (MDS) solution- the 5 dimensions- in summarizing or organizing patterns in the archival CBCB/2-3 data. Also these results show that the 5 dimensions have significant independent consistency whereas this was not clear from the Pearson's correlation for the 5 dimensions at the two times since simple correlation does not exclude covariation. The CBCL/2-3 subscales are typically highly correlated, as discussed in the Literature Review, so that correlations between scales often exceed test-retest figures. The analyses in this section exclude this covariance as a reason for the inter-age stability.

## **Section Two: Candidates for independent forms of dimensional consistency across toddlerhood.**

In Part Five of the Literature Review candidate dimensions in the literature on personality structure – the intraindividual profiling of personality variables – for the reported stability of aggression in childhood were collated and discussed. In Section Two dimensions emergent in the map are further evaluated, CANCOR and MOSS regression analyses are discussed, and patterns compared with constructs familiar in the literature.

### **Dimension 1**

Scores on the CBCL subscales were regressed on the dimension coordinates to examine their ability to predict the five emergent dimensions and these are presented in Table 13. Three of the five dimensions are best predicted by scores on the AGG scale item. The first dimension D1 is best predicted by AGG item scores. The oppositional and aggressive behaviours at D1+ appear to be considered the most antagonistic by a caregiver and may thus gain their dimensional stability across toddlerhood for this reason. This would concur with beliefs about the origins of such behaviours in childhood difficulty, which is

considered more than a temperamental trait (Laursen *et al.*, 2002), and findings of interaction effects notably the studies on temperamental resistance to control and restrictive parenting interaction in the development of externalizing behaviour (Bates *et al.*, 1998). For children who are highly resistant to control the Bates *et al.* (1998) study found that parents who are consistently restrictive may “shape the child’s responsivity to socially-imposed limits”, and for children low in resistance to control low amounts of parental control may provide chances for autonomy and facilitate the independent learning of social skills (Rothbart & Putnam, 2002, p. 32). The results of regressing the criterion MOSS data (*Task Four*) on the MDS coordinates (Table 9 and Table 10) confirm that patterns in the MOSS Aggression and Disobedient data are best organized or summarized by the D1 configuration relative to the other dimensions.

This dimension has conceptual similarities with aspects of negative affectivity – anger and frustration (Rothbart & Putnam, 2002), aspects of Agreeableness- unmanageability and antagonism (Laursen *et al.*, 2002), of undercontrol- impulsive, difficult-to-manage (Caspi, 2000) and the construct resistance to control- impulsivity-unmanageability (Bates *et al.*, 1998). Given the stability reported in the literature for surgency or high approach (Caspi and Silva, 1995; Rothbart & Putnam, 2002), D1 can be expected to show significant dimensional consistency across toddlerhood.

The hard-to-manage behaviours at D1 in particular may be complicit in coercive cycles (Patterson, 2002) Two factors - coercive and dominant - revealed in analyses of Q-sort items of behaviours believed to be descriptive of the aggressive preschool child (Vaughn *et al.*, 2003), appear to be represented at D1+. Group 36 Fight/attacks, Group 19 Temper/disobedient and Group 35 Angry/insensitive to punishment may capture similar hypothesized social dominance motivations as ‘Feisty; Test limits set by adults; Aggressive.....and Characteristically pushes and tries to stretch limits set by adults’ (Vaughn *et al.*, 2003, p.256). Group 9 Hits/destroys may be more characteristic of coercion. It is anticipated that analysis of the expanded item set in Part Four will contribute more information on the clusters and these emergent patterns.

## **Dimension 2**

The second dimension is best predicted by the negative of the Anxious/Depressed score plus the Destructive Behavior score. The fear-related inhibition that appears to feature in



D2 has demonstrated stability across childhood into adolescence (Caspi & Silva, 1995). Fear on the Infant Behavior Questionnaire (IBQ) predicts fear and shyness at 7 years (Rothbart & Putnam, 2002). The map appears to parse two major aspects of negative affect: fear and frustration. Considered a reactive dimension with roots in infant difficult temperament, a transactional interpretation would best explain the interactive effects that see substantially stronger findings for this dimension as a predictor of problem behaviours later in childhood when considered in combination with factors that include low socio-economic status, mothers' perception of the child as difficult, poor mother-child relationship and generally poor family functioning (Rothbart & Putnam, 2002). The regression results (Table 9) support the interpretation that this dimension parses high versus low fear or behavioural inhibition. The aspects of social withdrawal that feature in D2- may indicate patterns of maladaptive behaviour however other roles for fear are emphasized in the literature. The role of fear in emergence of conscience was discussed earlier and temperamental fear in the anxiety-related behavioural inhibition system may be beneficial in controlling problems arising from approach-related problem behaviours.

### **Dimension 3**

The criterion sorts supported the reading of D3- as a demanding or activity dimension. Dependent behaviours also feature at D3-. An alternative interpretation is to see this dimension as capturing anxious or insecure attachment types. D3 contains elements of Type C1 insecure attachment behaviour also called resistant, which features angry, active proximity-seeking but also ambivalence about the caregiver (Colin, 1996). Items in Group 11 Impatient are typically scored low in criterion sorts of the Attachment Q-Set (AQS). This is intended to reflect a history of maternal interference in the development of child's (1-5 years) attachment relationship and is hypothesized to be related to secure base behaviour (Waters, 1997). Toddlers who demonstrate the other major anxious attachment style - Type A toddlers - actively inhibit the impulse to seek comfort when their attachment behaviour system is aroused (Colin, 1996). The unresponsiveness to affect and lack of affect expression (Group 25), along with the apparent lack of interest or curiosity to explore the surrounding environment, (Group 26) supports an avoidant attachment interpretation. The regression results of the present study show Dimension 3 is correlated negatively with AGG scores relative to the other dimensions (see Table 9 and Table 10). The AGG items that feature in D3- #97 *Whining* and #16 *Demands must be met immediately* are particularly expressive of emotion and 'not characteristic' of avoidantly

attached toddlers (A1) who are described as exhibiting “Little affective sharing” in the Strange Situation (Colin, 1996, p. 38).

#### **Dimension 4**

The fourth dimension is best predicted more by AGG scale item scores than any other dimension. It is tempting to speculate on which AGG items may contribute to this dimension. The map is not informative past three dimensions and neither are the MOSS criterion sorts. A rational interpretation might contrast this moody, dysphoric negative affect dimension with D2- which features fear related to change and social stimulation. Rather than scoring on the more destructive, or demanding items of the AGG scale which feature in D1+ and D3- it seems more likely that the items not yet accounted for #69 *Selfish or won't share*, #30 *Easily jealous*; #82 *Sudden changes in mood or feelings* and #29 *Easily frustrated* may contribute. The regression analysis also shows the dimension is predicted by an absence of Destructive Behavior scores (Table 13). The DES scale items in D4- #5 *Can't concentrate, can't pay attention for long* and #59 *Quickly shifts from one activity to another* and the other items at D4- relate to less voluntary aspects of effortful control. The dimension D4, appears to parse aspects of the low end of Effortful Control or Constraint which encompass Inhibitory control, Attentional Focussing, Low intensity Pleasure and Perceptual Sensitivity (Rothbart & Putnam, 2002, p. 25). Stability has been found in toddlers for Effortful Control reflecting their emerging capacities for executive control (Shiner & Caspi, 2003). The moderate size of the CANCOR component suggests that this dimension may be an important contributor to the stability of the AGG construct across toddlerhood. Effortful Control in toddlers is related to internalisation of parental standards, social competence and lack of conduct problems. Research shows responsive parenting influences Effortful Control in toddlers (Kochanska, 2000, cited in Rothbart & Putnam, 2002, p.38).

#### **Dimension 5**

The fifth dimension is best predicted by the negative of both the Sleep Problems score and the Withdrawn score. The clusters at the D5- pole combine Sleep Problems and Withdrawal scale items and at D5+ Somatic scale items cluster with obsessive-compulsive descriptors. The CBCL/4-18 obsessive-compulsive items have fit poorly in models derived from Confirmatory Factor Analysis (CFA) but symptoms are linked conceptually and clinically to anxiety symptoms (Lengua *et al.*, 2001) and these two areas

therefore have been combined in the creation of alternative scales. Item # 86 *Too concerned with neatness or cleanliness* loads high on the CBCL/2-3 Somatic scale but did not emerged in one factor analyses of CBCL/2-3 items (Koot *et al.*, 1997). Achenbach's DSM-oriented CBCL/1½ -5 scales list items #50 and #74 under Affective Disorders and item #48 under Anxiety Disorders (Achenbach *et al.*, 2002). The item #62 *Refuses to play active games* suggests that this dimension parses aspects of overcontrol.

### **Section Three: Comparison between dimensions and CBCL/2-3 subscales**

In this section validated map groups are compared with Achenbach's syndrome groups and related to constructs and dimensions identified in the literature. Here (Figure 6) CBCL syndrome scale items are overlaid for comparison with validated clusters emergent in the map.

#### ***Aggressive Behavior (AGG)***

The underlying dimension that appears to account for most of the 'variance' in AGG scale items is an evaluation dimension – manageability - and the AGG items in particular that cohere at the extreme end of this dimension: Group 19 Temper/disobedient/defiant; Group 33 Loud and Group 34 Selfish/frustrated describe an oppositional child with low social skills, low emotional control but also not responsive to punishment (Table 16). The AGG items that explicitly describe acts of aggression however, (item #35 *Gets in many fights* and item #40 *Hits others*) do not show coherence with other AGG scale items. This suggests that the AGG scale is misnamed. Its conceptual basis is closer to oppositional behaviour than aggression. Although the only AGG items not to cluster was item #30 *Easily jealous* many AGG items cohere with clusters that better describe one or two of the other dimensions.

#### ***Destructive Behavior (DES)***

D2+ and D4- and, to a lesser extent D1+, feature Destructive Behavior items. DES 1 (Table 16) includes the self-distracting, self-soothing behaviours opposite the Negative Affectivity items at D2+. DES 2 items relate to executive control skills specifically Attention Shifting (Rothbart & Putnam, 2002), despite being sorted as Active by the MOSS participants. There is little support for dimensional coherence of the DES subscale.

### ***Anxious/ Depressed (ANX/DEP)***

ANX/DEP items that have the strongest dimensional consistency in toddlerhood do so by virtue of being at the extreme end of the D2- dimension. The dimensional consistency of the items at D2 – fear and discomfort with change and social stimuli – is mainly based on a cluster of items that load high on the CBCL ANX/DEP subscale. Group 23 Self-conscious/shy/sensitive/stranger fear, and Group 31 Novelty fear appear to index aspects of ego-overcontrol – the Type C personality (Block & Block, 1980), which according to Rothbart and others has a reactive Negative Affect basis (Rothbart & Putman, 2002). The construct recovered by the toddler ANX/DEP subscale appears to be more one of social inhibition than dysphoria.

### ***Withdrawn (WITH)***

The Withdrawn subscale items are divided between two dimensions. They form clusters at D3 - Group 25 Unresponsive to/shows little affect, Group 21 Withdrawn/no active games, Group 26 Preoccupied - describing aspects of ego-overcontrol familiar in descriptions of the avoidantly attached toddler. They also combine with Sleep Problems subscale items at D5-

### ***Somatic Problems (SOM)***

The Somatic Problems subscale has some dimensional consistency at D1, as part of an evaluative dimension. Otherwise there are Somatic items at D4- with dysphoric item descriptors, and at D5+ , the obsessive/compulsive behaviour descriptors.

### ***Sleep Problems (SLP)***

Group 5 Resists bed, and Group 32 Sleep trouble and Group 4 Nightmares/talks from the Sleep Problems subscale have some coherence at D3- , although voids are evident. The AQS indexes 'Sleeps lightly' as a dependency marker and other groups at D3 appear to index dependency or ambivalent attachment behaviours. Items #74 *Sleeps less than most children during day and/or night* and #48 *Nightmares* , however are key D5- markers.

**Table 17. Labels for the five dimensions showing suggested CBCL/2-3 scale placement**

<b>Dimension</b>	<b>‘positive pole’</b>	<b>‘negative pole’</b>
D1	<b>Antagonistic/hard-to-manage AGG 1</b>	<b>Somatic SOM</b>
D2	<b>Self-distracting/soothing DES 1</b>	<b>Highly sensitive to change/social stimulation ANX /DEP 1</b>
D3	<b>overcontroller/avoidantly attached/low activity WITH 1</b>	<b>Undercontroller/ambivalently attached/high activity AGG 2 + SLP 1</b>
D4	<b>Emotion regulation deficits/unhappy/aches/sulks AGG 3</b>	<b>Low effortful control/low concentration DES 2</b>
D5	<b>Obsessive/compulsive behaviour SOM</b>	<b>Sleep problems. SLP 2 + WITH 2</b>

*Summary*

MDS analyses distinguished five components of toddler behaviour that were found to be correlated over an 18 month period. Six independent forms of stability were confirmed between two sets of components for each age. Among the candidates for dimensional consistency revealed by MDS are dimensions that appear to have different conceptual bases in temperament or toddler personality. The interpretation of MDS results in the present study suggests constructs familiar in studies of personality structure and may help explain some of the anomalies that have emerged in empirically-based research into toddler psychopathology. That an MDS approach can so effectively tease apart the constituent dimensions underlying the toddler emotional and behaviour problem domain confirms that one of the exacerbating conditions contributing to problems interpreting the CBCL structure, reported in the literature, has been the over-reliance on factor analysis (FA). FA, with its pre-selected factors, curtails the exploratory process prematurely

(Napior, 1972). Item overlap between CBCL scales can be better addressed by dimensional scaling methods (e.g. Coxon, 1999) which extend the item-level analysis stage beyond that originally undertaken by the CBCL authors. It therefore has potential to reveal patterns in data sets at a different level of resolution. Interrogation of the factor structure was the main goal of the present study and novel MDS approach and research design proved effective in revealing three latent components of toddler behaviour stability that appear to account for AGG scores. Subsequent profiling may identify styles of toddler behaviour that contribute to a reconceptualisation of aggressive behaviour in toddlers and further inform as to what it is the CBCL/2-3 is measuring. The next section discusses the mapping of an enlarged item set which combines items from the two checklists – CBCL/2-3 and CBCL/4-18 – and is used to interrogate patterns in archival CBCL/4-18 data.

#### **Part Four: Discussion of MDS analysis of the Combined (CBCL/2-3 and CBCL/4-18) item set.**

The MDS solution of the Combined item set, discussed here was not supported by the results of vector analysis presented in Part Five, Chapter Four. The following discussion of dimensions emergent in the Combined map is therefore, purely speculative.

Items, in 44 identifiable clusters, bunched in at least six groups, are fairly evenly spread throughout the spatial map. These groups appear to be parsed by at least 3 dimensions with lower rates at D2+. Once again good face value is demonstrated and a sufficient inventory construction is suggested by the even spread of Achenbach's CBCL scale items (Figures 7 & 8). Tables 14-16 present clusters of items or groups for the first three dimensions. As anticipated in the discussion of the results for the MDS analysis of CBCL/2-3 items the additional CBCL/4-18 items appear to have fitted in between those of the CBCL/2-3 without affecting the arrangement found in analysis of toddler-only items. The solution may be rotated to the same set of dimensions as the other map. Additional clusters are evident around D1+ including delinquent behaviours for example Group 6 Vandalism and Group2 Bully/truant.

As with the earlier solution the D1 dimension parses the two largest groups of items. The h-tree (Appendix L) also appears to exhibit two similar major groupings of items (with Sexual Problems forming a separate additional group) with two or three major subgroups in the second group. The two large groups are themselves divided into two groups: one featuring overactive through resistant, law-breaking and aggression/delinquency descriptors and another consisting of clumsy through low effortful control descriptors. The other large group features self-harm through hallucinations and paranoia and anxious, dependent and fearful behaviours and another group featuring sleep problems, food, toilet and somatic problems.

### **Dimension 1**

As with the toddler item-only map, D1+ describes antagonistic and hard-to-manage behaviours familiar in the literature on children's problem behaviours. Eight of the toddler D1+ items feature again in the Combined map D1+ dimension. The Destructive Behavior items are not clustered here and Item #40 *Hits others* is grouped instead with #58 *Punishment doesn't change behavior*, reaffirming the suggested association between reward-oriented motivation aspects of Extraversion (Rothbart & Putnam, 2002) and physical aggression and the hypothesis that this dimension may reflect a history of coercive interactions (Patterson, 1992). Five toddler AGG items feature in the D1+ pole, of which only two - #35 *Gets in many fights* and #20 *Disobedient* - are common to both toddler and older child AGG scales. Somatic problem scale items concentrate at D1- similarly to the toddler-only D1- dimension, suggesting that this solution captures the evaluation dimension that emerged in the toddler map. As in the toddler-only map the D1+ pole includes characteristically coercive and dominant behaviours. Group 1 Fights/teases/no guilt may reflect coercive while Group 35 Defiant/bragging and Group 5 may indicate socially dominant behaviour as conceptualized by Vaughn et al. (2003).

### **Dimension 2**

With the addition of sexual problems, the self-soothing aspects feature again at D2+, and at D2- the fearful, novelty fear and negative affectivity construct is replicated. The association of the toddler items with emotional immaturity descriptors, inner-focussed negativity and another fearful descriptor again suggests the Negative Affectivity /Neuroticism construct interpretation. D2- features items from Achenbach's Anxious/Depressed subscales from both instruments making this dimension a strong



marker for Anxious/Depressed. It includes items that load highest on the toddler version Anxious/Depressed scale: #68, #10, #43, #33, #90 and #73. Interestingly the dysphoric items from the toddler map - Group 24 at D4+, are clustered with the items marking social inhibition at D2- instead of with the hypothesized effortful control dimension D4 as they were in the toddler map. That the item #90 *Unhappy, sad or depressed* (originally #103) was among the three strongest referral predictor items for all 4 sex/age groups in Achenbach's discriminant analyses used to establish validity for the CBCL/4-18 (Achenbach, 1991, p. 106) suggests that these dysphoric behaviours have different meanings for toddlers and for older children. In toddlerhood these behaviours may be more related to individual differences in Low intensity pleasure and Attentional Focusing-aspects of Effortful Control (Rothbart & Putnam, 2002) - than in older children where the behaviours appear to have semantic consistency with social inhibition, low self-esteem and fearful distress (D2-).

### **Dimension 3**

The dimensional consistency of toddler D3+ Group 26: Preoccupied including items #71 *Shows little interest in thing around him/her* and #77 *Stares into space or seems preoccupied* is replicated in this map, along with items from the older checklist that suggest semantic coherence of an underactive dimension. D3- however includes two items from the toddler D4- pole plus #66 *Screams a lot*, an AGG item, and an Attention Problems item- #6 *Can't sit still or restless*. This is in contrast to the demanding, impatient and dependent items in the toddler D3-. The Combined item map D3- would appear to be an activity dimension with behaviours considered demanding (MOSS). This supports the contention that D3 is a strong candidate for dimensional stability across instruments and age-bands relating activity to attention problems in older children.

**Table 18. Comparison of dimensions for the Combined item set revealed by MDS with the CBCL/2-3, with dimensions labelled, Achenbach’s subscales (numbered and in brackets) for the purpose of discussion, and mapgroups in parentheses**

Child Behavior Checklist item sets		
Dimension	CBCL/2-3	Combined CBCL/2-3 & 4-18
D1+	Antagonistic and hard-to-manage /frustrated [Agg 1] (35, 20, 36, 9)	Antagonistic and hard-to-manage /frustrated [Agg1] (1, 36, 35, 5, 4)
D1-	Somatic [Som] (1)	Somatic[Som] (8, 33, 30, 31)
D2+	Low fear-behavioral inhibition /self-distracting/soothing [Des1] (7)	Sexual problems [Sex] (40, 22, 23)
D2-	Negative affect/fearful distress /social inhibition [Anx/Dep ] (23, 21, 22)	Negative affect /fearful distress /social inhibition [Anx/Dep & Soc] (10, 9, 39, 37, 24, 38)
D3+	Controlling/ Underactive [With 1] (26, 25)	Controlling/Underactive [With 1 & Attn] (27,28,13)
D3-	Voids or Overactive/demanding [Agg 2 & Slp 1] (5, 13, 15)	Voids/Attention problems [Attn/Agg2] (21, 19)
D4+	Low emotional regulation [Agg 3]	
D4-	Low concentration [Des 2]	
D5+	Obsessive/compulsive	
D5-	Sleep problems [Slp 2 & With]	

Notes:

1. The D3 dimension in the Combined solution is reversed when compared to the CBCL/2-3 solution.

## **Part Five: Discussion of integration of archival raw CBCL/4-18 data into the map of the Combined (CBCL/2-3 and CBCL/4-18) item set.**

The Combined items set GOPA data appear to reflect greater ‘variance’ in toddler items compared with the items for older children. The Combined map has apparently captured only the structure of the common items and cannot organize data for older children in any coherent way. The dimensions between maps may appear homologous, but it seems the Combined map is not useful in interpreting patterns in the CBCL/4-18 raw data. While it is possible to speculate on the relationship between the two AGG scales across instruments based on the results of geometrical comparison, as has been attempted above, the non-findings of the vector analysis of raw CBCL/4-18 data on the Combined solution means no confidence may be placed in the results. Closer examination of the raw CBCL/4-18 data shows that not only do many of the items have no variance or next-to none, but this is a result of so many items receiving a score of 1. It appears the Likert response scale is not broad enough to provide the MDS map of the CBCL/4-18 problem domain with enough variation to summarize latent patterns. Unlike the CBCL/2-3 raw data, the data for older children and adolescents is not amenable to analysis at the low-dimension level provided by the MDS map. This suggests that the two checklists are conceptually different. Scores on the toddler checklist were found, in the present study, to be indications of temperament – environment interactions many of which are familiar in the literature on child temperament and attachment.. Scores on the older checklist, however, appear to indicate constructs in the psychiatric domain. It is possible that were the sorting undertaken by child mental health professionals the resulting MDS map would prove of a high enough resolution to reveal the underlying patterns in the case data. One way of examining patterns in the CBCL data that may reveal the sources of variability is to do complete Q-sorts of the Combined item sets. Preliminary explorations suggest Q-factor analysis may deliver a higher-dimensional view capable of revealing patterns in the raw CBCL/4-18 data.

It is also possible that the non-result could be an artefact of the sample. The Shaw *et al.*, (2000) data was of a select sample of ‘low-income ‘boys. A different community sample might show more variance in item scores. On the other hand the nature of the current sample may have allowed dimensional analysis at this low resolution. Further analysis

using the toddler map with different samples is needed before generalization to a wider population is possible.

### **Concluding Remarks**

The key research question was: Is a distinct, trait-like aggression construct supported by Multidimensional Scaling analyses of the CBCL/2-3 problems domain? What can an MDS exploration contribute to confidence in the validity of the CBCL Aggressive Behavior (AGG) construct? The present study used a pattern-investigation approach with a heuristic design to unravel objective dimensions in parent perception underlying the toddler CBCL problem item domain. The primary purpose for this however was to allow a focus on themes in the subjective individual case data. The investigation of the latent dimensional structure was motivated by a desire to clarify the theoretical and empirical underpinnings of the trait-like child overt aggression construct (AGG) reported by Achenbach (1995) and subsequent research investigating the heritability of the AGG construct in twins (Koot *et al.*, 1997; Eley *et al.*, 1999).

The MDS analysis of the CBCL/2-3 item set was successful in unravelling different constructs underlying the toddler item domain - the first research objective of the present study. The MDS analysis demonstrated that while many of the CBCL subscale items were representative of important latent constructs in toddler behaviour not all were consistent with the original factor structure. Three different dimensions accounted for (geometric) variability of AGG items in the MDS map. The low-dimensional approach of the MDS method involves pattern investigation that is encouraging of transparent conceptual interpretation. Emergent constructs were related to theories and research familiar in the literature. The AGG scale appears to have stability across toddlerhood as a result of three alternative constructs: a temperament-environment interaction construct which features high frustration, anger and resistance to control - believed to interact with punitive or restrictive parenting practices; a demanding, high activity construct possibly reflecting insecure (anxious) attachment style; and a construct reflecting developing toddlers' ability to control their attention and behaviour..

Results of the present study suggest that the use of the AGG scale as a measure of toddler aggression confounds at least three different forms of dimensional consistency. Reporting only AGG scores confounds important temperament-environment interactions having

unique developmental sequela described in the literature. Instead of a global trait-like aggression construct, as described by Achenbach's research, a more comprehensive and differentiated description is indicated by the current study that may illuminate the 'early-starter' antisocial construct. The present study supports criticism of research studies that report only EXT or AGG scores (e.g. Wright, Zakriski and Drinkwater, 1999; Granic & Lamey, 2002). Researchers of aggression in toddlers, when forming samples for prospective studies, for example, are advised to consider the growing number of studies, to which the present one will be added, that report heterogeneity in aggression and antisocial behaviour and that indicate the use of more comprehensive ways of forming research samples.

The map of the toddler CBCL items may be used to investigate other data sets. Although this study re-analysed case data from a sample of boys, the toddler map may in future be used to investigate patterns in girls' CBCL data. More attention has been paid to boys' conduct disorder and externalising behaviour than girls' - possibly because it is "more intense and disruptive and 'here and now'" - but not because it is more frequent (Tremblay, 1991, p.76). Girls diagnosed with CD are more likely to become adolescent mothers or single parents, and mothers of "highly disruptive, conduct-disordered boys" (Tremblay, 1991, p.76). Although it is not possible to say with certainty, given the scant contextual information in the CBCL items, dimensions of toddler behaviour that demonstrate stability, as revealed in the sets of boys' archival data in the present study, are also likely to be salient in girls' behaviour, but may be predicted by scores on different CBCL scales. It is anticipated that the toddler map will also filter 'noise' from girls' case data and reveal patterns of dimensional consistency over toddlerhood. Since the dimensions revealed as latent in the AGG construct index reciprocal, transactional relationship processes it will be as important to follow up their developmental sequela, in girls' development as in boys'.

Rather than refining the AGG scale, studies of the dimensional structure of toddler personality instruments may, because of the dimensional overlap with the CBCL problem domain, incorporate CBCL items to their advantage and reveal a more detailed description of personality. CBCL items found in this study to be particularly characteristic of dimensions of consistency over toddlerhood may be incorporated into other maps of toddler personality (Bimler, Kirkland, Fitzgerald, Zucker, & Foley,

unpublished manuscript) or attachment (Kirkland *et al.* 2004). The current study supports research already advanced by the Massey University approach demonstrating that parents' perception contains objective elements which may be interrogated to reveal important dimensions of toddler behaviour. Efforts to construct a new aggression scale may utilise these elements with an MDS approach, along with tools such as the Q-sort (Block, 1961) developed in the study of personality structure- a field that has a tradition of employing parent-reports in research.

While for this study the conceptual overlap between the domains of psychopathology and structural studies of personality suggested common dimensions (Moffitt, 1993; John *et al.* 1994; Huey & Weisz, 1997), and the probability of an MDS approach proving suitable was anticipated, possible limitations to the study, particularly those around the content of items, argued for caution. The concern was well-founded considering the non-result of the integration of archival CBCL/4-18 data. Consequently the expanded (Combined) items set map was not validated –the second research objective - and the estimation of inter-instrument and inter-age band stability of the constructs emergent in the MDS map- the third research objective of the study - was incomplete. Alternative approaches were suggested.

To conclude, MDS provides an alternative methodology to factor analysis in facilitating assessment of internal validity at the item level. Dimensions may be recovered without pre-selection of factors. Further research integrating CBCL/2-3 items into other personality instruments may result in a richer description of personality. The present investigation endorses an MDS approach in furthering the goal of developing an alternative aggression scale that better reflects the heterogeneity apparent in aggression in toddlers. The conceptual transparency afforded by the MDS procedures and the ease with which participants manipulated the stimuli are encouraging. The pattern-based approach of MDS methodology facilitates transparency in interpreting toddler behaviour that is empowering to parents. The present study has demonstrated that parent participant sorters and experts recover the same latent structure. Using the methodology employed in the present study, and without pre-selection of factors, parent sorters may access constructs once believed to be the preserve of professionals. Opportunities for parent participation in researching their own children at this low-dimensional, item-level, are valuable as a

means of raising awareness as well as giving a sense of ownership over the process and thus potentially increasing the effectiveness of interventions.

Historically - at least up until the turn of the last century - there was reluctance to label any child 'unmanageable' (Tremblay, 1995). With contemporary pressures to refine the assessment of children to include standardized measures that allow comparison with peers across contexts concern has arisen around theories that imply the locus of problems as being 'in the child' rather than being an effect of both behaviour and the surrounding social environment. Among developmentalists aggression in childhood is no longer seriously considered a trait and further studies with the toddler map may corroborate the transactional constructs found in the current investigation. The present study has contributed to further clarifying the temperament and environment basis of AGG – and its conceptual and empirical perspectives - promoting truly developmental theory and research.



## APPENDICES

### APPENDIX A

#### DESCRIPTION OF THE CBCL/2-3 AND CBCL/4-18 DEVELOPMENT AND SPECIFICATIONS

##### The CBCL/4-18

The CBCL/4-16 (Achenbach & Edelbrock, 1983, cited in Achenbach, 1991a) was the prototype for a set of measures for assessing parent-reports of child competence and child behavior problems. Descriptions of problems that are of concern to, and reportable by parents and mental health professionals were collected from the clinical and research literature, and consultation with clinical and developmental psychologists, child psychiatrists and psychiatric social workers and parents. The 118 problem items include an array of specific emotional and behavior problems and space for "other physical problems without medical cause" (Items #56) and "any problems your child has that were not listed" (Item#113). Parents are requested to rate each item that describes the child currently or within the last 6 months on a three step response scale (0, 1, 2), circling 2 if the item is very true or often true of their child; 1 if the item is somewhat or sometimes true of their child and 0 if the item is not true of their child.

In addition to specific item descriptors the CBCL items structure was designed to identify problems that tend to occur together, termed "syndromes". These were identified quantitatively, by principle components analysis of the parent ratings of clinically referred children that make up the sample. In addition to a new normalisation sample, which included children up to 18, the CBCL/4-18 identified eight "cross-informant syndromes" -constructs derived from principle components analyses (PCA) varimax rotation of data from three checklists: CBCL/4-18, Teacher Report Form and Youth Self-Report Form. The pre-1991 syndrome scales by contrast, had been developed separately for each checklist and designed to capture "the patterns of problems specifically identified for each sex within particular age ranges on each instrument taken separately" (Achenbach, 1991, p. iv). The exact composition of each syndrome varied among the sex/age groups and informants. Although within each checklist (pre-1991) the scales were consistent, the developers wanted to transcend instrument-specificity. The 1991 syndromes were thus designed to capture "problems common to both sexes, and different age-ranges, according to parent-, self- and teacher-reports". Two sets of analyses were performed for each sex at age 4-5, 6-11 and 12-18. In one set of analyses all the CBCL items, except the very low prevalence items were included. The syndromes identified in multiple sex/age groups were compared to identify items that were common to a syndrome across sex/age groups. These syndromes are listed on the 1991 CBCL profile.

In the second set of analyses only the 89 items common to the three checklists were included and the same process as applied above to all items was followed. Items that were found in the analogous syndrome from at least two of the three checklists were used to form a "cross-informant syndrome construct" (Achenbach, 1991, p. 99).

For each sex/age group sets of items were identified that consistently grouped together with high loadings on a rotated component. Items loading  $> .30$  were retained for all syndromes except the one labelled Aggressive Behavior, for which, because of the large number of high loadings, items were retained that loaded  $> .40$ . Items that loaded  $> .40$  on the Aggressive Behavior scale and  $> .30$  on a second scale were retained for the second scale only. The 1991 profile displays eight cross-informant syndromes: *Withdrawn*, *Somatic Complaints*, *Anxious/Depressed*, *Social Problems*, *Thought Problems*, *Attention Problems*, *Delinquent Behavior* and *Aggressive Behavior*. A *Sex Problems* syndrome does not have counterparts on the YSR or TRF but may be scored from the CBCL.

Normalization of the CBCL/4-18 was on a sample of 2,368 4 to 18 year old US children representative with respect to demography, SES, ethnicity, and urban/suburban/rural residence. Children who had received mental health service treatment in the preceding 12 months were excluded.

The CBCL syndromes can be scored on raw scores, normalized T scores and normal, borderline or clinical cutpoints. The first-order factors (broad-band) or syndrome scales have a clinical cutpoint at  $T > 70$  and between  $T = 67$  and  $T = 70$  is indicative of borderline clinical score (Achenbach, 1991, p. 56). Scores below  $T = 67$  are considered to be in the normal range. For research purposes however, threshold may be set at the researcher's discretion (Achenbach, 1991, p. 57).

Low prevalence rates of items in the Sexual Problems scale mean cutpoints are not specifiable and use of the T score is recommended.

For research purposes raw scores rather than T scores are recommended for statistical analyses because in normalizing the T scores the range of scores was truncated and does not show as much differentiation between non-deviant subjects.

The CBCL can also be scored on composite or second-order factors derived from further analyses of syndrome scales for each sex/age Group. Principal factor analyses was used to extract the two largest factors in each solution and loadings averaged across all groups on all three instruments (CBCL, TRF & YSR) to yield, on the Internalizing factor : *Withdrawn*, *Somatic Complaints* and *Anxious/Depressed*, and on the Externalizing factor: *Aggressive Behavior* and *Delinquent Behavior* (Achenbach, 1991, p. 62 for loadings).

The broad-band scales have a clinical cutpoint at  $T > 63$  and between  $T = 60$  and  $T = 63$  is indicative of borderline score (Achenbach, 1991, p. 63). Scores below  $T = 60$  are considered to be within the range of normality. Scoring for these broad-band factors involves adding the scores of items on each of the scales extracted. A Total Problems score is formed by summing all the syndrome and Other Problem scores.

T scores are not truncated for the Internalizing, Externalizing and Total Problems scales. Total Problems scores have the same cutpoints as the broad-band factor scales (1991, p. 232).

Reliability of item scores was assessed using the intraclass correlation coefficient (ICC) from one-way analysis of variance (Bartko, 1976). This is a measure that reflects both

the differences in rank ordering of items and the difference in magnitude between two sets of scores. Scores on 241 matched triads of children (N=723) on the ICC were .959 ( $p<.001$ ). It thus showed an very high inter-interviewer reliability in scores obtained for each item relative to scores obtained for each other item (1991, p. 71). Mean test-retest reliability of problem-item scores of non-referred children over a 1-week interval was .952 for the ICC ( $p<.001$ ). Test-retest reliability of scale scores yielded a mean of  $r=.89$  over a period of 7 days. Scores have been found to decline slightly on rating scales and this was also the case for the CBCL/4-18 for which the mean decrease in problem scale scores was 10.7% across the time period. Inter-parent agreement was indicated by means ranging from .65 to .75 for the four sex/age groups. Mean 1-year stability was calculated as  $r = .75$  for problem scales and 2-year at  $r = .71$ . Changes in mean scores did not exceed chance expectations.

Content validity was evidenced in that significantly ( $p<.01$ ) higher scores were obtained by clinically referred children than demographically matched nonreferred children on nearly all the problem items. #2 Allergy and Item #4 Asthma did not show significant differences and were dropped from the problem scale scores. Construct validity was initially assessed through correlating CBCL scale scores with scores from counterpart scales of the Conners (1973) Parent Questionnaire and the Quay-Peterson (1983) Revised Behavior Problem Checklist by having parents of 60 clinically referred 6- to 11-year-olds complete the three instruments. Correlations with the Quay-Peterson scales ranged from .59 (Delinquent Behavior-Socialised Aggressive) to .88 (Aggressive Behavior - Conduct Disorder) and .59 (Attention Problems - Impulsive-Hyperactive) to .86 (Aggressive Behavior-Conduct Problem) for the Conners instrument.

Criterion-related validity is evidenced through the ability of the CBCL's quantitative scale scores and clinical cutpoints to discriminate between demographically matched referred and non-referred children (Achenbach, 1991).

Findings from discriminant analyses identified items and scales that best discriminate between referred and nonreferred children (p. 90).

Item analyses (ANCOVA) of scores obtained by 4,220 matched referred and non referred children on the CBCL identified the percent of variance that was accounted for by each of referral status, sex and age effects. As noted above Items #2 and 4 failed to discriminate significantly between referred and non-referred samples. Item #75 *Shy or Timid* and Item #83 *Stores things up he/she doesn't need* discriminated at  $p<.02$ . Item #99 *Too concerned about neatness or cleanliness* scored nonsignificantly higher for referred than nonreferred children.

Differences between referred and nonreferred children accounted for 29% of the variance with no significant effects of age, sex, interactions or ethnicity. Item # 103 *Unhappy, sad, depressed* showed the largest difference between referred and nonreferred children at 20% of variance accounted for by referral status. Of the differences in item score variance accounted for by referral status boys scored higher on Externalizing items and lower on Internalizing items; Externalizing problems were more common among younger children and Internalizing problems more common among older children (1991, p. 149).; An SES effect accounting for no more than 1% of the variance in the total problem score and in 38 items highlighted the tendency for lower SES parents to report slightly more problems than upper SES parents.

Significantly more Externalizing than Internalizing items were scored higher by lower SES parents.

Issues: One reason for new scale construction (1991) was “limited agreement among informants” (1991, p.153).

### THE CBCL/2-3

The CBCL/2-3 was developed in 1986 (Achenbach et al, 1987; revised Achenbach, 1992) extending previously developed empirically based assessment procedures to 2- and 3-year-olds. Like the CBCL/4-18, the CBCL/2-3 form elicits information from a principle caregiver about specific problem behaviours.

The CBCL/2-3 is a standardized rating form with 99 items, of which 59 are similar to CBCL/4-18 and 40 items are specifically designed for the younger age Group. Judgments are based on the preceding 2 months reflecting the fast pace of development in toddlers. The Child Behaviour Profile is a set of scoring scales for the CBCL/2-3 that are standardized for both sexes. It includes scales comprising syndromes of problems identified by factor analysing (PCA) parents’ ratings of large samples of children- 546 CBCL’s for children of both sexes, including referred children, children considered at risk (low birth weight), and children from the general population whose scores were in the top 50% of the non-referred sample (Achenbach,1992). Items excluded from PCA, for having too high or too low prevalence to afford sufficient variance for analysis were: Item #57 *Problems with eyes without medical cause* and the open-ended item #100 *Other problems*. In addition to the main sample separate samples of boys and girls were analyzed to identify sex-specific syndromes. No robust syndromes were found that were specific to one sex. As with the CBCL/4-18 items, loading  $> .30$  were retained for each syndrome except Aggressive Behavior which had a cutpoint of  $> .40$ .

Seven items that loaded  $> .40$  on the Aggressive Behavior scale and  $> .30$  on a second scale were retained for the second scale only.

The CBCL/2-3 identifies at least 6 syndromes in parents’ ratings of toddlers, four of which have counterparts in syndromes found for older children in the CBCL/4-18. This is despite differences in the overall item pool and composition of the syndromes. Syndromes identified on the CBCL/2-3 are *Withdrawn*, *Anxious/Depressed*, *Somatic Complaints*, *Sleep Problems*, *Delinquent Behavior* and *Aggressive Behavior* (Achenbach, 1992, p. 14 for loadings).

The CBCL/2-3 syndromes can be scored on raw scores, normalized T scores and normal, borderline or clinical cutpoints identical to the CBCL/4-18. It also reveals broad-band internalizing and externalizing groupings like most other factor analyses of children’s behavioral/emotional problems (Achenbach, Edelbrock and Howell, 1987, p. 647; Achenbach, 1992). Principal factor analyses, used to extract the two largest factors in each solution yielded, on the factor termed Internalizing: *Withdrawn*, *Somatic Complaints* and *Anxious/Depressed*, and on the factor termed Externalizing: *Aggressive Behavior* and *Delinquent Behavior*.

The *Withdrawn* syndrome also had a mean loading of .50 on the Externalizing factor defined by the Aggressive and Delinquent Behavior syndromes. The *Withdrawn* syndrome items #27 *Doesn’t seem to feel guilty after misbehaving* and #81 *Stubborn*,

*sullen and irritable* also loaded .46 on the Aggressive Behavior factor. The 1992 Manual for the CBCL/2-3 states that the “problems comprising the CBCL/2-3 Withdrawn syndrome are less exclusively of an internalizing nature than is true for the Withdrawn syndrome on the CBCL/4-18, TRF, and YSR” (Achenbach, 1992, p. 38).

The Sleep Problems syndrome did not load  $\geq .25$  on any Externalizing factor and the highest loading on Externalizing factor for the Somatic Problems syndrome was .35. As a result neither syndrome was included in the broad-band groupings.

Normalization of the CBCL/2-3 was on a sample of 368 2-3 year-olds with similar descriptive features to the CBCL/4-18 sample (Achenbach, 1992, p. 22).

The first-order factors or syndrome scales have a clinical cutpoint at  $T > 70$  and between  $T = 67$  and  $T = 70$  is indicative of borderline score (Achenbach 1992, p. 33).

Total Problems scores have a clinical range over  $T = 60$  and borderline up to  $T = 63$ . (1992, p. 174). The broad-band factors-Externalizing and Internalizing Behavior Problems- have  $T > 60$  as cutpoint with borderline up to  $T = 63$ . For research purposes however, as with the checklist for older children, other cutpoints may be set for specific research goals with particular samples at the researcher’s discretion. (Achenbach, 1992, p. 33)

Mean test-retest reliability of CBCL/2-3 problem scale scores of non-referred children over 7 days was .85. As was the case for the CBCL/4-18 problem scale scores tended to decrease slightly. Test-retest *t*-tests indicated significant declines which accounted for only 4.3% of the variance in scale scores. Inter-parent agreement was indicated by means ranging from  $r = .63$  at age two and  $r = .60$  at age 3. Mean 1-year stability was calculated as  $r = .64$  for all the problem scales. Two scales- Destructive Behavior and Externalizing Problems showed significant declines and three scales- Anxious/Depressed, Sleep Problems and Internalizing Problems showed significant increases in scores.

As with the CBCL/4-18 content validity was evidenced in that significantly ( $p < .01$ ) higher scores were obtained by clinically referred children than demographically matched nonreferred children on nearly all the problem items. #51 *Overweight* and Item #79 *Stores up things he/she doesn’t need* did not show significant differences and were omitted from the problem scale scores. Construct validity was initially demonstrated through convergence of CBCL scale scores with scores from counterpart scales of the Richman Behaviour Checklist (RBC). Correlations with the RBC scales ranged from .58 to .77 for different situations and informants.

Discriminant validity was evidenced through the CBCL/2-3’s independence of developmental measures. The CBCL/2-3 total problems scores showed no concurrent correlations with Bayley’s (1969) Mental Scale at age 2, the McCarthy (1972) General Cognitive Index at age 3 or the Minnesota Child Development Inventory (MCDI) at ages 2 and 3. Criterion-related validity was evidenced through multiple regressions on raw scale scores on referral status, SES and ethnicity which demonstrated the ability of the CBCL/2-3 quantitative scale scores and clinical



cutpoints to discriminate between demographically matched referred and non-referred children (Achenbach, 1992).

Findings from discriminant analyses identified items and scales that best discriminate between referred and nonreferred children. For boys Externalizing accounted for more than seven times as much variance as Internalizing (29% vs. 4%) in discriminating between referred and nonreferred children. (p. 70). Internalizing problems accounted for more than five times as much variance as Externalizing (21% vs. 4%) for girls. The Aggressive Behavior syndrome was the strongest predictor for both sexes (30% of variance for boys, 21% for girls)

Item analyses (ANCOVA) of scores obtained by total of 642 matched referred and non referred children on the CBCL/2-3 identified the percent of variance that was accounted for by each of referral status, sex and age effects. Items #79 *Stores up things he/she doesn't need* and #51 *Overweight* failed to discriminate significantly between referred and non-referred samples and were excluded for the total problem score. Differences between referred and nonreferred children accounted for 28% of the variance with no significant effects of age, sex, interactions or ethnicity on the total problems score. Item # 58 *Punishment doesn't change his/her behavior*, #85 *Temper tantrums or hot temper*, and #88 *Uncooperative* accounted for the largest differences: 18%, 17% and 19% of the variance respectively.

Referred boys showed a tendency to score high on Item #91 *Unusually Loud*. Of the differences in item score variance accounted for by referral status boys scored higher on Externalizing items and lower on Internalizing items. Unlike the CBCL/4-18 scores for older children and adolescents, age differences (2 or 3-years) showed no significant relation to the Internalizing and Externalizing groupings of items. One item, #3 *Afraid to try new things*, showed a tendency for upper SES children to score higher than lower SES children, accounting for no more than 1% of the variance. Unlike the CBCL/4-18 no significant relationship between SES differences and Externalizing versus Internalizing groupings were found.

One difference between the two above-mentioned checklists is the CBCL/2-3 comparison with standardized developmental measures. Also the CBCL/2-3 has no competence or cross-informant scales however the computer program can display scores from up to five informants for comparison.

Another difference is that for the CBCL/2-3 no items were retained for more than one syndrome scale which also means that no items are included in both the Internalizing and Externalizing grouping.

## APPENDIX B

### ITEMS FORMING THE CBCL/2-3 AGGRESSIVE BEHAVIOR SYNDROME SCALE AND THE CBCL/4-18 AGGRESSIVE BEHAVIOR SYNDROME SCALE

#### 15 items forming the CBCL/2-3 Aggressive Behavior syndrome scale

- 15. Defiant
- 16. Demands must be met immediately
- 20. Disobedient
- 29. Easily frustrated
- 30. Easily jealous
- 35. Gets in many fights
- 40. Hits others
- 44. Angry moods
- 58. Punishment doesn't change his/her behavior
- 66. Screams a lot
- 69. Selfish or won't share.
- 82. Sudden changes in mood or feelings
- 85. Temper tantrums or hot temper
- 91. Unusually loud
- 97.\* Whining

#### 20 items (re-numbered) forming the CBCL 4-18 Aggressive Behavior syndrome scale:

- 203. Argues a lot.
- 207. Bragging, boasting.
- 216. Cruelty, bullying, or meanness to others.
- 96. Wants a lot of attention (CBCL/4-18 - # 19 Demands a lot of attention).
- 17.\* Destroys his/her own things [from Des to Agg]
- 18.\* Destroys things belonging to his/her family or others. [from Des to Agg]
- 20. Disobedient (CBCL/4-18 #22 Disobedient at home)
- 223. Disobedient at school.
- 30. Easily jealous
- 35. Gets in many fights
- 53.\* Physically attacks people (not part of any CBCL/2-3 scale)
- 66. Screams a lot
- 274. Showing off or clowning.
- 81.\* Stubborn, sullen, or irritable. [from With to Agg]
- 82. Sudden changes in mood or feelings
- 293. Talks too much.
- 294. Teases a lot.
- 85. Temper tantrums or hot temper
- 297. Threatens people
- 91. Unusually loud

Note:

- \*#17 and #18, included in the toddler Destructive Behavior scale.
- \* #53 included in the Other Problems list in the toddler problem profile.
- \* #81 included in the toddler Withdrawn scale
- \* #97 is included in Other Problems list in the older children's problem profile.



## APPENDIX C

### CBCL/2-3 ITEM SET

1. Aches and pains (without medical cause)
2. Acts too young for age
3. Afraid to try new things
4. Avoids looking others in the eye
5. Can't concentrate, can't pay attention for long
6. Can't sit still or restless
7. Can't stand having things out of place
8. Can't stand waiting: wants everything now
9. Chews on things that aren't edible
10. Clings to adults or too independent
11. Constantly seeks help
12. Constipated, doesn't move bowels
13. Cries a lot
14. Cruel to animals
15. Defiant
16. Demands must be met immediately
17. Destroys his/her own things.
18. Destroys things belonging to his/her family or other children.
19. Diarrhea or loose bowels when not sick
20. Disobedient
21. Disturbed by any change in routine
22. Doesn't want to sleep alone
23. Doesn't answer when people talk to him/her
24. Doesn't eat well
25. Doesn't get along well with other children
26. Doesn't know how to have fun, acts like a little adult
27. Doesn't seem to feel guilty for misbehaving
28. Doesn't want to go out of home
29. Easily frustrated
30. Easily jealous
31. Eats or drinks things that are not food
32. Fears certain animals, situations, or places
33. Feelings are easily hurt
34. Gets hurt a lot, accident-prone
35. Gets in many fights
36. Gets into everything
37. Gets too upset when separated from parents
38. Has trouble getting to sleep
39. Headaches (without medical causes)
40. Hits others
41. Holds his/her breath
42. Hurts animals or people without meaning to
43. Looks unhappy without good reason
44. Angry moods
45. Nausea, feels sick (without medical cause)

46. Nervous movements or twitching
47. Nervous, high-strung, or tense
48. Nightmares
49. Overeating
50. Overtired
51. Overweight
52. Painful bowel movements
53. Physically attacks people
54. Picks nose, skin, or other parts of body
55. Plays with own sex parts too much
56. Poorly coordinated or clumsy
57. Problems with eyes (without medical cause)
58. Punishment doesn't change his/her behavior
59. Quickly shifts from one activity to another
60. Rashes or other skin problems (without medical cause)
61. Refuses to eat
62. Refuses to play active games
63. Repeatedly rocks head or body
64. Resists going to bed at night
65. Resists toilet training
66. Screams a lot
67. Seems unresponsive to affection
68. Self-conscious or easily embarrassed
69. Selfish or won't share
70. Shows little affection towards people
71. Shows little interest in things around him/her
72. Shows too little fear of getting hurt
73. Too shy or timid
74. Sleeps less than most children during day and/or night
75. Smears or plays with bowel movements
76. Speech problem
77. Stares into space or seems preoccupied
78. Stomach aches or cramps (without medical cause)
79. Stores up many things he/she doesn't need
80. Strange behavior
81. Stubborn, sullen, or irritable
82. Sudden changes in mood or feelings
83. Sulks a lot
84. Talks or cries out in sleep
85. Temper tantrums or hot temper
86. Too concerned with neatness or cleanliness
87. Too fearful or anxious
88. Uncooperative
89. Underactive, slow moving, or lacks energy
90. Unhappy, sad, or depressed
91. Unusually loud
92. Upset by new people or situations
93. Vomiting, throwing up (without medical cause)
94. Wakes often at night
95. Wanders away from home

- 96. Wants a lot of attention
- 97. Whining
- 98. Withdrawn, doesn't want to get involved with others
- 99. Worries

**APPENDIX D**  
**CBCL SUBSET OF 39 ITEMS FOR MOT**

- 2 Acts too young for age
- 4 Avoids looking others in the eye
- 5 Can't concentrate, can't pay attention for long
- 8 Can't stand waiting: wants everything now
- 9 Chews on things that aren't edible
- 13 Cries a lot
- 14 Cruel to animals
- 20 Disobedient
- 22 Doesn't want to sleep alone
- 24 Doesn't eat well
- 30 Easily jealous
- 33 Feelings are easily hurt
- 41 Holds his/her breath
- 42 Hurts animals or people without meaning to
- 43 Looks unhappy without good reason
- 46 Nervous movements or twitching
- 47 Nervous, high-strung, or tense
- 50 Overtired
- 54 Picks nose, skin, or other parts of body
- 55 Plays with own sex parts too much
- 56 Poorly coordinated or clumsy
- 58 Punishment doesn't change his/her behavior
- 61 Refuses to eat
- 62 Refuses to play active games
- 63 Repeatedly rocks head or body
- 64 Resists going to bed at night
- 65 Resists toilet training
- 69 Selfish or won't share
- 70 Shows little affection towards people
- 71 Shows little interest in things around him/her
- 75 Smears or plays with bowel movements
- 82 Sudden changes in mood or feelings
- 83 Sulks a lot
- 84 Talks or cries out in sleep
- 86 Too concerned with neatness or cleanliness
- 87 Too fearful or anxious
- 94 Wakes often at night
- 95 Wanders away from home
- 96 Wants a lot of attention

## APPENDIX E

### COMBINED ITEM SET NUMBERING KEY

New number	Item name	Original numbering	
		CBCL/2-3	CBCL/4-18
1.	Aches and pains (without medical cause)	1	
2.	Acts too young for age	2	
3.	Afraid to try new things	3	
4.	Avoids looking others in the eye	4	
5.	Can't concentrate, can't pay attention for long	5	
6.	Can't sit still or restless.	6	
7.	Can't stand having things out of place	7	
8.	Can't stand waiting: wants everything now	8	
9.	Chews on things that aren't edible	9	
10.	Clings to adults or too independent	10	
11.	Constantly seeks help	11	
12.	Constipated, doesn't move bowels	12	
13.	Cries a lot	13	
14.	Cruel to animals	14	
15.	Defiant	15	
16.	Demands must be met immediately	16	
17.	Destroys his/her own things	17	
18.	Destroys things belonging to his/her family or other children	18	
19.	Diarrhoea or loose bowels when not sick	19	
20.	Disobedient	20	
21.	Disturbed by any change in routine	21	
22.	Doesn't want to sleep alone.	22	
23.	Doesn't answer when people talk to him/her.	23	
24.	Doesn't eat well	24	
25.	Doesn't get along well with other children	25	
26.	Doesn't know how to have fun, acts like a little adult	26	
27.	Doesn't seem to feel guilty for misbehaving	27	
28.	Doesn't want to go out of home	28	
29.	Easily frustrated	29	
30.	Easily jealous	30	
31.	Eats or drinks things that are not food	31	
32.	Fears certain animals, situations, or places	32	
33.	Feelings are easily hurt	33	
34.	Gets hurt a lot, accident -prone	34	
35.	Gets in many fights	35	
36.	Gets into everything	36	
37.	Gets too upset when separated from parents	37	
38.	Has trouble getting to sleep	38	
39.	Headaches (without medical causes)	39	

New number	Item name	Original numbering	
		CBCL/2-3	CBCL/4-18
40.	Hits others	40	
41.	Holds his/her breath	41	
42.	Hurts animals or people without meaning to.	42	
43.	Looks unhappy without good reason	43	
44.	Angry moods	44	
45.	Nausea, feels sick (without medical cause)	45	
46.	Nervous movements or twitching	46	
47.	Nervous, high-strung, or tense	47	
48.	Nightmares	48	
49.	Overeating	49	
50.	Overtired	50	
51.	Overweight	51	
52.	Painful bowel movements	52	
53.	Physically attacks people	53	
54.	Picks nose, skin, or other parts of body	54	
55.	Plays with own sex parts too much	55	
56.	Poorly coordinated or clumsy	56	
57.	Problems with eyes (without medical cause)	57	
58.	Punishment doesn't change his/her behavior	58	
59.	Quickly shifts from one activity to another	59	
60.	Rashes or other skin problems (without medical cause)	60	
61.	Refuses to eat	61	
62.	Refuses to play active games	62	
63.	Repeatedly rocks head or body	63	
64.	Resists going to bed at night	64	
65.	Resists toilet training	65	
66.	Screams a lot	66	
67.	Seems unresponsive to affection	67	
68.	Self-conscious or easily embarrassed	68	
69.	Selfish or won't share.	69	
70.	Shows little affection towards people.	70	
71.	Shows little interest in things around him/her	71	
72.	Shows too little fear of getting hurt	72	
73.	Too shy or timid	73	
74.	Sleeps less than most children during day and/or night	74	
75.	Smears or plays with bowel movements	75	
76.	Speech problem	76	
77.	Stares into space or seems preoccupied	77	
78.	Stomach aches or cramps (without medical cause)	78	
79.	Stores up many things he/she doesn't need	79	
80.	Strange behavior	80	
81.	Stubborn, sullen, or irritable	81	

New number	Item name	Original numbering	
		CBCL/2-3	CBCL/4-18
82.	Sudden changes in mood or feelings	82	
83.	Sulks a lot	83	
84.	Talks or cries out in sleep	84	
85.	Temper tantrums or hot temper	85	
86.	Too concerned with neatness or cleanliness	86	
87.	Too fearful or anxious	87	
88.	Uncooperative	88	
89.	Underactive, slow moving, or lacks energy	89	
90.	Unhappy, sad or depressed	90	
91.	Unusually loud	91	
92.	Upset by new people or situations	92	
93.	Vomiting, throwing up (without medical cause)	93	
94.	Wakes often at night	94	
95.	Wanders away from home	95	
96.	Wants a lot of attention	96	
97.	Whining	97	
98.	Withdrawn, doesn't want to get involved with others	98	
99.	Worries	99	
202.	Allergy.		2
203.	Argues a lot.		3
204.	Asthma.		4
205.	Behaves like opposite sex.		5
206.	Bowel movements outside toilet.		6
207.	Bragging, boasting.		7
209.	Can't get his/her mind off certain thoughts; obsessions.		9
212.	Complains of loneliness.		12
213.	Confused or seems to be in a fog.		13
216.	Cruelty, bullying, or meanness to others.		16
217.	Day-dreams or gets lost in his/her thoughts.		17
218.	Deliberately harms self \or attempts suicide.		18
223.	Disobedient at school.		23
226.	Doesn't seem guilty after misbehaving.		26
230.	Fears going to school.		30
231.	Fears he/she might think or do something bad.		31
232.	Feels he/she has to be perfect.		32
233.	Feels or complains that no one loves him/her.		33
234.	Feels others are out to get him/her.		34
235.	Feels worthless or inferior.		35
238.	Gets teased a lot		38
239.	Hangs around with others who get into trouble.		39
240.	Hears sounds or voices that aren't there.		40



New number	Item name	Original numbering	
		CBCL/2-3	CBCL/4-18
241.	Impulsive or acts without thinking.		41
242.	Would rather be alone than with others.		42
243.	Lying or cheating		42
244.	Bites fingernails.		44
246.	Nervous movements or twitching.		46
250.	Too fearful or anxious.		50
251.	Feels dizzy.		51
252.	Feels too guilty.		52
259.	Plays with own sex parts in public.		59
261.	Poor school work.		61
263.	Prefers being with older kids.		63
264.	Prefers being with younger kids		64
265.	Refuses to talk.		65
266.	Repeats certain acts over and over.		66
267.	Runs away from home.		67
269.	Secretive, keeps things to self.		69
270.	Sees things that aren't there		70
272.	Sets fires.		72
273.	Sexual problems.		73
274.	Showing off or clowning.		74
277.	Sleeps more than most kids during day and/or night.		77
281.	Steals at home.		81
282.	Steals outside the home.		82
285.	Strange ideas.		85
289.	Suspicious.		89
290.	Swearing or obscene language.		90
291.	Talks about killing self.		91
293.	Talks too much.		93
294.	Teases a lot.		94
296.	Thinks about sex too much.		96
297.	Threatens people.		97
298.	Thumb-sucking.		98
300.	Trouble sleeping.		100
301.	Truancy skips school.		101
305.	Uses alcohol or drugs for non-medical purposes.		105
306.	Vandalism.		106
307.	Wets self during the day.		107
308.	Wets the bed.		108
310.	Wishes to be of opposite sex		110

## APPENDIX F

### INSTRUCTION SHEET FOR GOPA SORTING

#### General procedures for sorting

Chris Orange  
10/457 Swanson Rd.  
Ranui  
Ph. 09 8322164  
[Oranges@.xtra.co](mailto:Oranges@.xtra.co)

Hi

This isn't a test at all. I'm hoping to find enough people to provide data so that I can take the tests, that these descriptions come from, apart. (Child Behavior Checklist for Ages 2-3, and Ages 4-18, Achenbach, 1991; 1992)

**Phase one:** Find a big flat space about a metre square. After reading the first card you turn over place the next one either beneath it, if you think the behavior is related, or, if not, beside it. You don't have to explain. Just keep on grouping in this way until all cards are sorted.

...you might have 8 or 18 groups by the end and your groups might also have many items or only one.

When you're done please write the item numbers down as shown on the form. If you get stuck call me on 8322164.

**Phase two:** Look at your groups again and see if any of them are obviously opposites. If so please write them down-just one number from each will do to tell me which group you are talking about. If you find more than 3 please write them all down.

**Phase three:** Divide, if possible, each group into subgroups by bracketing as shown on the form.

**Phase four:** Look at your original groups again (before subdivision) and try to find ones that could be merged into each other. Once you make a new 'supergroup' you mustn't split it up, but you can add other groups to it and make an even bigger superGroup Write only one number from each group as instructed.

Any problems call me on 8322164. Thanks

Chris Orange

# **APPENDIX F continued** **SHEET FOR RECORDING GOPA DATA**

\_\_\_\_\_  
 (today's date)

## **Phase one – grouping**

Make up at least 8 (and up to 16) different groups of similar items with **no more than 7** items per group. A group may have a single item. Keep each group's item numbers on the same line. **Please print neatly.** Do NOT number groups.

Example: 7    22    1    43    78    12

## **Phase three – partition**

For all phase 1 groups with more than 2 items, copy all these numbers onto the identical line below but use brackets to show sub groups, that is how the most similar items go together. A sub group may have a single item within brackets.

(12    43    22)    (1    7)    (78)

## **Phase two – opposites**

Which of the phase 1 groups are the most different? Record these "opposites" by entering any one item number from each group on the spaces below. Try to find at least two sets of opposites.

"Opposite" set 1: \_\_\_\_\_ # "Opposite" set 2: \_\_\_\_\_ # "Opposite" set 3: \_\_\_\_\_ #

## **Phase four – adding**

Join together the most similar groups in phase 1. To show which groups go together enter any one item number from each group on the spaces below. Only some groups will join up, many will not. Try to make at least two merges. If there are more than three, continue showing pairs.

merger a) \_\_\_\_\_ #    merger b) \_\_\_\_\_ #    merger c) \_\_\_\_\_ #

## APPENDIX G

### METHOD OF TRIADS: SORTING INSTRUCTION SHEET


#### SORTING TRIADS

Chris Orange  
2-41 Wallace St.  
Heme Bay  
Ph. 09-361-3011  
Oranges@xtra.co.nz

Hi

Thanks for saying you'd do this for me.

Shuffle the deck and put three cards beside each

other in a line, ...eg: 

20	67	13
99	58	47
73	10	5
etc	etc	etc

then three underneath 

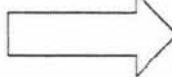
20	67	13
99	58	47
73	10	5
etc	etc	etc

until the whole deck is laid out in  
three columns. Like this eg:.....

Then go through each line, one by one, and take out the card that seems different from the other two.

Place it to the right of the line... eg like

20	67	13	
99	58	47	
73	<u>10</u>	5	
etc	etc	etc	



20	13	67
58	47	<u>99</u>
5	73	<u>10</u>
etc	etc	etc

Now, on the form provided, write the numbers you've got in table 1, going from left to right.

The 'different' cards should all be under the column marked \*.

Table One \*

20	13	67
58	47	<u>99</u>
5	73	<u>10</u>
etc	etc	etc

Thanks-now please **shuffle** and repeat with tables 2 & 3.

Any problems please call me on 09-361-3011  
Or e-mail me at above address.

## APPENDIX G continued

### METHOD OF TRIADS: DATA RECORDING SHEET

CBCC  
/39 0231

From each set of three  
select the one statement  
you think is different  
from the other two

TABLE 1 \*


TABLE 2 \*

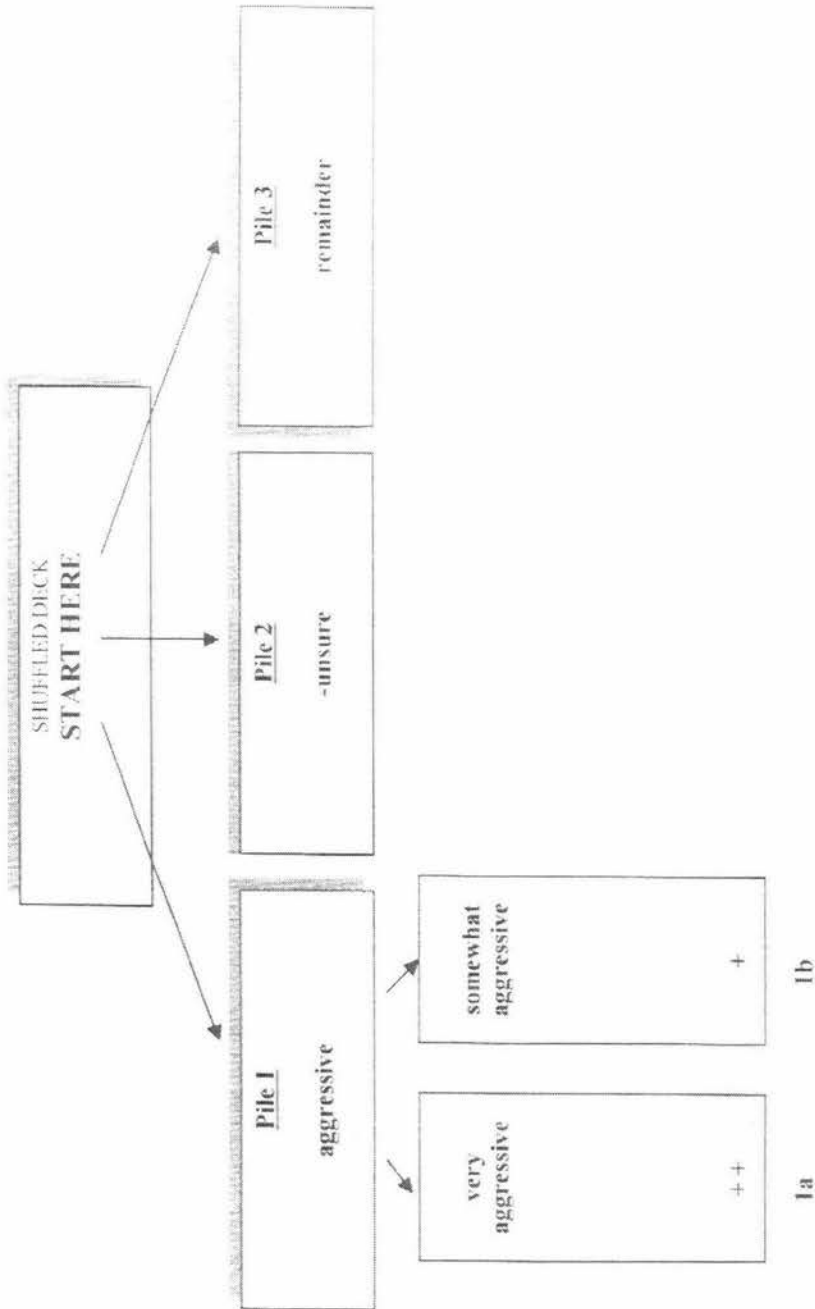

TABLE 3 \*


From each triad place number for "odd one out" item into right-most column headed with \*. Place other item numbers from that triad set onto the same row. When a table is completed, shuffle item-cards and begin again but using the next table.

Complete all three tables.

APPENDIX H

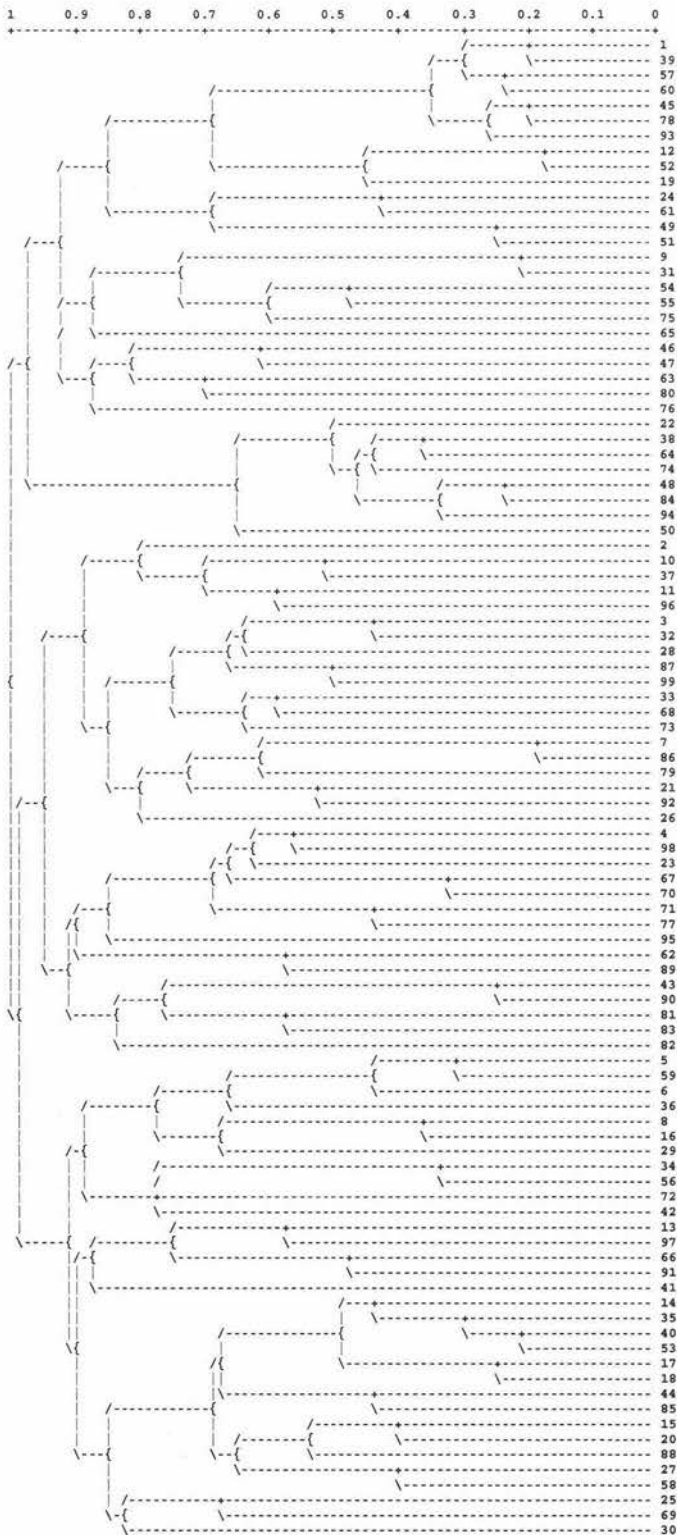
SHEET FOR RECORDING METHOD OF SUCCESSIVE SORT  
DATA: CRITERION SORT: EG. AGGRESSIVE



First, read and place item-cards into Pile 1, 2 or 3. Then redistribute Pile 1 items into 1a or 1b. Cards may be shifted between piles at any time. The final 4 piles may have an uneven number of cards in them. When sorting is completed then write item numbers *nearly* into boxes 1a and 1b.

# APPENDIX I

## CBCL/2-3 H-TREE





## APPENDIX J

### MAPGROUPS IN THE MDS MAP OF THE CBCL/2-3 ITEM SET AND LIST OF ITEMS NOT CLUSTERED

<p><b>Group 1 Somatic problems without medical cause</b></p> <p>39. Headaches (without medical cause)</p> <p>45. Nausea, feels sick (without medical cause)</p> <p>60. Rashes or other skin problems (without medical cause)</p> <p>78. Stomach aches or cramps (without medical cause)</p> <p>93. Vomiting, throwing up (without medical cause)</p> <p><b>Group 2 Bowel problems</b></p> <p>12. Constipated, doesn't move bowels</p> <p>52. Painful bowel movements</p> <p><b>Group 4 Nightmares/talks</b></p> <p>48. Nightmares</p> <p>84. Talks or cries out in sleep</p> <p><b>Group 5 Resists bed</b></p> <p>64. Resists going to bed at night</p> <p>74. Sleeps less than most children during day and/or night</p> <p><b>Group 7 Chews non-food</b></p> <p>9. Chews on things that aren't edible</p> <p>31. Eats or drinks things that are not food</p> <p>54. Picks nose, skin, or other parts of body</p> <p><b>Group 9 Hits/destroys</b></p> <p>17. Destroys his/her own things.</p> <p>18. Destroys things belonging to his/her family or other children.</p> <p>40. Hits others</p> <p><b>Group 11 Impatient</b></p> <p>8. Can't stand waiting; wants everything now</p>	<p><b>Group 20 Moody/unpredictable changes</b></p> <p>81. Stubborn, sullen, or irritable</p> <p>82. Sudden changes in mood or feelings</p> <p><b>Group 21 Withdrawn/no active games</b></p> <p>62. Refuses to play active games</p> <p>98. Withdrawn, doesn't want to get involved with others</p> <p><b>Group 22 Unhappy</b></p> <p>43. Looks unhappy without good reason</p> <p>90. Unhappy, sad, or depressed</p> <p><b>Group 23 Self – conscious shy/sensitive/stranger fear</b></p> <p>33. Feelings are easily hurt</p> <p>68. Self-conscious or easily embarrassed</p> <p>73. Too shy or timid</p> <p>92. Upset by new people or situations</p> <p><b>Group 25 Unresponsive to/shows little affect</b></p> <p>67. Seems unresponsive to affection</p> <p>70. Shows little affection towards people</p> <p><b>Group 26 Preoccupied</b></p> <p>71. Shows little interest in things around him/her</p> <p>77. Stares into space or seems preoccupied</p> <p><b>Group 27 Overconcern with neatness/placement</b></p> <p>7. Can't stand having things out of place</p> <p>86. Too concerned with neatness or cleanliness</p> <p><b>Group 28 Overeats/weight</b></p> <p>49. Overeating</p> <p>51. Overweight</p>
--	--

<p>16. Demands must be met immediately</p> <p><b>Group 12 Overactive/low attention</b></p> <p>5. Can't concentrate, can't pay attention for long</p> <p>6. Can't sit still or restless</p> <p>59. Quickly shifts from one activity to another</p> <p><b>Group 13 Whines/wants attention</b></p> <p>96. Wants a lot of attention</p> <p>97. Whining</p> <p><b>Group 15 Dependent</b></p> <p>11. Constantly seeks help</p> <p>37. Gets too upset when separated from parents</p> <p><b>Group 16 Into everything</b></p> <p>36. Gets into everything</p> <p>72. Shows too little fear of getting hurt</p> <p><b>Group 19 Temper/disobedient</b></p> <p>15. Defiant</p> <p>20. Disobedient</p> <p>85. Temper tantrums or hot temper</p>	<p><b>Group 29 Undereats</b></p> <p>24. Doesn't eat well</p> <p>61. Refuses to eat</p> <p><b>Group 30 Doesn't answer/sulks</b></p> <p>23. Doesn't answer when people talk to him/her</p> <p>83. Sulks a lot</p> <p><b>Group 31 Novelty fear</b></p> <p>3. Afraid to try new things</p> <p>21. Disturbed by any change in routine</p> <p><b>Group 32 Sleep trouble</b></p> <p>38. Has trouble getting to sleep</p> <p>50. Overtired</p> <p>94. Wakes often at night</p> <p><b>Group 33 Screams/loud</b></p> <p>66. Screams a lot</p> <p>91. Unusually loud</p> <p><b>Group 34 Frustrated/selfish</b></p> <p>29. Easily frustrated</p> <p>69. Selfish or won't share</p> <p><b>Group 35 Angry/insensitive to punishment</b></p> <p>44. Angry moods</p> <p>58. Punishment doesn't change his/her behavior</p> <p>88. Uncooperative</p> <p><b>Group 36 Fights/attacks</b></p> <p>35. Gets in many fights</p> <p>53. Physically attacks people</p>
---	---

Note: There are no mapgroups numbered 3, 6, 8, 10, 14, 17, 18, and 24.

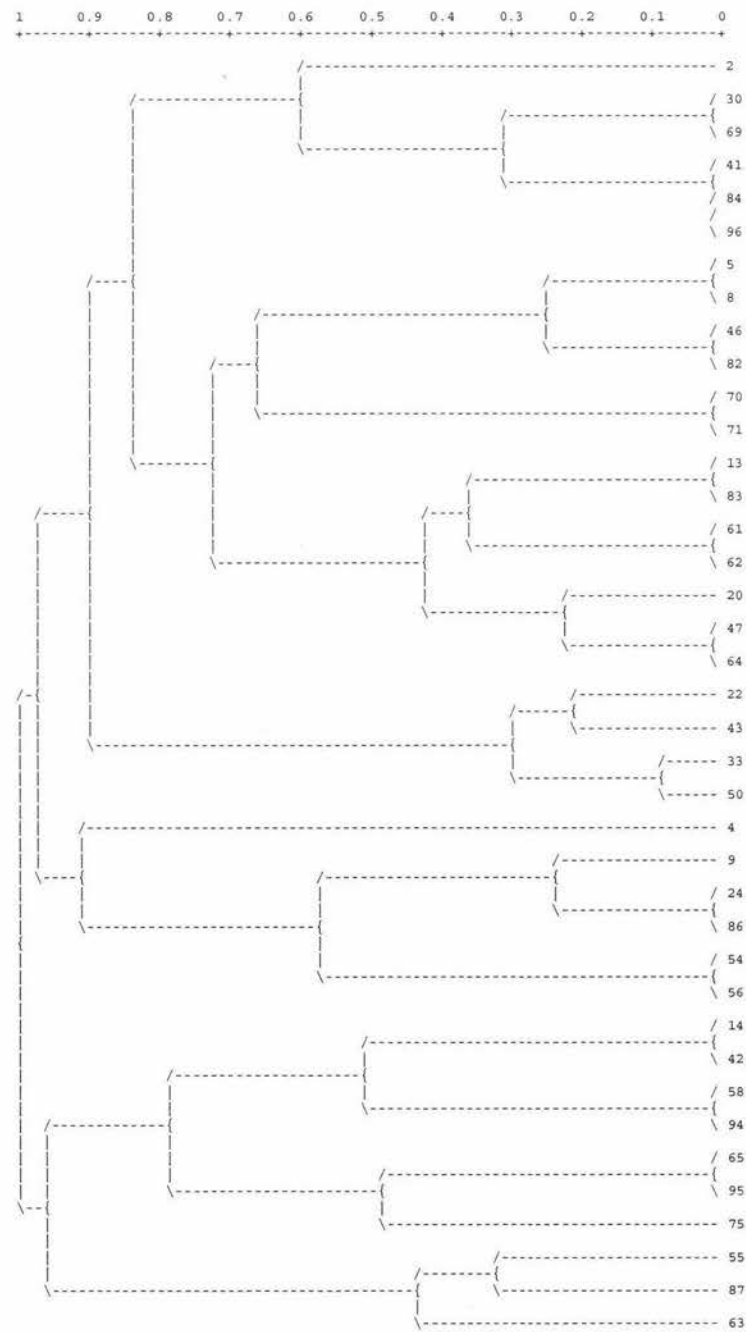
Items not clustered on CBCL/2-3 map

1. Aches and pains (without medical cause)
2. Acts too young for age
4. Avoids looking others in the eye
10. Clings to adults
13. Cries a lot
14. Cruel to animals
19. Diarrhea or loose bowels when not sick
22. Doesn't want to sleep alone
25. Doesn't get along well with other children
26. Doesn't know how to have fun, acts like a little adult
27. Doesn't seem to feel guilty for misbehaving
28. Doesn't want to go out of home
30. Easily jealous
32. Fears certain animals, situations, or places
34. Gets hurt a lot, accident-prone
41. Holds his/her breath
42. Hurts animals or people without meaning to
46. Nervous movements or twitching
47. Nervous, high-strung, or tense
55. Plays with own sex parts too much
56. Clumsy
57. Problems with eyes (without medical cause)
63. Repeatedly rocks head or body
65. Resists toilet training
75. Smears or plays with bowel movements
76. Speech problem\*
79. Stores up many things he/she doesn't need
80. Strange behavior
87. Too fearful or anxious
89. Underactive, slow moving, or lacks energy
95. Wanders away from home
99. Worries

Notes: \* Item #76 Speech Problems was among the three strongest referral-predictor items for both sexes, in the discriminant analyses Achenbach used to establish validity.(Achenbach. 1992, p. 71)

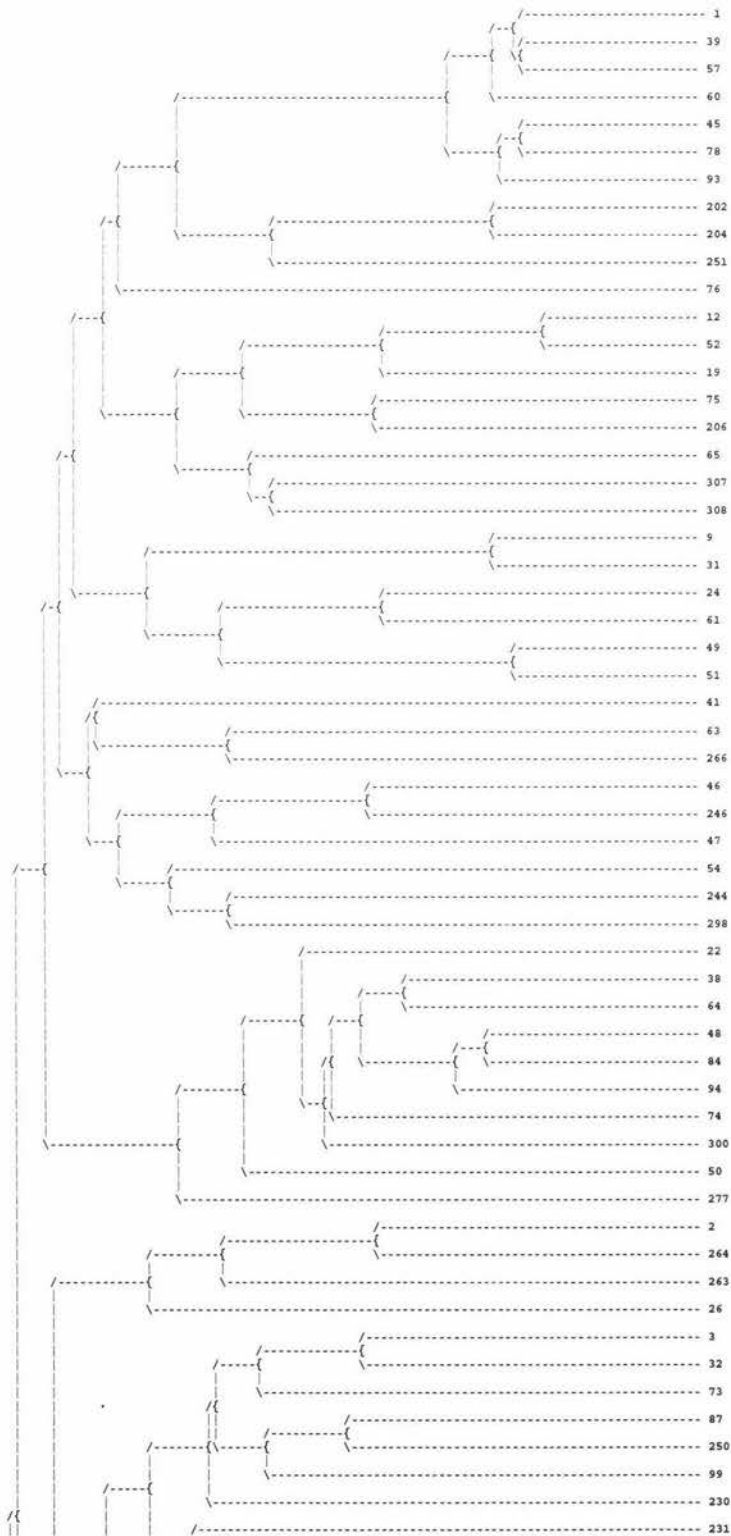
APPENDIX K

MOT RESULTS FOR CBCL/2-3 SUBSET OF 39 ITEMS

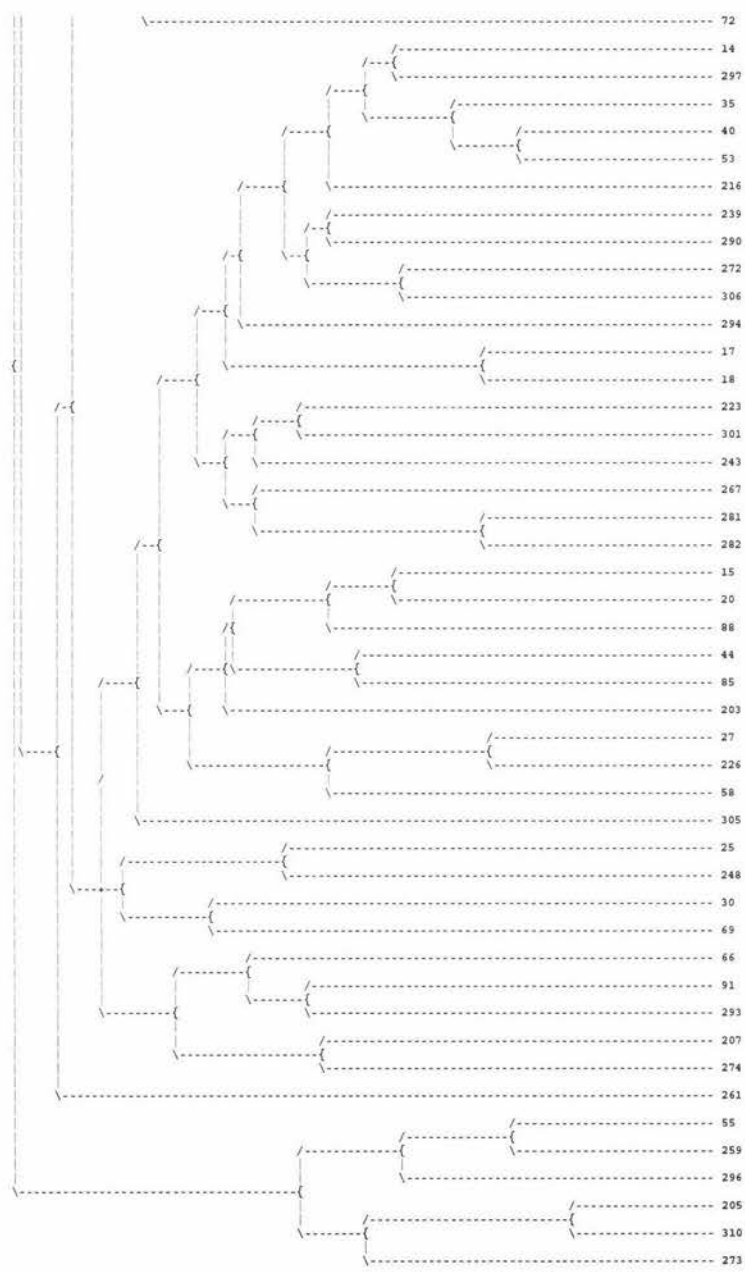


APPENDIX L

H-TREE FOR THE COMBINED (CBCL/2-3 & CBCL/4-18) ITEM SET



252	10	37	28
11	96	7	86
232	21	92	79
209	13	97	81
83	43	90	33
68	235	238	212
233	4	98	67
70	23	265	71
77	242	62	89
95	234	289	269
80	285	240	270
213	217	218	291
5	59	6	36
241	8	16	29
82	34	56	42





## APPENDIX M

### MAPGROUPS IN THE MDS SOLUTION FOR THE COMBINED (CBCL/2-3 AND CBCL/4-18) ITEM SET

<p><b>Group 1 Fights/teases/no guilt</b></p> <p>27. <i>Doesn't seem to feel guilty for misbehaving</i></p> <p>35. <i>Gets in many fights</i></p> <p>223. <i>Disobedient at school.</i></p> <p>294. <i>Teases a lot.</i></p> <p><b>Group 2 Bully/truant</b></p> <p>216. <i>Cruelty, bullying, or meanness to others.</i></p> <p>243. <i>Lying or cheating</i></p> <p>267. <i>Runs away from home.</i></p> <p>281. <i>Steals at home</i></p> <p>301. <i>Truancy skips school.</i></p> <p><b>Group 3 Rule/law breaking</b></p> <p>18. <i>Destroys things belonging to his/her family or other children</i></p> <p>290. <i>Swearing or obscene language.</i></p> <p>282. <i>Steals outside the home.</i></p> <p>272. <i>Sets fires</i></p> <p>297. <i>Threatens people.</i></p> <p><b>Group 4 Angry/irritable</b></p> <p>44. <i>Angry moods</i></p> <p>81. <i>Stubborn, sullen, or irritable</i></p> <p>88. <i>Uncooperative</i></p> <p><b>Group 5 Disobedient</b></p> <p>20. <i>Disobedient</i></p> <p>203. <i>Argues a lot.</i></p> <p><b>Group 6 Vandalism</b></p> <p>239. <i>Hangs around with others who get into trouble.</i></p> <p>306. <i>Vandalism.</i></p> <p><b>Group 7 Chews on non-food/toilet problems</b></p> <p>9. <i>Chews on things that aren't edible</i></p> <p>307. <i>Wets self during the day.</i></p> <p>206. <i>Bowel movements outside toilet.</i></p> <p><b>Group 8 Somatic problems</b></p> <p>60. <i>Rashes or other skin problems (without medical cause)</i></p>	<p><b>Group 21 Hyperactive</b></p> <p>5. <i>Can't concentrate, can't pay attention for long</i></p> <p>66. <i>Screams a lot</i></p> <p><b>Group 22 Plays with sex parts</b></p> <p>55. <i>Plays with own sex parts too much</i></p> <p>259. <i>Plays with own sex parts in public.</i></p> <p><b>Group 23 Picks skin/rocks head</b></p> <p>54. <i>Picks nose, skin, or other parts of body</i></p> <p>63. <i>Repeatedly rocks head or body</i></p> <p>75. <i>Smears or plays with bowel movements</i></p> <p><b>Group 24 Unhappy/fears things /depressed</b></p> <p>43. <i>Looks unhappy without good reason</i></p> <p>32. <i>Fears certain animals, situations, or places</i></p> <p>90. <i>Unhappy, sad or depressed</i></p> <p><b>Group 25 Loud/active</b></p> <p>91. <i>Unusually loud</i></p> <p>274. <i>Showing off or clowning.</i></p> <p>36. <i>Gets into everything</i></p> <p><b>Group 26 Avoids others</b></p> <p>4. <i>Avoids looking others in the eye</i></p> <p>98. <i>Withdrawn, doesn't want to get involved with others</i></p> <p><b>Group 27 Preoccupied</b></p> <p>77. <i>Stares into space or seems preoccupied</i></p> <p>217. <i>Day-dreams or gets lost in his/her thoughts</i></p> <p><b>Group 28 Asocial/self-focussed</b></p> <p>71. <i>Shows little interest in things around him/her</i></p> <p>62. <i>Refuses to play active games</i></p> <p>242. <i>Would rather be alone than with others.</i></p>
--	--

<p>45. <i>Nausea, feels sick (without medical cause)</i></p> <p>39. <i>Headaches (without medical causes)</i></p> <p>1. <i>Aches and pains (without medical cause)</i></p> <p>93. <i>Vomiting, throwing up (without medical cause)</i></p> <p>78. <i>Stomach aches or cramps (without medical cause)</i></p> <p><b>Group 9 Low esteem</b></p> <p>68. <i>Self-conscious or easily embarrassed</i></p> <p>235. <i>Feels worthless or inferior.</i></p> <p><b>Group 10 Immature</b></p> <p>33. <i>Feelings are easily hurt</i></p> <p>264. <i>Prefers being with younger kids</i></p> <p><b>No Group 11</b></p> <p><b>Group 12 Compulsive/guilty feelings</b></p> <p>7. <i>Can't stand having things out of place</i></p> <p>86. <i>Too concerned with neatness or cleanliness</i></p> <p>232. <i>Feels he/she has to be perfect.</i></p> <p>252. <i>Feels too guilty.</i></p> <p><b>Group 13 Underactive/confused</b></p> <p>89. <i>Underactive, slow moving, or lacks energy</i></p> <p>213. <i>Confused or seems to be in a fog.</i></p> <p><b>Group 14 Little affect/not social</b></p> <p>67. <i>Seems unresponsive to affection</i></p> <p>70. <i>Shows little affection towards people.</i></p> <p>25. <i>Doesn't get along well with other children</i></p> <p><b>Group 15 Doesn't answer</b></p> <p>23. <i>Doesn't answer when people talk to him/her.</i></p> <p>265. <i>Refuses to talk.</i></p> <p><b>Group 16 Hallucinates</b></p> <p>270. <i>Sees things that aren't there</i></p> <p>240. <i>Hears sounds or voices that aren't there.</i></p> <p>209. <i>Can't get his/her mind off certain thoughts; obsessions.</i></p> <p><b>Group 17 Sleep problems</b></p> <p>38. <i>Has trouble getting to sleep</i></p> <p>84. <i>Talks or cries out in sleep</i></p>	<p><b>Group 29 Impatient/demanding</b></p> <p>8. <i>Can't stand waiting: wants everything now</i></p> <p>96. <i>Wants a lot of attention</i></p> <p>29. <i>Easily frustrated</i></p> <p>97. <i>Whining</i></p> <p><b>Group 30 Eye probs/dizzy</b></p> <p>57. <i>Problems with eyes (without medical cause)</i></p> <p>251. <i>Feels dizzy.</i></p> <p><b>Group 31 Eating/weight problems</b></p> <p>49. <i>Overeating</i></p> <p>51. <i>Overweight</i></p> <p><b>Group 32 Nervous movements</b></p> <p>46. <i>Nervous movements or twitching</i></p> <p>246. <i>Nervous movements or twitching.</i></p> <p>47. <i>Nervous, high-strung, or tense</i></p> <p><b>Group 33 Constipated</b></p> <p>12. <i>Constipated, doesn't move bowels</i></p> <p>52. <i>Painful bowel movements</i></p> <p><b>Group 34 Overtired</b></p> <p>50. <i>Overtired</i></p> <p>244. <i>Bites fingernails.</i></p> <p><b>Group 35 Defiant/bragging</b></p> <p>15. <i>Defiant</i></p> <p>207. <i>Bragging, boasting.</i></p> <p><b>Group 36 Hits others/insensitive to punishment</b></p> <p>40. <i>Hits others</i></p> <p>58. <i>Punishment doesn't change his/her behavior</i></p> <p><b>Group 37 Novelty fear/shy</b></p> <p>3. <i>Afraid to try new things</i></p> <p>73. <i>Too shy or timid</i></p> <p><b>Group 38 Dependent/fears</b></p> <p>11. <i>Constantly seeks help</i></p> <p>22. <i>Doesn't want to sleep alone.</i></p> <p>13. <i>Cries a lot</i></p> <p><b>Group 39 Clingy</b></p> <p>10. <i>Clings to adults or too dependent</i></p> <p>212. <i>Complains of loneliness.</i></p>
---	---

<p><b>Group 18 Sleep disturbed</b></p> <p>48. <i>Nightmares</i></p> <p>94. <i>Wakes often at night</i></p> <p>300. <i>Trouble sleeping.</i></p> <p>308. <i>Wets the bed.</i></p> <p><b>Group 19 Restless/easily distracted</b></p> <p>6. <i>Can't sit still or restless.</i></p> <p>59. <i>Quickly shifts from one activity to another</i></p> <p><b>Group 20 Fearful</b></p> <p>87. <i>Too fearful or anxious</i></p> <p>99. <i>Worries</i></p> <p>230. <i>Fears going to school.</i></p> <p>250. <i>Too fearful or anxious</i></p>	<p><b>Group 40 Sexual issues</b></p> <p>273. <i>Sexual problems.</i></p> <p>310. <i>Wishes to be of opposite sex</i></p> <p><b>Group 41 Strange/suicidal ideas</b></p> <p>285. <i>Strange ideas.</i></p> <p>291. <i>Talks about killing self.</i></p> <p><b>Group 42 Moody/unpopular</b></p> <p>248. <i>Not liked by other kids.</i></p> <p>82. <i>Sudden changes in mood or feelings</i></p> <p><b>Group 43 Fears change/own actions</b></p> <p>21. <i>Disturbed by any change in routine</i></p> <p>231. <i>Fears he/she might think or do something bad.</i></p> <p><b>Group 44 Impulsive/reckless</b></p> <p>72. <i>Shows too little fear of getting hurt</i></p> <p>241. <i>Impulsive or acts without thinking.</i></p>
--	--

## APPENDIX M CONTINUED

*Items lacking proximity in the h-tree and items that didn't cluster on the MDS map of the Combined CBCL/2-3 and CBCL/4-18 item set*

Items lacking proximity on the h-tree	Items not clustered on map
22. Doesn't want to sleep alone. 26. Doesn't know how to have fun, acts like a little adult 41. Holds his/her breath 42. Hurts animals or people without meaning to. 72. Shows too little fear of getting hurt 76. Speech problem 79. Stores up many things he/she doesn't need 82. Sudden changes in mood or feelings 95. Wanders away from home  209. Can't get his/her mind off certain thoughts; obsessions. 230. Fears going to school. 238. Gets teased a lot 241. Impulsive or acts without thinking. 251. Feels dizzy. 269. Secretive, keeps things to self. 277. Sleeps more than most kids during day and/or night. 305. Uses alcohol or drugs for non-medical purposes.	2. Acts too young for age 16. Demands must be met immediately 17. Destroys his/her own things 26. Doesn't know how to have fun, acts like a little adult 28. Doesn't want to go out of home 30. Easily jealous 34. Gets hurt a lot, accident -prone 37. Gets too upset when separated from parents 41. Holds his/her breath 42. Hurts animals or people without meaning to 64. Resists going to bed at night 65. Resists toilet training 69. Selfish or won't share. 74. Sleeps less than most children during day and/or 76. Speech problem 79. Stores up many things he/she doesn't need 83. Sulks a lot 85. Temper tantrums or hot temper 92. Upset by new people or situations 95. Wanders away from home 218. Deliberately harms self \ or attempts suicide. 261. Poor school work* 263. Prefers being with older kids. 266. Repeats certain acts over and over. 269. Secretive, keeps things to self 277. Sleeps more than most kids during day and/or night. 293. Talks too much. 296. Thinks about sex too much 305. Uses alcohol or drugs for non-medical purposes

Notes: Item # 261. *Poor school work* is among the three strongest referral predictors for all sex/age groups except 12-18 girls, in Achenbach's discriminant analyses used to establish validity (Achenbach, 1991, p. 106)

## REFERENCES

- Achenbach, T. M. (1982) *Developmental Psychopathology* (2<sup>nd</sup> Ed.) John Wiley & Sons.
- Achenbach, T. M. (1991a). *Manual for the Child Behavior Checklist/4-18 and 1991 Profile*, Burlington, VT: University of Vermont Department of Psychiatry.
- Achenbach, T. M. (1991b). *Manual for the Teacher's Report Form and 1991 Profile*. Burlington, VT: University of Vermont Department of Psychiatry.
- Achenbach, T. M. (1991c). *Manual for the Youth Self-Report and 1991 Profile*. Burlington, VT: University of Vermont Department of Psychiatry.
- Achenbach, T. M. (1992). *Manual for the Child Behavior Checklist/2-3 and the 1992 Profile*. Burlington, VT : University of Vermont Department of Psychiatry
- Achenbach, T. M., & Dumenci, L. (2001). Advances in empirically based assessment: Revised cross-informant syndromes and new DSM-oriented scales for the CBCL, YSR, and TRF: Comment on Lengua, Sadowski, Friedrich, and Fisher (2001). *Journal of Consulting and Clinical Psychology*, 69, (4), 699–702.
- Achenbach, T. M., Dumenci, L. & Rescorla, L. A. (n.d.). Ratings of relations between DSM-IV Diagnostic Categories and Items of the CBCL/11/2-5 and C-TRF. Burlington, VT: University of Vermont Research Center for Children, Youth and Families. Retrieved October 25, 2002, from <http://www.aseba.org/research/achenbach.html>
- Achenbach, T.M., Dumenci, L. & Rescorla, L.A. (2001, October). Ratings of relations between DSM-IV Diagnostic Categories and Items of the CBCL/6-18, TRF, and YSR. Burlington, VT: University of Vermont Research Center for Children, Youth and Families. Retrieved 25/10/2002 from <http://www.aseba.org/research/achenbach.html>

- Achenbach, T. M., Edelbrock, C. & Howell, C. T. (1987). Empirically based assessment of the behavioral /emotional problems of 2-and 3- year-old children, *Journal of Abnormal Child Psychology*, 15, (4), 629-650.
- Achenbach, T. M., Howell, C. T., Quay, H. C., & Conners, C. K. (1991d). National survey of problems and competencies among four-to-sixteen-year-olds: Parents' reports for normative and clinical samples. *Monographs of the Society for Research in Child Development*, 56, (Serial No. 225, Whole No. 3).
- Achenbach, T. M., Howell, C. T., McConaughy, S. H. & Stanger, C. (1995) Six-year predictors of problems in a national sample of children and youth: I. Cross-informant syndromes. *Journal of the American Academy of Child Adolescent Psychiatry* 34, 336-347
- Achenbach, T. M. & McConaughy, S. H. (1987). Empirically Based Assessment of Child and Adolescent Psychopathology: Practical Applications. Vol. 13. Alan E. Kazdin (Ed.) *Developmental Clinical Psychology and Psychiatry*. Sage Pubs: California.
- Achenbach, T. M. & Rescorla, L.A. (2000). *Manual for the ASEBA Preschool Forms and Profiles*. Burlington, VT: University of Vermont Department of Psychiatry.
- Achenbach, T. M. & Rescorla, L.A. (2001). Empirically based and DSM-oriented assessment of preschoolers for pharmacotherapy and other interventions. *Child and Adolescent Psychopharmacology News*, 6, (5), 1-7.
- Ainsworth, M. S. (1990). Epilogue. In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment and the pre-school years: Theory, research and intervention*. (pp.463-488).Chicago: University of Chicago Press.

- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4<sup>th</sup> ed.). Washington, DC.
- Bates, J. E., Pettit, G. S., Dodge, K. A. & Ridge, B. (1998). Interaction of temperamental resistance to control and restrictive parenting in the development of externalizing behavior. *Developmental Psychology*, 34, (5), 982-995.
- Bergman, L. R., Eklund, G., & Magnusson, D., (1991). Studying individual development: problems and methods. In D. Magnusson, L. R. Bergman, G. Rudinger & B. Torestad (Eds.) *Problems and Methods in Longitudinal Research: Stability and Change*. (pp.1-27). Cambridge: Cambridge University Press.
- Berube, R. L., & Achenbach, T. M. (2004). *Bibliography of published studies using ASEBA instruments: 2004 edition*. Burlington: University of Vermont, Research Center for Children, Youth and Families.
- Biederman, J., Monuteaux, M. C., Greene, R. W. E., Braaten, E., Doyle, A. E. & Faraone, S.V. (2001). Long-term stability of the Child Behavior Checklist in a clinical sample of youth with Attention Deficit Hyperactivity Disorder. *Journal of Clinical and Child Psychology*, 30, (4), 492-502.
- Bimler, D. & Kirkland, J. (1998). Perceptual modelling of product similarities using sorting data. *Marketing Bulletin*, 9, 16-27. Retrieved January 7, 2005 from <http://marketing-bulletin.massey.ac.nz/article10/article3b.asp>
- Bimler, D. & Kirkland, J. (1999). Capturing images in a net: Perceptual modelling of product descriptors using sorting data. *Marketing Bulletin*, 10, 11-23. Retrieved October 16, 2003 from <http://marketing-bulletin.massey.ac.nz/article10/article3b.asp>



- Bimler, D. & Kirkland, J. (2001a). School truants and truancy motivation sorted out with multidimensional scaling. *Journal of Adolescent Research*, 16, 75-102.
- Bimler, D. & Kirkland, J. (2001b). Fables of the reconstruction: Characterizing business structures with on-line data collection, in J. Haynes (Ed.) *Internet management issues: a global perspective*, Hershey: Idea Group Publications.
- Bimler, D. & Kirkland, J. (2002). Unifying versions and criterion sorts of the Attachment Q-Set with a spatial model. *Canadian Journal of Infant Studies*, 9, 2-18.
- Bimler, D. & Kirkland, J. (2004). Twins and odd-ones-out: a twin study of genetic contributions to variability in personal colour space. *Clinical and Experimental Optometry* 87, (4-5), 313-321. Retrieved January 7, 2005 from <http://www.optometrists.asn.au/ceo>
- Bimler, D., Kirkland, J., Fitzgerald, H., Zucker, R.A., & Foley, S. (Unpublished manuscript). Constructing personality maps, mapping personality constructs: A multidimensional analysis of the California child Q-set.
- Bimler, D., Kirkland, J. & Jameson, K. A. (2004). Quantifying variations in personal color spaces: Are there sex differences in color vision? *Color Research and Application*. 29, 128-134. Retrieved January 7, 2005 from <http://www.interscience.wiley.com>
- Block, J. (1961). *The Q-sort method in personality assessment and psychological research*, Reprinted 1978, Palo Alto, CA, Consulting Psychologist Press.
- Block, J. (1971). *Lives through time*. Berkeley, CA: Bancroft Books.
- Block, Jack (1995). A contrarian view of the five-factor approach to personality description. *Psychological Bulletin*, 117, 187-215.

- Block, J. H. & Block, J. (1980). The role of ego-control and ego-resiliency in the organization of behavior. In W.A. Collins (Ed.). *Minnesota Symposia on Child Psychology* 13, 39-101. Hillsdale, NJ: Erlbaum
- Briggs-Gowan, M. J., Carter, A. S. & Schwab-Stone, M. (1996). Discrepancies among mother, child, and teacher reports: Examining the contributions of maternal depression and anxiety. *Journal of Abnormal Child Psychology*, 24, (6).
- Campbell, S. B., (1998). Developmental Perspectives. In Ollendick and Hersen (Eds.), *Handbook of Child Psychopathology*, 3rd edition, (pp.213-237). Plenum Press, New York.
- Campbell, S. B. (2002). *Behavior problems in preschool children: Clinical and developmental issues*, 2nd edition. New York: Guilford Press. Retrieved January 1<sup>st</sup>, 2005 from [www.cognitivetherapynyc.com/pdf/campbell.pdf](http://www.cognitivetherapynyc.com/pdf/campbell.pdf)
- Campbell, S. B. & Ewing, L. J. (1990). Follow-up Hard-to-Manage preschoolers: Adjustment at age 9 and predictors of continuing symptoms. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 31, (6), 871-890.
- Campbell, S. B., Shaw, D. S., & Gilliom, M. (2000). Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology*, 12, 467-488. Retrieved November 4, 2003 from [http://www.pitt.edu/~momchild/publications/peer-review/early\\_externalizing\\_behavior.htm](http://www.pitt.edu/~momchild/publications/peer-review/early_externalizing_behavior.htm)
- Carroll, J. D. & Chang, J-J. (1982). Analysis of individual differences in multidimensional scaling via an N-way generalization of Eckart-Young decomposition. In P. M. Davies & A. P. M. Coxon (Eds.), *Key texts in Multidimensional scaling*, (pp.229-252). London: Heinemann Educational Books. (Reprinted from *Psychometrika*, 35, (1970), 283-319.)

- Carroll, J. D. & Wish, M. (1975). Multidimensional scaling: Models, methods, and relations to delphi. In Harold Linstone and Murray Turoff (Eds.) (2002) *The Delphi Method: Techniques and Applications*. Retrieved January 4 2004, from <http://www.is.njit.edu/pubs/delphibook/>
- Carter, A. S. (2003 October). The Infant-Toddler Social and Emotional Assessment: factor structure, reliability, and validity – ITSEA. *Journal of Abnormal Child Psychology*, 2003. Retrieved November 4, 2004, from [http://www.findarticles.com/p/articles/mi\\_m0902/is\\_5\\_31/ai\\_109082160/print](http://www.findarticles.com/p/articles/mi_m0902/is_5_31/ai_109082160/print)
- Caspi, A. (2000). The child is the father of the man. *Journal of Personality and Social Psychology*, 78, (1), 158-172.
- Caspi, A., Block, J., Block, J. H., Klop, B., Lynam, D., Moffitt, T. E. & Stouthamer-Loeber, M. (1992). A “Common-Language” version of the California Child Q-Set for personality assessment. *Psychological Assessment*, 4, (4), 512-523.
- Caspi, A., Harrington, H., Milne, B., Arnell, J.W., Theodore, R. F.& Moffitt, T. E. (2003). Children’s behavioral styles at age 3 are linked to their adult personality traits at age 26. *Journal of Personality*, 71, (4), 495-514.
- Caspi, A & Silva, P. A. (1995). Temperamental qualities at age 3 predict personality traits in young adulthood: Longitudinal evidence from a birth cohort. *Child Development*, 66, 486-498. Retrieved January 10 2005 from EBSCO database.
- Coie, J. & Dodge, K. A. (1998). Aggression and Antisocial Behavior. In N. Eisenberg (Ed) *Handbook of Child Psychology*, Vol. 3, 5th Ed, pp.779-862. Wiley & Sons.
- Colin, V. L. (1996). *Human Attachment*. NY: McGraw-Hill.
- Connor, D. F. (2002). *Aggression and Antisocial Behavior in Children and Adolescents: Research and Treatment*, New York: Guilford Press.

- Coxon, A. P. M. (1982). The mapping of family composition preferences: a scaling analysis. In M. Davies & A. P. M. Coxon (Eds.), *Key texts in Multidimensional scaling*. (pp.163-180). London: Heinemann Educational Books. (Reprinted from *Social Science Research*, 3, 191-210.)
- Coxon, A. P. M. (1982). *The User's Guide to Multidimensional Scaling*. Heinemann Educational Books: London
- Coxon, A. P. M., (1999). *Sorting Data: Collection and Analysis*. Sage University Papers Series on Quantitative Applications in the Social sciences, 07-127. Thousand Oaks, CA: Sage.
- Coxon, A. P. M. & Jones, C. L. (1983). "Multidimensional Scaling," in McKay, Schofield, & Whiteley (eds.), *Data Analysis and the Social Sciences*. Pinter.
- Cummings, E. M., Iannotti, R. J. & Zahn-Waxler, C. (1989). Aggression between peers in early childhood: individual continuity and developmental change. *Child Development*, 60, 887-895.
- Doll, B. (1998). Reviews of the Child Behavior Checklist. In O. K. Buros & L. L. Murphy (Eds.), *Thirteenth mental measurements yearbook*. (pp.217-220), Lincoln, NE: Buros Institute.
- Drotar, D., Stein, R. E. K. & Perrin, E.C. (1995). Methodological issues in using the Child Behavior Checklist and its related instruments in clinical child psychology research. *Journal of Clinical Child Psychology*, 24, (2), 184-192.
- Edelbrock, C. & Achenbach, T. M. (1980). A Typology of Child Behavior Patterns: Distribution and Correlates for Disturbed Children Aged 6-16. *Journal of Abnormal Child Psychology*, 8, (4), 441-470.
- Eley, T. C., Lichtenstein, P. & Stevenson, J. (1999). Sex differences in the etiology of aggressive and non-aggressive antisocial behavior: Results from two twin studies. *Child Development*, 70, 155-168.

- Erikson, E. (1977). *Childhood and Society*, Frogmore, St Albans, Herts: Triad/Paladin.
- Forgas, J. P. (1982). Multidimensional scaling: a discovery method in social psychology. In M. Davies & A. P. M. Coxon (Eds.), *Key texts in Multidimensional scaling*. (pp.144-162). London: Heinemann Educational Books.
- Frick, P. J., Lilienfeld, S. O., Ellis, M., Loney, B. & Silverthorn, P. (1999). The association between anxiety and psychopathy dimensions in children. *Journal of Abnormal Child Psychology*, 27, (5), 383-392.
- Frick, P.J. (1998). Conduct Disorders. In Ollendick and Hersen (Eds.), *Handbook of Child Psychopathology*, 3<sup>rd</sup> edition, p.213-237. Plenum Press, New York.
- Furlong, M. J., & Wood, M. (1998). Reviews of the Child Behavior Checklist. In O.K. Buros L.L. Murphy, Ed.), *Thirteenth mental measurements yearbook*. p.220-224, Lincoln, NE: Buros Institute.
- Gould, M. S., Bird, H. & Jaramillo, B. S. (1993, June). Correspondence between statistically derived behavior problem syndromes and child psychiatric diagnoses in a community sample. *Journal of Abnormal Child Psychology*, 21 (31) p287 +(27) Retrieved February 3, 2004, from Expanded Academic database.
- Granic, I & Hollenstein T. (2003). Dynamic systems methods for models of developmental psychopathology. *Development and Psychopathology*, 15, 641-669.
- Granic, I. & Lamey, A.V., (2002). Combining dynamic systems and multivariate analyses to compare the mother-child interactions of externalizing subtypes. *Journal of Abnormal Child Psychology*, 30, (3), 265-283.

- Greenberg, M.T. (1999). Attachment and Psychopathology in Childhood, *Handbook of Attachment, Theory, Research and Clinical Applications*, New York: Guilford Press.
- Hartman, C. A., Hox, J. Auerbach, J., Erol, N., Fonseca, A. C., Mellenbergh, G. J., Novik, T. S., Oosterlaan, J., Roussos A. C., Shalev, R. S., Zilber, N. & Sergeant, J. A. (1999). Syndrome dimensions of the child behavior checklist and the teacher report form: a critical empirical evaluation. *Journal of Child Psychology and Psychiatry*, 40, (7), 1095-1116.
- Heubeck, B. G., (2000). Cross-cultural generalizability of CBCL syndromes across three continents: From the USA and Holland to Australia, *Journal of Abnormal Child Psychology*, 28, (5), 439-451.
- Hinde, R. A. (1985). Categories of behavior and the ontogeny of aggression. *Aggressive Behavior*, 11, 333-335.
- Howe, D. (1995). *Attachment theory for social work practice*. Macmillan Press: London.
- Hudziak, J. J., van Beijstreveldt, C. E. M., Bartels, M., Rietveld, M. J. H., Rettew, D. C., Derks, E. M. & Boomsma, D. I. (2003). Individual differences in aggression: Genetic analyses by age, gender and informant in 3-, 7-, and 10-year-old Dutch twins. *Behavior Genetics* 33, (5), 575-589.
- Huey, S. J. Jr., & Weisz, J. R. (1997). Ego Control, Ego Resiliency, and the Five-Factor Model as predictors of behavioral and emotional problems in clinic-referred children and adolescents. *Journal of Abnormal Psychology*, 106, (3), 404-415.
- Jensen, P. S., Watanabe, H. K., Richters, J. E., Roper, M., Hibbs, E. D., Salzberg, A. D. & Liu, S. (1996). Scales, diagnosis, and child psychopathology: II. Comparing the CBCL and the DISC against external validators. *Journal of Abnormal Child Psychology*, 24, (2), 151-168.

- John, O .P., Caspi, A., Robins, R. W., Moffitt, T. E. & Stouthamer-Loeber, M. (1994). The "Little Five": Exploring the nomological network of the Five-Factor Model of Personality in adolescent boys. *Child Development*, 65, 160-178.
- Keiley, M. K., Lofthouse, N., Bates, J. E., Dodge, K. A. & Pettit, G. S. (2003, June). Differential risk of covarying and pure components in mother and teacher reports of externalizing and internalizing behavior across ages 5 to 14. *Journal of Abnormal Child Psychology*, Retrieved January 23, 2004, from [http://www.findarticles.com/p/articles/mi\\_m0902/is\\_3\\_31/ai\\_101611941](http://www.findarticles.com/p/articles/mi_m0902/is_3_31/ai_101611941)
- Kirkland, J., Bimler, D., Drawneek, A., McKim, M. & Scholmerich, A. (2001). A quantum leap in the analyses and interpretation of attachment sort items. In B. Vaughn, E. Waters, G. Posada, and D. Teti (Eds). *Patterns of Secure Base Behavior: Q-sort Perspectives on Attachment and Caregiving in Infancy and Childhood*. (pp.42-65) Lawrence Erlbaum.
- Kirkland, J., Bimler, D., Drawneek, A., McKim, M. & Schoelmerich, A. (2004). An alternative approach for the analyses and interpretation of attachment sort items. *Early Child Development and Care*, 174, (7-8), 701-719. Retrieved March 1st, 2005 from <http://taylorandfrancis.metapress.com/openurl.asp?genre=article&id=doi:10.1080/0300443042000187185>
- Koot, H. M., Edwin, J. C. G., Van Den Oord, E J. C. G., Verhulst, F. C. & Boomsma, D. J. (1997). Behavioral and emotional problems in young preschoolers: cross-cultural testing of the validity of the child behavior checklist/2-3. *Journal of Abnormal Child Psychology*, 25, (3), 183-196.
- Kruskal, J. B. (1982). Multidimensional scaling by optimizing goodness-of-fit to a non-metric hypothesis. M. Davies & A. P. M. Coxon (Eds.), *Key texts in Multidimensional scaling*, London: Heinemann Educational Books. (pp. 59-83) (Reprinted, from *Psychmetrika*, 29, (1964a), pp.1-27)



- Kruskal, J. B. (1982). Non-metric multidimensional scaling: a numerical method.. In M. Davies & A. P. M. Coxon (Eds.), *Key texts in Multidimensional scaling*, (pp.84-97) London: Heinemann Educational Books. (Reprinted from *Psychometrika*, 29, (1964b), pp. 115-129.)
- Laursen, B., Adams, R. & Pulkkinen, L. (2002). The antecedents and correlates of agreeableness in adulthood. *Developmental Psychology*, 38, (4), 591-603.
- Lengua, L. J. & Sadowski, C. A. (2001). Assessing the child psychopathology beast: a reply to Achenbach and Dumenci's (2001) Commentary. *Journal of Consulting and Clinical Psychology*, 69, (4), 703-705.
- Lengua, L. J., Sadowski, C. A., Friedrich, W. N. & Fisher, J. (2001). Rationally and empirically derived dimensions of children's symptomatology: Ratings and confirmatory factor analyses of the CBCL. *Journal of Consulting and Clinical Psychology*, 69, (4), 683-698.
- Loeber, R. & Hay, D. (1997). Key issues in the development of aggression and violence from childhood to early adulthood. *Annual Review of Psychology*, 48, 371-411.
- Lutz, M. N., Fantuzzo, J. & McDermott, P. (2002). Multidimensional assessment of emotional and behavioral adjustment problems of low-income preschool children: development and initial validation. *Early Childhood Research Quarterly*, 17, (3), 338-355.
- Lyons-Ruth, K. (1996). Attachment relationships among children with Aggressive behavior problems: the role of disorganized early attachment patterns. *Journal of Consulting and Clinical Psychology* 64, (1), 64-73.
- Macmann, G. M. & Barnett, D. W. (1993). The Child Behavior Checklist/4-18 and related materials: Reliability and validity of syndromal assessment. *School Psychology Review*, 22, (2). Retrieved 23 January, 2005 from EBSCO database.

- Marshall, K., Bimler, D. & Kirkland, J. (2002). Postnatal Depression: Mapping the territory and revealing styles. *The Canadian Journal of Infancy and Early Childhood*, 9, (2), 79-90.
- Meadows, S. (1986). *Understanding Child Development: Psychological perspectives in an interdisciplinary field of inquiry*. London: Unwin Hyman.
- Moffitt, T. E. (1993). Adolescent-limited and life-course-persistent antisocial behavior: a developmental taxonomy. *Psychological Review*, 100, (4), 674-701.
- Napier, D. (1972). Nonmetric Multidimensional Techniques for Summated Ratings. In Shepard, R. N., Romney, A.K. & Nerlove, S.B. (Eds.) *Multidimensional Scaling: Theory and Applications in the Behavioral Sciences*. (pp.157-178) New York & London: Seminar Press.
- Osgood, C. E. (1971). Explorations in semantic space: A personal diary. *Journal of Social Issues*, 27,(4), 5-64.
- Owens, E. B. & Shaw, D. S. (2003). Predicting growth curves of externalizing behavior across the preschool years. *Journal of Abnormal Psychology*, 31, (6), 575-590.
- Ozer, D. J. & Gjerde, P. F. (1989). Patterns of personality consistency and change from childhood through adolescence. *Journal of Personality*, 57, (2), 483-507.
- Patterson, G. J. (2002). The Early Development of Coercive Family Process. In Reid, J. B., Patterson, G. R. & Snyder J. (Eds.) *Antisocial Behavior in Children and Adolescents: A developmental Analysis and Model for Intervention*, Washington: APA
- Prior, M. (1992). Development of temperament. In P. C. Heaven, (Ed.), *Life span development* (pp.94-118), Sydney: Harcourt Brace Jovanovich.
- Rothbart, M. K. & Bates, J. E. (1998). Temperament. In W. Damon & N. Eisenberg (Eds.), *Handbook of Child Psychology: 5th Ed.*, (pp.105-176 ). Wiley & Sons.

- Rothbart, M. K., & Putnam, S. P. (2002). Temperament and socialization. In L. Pulkkinen & Avshalom Caspi (Eds.), *Paths to Successful Development*. (pp.19-45). Cambridge: Cambridge University Press.
- Rothbaum, F. & Weisz, J. R. (1994). Parental caregiving and child externalizing behavior in nonclinical samples: a meta-analysis. *Psychological Bulletin*, 116, (1) 55-74.
- Rubin, K. H., Hastings, P., Chen, X. Stewart, S. & McNichol, K. (1998). Interpersonal and maternal correlates of aggression, conflict, and externalizing problems in toddlers. *Child Development*, 69, 1614-1629.
- Shaw, D.S. (2003a). Commentary on papers regarding "aggression as an outcome of early childhood development". In Tremblay R. E, Barr, R. G, Peters, R. De V., [Eds.] *Encyclopedia on Early Childhood Development* [online] Montreal, Quebec; Center of Excellence for Early Childhood Development; 2003: 1-5. Retrieved July 2003 from <http://www.excellence-jeunesenfants.ca/documents/ShawANGxp.pdf>.
- Shaw, D.S. (2003b). Innovative approaches and methods to the study of children's' conduct problems. *Social Development Issues*, 12, (3), 309-313.
- Shaw D. S., & Bell, R. Q. (1993). Developmental theories of parental contributors to antisocial behavior. *Journal of Abnormal Child Psychology*, 21, (5), 493-519. Retrieved November 4, 2003 from INFOTRAC database.
- Shaw, D. S, Bell, R. Q. & Gilliom, M. (2000). A truly early starter model of antisocial behavior revisited. *Clinical Child and Family Psychology Review*, 3, (3), 155-172.
- Shaw, D. S., Gilliom, M. & Giovanelli, J. (2000). Aggressive behavior disorders. In Charles H. Zeanak, Jn., (Ed.), *Handbook of Infant Mental Health* (2nd ed). (pp.397-411). New York: Guilford Press.

- Shaw, D. S., Gilliom, M., Ingoldsby, E. M. & Nagin, D. S. (2003). Trajectories leading to school-age conduct problems. *Developmental Psychology*, 39, (2), 189-200.
- Shaw, D. S. & Winslow, E. B. (1997). Precursors and correlates of antisocial behavior from infancy to preschool. In David M. Stoff, James Breiling and Jack D. Maser (Eds.), *Handbook of Antisocial Behavior*, (pp.148-158). New York: Wiley
- Shaw, D. S., Winslow, E. B., Owens, E. B., Vondra, J. I., Cohn J. F. & Bell, R. Q. (1998). The development of early externalizing problems among children from low-income families: A transformational perspective. *Journal of Abnormal Child Psychology*, 26, (2), 98-107.
- Shepard, R.N. (1982). Representation of structure in similarity data: Problems and prospects. In M. Davies & A. P. M. Coxon (Eds.), *Key texts in Multidimensional scaling*, London: Heinemann Educational Books. (Reprinted from *Psychometrika*, 39, (1974), 373-422.)
- Shields, A. & Cicchetti, D. (1997). Emotion regulation among school-age children: The development and validation of a new criterion Q-sort scale. *Developmental Psychology*, 33, (6), 906-916.
- Shiner, R & Caspi, A. (2003). Personality differences in childhood and adolescence: measurement, development, and consequences. *Journal of Child Psychology and Psychiatry*, 44, (1), 2-32.
- Smith, C. L., Calkins, S. D., Keane, S. P., Anastopoulos, A. D. & Shelton, T. L. (2004). Predicting stability and change in toddler behavior problems: contributions of maternal behavior and child gender. *Developmental Psychology*, 40, (1), 29-42.
- Tedeschi, J. T. & Quigley, B. M. (1996). Limitations of laboratory paradigms for studying aggression. *Aggression and Violent Behavior*, 1, (2), 163-177.

- Tremblay, R. E. (1995). Kindergarden behavioral patterns, parental practices, and early adolescent antisocial behavior. In J. McCord (Ed.), *Coercion and punishment in long-term perspectives* (pp.139-153). New York: Cambridge University Press.
- Tremblay, R. E. (2002). Aggression, prosocial behaviour, and gender: Three magic words but no magic wand. In L. Pulkkinen & Avshalom Caspi (Eds.), *Paths to Successful Development*. (pp. 71-78). Cambridge: Cambridge University Press.
- van Aken, M. A. G., van Lieshout, C. F. M., Scholte, R. H. J & Haselager, G. J. T. (2001). Personality types in childhood and adolescence: Main effects and person-relationship transactions. In Lea Pulkkinen and Avshalom Caspi (Eds.) *Paths to successful development: Personality in the life course* (pp.129-156). New York: Cambridge University Press.
- Vaughn, B. E., Vollenweider, M., Bost, K. K., Azria-Evans, M. R. & Snider, J. B. (2003). Negative interactions and social competence for preschool children in two samples: Reconsidering the interpretation of aggressive behavior for young children. *Merrill-Palmer Quarterly*, 49, (3), 245-278.
- Walker, L. S., Garber, J. & Van Slyke, D. A. (1995). Do parents excuse the misbehaviour of children with physical or emotional symptoms? An investigation of the pediatric sick role. *Journal of Pediatric Psychology*, 20, (3), 329-345.
- Waters, E. & Deane, K. (1985). Defining and assessing individual differences in attachment relationships: Q-methodology and the organization of behavior in infancy and early childhood. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research* (pp.41-65). Chicago: *Monographs for the Society for Research in Child Development*, 50, 1-2, serial no.209)
- Waters, E. (1997). Attachment behavior Q-set (Version 3.0) adviser. Retrieved 2001 from <http://www.psy.sunysb.edu/ewaters/aqs.htm>.

- Weisz, J. R., Weiss, B., Suwanlert, S. & Chaiyasit, W. (2003). Syndromal structure of psychopathology in children of Thailand and the United States. *Journal of Consulting and Clinical Psychology*, 71, (2), 375-385.
- Weller E. B., Rowan A., Elia J., & Weller R. A. (1999). Aggressive behavior in patients with Attention-Deficit/Hyperactivity Disorder, Conduct Disorder, and Pervasive Developmental Disorders. *Journal of Clinical Psychiatry*, 60, [suppl 15], 5-11.
- Weller, S. C. & Romney, A.K. (1988). *Systematic Data Collection*. Newbury Park, Cal.: SAGE.
- Willoughby, M., Kupersmidt, J. & Bryant, D. (2001). Overt and covert dimensions of antisocial behavior in early childhood. *Journal of Abnormal Child Psychology*, 29, (3), 177+. Retrieved April 4, 2003, from INFOTRAC database.
- Wright J. C, Zakriski A. L, Drinkwater M. (1999). Developmental psychopathology and the reciprocal patterning of behavior and environment. *Journal of Consulting and Clinical Psychology* 1999, 67, 95-107.
- Wright, J. C. & Zakriski, A. L. (2003). When syndromal similarity obscures functional dissimilarity: Distinctive Evoked environments of externalizing and mixed syndrome boys. *Journal of Consulting and Clinical Psychology*, 71, (3), 516-527.
- Zakriski, A.L. & Wright, J.C. (n.d.). Standardized checklists obscure contextual determinants of child behavior. *Psychological Assessment*, Retrieved August 16, 2004 from <http://www.childresearch.net/CYBRARY/NEWS/9911.HTML>