ANOTHER PIECE FOR THE PUZZLE: PSYCHOPHYSIOLOGICAL INDICATORS OF THE ABSENCE OF EMPATHIC RESPONDING IN FACTOR I PSYCHOPATHY

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ABSTRACT

Antisocial behaviour has increasingly been identified as a problem in today's Western societies. One of the crucial issues is the question of identification, prevention and/or treatment. There is much debate among social scientists from different theoretical perspectives whether antisocial behaviours are a product of environmental influences or of biological predispositions. This study was lead by the assumption that there is a distinct group of antisocial individuals with a biological dimension (psychopathy Factor I), who can be distinguished early in life from merely delinquent individuals. As the research literature indicates, lack of empathy seems to be a prominent marker distinguishing psychopathic reactions from other antisocial behaviours. The overall aim of this research was to investigate whether psychophysiological indicators are powerful enough in detecting the absence of empathic responding in psychopathy Factor I. The main research questions explored were: whether empathy and psychopathy Factor I are inversely related to each other; whether it would be possible to discriminate empathic (i.e., empathy-analogues) from non-empathic children (i.e., psychopathy-analogues); and finally, whether psychophysiological measures (heart rate and skin conductance) would prove to be useful assessment tools for this task. Fifty boys, aged five years, from 22 different schools, participated in this study. They were pre-selected by their teachers to fit either into a group of 'non-empathic/difficulties with social behaviours', or a second group 'highly empathic' (via pre-screening checklist). The children's group membership remained unknown to the researcher. Each boy was tested twice. The first session (Phase A) involved the administration of test batteries using potential measures of dispositional empathy and psychopathy, whereas the second session (Phase B) included the ambulatory measurement of the children's heart rate and skin conductance, while they were watching several empathy-inducing film segments. The results of Phase A identified the most consistent empathy and psychopathy (Factor I) questionnaire measures, and further revealed that these instruments were strongly negatively correlated with each other. This seemed to indicate that the construct of affective empathy is indeed inversely related to psychopathy Factor I. The results of Phase B revealed that it was possible to develop a classification system which would distinguish two groups of children, based on their psychophysiological data related to empathic/non-empathic responding. Following

the lead of the research literature, resting heart rate level was used as the initial criterion for grouping. This first classification was then further developed and modified using other psychophysiological variables as criteria, such as heart rate reactivity, heart rate variability, and skin conductance responses, as grouping variables for clustering and discriminant analysis procedures. As expected, the results seemed to conform to the theories regarding empathic/non-empathic responding in children, and thus appeared to confirm that the two groups originated from two different populations. The final classification system, based on an aggregate of these psychophysiological data, was then further verified by mapping it onto the questionnaire data from Phase A. This analysis revealed that the final classification system matched to a reliable degree the children's questionnaire scores. These results might open the possibility that individual profiles for at risk children could be developed, based on psychophysiological indicators. Psychophysiological measures appear to be reliable, are not intrusive, and most importantly, are independent from rater-bias and demand characteristics. They can be particularly important for research with very young children, who do not yet possess elaborate language skills and frequently lack insight into their own emotional responses. Thus, it has been found that psychophysiological indicators may be able to contribute an additional piece to the multimodal assessment of children 'at risk', and it also means that early detection and prevention of psychopathy might be a step closer.

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DEDICATION

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Not everything that can be counted counts,

and not everything that counts can be counted.

(Albert Einstein)

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

FOREWORD

A child's life is like a piece of paper on which every person leaves a mark.
(Chinese proverb)

I would like to add that it is not a blank piece of paper - Nature has already left her mark.

Many different approaches have been used to research human development and there is an increasing acceptance of the view that variability in development is as much due to environmental as to genetic influences. The synthesis of biological, social and psychological fields of study is emerging to open the possibility of investigation into individual human behaviour from a variety of perspectives. The interactive process between genetic/biological predispositions and environmental/ parenting determinants has an important influence on learning processes and the development of personality. The resulting response style is of course highly individualised, nevertheless it is possible to detect universal patterns. This framework of theories and processes becomes increasingly important for the investigation of psychopathology.

Psychopathology can take many forms and one of the main criteria for its presence is the degree of impairment in an individual's daily functioning. This becomes compounded when other individuals or society as a whole are affected by the person's maladaptive functioning. Most prominently this includes the various forms of antisocial behaviours. The underlying motivation to the current study was the belief that early detection of psychopathology is crucial for the successful implementation of preventative measures.

In preparation for the design and conduct of the experiments the relevant literature was consulted, which is presented in the introduction, grouped into topics related to the investigation of antisocial psychopathology. Firstly, in Chapter 1, in the area of 'children at risk', their identification, and the need or possibility for preventative interventions, have been explored. Secondly, in Chapter 2, psychopathology as it pertains to antisocial behaviour has been studied from various perspectives. It was especially important to distinguish between mere delinquent behaviours and antisocial expressions of an underlying psychopathology. This distinction is

relevant for adults as well as for children and was crucial for the discussion of issues related to classification. The relative contributions of personality, biology, physiology, family, and other environmental influences were discussed in relation to the emerging profile of a psychopathic individual. Thirdly, in Chapter 3, based on the tentative profile of psychopathic traits, it was possible to hypothesise which specific emotions might serve as possible markers for psychopathy. The investigation focussed on empathy in general and the lack of empathic responding in particular.

These different areas of enquiry contributed to the design of the current study. The usefulness of psychophysiological measures was examined, as indicators for the absence of empathic responding in young children, who might be at risk for antisocial attitudes based on their underlying psychopathology. This might be leading one step closer to the ultimate goal of early detection and the subsequent possibility of prevention.

INTRODUCTION

CHAPTER 1

By the time he started school he was used to stealing from his parents and local stores and bullying other children into giving him their candy and toys. Often, he was able to talk his way out of trouble. 'I'd just look them straight in the eye and feed them shit. It was great. I still do it. My mother bought it for a long time.'.....How are we to understand such children? How is society to respond...? (Hare, 1993, p. 162)

1.1. Children 'At Risk'

Variations in social and emotional functioning with the resulting variations in behaviour are already visible in early childhood. Some children are described as optimally adapted when they enter school, others show signs of a problematic development. Behaviour problems in general and externalising, aggressive behaviours specifically have been considered to be especially worrisome as they are seen as predictors for dysfunctions in social interactions that may attain clinical levels. Early aggressiveness is connected with a multitude of social problems and has been considered a major antecedent to future crime (Maxwell & Robertson, 1995; Stattin & Magnusson, 1989; Tuma, 1989).

The mental health problems of children range from diagnosable mental illness to sub-clinical problems and at-risk conditions. Some problems disappear during development, others actually interfere with the child's development. Many environmental and psychosocial risk factors have been identified, such as poverty, minority ethnic/cultural status, parental psychopathology, physical or other maltreatment, teenage parents, premature birth, low birth weight, parental divorce and serious childhood illness. This list is not exhaustive, rather it is a reminder that commonly several risk factors occur together to create a criminogenic environment and to shape and influence a child's cognition, behaviour and personality. Risk factors have complex relations to clinical disorders and ideally they are addressed before they stabilize as predictors of dysfunction (Coie et al., 1993; Kazdin, 1993;

Lorion, Myers, Bartels, & Dennis, 1994). Wakefield (1992) proposed a broad concept of disorder or dysfunction that seems to have found some general acceptance: "...single outcomes follow from multiple pathways and single pathways precede diverse outcomes. The primary focus becomes the functional impairment." (p. 174). Alternatively, the Diagnostic and Statistical Manual of Mental Disorders (4th ed.) lists several categories of the most commonly occurring mental health problems of children, as they conform to the much narrower framework established by the American Psychiatric Association (1994), such as: Mental Retardation, Learning Disorder, Autistic Disorder, Asperger's Disorder, Attention-Deficit/Hyperactivity Disorder, Conduct Disorder, Oppositional Defiant Disorder, Feeding or Eating Disorders, Separation Anxiety Disorder, Reactive Attachment Disorder, Substance-related Disorders, Elimination Disorders. The use of this classification system requires the consistent use of a prescribed symptom checklist, emphasising frequency and severity behaviour over etiology.

Despite these various approaches to the definition of risk and dysfunction most mental health professionals agree that early preventative intervention can make a significant contribution to the health of the individual child and of society as a whole. The ability to detect irregular and maladaptive response patterns at early stages would include the promise for early treatment and the prevention of more serious manifestations (Dishion & Andrews, 1995; Kazdin, 1993; Mealey, 1995b; Offord, 1989; Offord, 1996). Antisocial behaviour has been one area of dysfunction that has been increasingly in the media spotlight. Antisocial behaviour of children and adolescents has been identified as a serious social and clinical problem that is of vital concern. Thus, a major focus of preventative efforts has been placed on antisocial behaviour in general terms; ranging from obnoxious or oppositional behaviour to criminally offensive acts (Tolan, Kendall, & Guerra, 1995).

1.2. Call for Prevention

The goal of prevention is to mitigate or eliminate the causes of disorder and thus the emphasis is primarily on the systematic study of potential precursors of dysfunction, called risk factors and protective factors (Coie et al., 1993). Risk factors are indicative of high probability of onset, greater severity and longer duration,

whereas protective factors interact with those risks to buffer their effects. Prevention needs to address the complex interactions among genetic, biomedical, and psychosocial risk and protective factors. The emerging evidence in the last two decades has supported the effectiveness of preventative interventions especially for youth (Lorion et al., 1994). The focus today is on 'how?', rather than 'whether' or 'why?'. The interventions can be roughly grouped into: primary prevention, which targets populations at risk and aims at reducing the incidence of the disorder; secondary prevention, which targets identified individuals at a preclinical state to decrease prevalence and severity; and tertiary prevention, which targets individuals with confirmed dysfunction to minimize the long-term consequences of the condition. The preventative efforts are not only grouped into different stages, they are also delivered by different services, ranging from conventional therapies to educational systems or juvenile justice systems. According to General Systems Theory, human behaviour develops within a context of family, school, peers, work, and biological predisposition, and prevention attempts have to rely on collaboration of interdisciplinary teams to achieve the set goals (Coie et al., 1993). Unfortunately, the children are not always diagnosed and there is a lack of communication between the providers of these services (Tuma, 1989). There is the added difficulty that "...individuals are unaware of their risk status and do not understand why they (or their children) need to participate in an intervention, nor how they would benefit" (Lorion et al., 1994, p.130). This ethical question of consent needs to be considered and addressed in the context of advocating early detection and prevention, especially as outcome research has indicated that various interventions are successful and that the prevention services do work. However, Tuma (1989) reminds us that we do not yet have all the answers that would show exactly the best way to identify and treat the child in need; rather we need more research to answer the questions.

To emphasise again, the area of antisocial, conduct-disordered behaviour of children is of specific interest for preventative efforts (Lochman & Conduct Problems Prevention Research Group, 1995). Conduct-disordered behaviour is described to include a chronic, highly stable pattern of psychopathology, that involves progressive accumulation of problem behaviours and eventually leads to the diagnosis Conduct Disorder. The risk markers are not seen as causes, rather as indicators, which can be identified during screening procedures.

There are many theoretical approaches that lead to the same conclusion: early prevention that reduces one variable within the context will probably also reduce others (e.g., delinquency, drugs, drink driving, family violence, school failure), (Farrington, 1995). There is also empirical evidence that ignoring early signs of psychopathology displayed by 'at risk' children often leads to the classification of Conduct Disorder, and later Antisocial Personality Disorder. Identification appears to be the first step towards possibly avoiding negative outcomes - for the benefit of the individual and of society as a whole.

Based on the review of relevant literature it has been possible to establish the importance of the early identification of antisocial traits in young children. The next step requires a clear definition of the various labels that have been used to describe antisocial individuals, such as delinquent, psychopath, or antisocial personality. In addition it was important to consider the respective contributions of genetics, biology, environment, and upbringing to the etiology of antisocial thinking and behaviour.

CHAPTER 2

Despite a wealth of published research on psychopathy,..clinicians and authors continue to confuse sociopathy, antisocial personality disorder (ASPD) and psychopathy - inappropriately viewing them as synonymous ....Although most criminal psychopaths meet criteria for ASPD, the majority of ASPD patients are not psychopaths (Gacono, 2000, p. 406)

2.1. 'Delinquency' or 'Psychopathy' and Antisocial Children

Delinquency is often used as a marker to justify the label 'psychopath'. Similarly, when the individual is not yet 18 years of age, antisocial, criminal acts are considered to be proof of Conduct Disorder (CD). This confusion has its origins in the fact that observable behaviours, such as delinquency and aggression, are equated with the underlying personality structure. Thus it is important to emphasise that CD in children and psychopathy in adults are multidimensional constructs, that require the distinction between states and multiple interacting traits. Frick, Barry and Bodin (2000) point out that the callous and unemotional dimension of psychopathy does not seem to be captured well by the traditional definitions of antisocial behaviour, such as the DSM-IV definitions. There is enough research evidence to allow the concept of psychopathy to be extended from adults to adolescents, thus it is possible and important to differentiate between psychopathic youth and other aggressive youth (Forth & Maillox, 2000).

In children there is a distinction between Oppositional Defiant Disorder (ODD), which is defined by hostile, argumentative, defiant and angry behaviours, and Conduct Disorder (CD) which includes the more serious aggressive and antisocial behaviours that involve violating the rights of others or of societal norms. Some researchers have proposed that CD and ODD are more or less severe forms of the same disorder (Dunn, Lochman, & Colder, 1997; Fricket al., 1992).

In New Zealand around 60 children are suspended from school each day, mostly for violence and non-compliance (Macfie, 1999). In the United States CD has been described as the most common reason for referrals to mental health professionals and the prevalence is estimated at about 6% to 16% for males (2% -

9% for females), (American Psychiatric Association, 1994). Aggression and criminal conduct are part of the general concept of 'antisocial behaviours' displayed by children, and they are increasingly concerning: e.g., police in Hamilton, NZ (population ca. 100.000) are dealing with about 50 cases of serious crime per week, committed by children under 12 years. "By the time they reach nine, the attitudes are so ingrained that it's almost impossible to fix by then" (Hawkes, 2001, p. 1).

Some of the early symptoms of CD, as reported by mothers, were stubbornness and tantrums, leading to oppositional behaviours, leading to stealing and fire setting, and finally to truancy, vandalism and substance abuse (Robins, 1991). Bullying behaviour is another early expression of future difficulties and studies found that about 60% of school bullies had criminal convictions by the age of 24 (Olweus, 1993). A few factors correlated with CD have been collated, such as: male gender, low IQ, difficult temperament, failure to make strong attachment, school failure, a family background of criminal and/or alcoholic parents who use erratic and severe discipline, large families, impulsivity, a failure to inhibit behaviours, and early aggressiveness (Robins, 1991; Stattin & Magnusson, 1989; Tremblay et al., 1992).

It is possible to differentiate overt antisocial behaviour, such as arguing, temper tantrums, fighting, and direct physical or verbal aggression, from covert antisocial behaviours, such as stealing, truancy, fire setting and indirect aggression (i.e., social manipulation) (Kaukiainen et al., 1999; Loeber & Schmaling, 1985). Children who are cruel to animals may represent another subgroup of CD, which has a poor prognosis and links to adult psychopathy (Luk, Staiger, Wong, & Mathai, 1999). Outcome studies confirmed the connection between childhood conduct problems and adult criminality and/or mental disorders (for example, Kratzer, & Hodgins, 1997; Lynam, 1996).

In the attempt to clarify antisocial behaviour, researchers have often stressed the importance of developmental conditions (Patterson, DeBaryshe, & Ramsey, 1989). Ineffective parenting practices were seen as prime determinants for childhood conduct disorders. These lead to academic failure, peer rejection and to involvement in deviant peer groups, which are precursors for delinquent behaviours. This perspective investigates mainly the environmental conditions and family demographics/stressors (Vaden-Kiernan, Ialongo, Pearson, & Kellam, 1995). A

different approach combines environmental effects with child effects and the focus is on their interaction during development. This perspective avoids the fruitless debate between nature versus nurture proponents and instead suggests the value of a vulnerability-stress model (Cicchetti & Greenberg, 1991; Dodge, 1990).

It becomes apparent that descriptions of behaviour alone are not sufficient to allow for investigations into etiology, presentation and prognosis of CD, ASPD, and psychopathy. Psychopathy is a construct, which can be used to distinguish a clearly defined group of individuals, in childhood and adulthood, irrespective of delinquency (Forth & Maillox, 2000). Frick, O'Brien, Wootton, and McBurnett (1994) added that the study of childhood precursors has mainly focussed on severity and types of behaviour and has ignored psychological dimensions, which are more specific to the construct. According to Hare (1996b) psychopathy is a "socially devastating disorder defined by a constellation of affective, interpersonal and behavioral characteristics, including egocentricity; impulsivity; irresponsibility; shallow emotions; lack of empathy, guilt, or remorse; pathological lying; manipulativeness; and the persistent violation of social norms and expectations" (p. 38).

There has been reluctance in applying the concept of psychopathy to children, because of the negative connotations in terms of prognosis and treatment; although this might be preferable to the common confusion of considering CD to be a childhood manifestation of psychopathy. CD is a heterogenous construct, based on overt behaviours and only a small subset of children fits the psychopathic criteria. Callous and unemotional traits (such as shallow emotions and lack of empathy or guilt) have been used by Frick et al. (2000) to divide children within the childhood-onset category of CD into two distinct subgroups: callous and unemotional on the one hand, and 'poor impulse control - conduct problems', which is analogous to delinquent behaviours, on the other (Wootton, Frick, Shelton, & Silverthorn, 1997). Christian, Frick, Hill, Tyler, and Frazer (1997) confirmed the importance of callous and unemotional traits, by reporting that these traits define a unique subgroup of antisocial children with a severe pattern of antisocial behaviour, who correspond closely to adult conceptualisations of psychopathy.

The review of relevant literature, in search for the definition of psychopathy, has demonstrated that there is confusion between behaviour-based (i.e.,

delinquency) and personality-based (i.e., psychopathy) approaches. This is true for the childhood as well as the adult area. The DSM-IV classification is based on overt behaviours and therefore is not well suited to capture the psychopathic, callous and unemotional individual. Various authors have proposed different descriptions and classification systems. For example in 1801 Pinel described individuals who displayed 'manie sans délire', in 1835 Prichard called the same condition 'moral insanity' (Pinel, cited in Hare, 1993; Pritchard, cited in Hare, 1993) and Cleckley added his own description in the 'Mask of Sanity' (Cleckley, 1955). These definitions have in common that they are combining deviant personality traits with antisocial behaviours to arrive at the description of a psychopathic individual. This is in contrast to the previously described approach proposed by the DSM-IV, which uses the label Antisocial Personality Disorder and neglects the concepts of traits and personality, in favour of clearly identifiable behaviours and criminal conduct (Sutker, Bugg, & West, 1993).

Only about 1% of the general adult population (5% of adolescents) belong to a subgroup of ASPD who make up about 15%-25% of the prison population and commit about 50%-60% of all crimes (Hare, 1996a; Hare, 1996b; Henry, Caspi, Moffit, & Silva, 1996; Lilienfeld, 1994; Patrick, 1995; Zagon, 1995). The criteria of the DSM for ASPD have changed several times during the revisions of the manual and Widiger et al. (1996) described the process of a field trial, where the current criteria were tested against a new diagnostic instrument, the Psychopathy Checklist, developed by Hare (1991).

This checklist has since been revised and has attained high reliability and validity (Bodholdt, Richards, & Gacono, 2000). The 20 items represent two separate factors or traits, that can be compared to the previously mentioned factors in CD (i.e., callous and unemotional versus impulsivity and conduct problems). Factor I items indicate an underlying personality dimension that is similar to Cleckley's understanding of psychopathy: glibness, superficial charm, grandiose sense of self-worth, pathological lying, conning, manipulation, lack of remorse or guilt, shallow affect, callousness, lack of empathy, failure to accept responsibility for own actions. Factor II items load on the deviant behavioural dimension, which is similar to aspects of the DSM-IV definition: need for stimulation, proneness to boredom, parasitic lifestyle, poor behavioural controls, early behavioural problems, lack of

realistic long-term goals, impulsivity, irresponsibility, juvenile delinquency (Hart & Hare, 1996a). Factor I scores were associated with the less frequent and more serious instrumental/predatory violence as opposed to the reactive/impulsive violence of Factor II (Henry et al., 1996; Livesley, 1998).

This two-factor structure was replicated by Frick and Hare (1994) in their adapted checklist for children. The callous/unemotional dimension corresponds to Factor I, and the impulsivity/conduct problems dimension corresponds to Factor II. Due to the development of this checklist and other methods it was possible to divide children with CD into subgroups and to identify the severely disturbed cluster, with many characteristics similar to adults with psychopathy. These children show a preference for thrill- and adventure-seeking, a greater sensitivity to rewards than punishments, and show low behavioural inhibition as well as low fearfulness. There is earlier onset of criminal behaviours, which are more severe, more varied, and more frequent. It is likely that a range of genetic and environmental factors influences the onset, development, and presentation of psychopathy (Lynam, 1996).

In parallel to the described two-factor approach, a longitudinal study undertaken in Dunedin, New Zealand, has differentiated antisocial behaviours into 'life-course persistent' (similar to Factor I) and 'adolescent-limited' (similar to Factor II and ASPD classification), (Moffitt, 1993; Moffitt, Caspi, Dickson, Silva, & Stanton, 1996). Moffitt (1993) suggested that "delinquency conceals 2 distinct categories of individuals, each with a unique natural history and etiology" (p. 695). The study arrived at the conclusion that childhood- and adolescent-onset cases differed in temperament as early as three years of age. This result implies that primary prevention efforts must begin very early in the life of these children and must encompass multiple modalities, such as family, school and the child. The prevalence-rate of 'life-course persistent' antisocial behaviour is estimated at 5% to 10%, whereas the 'adolescent-limited' rate is at least 25%. During the peak prevalence of offending in adolescence, at about 17 years of age, it is difficult to distinguish the two groups, as both engage in antisocial behaviours. However, the detailed analysis reveals the previously reported pattern of increased severity and frequency for the 'life-course persistent' group.

So far, the single best discriminator between 'life-course persistent' and 'adolescent-limited' offenders seems to be the time of onset of antisocial activity

and behavioural difficulties; this is also a strong predictor of the persistence into adult crime. At three years of age undercontrolled temperament is coupled with subtle signs of neuropsychological dysfunctioning, affecting language, memory, and social behaviour. Often co-morbid Attention Deficit Hyperactivity Disorder (ADHD) is present (Lynam, 1996), as well as an adverse family and social context.

The above description of 'life-course persistent' individuals resembles the previous descriptions of psychopathic individuals and has been supported by many researchers (Farrington, 1995a; Loeber & Stouthamer-Loeber, 1998; McGee, Feehan, & Williams, 1995; Raine, Reynolds, Venables, & Mednick, 1997). Similarly, the hypothesis that persistent antisocial behaviour has its origins in an interaction between children's neuropsychological vulnerabilities and criminogenic environments is well accepted and mirrors the previously mentioned diathesis-stress theory advocated by developmental psychologists.

The implications of the dual taxonomy proposed by Moffitt and by Hare for detection, prevention and intervention efforts are obvious. Other scientists like Mealey (1995b), Lilienfeld (1998), or Harris, Marnie, and Quinsey (1994) approached the research in the area of psychopathy from a different angle. They reviewed existing data and theories and explored whether categorical (i.e., a system of distinct classes) or dimensional approaches would be more meaningful for the assessment of psychopathy. According to the dimensional, personality-based conceptualisation, psychopathy is regarded as a constellation of personality traits which can be generalised to non-clinical populations. Mealey (1995b) addressed in her metanalysis most aspects of psychopathy, including presentation, etiology, genetics and the various explanatory theories. She arrived at the conclusion that there is an important distinction between primary and secondary 'sociopath' and that there is a sub-clinical manifestation of a trait continuum in all of us, which only sometimes becomes evident. There is no definite agreement on whether the categorical or the dimensional approach is correct for classification and some authors suggest that there might be a certain amount of heritability involved in the secondary psychopathy (Factor II), and that factors of 'nurture' can be protective as well as aggravating in the development of primary psychopathy (Factor I) (Plutchik, 1995).

The distinction of psychopathy from delinquent behaviour represents the first important step to its description as an enduring personality trait, which is already

evident in childhood. This definition also includes the possibility that the study of psychopathy can include biological and genetic factors, and physiological reactions, and is no longer confined to the description of observable behaviours.

2.2. The Role of Personality and Temperament

> *Although antisocial or criminal behaviour may be the most conspicuous feature of psychopathy, the lack of ability to regulate or adjust a response set may be the most integral. For example: 'I always know damn well I shouldn't do these things, that they're the same as what brought me to grief before. I haven't forgotten anything. It's just that when the time comes I don't think of anything else. I don't think of anything but what I want now.' (Wallace, Schmitt, Vitale, & Newman, 1996, p. 100)*

To understand the concept of psychopathy, it is also useful to attempt a general definition of 'personality' and 'temperament'. Westen and Gabbard (1999) stated that humans are not born as adults and their caretaking environments interact with their own innate tendencies to shape their beliefs, expectations, feelings, motives, and behaviours. Humans are also born into bodies and the physical experiences influence the developmental processes.

Personality theory can be divided into four main approaches: (1) the study of traits, such as 'Extraversion' vs. 'Introversion'; (2) the study of motivational concepts, such as approach and avoidance mechanisms; (3) the study of cognition in personality, such as attribution theory or concepts like self-esteem and self-awareness, and Erikson's ego-identity; and (4) the study of personality in context, such as social and situational interactions (Winter & Barenbaum, 1999). This lack of consensus is not an impediment and it is not imperative to follow one model, rather a synthesis of all available knowledge is relevant to understand and explain why an individual thinks, feels, acts and reacts in real life in a certain way (Caspi & Roberts, 1999; Kohnstamm, Bates, & Rothbart, 1989; Magnusson, 1999; Widiger, Verheul, & vandenBrink, 1999).

Many authors have suggested that instead of trying to study the whole, it is legitimate to select certain variables, such as temperament, which is defined as "dimensions of personality that are basic, early appearing, biologically rooted, and

fairly continuous" (Bates, 1989, p. 231). Activity-levels, attention, fear responses, stimulation needs, emotionality, sociability are examples of basic building blocks for personality. They are partly inherited and partly shaped and modified by the environmental influences during the socialisation process. However, temperamental characteristics are also actively shaping and affecting the environment in a reciprocal process: For example, the child's temperament has a direct effect on parents and the attachment process (Buss, 1989; Thomas & Chess, 1989).

Personality and temperament variables are obviously important for the understanding of psychopathology (Robins, John, & Caspi, 1998). Eysenck (1947) tailored his theory of three personality dimensions to explain delinquent behaviours: Individuals with high scores on 'extraversion' are difficult to condition and thus have difficulties with inhibition; individuals with high scores on 'neuroticism' are highly anxious, which may act as a drive into antisocial behaviours; and individuals high on 'psychoticism' are lacking in guilt feelings or sensitivity to other people and thus are prone to delinquency. This theory was based on a postulated imbalance between androgens and estrogens and thus acknowledged a genetic contribution to personality traits (Eysenck, 1967; Fonseca & Yule, 1995). This framework has since been adopted and validated by other researchers and was extended to include extraversion, neuroticism, conscientiousness, agreeableness, and openness to experiences (Clark & Watson, 1999; Lilienfeld, 1998; McCrae & Costa, 1999; Schmitt & Newman, 1999; Tellegen, 1991).

2.3. Models and Biological Variables

Most of the described models are used to screen populations (via checklists and questionnaires) for specified traits in order to confirm and support the classification of individuals. For example, Gray (1972) developed his model of personality and learning based on the hypothesis that children and adolescents with severe antisocial behaviour showed a markedly increased sensitivity to rewards. Other research found response perseveration for rewards and lack of inhibitory control in conduct disordered children (Wallace et al., 1999). Gray (1972) identified the Behavioural Inhibition System (BIS) and the Behavioural Approach System (BAS) as interacting systems related to learning and experience. Normally these systems are balanced and BIS inhibits behaviour in response to punishment cues,

while BAS activates behaviour in response to reward cues. Anxiety influences the functioning of BIS, and impulsivity is related to BAS. This theory is linked to psychopathic populations by postulating a deficit in passive avoidance (lack of BIS, hyper-responsive BAS). The BIS-deficient/BAS-dominant reactions, which are influenced by dopamine, (deficits in dopamine receptors, or dopamine transporters respectively), can be found in other populations with impulsive behaviours and have added a valuable, genetically based, descriptor to the definition of antisocial or psychopathic individuals (Daugherty, Quay, & Ramos, 1992; Fonseca & Yule, 1995; Gray, 1983; Newman and Kosson's, 1986; Pickering & Gray, 1999; Rothbart, 1989).

In support of Gray's model, Arnett et al. (1997) presented findings by Fowles (1980), who postulated a 'three-arousal-model': BAS for reward (heart rate/HR as index), BIS for passive avoidance (Skin conductance/SC as index), and a 'Non-specific arousal system' (NAS), which receives input from both. It has been concluded that the psychopathic individual is less likely to learn from punishment because the BAS is too dominant. O'Brien, Frick, and Lyman (1994) explored Gray's biobehavioural theory of personality with a population of conduct disordered children and adolescents, which led to the conclusion that anxiety was an important moderating variable influencing the reward dominant behaviour. However, when psychopathic individuals were involved in a goal directed task they ignored neutral as well as punishing cues, which seems to indicate that this population is not necessarily 'fearless', but rather deficient in the processing of peripheral information when involved in a reward-promising situation. This was confirmed by the finding that primary 'sociopaths' were able to actively avoid punishment, which fitted their value system: for social punishment (disapproval) and physical punishment (slight shock) they were low in anticipatory arousal and avoidance learning; only when the punishment consisted of money-loss did they react according to learning theory (Newman, Schmitt, & Voss, 1997; Schmauk, 1970).

Avoidance learning and response modulation are closely related to the concept of regulation and reactivity. Temperament is observed in infants via their reactivity and regulation/modulation to environmental stimuli (Fox & Stifter, 1989). High vagal tone is an indicator of more sociable, reactive and outgoing infants (at 14 months); high heart rate and low heart-rate variability points towards sympathetic excitation and high sociability. These infants are able to generate a wider range of

strategies to modulate their reactions. Emotional reactivity and regulation are important indicators of stress and arousal, which can lead to psychopathology and behaviour disorders. The ability to regulate emotion, and focus or shift attention is an important indicator of pro-social behaviours and a prerequisite for empathic concern and sympathy. Genetic and environmental variables have been identified as factors in the development of reactivity (Higley & Suomi, 1989).

It is increasingly obvious that the models and theories of personality and temperament contribute directly to the explanation of dysfunctional behaviours (Lilienfeld, Purcell & Jones, 1997; Mealey, 1995b; Pervin, 1999). By adding and integrating these theories and research findings, a portrait of the psychopath, (Factor I), as he develops from childhood beginnings, begins to emerge (Hart & Hare, 1996b).

Biological variables operate in conjunction with numerous other variables contributing to violence. (A detailed account of the psychophysiological approach and how it infers psychological significance from physiological signals will be presented later in this study.) Stoff and Cairns (1996), pointed out that there are several misconceptions regarding research on the biology of aggression and that these misconceptions have to be addressed. Biological variables do not operate uni-directionally on behaviour, thus they have to be addressed within a social context where they influence social behaviour and vice versa (Gariepy, cited in Stoff & Cairns, 1996). Biological variables do not cause aggression, although there are certain links between biological antecedents, intervening influences and outcomes. And most importantly: 'Biology is not destiny'. "Biological influences do not act in a vacuum - their expression is highly dependent on environmental parameters and the environment works through a biological substrate" (Stoff & Cairns, 1996, p. xiv). This perspective is supported by Scarpa and Raine (1997a), when they conclude that biology has to be seen as a predisposition that increases the likelihood to certain behaviours (including antisocial behaviours). Biochemical relationships to violence have been found via low levels of serotonin, which is hypothesised to play an inhibitory role in aggression; and possibly via reduced levels of cortisol, which is hypothesised to indicate low hypothalamic-pituitary-adrenal arousal and anxiety. A further area of biological predisposition might be indicated by neuropsychology: frontal dysfunction is hypothesised to affect personality. Damage to the frontal

cortex can result in psychopathy-like behaviours such as argumentativeness, lack of planning, lack of concern for consequences, shallowness, impulsivity, violence, and reduced ability to utilise symbols. Finally, psychophysiological data are used to infer emotion, arousal and cognitive processes from heart rate, skin conductance and EEG measures. A hypothesised general under-arousal in all three areas has been linked to reduced orienting, fearlessness and disinhibited temperament.

The contribution of physiological under-arousal to violent behaviour had been suspected earlier by Eysenck (1976), Hare (1968), Quay (1965) and many others. Raine, Venables and Williams (1990) attempted to provide evidence. In a retrospective study, they found that individuals who exhibit criminal behaviours were associated with lower resting heart rate, reduced skin conductance activity, and more slow-wave EEG theta activity. This result was replicated with 3-year-old boys (Raine, Venables, & Mednick, 1997), which disproved the alternative explanation that criminal activity might have lead to better fitness and thus to lower resting HR, (i.e., the activity/fitness levels of children at this age are not different enough to serve as possible explanation for the difference in HR data). Two theoretical pathways lead from low arousal to criminal behaviour: either there is an active search for stimulation to increase the arousal to its homeostatic level; or there is fearlessness and a lack of response to punishment or consequences, which leads to criminal activity by default. Appropriate arousal levels are also believed to lead to optimal orienting responses, thus to appropriate conditioning and learning, which have been explained as crucial components in the process of socialisation.

Reward-dominance has been established as one of the core-features of psychopathy. This tendency to pursue reward, while ignoring peripheral stimuli is obviously linked to the ability of self-regulation, which is one of the deficits previously described in psychopaths. This particular characteristic has been proposed as an additional confirmation that ASPD and psychopathy describe two different individuals: while the antisocial person intentionally violates societal norms, the psychopath is very often oblivious to their existence. (Sutker et al., 1993; Wallace et al., 1996; Wallace, Vitale, & Newman, 1999; Wilson, & Evans, 2002).

Approach and avoidance are the two forces usually regulating behaviours. For the psychopathic individual this results in "slow conditioning to fear via warning signals, less influence of threats of punishment ... and inclination to over-respond to

unusual or exciting stimuli" (Sutker et al., 1993, p. 348). Blair, Jones, Clark, and Smith (1997) found that psychopathic individuals are unresponsive to distress cues, but react normally (as measured by skin conductance/SC) to threatening stimuli, which connects well with the previous findings that they are capable of processing important and/or salient stimuli in a controlled fashion. It is also an indicator that distress in other people is not perceived to be an 'important stimulus' and thus does not elicit a response. Stevens, Charman, and Blair (2001) extended this finding by proposing a 'Violence Inhibition Mechanism Model', which is believed to activate the emotion system via sad and fearful facial and vocal expressions by the victim of violence and aggression. Normally this activation results in autonomic arousal to inhibit further violent behaviour. Their proposed deficit in the neurophysiological system (involving the amygdala) inhibits the recognition of sad and fearful affect (facial as well as vocal expression) and thus does not modulate the behaviour. Stimuli representing 'happy' and 'angry' are processed without fault.

2.4. Physiological Indicators

Neuropsychological indicators have been studied frequently in the area of criminality, such as in Moffitt, Lynam, and Silva's (1994) study, which concluded that poor neuropsychological status predicted (particularly for males) offending before age 13. By contrast, neuropsychological status was unrelated to delinquency that began in adolescence. Other neuropsychological indicators were deficits in verbal skills (e.g., abstract reasoning and language comprehension) and in self-control functions (e.g., planning, inhibiting inappropriate responses, attention and concentration). Poor performance on tests of self-control also revealed abnormalities in aspects of the central nervous system (CNS): for example in EEG recordings, poor blood flow to frontal lobes of brain (Raine, Brennan, Mednick, & Mednick, 1996), abnormal glucose metabolism in the left hemisphere and pre-frontal cortex (Raine, 1998), lateral asymmetry in orbitofrontal cortex, and less lateralisation for linguistic processing (Moffitt, 1993; Moffitt et al., 1996; Moffitt et al., 1994; Raine, O'Brien, Smiley, Scerbo, & Chan, 1990; Raine, Stoddard, Bihrle, & Buchsbaum, 1998). These subtle neuropsychological dysfunctions have been theorised to disrupt normal development of language, memory and self-control, which increases the vulnerability to criminogenic aspects in the environment (Moffitt et al., 1994).

Raine (1998) pointed out that there are multiple ways to link CNS dysfunctions to antisocial outcomes: The lack of inhibition leads to more risk-taking; the lack of self-regulation leads to rule-breaking and emotional/aggressive outbursts; the reduced intellectual flexibility, poor problem solving ability and reduced ability to profit from verbal cues leads to impaired educational attainment and limited social functioning; poor concentration and reduced reasoning ability add to school and employment failure and to economic disadvantage (Raine & Buchsbaum, 1996).

The link between psychopathy and the affective processes involving language is particularly interesting. Tasks of dichotic listening have shown that psychopathic individuals do not have the same asymmetry (right ear advantage; left brain hemisphere) as normal control subjects. This lack of lateralization is believed to reflect an impairment in the role of language for mediating and regulating behaviours (Hare & Forth, 1985; Raine et al., 1990; Williamson, Harpur & Hare, 1991). Additionally, it has been demonstrated by measuring event related potentials, that there is an impairment in the processing of emotional words (Barrat, Stanford, Kent, & Felthous, 1997). This distinction is an important confirmation of the difference between antisocial individuals and psychopaths, both involved in delinquency. The former show general deficits in language processing which as a consequence may negatively influence the emotional, cognitive and social development, often leading to impulsivity, frustration and aggression. Whereas the latter show specific deficits related to the emotional content and significance of language cues (verbal as well as non-verbal), which lead to premeditated antisocial acts and use of instrumental violence with the goal to obtain a desired reward, while disregarding fear of punishment as well as the emotions or pain of the victims.

Physiological arousal as a factor in violence had been suggested before, for example by Eysenck (1982), Hare (1968), Quay (1965), and Raine et al. (1998). It has been mentioned previously that lower resting heart rate, reduced skin conductance and more slow-wave EEG theta activity have been found in criminals (irrespective of demographic variables), which has been connected to arousal levels and explained either via the 'fearlessness theory' or via the 'stimulation-seeking theory' (Raine & Liu, 1998; Raine, Lencz, Bihrle, LaGasse, & Colletti, 2000). The seeking of stimulation and its regulation have been postulated as a biological trait, or a dimension of personality that can be found in humans as well as in other species

(Heron, 1971; Zuckerman, 1983). This has led to the conclusion that the normal functioning of the brain depends on a continuing arousal reaction, and constant 'sensory bombardment'. For example Quay (1965) hypothesised that psychopaths require higher, more variable stimulation because of their lowered basal reactivity and more rapid adaptation to stimulation, which leads to the impaired ability to delay gratification and thus to impulsive behaviours, reward-seeking, and disregard of consequences.

The distinction between sensation seeking, impulsive, and well regulated individuals can be expressed on the dimension of inhibition. Inhibited (anxious) children were found to have higher heart rate (HR) and skin conductance (SC) as reaction to novel stimuli, and to have a more stable HR (i.e., less variability) during baseline measures (Raine, Venables, & Williams, 1995; Scarpa, Raine, Venables, & Mednick, 1997). This result has been explained by linking the higher sympathetic reactivity in inhibited/anxious children (due to limbic arousal) to the lower threshold for excitability and stress (in the amygdala and hypothalamus). During a longitudinal study, resting HR was measured in 3-year-old children and later in the same individuals at 11 years of age, and compared to their scores on antisocial assessments. Lower HR was correlated to higher scores on aggression and measures of antisocial behaviour (no interactions to gender, ethnicity, demographic and biological variables). Raine et al. (1997) summarize that "low resting heart rate, a partly heritable trait reflecting fearlessness and stimulation-seeking, is an important diagnostically specific, well-replicated, early biological marker for later aggressive behaviour" (p. 107).

Some of the indicators of autonomic activity (HR and SC) in antisocial behaviour can be summarized as follows: reduced arousal, poorer classical conditioning, increased stimulation-seeking, deficits in information processing and attention allocation, and deficient orienting due to pre-frontal dysfunction. The accepted perspective today asserts that biological variables and behaviour and environment impact on each other in a reciprocal way (Cairns & Stoff, 1996).

According to the presented biobehavioural approach it is possible to include genetic descriptors for the understanding of psychopathology. Despite the reciprocal interaction of biology and environmental variables, it is possible to detect specific indicators, which allow for the description of a psychopathic individual. In infancy

the ability to shift attention, to regulate emotions, and to be social and reactive to the environment is evidenced by high resting HR, low HR variability, and high SC. This is in contrast to the under-aroused, stimulation-seeking, and fearless psychopathic individuals. Their low resting HR, high HR variability, and low SC indicate a lack of passive avoidance, a lack of response-modulation, a tendency for response preseveration and reward dominance, an unresponsiveness to other's distress, and a general deficiency in the BIS system. These differences in neuropsychological status are believed to be useful predictors for antisocial attitudes and the development of Factor I psychopathy.

2.5. The Interaction of Physiology and Environment

In order to complete the picture of the developing psychopathic individual, it is necessary to mention the influence of environmental variables during the formative years. Evidence from genetic research shows that the genetic influences on individual differences in behaviour are substantial, but the same data also reveal that non-genetic factors are responsible for more than half of the variance (Perry, 2001; Plomin, 1989). Environmental influences are specific for each child and there are certain recognised risk factors for the development of psychopathology in childhood, especially in its expression as aggression and antisocial behaviour (Carey, 1996). Henry et al. (1996) examined the familial predictors of criminal convictions and found that violent as well as non-violent antisocial acts were related to family factors, which means that environmental influences are implicated in the development of Factor I or 'true' psychopaths as well. The risk factors can be grouped into: social disadvantage, genetic predisposition, family modelling, and psychosocial stress (Sutker et al., 1993).

Within these generalised elements of risk, some researchers have turned to the specific study of the biosocial interaction. For example Raine and Liu (1998) suggested that birth complications may result in brain dysfunction and neurological/ neuropsychological defects, which may indirectly and directly predispose to violence. The environment and biology interact in such a way that a child with an inborn vulnerability needs an environment with clear consistency, whereas a child with minimal vulnerability can develop adequately even under severe social conditions (Magnusson, 1996). Perry (2001) has described several possibilities as to

how children deal with prolonged threat and abuse, and how as a consequence the development of the brain is influenced and altered.

Apart from describing deviant behaviour, several researchers were interested in how the behaviour is organised, what its underlying goals and functions might be, and which systems support and direct it. This led to investigations into parental affect (Allen, Hauser, & Borman-Spurrell, 1996; delCarmen & Huffman, 1996; Lyons-Ruth, 1996; Rosenstein & Horowitz, 1996; Van Ijzendorn & Bakermans-Kranenburg, 1996; Zeanah, 1996). Erratic parental behaviours make it difficult for children to make any predictions or to discover any regularity regarding antecedents and consequences of any behaviour or event, and thus can lead to chronic anxiety. These influences have been shown to affect the development of neurobiological functioning and brain organisation. Harlow and Harlow (1971) demonstrated in their classic animal studies how social deprivation during a critical period negatively influenced the animal's ability to socialise, to form relationships, or to be a parent; and these findings were paralleled by the findings from attachment studies (Ainsworth, Blehar, Waters, & Wall, 1978; Cicchetti, Toth, & Lynch, 1995; Karen, 1990; Lyons-Ruth, 1996; Main, 1996; Main & Cassidy, 1988). Kraemer (1992) added the 'isolation syndrome' to the description and he asserted that physiological systems do not just 'mature', rather they develop in relation to the infant's care-giving environment. Observed results of isolation are: reductions in cortical and cerebellar dendritic branching, altered limbic system, changed cerebellar electrophysiology, reduction in amine system output and thus a general deficit in organising emotional behaviour in response to stressors. These infants are believed to suffer a pronounced risk for mental disorders (Mednick & Gabrielly, 1984; Rosenstein & Horowitz, 1996).

Izard et al. (1991) demonstrated that HR variability is reliably related to attachment security. The underlying mechanism might be vagal control of HR that indicates the individual's capacity to mediate physiological and behavioural reactivity (i.e., self-regulation); for example all insecurely attached infants had higher scores on HR variability. According to psychobiological attachment theory it is suggested that the causes of developmental psychopathology may be largely environmental, yet the effects that need to be prevented or reversed are neurobiological (Kraemer, 1992). Similarly, it has been asserted by several

researchers that even in those psychiatric conditions currently thought to be based on biology, a causative role may be played by child abuse. (Carr, 1999; Jones, 1996; Read, 1998).

To summarise, Brennan and Raine (1997) presented the findings of several studies, which confirmed that biological variables can protect against antisocial behaviours in socially vulnerable individuals and that social variables can protect against antisocial behaviour in biologically vulnerable individuals. "With growing insight into the complexity of human behaviour and the plasticity of the brain over lifetime, a multifactorial model of etiology is gaining ground" (Herpertz & Sass, 1997, p. 439).

In synthesising the information presented thus far it becomes clear that an integrated approach for understanding psychopathy is required. It seems reasonable to approach the study in this area from a bio-psycho-social perspective and to accept the notion that the development of psychopathy Factor I is the result of stressors interacting with the diathesis (Dodge, 1990; Lykken, 1995; Mealey 1995a; Mealey 1995b; Rowe et al., 1996).

In Table 1 some of the main findings relating to the development of psychopathy are summarised and grouped into 'diathesis'-factors or 'stress'-factors, respectively. The list of findings represents single puzzle pieces that are available to describe a psychopathic personality from the perspective of the 'Diathesis - Stress Theory'.

Based on the overview of relevant literature it has been possible to establish a broad profile of the psychopathic individual. Issues regarding classification were clarified and influences that are relevant for the development were discussed. It became increasingly obvious that deficits in the area of emotions, emotion-regulation, and especially social emotions are useful indicators for suggesting the presence of Factor I psychopathy. The next chapter presents an exploration of emotions as they relate to psychopathy, with a specific emphasis on empathy.

Table 1

Diathesis – Stress Factors in Relation to Psychopathy

'Diathesis' factors (Personality/Biology)	Additive 'Stress' factors (Environment)
Over two-thirds of eventual chronic offenders are already distinguishable in kindergarten	The Factor I distinction essentially separates psychopaths from antisocial persons (FII). The environmental factors play the most important role in the development of the latter (only 20-33% of male prison inmates are psychopaths)
Genetic predisposition will lead a child to be selectively unresponsive to those environmental cues which are necessary for normal socialisation and to actively seek arousing and possibly deviant stimuli	The environmental risk may consist of a criminogenic environment, psychiatric illness in caregivers, behavioural disturbance or substance abuse in caregivers, inconsistent discipline, disrupted family life and family violence, single parent family, maltreatment and abuse
The link between temperament development and antisocial personality includes Eysenck's 'extraversion', 'neuroticism' and 'psychoticism'	The frequency, severity and early onset of antisocial behaviours is a predictor for adult delinquency
Genetically predisposed sub-optimal levels of arousal lead to insensitivity towards low levels of stimulation (including other's distress) and to sensation-seeking	Personality development is not mainly influenced by shared environments, rather by micro-environments which are creating idiosyncratic experiences
The interaction of neural systems in the psychopaths is biased towards high novelty-seeking and low harm-avoidance, indicated via low serotonin and norephineprine activity and high dopamine activity	There is a deficit in social emotions such as guilt, anxiety and sympathy (but there is still the experience of moods such as optimism, depression or anger in response to reward-seeking activities)
Gray's 'Behavioral Activation System (BAS)' is balanced via the 'Behavioral Inhibition System (BIS)', and both are influenced by the 'Fight/flight system'; The psychopath displays an unresponsive BIS	
ANS reactivity is reduced and there is lower baseline HR and less arousal in response to pain and punishment	
Lack of responsiveness to 'normal' (reward/ punishment) stimuli and to emotional expressions of others results in reduced ability to be conditioned and thus socialised	
Psychopaths display inhibitory problems in reward and punishment situations	

CHAPTER 3

'Emotion' refers to an astonishing array of happenings, from the mild to the intense, the private to the public, the simple to the complex, and the brief to the extended. Irritation with a recalcitrant doorknob, grief at the death of a child, surprise at a soap opera revelation, anger at grave social injustices, and amusement at a clever turn of a phrase all count as emotions (Gross, 1999, p.528)

3.1 Emotions and Psychopathy

So far, this introduction has focused on the traditional aspects of psychopathy research: The evidence of antisocial behaviours and cognitions. Aggression is one example of emotions based on negative affect, which has been analysed extensively in relation to psychopathy. One possible alternative approach to explore and study psychopathic dysfunctions starts with pro-social indicators of behaviour. Empathy, sympathy and altruism are examples of positive emotions that are often posited at the opposite end of aggression.

Emotions are complex processes, which are as much biologically based as socially shaped. Originally it was thought that emotions could be explained by instinct and fixed action patterns. Further study led to the current perspective that emotions are whole-body processes that involve changes in the domains of subjective experience, behavioural expression, and central and peripheral physiology (Gross, 1999). This process can be captured in Gross' model where emotional cues are evaluated by the individual, then the cues are scrutinized and measured against the behavioural, experiential and physiological background of the individual. This, in turn, leads to the unique and individualised regulation response, and finally to the overt emotion expression. Panksepp (1982) expanded on this model by pointing out that research has produced evidence that humans share primitive emotional processes and specific hard-wired brain circuits with other mammals, (see also LeDoux, 1986). He was also convinced that the number of fundamental emotional circuits is limited and gets enriched via mixing and the added influences of social learning. Proposed were four basic systems involving midbrain, limbic system and

basal ganglia: 'expectancy' (exploration, orienting), 'fear' (flight), 'rage' (fight), and 'panic' (bonding, anxiety, distress). Obviously these systems are influenced via learning and reinforcement and any imbalances can lead to major emotional disorders.

The expression of emotions can be either verbal or non-verbal, for example facial expressions, (Ekman, Levenson, & Friesen, 1983), but always includes physiological change. It was even proposed that the bodily changes occurring during emotive situations might be causes rather than consequences of emotions. Derryberry and Rothbart's (1988) view of emotion included states of arousal, which are in form of patterns, and based on cortical appraisals (see also Ekman, Levenson, & Friesen, 1983). Dispositional emotionality is seen as the frequency and intensity (amplitude) of individual feelings, independent of valence, and is described as a part of personality. In contrast, emotional reactivity is situational and depends on the individual's ability to regulate emotions and to moderate their exogenous expression. This distinction between situational versus dispositional was parallelled by Mehrabian's emotional 'states' (Mehrabian, 1996) versus the emotional 'traits' (i.e., temperament).

Mealey (1995a; 1995b) added a further dimension to the heterogeneity of emotions by using the evolutionary model to distinguish between 'primary' emotions, which are basic, instinctual, and related to survival (such as fear, anger, disgust), and 'secondary' or 'social' emotions, which are complex, specifically human and require cognitive interpretations. The latter also exhibit greater variability as they are learned via socialisation; for example shame, guilt, sympathy and empathy. Psychopathic individuals are defined by an apparent lack of sincere social emotions, while experiencing the full range of primary emotions.

It seems obvious that the interaction between predisposition and environmental influences shapes the appraisal and arousal reactions, as well as the emotional response and overt expression. Arousability has been mentioned several times in relation to emotion research, and Derryberry and Tucker (1992) joined other researchers by proposing three active processes: peripheral effects on bodily processes, central effects on cognitive processes, and subjective emotional

experiences. They also stressed that emotional processes cannot be localised to a specific area of the brain, rather that they are widely distributed.

It has been mentioned before that primary emotions, such as sadness, happiness, disgust and anger, are attributed to all humans and are independent of socialisation. 'Moral' emotions, such as guilt, shame, embarrassment, and empathy are predictors of externalising pro-social behaviours, depending on the degree of distress (Eisenberg, 2000b). With high levels of distress and self-focus the emotions do not translate into pro-social actions, unless pro-social behaviour serves to reduce their own aversive state (Eisenberg et al., 1989). With adequate regulation and cognitive processing distress can be transformed into 'moral' emotions that often lead to other-focus, sympathy and helping behaviour. Sympathy is an emotional response stemming from the comprehension of another's emotional state, it consists of feelings of concern *for* the other. Empathy is an affective response that arises from the comprehension of another's emotional condition and is *similar* to the other person's feelings. Dispositional sympathy and empathy have been associated with low levels of aggression and antisocial behaviours. Cardiac vagal tone (HR variability) is considered to be an index of emotion regulation on the physiological level, via inhibited sympathetic nervous system, and thus to facilitate pro-social and calm behaviour. From this follows that individuals who are prone to physiological over-arousal and distress appear to be low in dispositional sympathy. The degree of emotion regulation plays a crucial role in the resulting moral behaviours and social competence: Children identified as 'under-controlled' at 3 years, were in adulthood more likely to be diagnosed with Antisocial Personality Disorder or convicted for a violent offence.

Pro-social emotions of children are clearly influenced by their family environment as well. Children's physiological predisposition reacts directly with teaching and also indirectly with parental modelling (Eisenberg et al., 1992). Research has shown that there was correspondence between mother's and child's heart rate and facial indices as reaction to a sympathy-inducing film. The children's vicarious emotional responding was influenced by maternal sympathy, perspective taking, and pro-social behaviours. Eisenberg et al. (1988) also found evidence that parents who encouraged the expression of emotions, had children who scored high

on empathy and were less likely to experience personal distress in sympathy-invoking situations. Dunn, Brown, and Beardsall (1991) confirmed with their research that family discourse is critical for children's development of emotional understanding and their ability to recognize emotions in others. However, it is important to note the distinction between understanding emotions on the one hand, and prosocial behaviours on the other; the cognitive ability of understanding has previously been shown to translate into both pro-social as well as antisocial behaviours (Denham, McKinley, Couchoud, & Holt, 1990).

Gottman, Fainsilber-Katz, and Hooven (1997) suggest that parental interactions with their children serve as 'emotion-coaching': teaching to suppress vagal tone, to use cognitions, to self-soothe, or to focus attention. This suggests that "parents can influence a child's physiology by emotion-coaching" (p. 102). A consequence of emotion-coaching is the development of a 'Theory of Mind', which is defined as the ability to understand others' minds (Hughes & Cutting, 1999; Frith & Frith, 2001). Although the ability to understand another person's emotions and motivations is partly based on genetic influences (as demonstrated by twin studies), it has been shown that parental education and the level of talk about feelings have a great influence (Keenan & Aitken, 1998). 'Perspective taking' is often used to describe the ability to anticipate another's thoughts and to infer the cognitions of another person from available information. 'Perspective taking' is an important aspect of empathy and many authors point to the similarities between 'perspective taking' and ToM (Dixon & Moore, 1990). The genetic influence in ToM has been demonstrated through research into Autism. Autistic children have been found to be "impaired in their ability to attribute mental states to themselves and others" (Tager-Flusberg, 1992, p. 168). This deficit translates into difficulties in social understanding and social relationships (Harris, 1995). The psychopathic individual on the other hand, is able to cognitively understand the other person's perspective, however he is not able to 'read the emotion' or recognise another's distress and consequently is equally unable to respond with empathy (Hare, 1996b; Steuerwald & Kosson, 2000).

3.2 Empathy

> *We have a natural tendency to feel ourselves into what we perceive or imagine. As we read about the forest, we may, as it were, become the explorer: We feel for ourselves the gloom, the silence, the humidity, the oppression, the sense of lurking danger; everything is strange, but it is to us that strange experience has come. We are told of a shocking accident, and we gasp and shrink and feel nauseated as we imagine it; we are told of some new delightful fruit, and our mouth waters as if we were about to taste it. This tendency to feel oneself into a situation is called empathy (Titchener, 1915, p.198, cited in Wispe, 1987)*

There are countless definitions of empathy and various ways to explore the topic, but in the context of this research it is important to acknowledge that empathy can have: a regulatory effect on aggression, a motivating effect on pro-social behaviour, a facilitating effect on communication and social relationships, and an organising role in development and adjustment (Bohart & Greenberg, 1997). However, the arousal of empathy does not always result in pro-social behaviours, and in some cases may lead to feelings of distress and self-focus (Eisenberg & Strayer, 1987).

Many writers are concerned about "the bewildering array of explicit and implicit meanings of the term empathy" (Staub, 1987, p. 103), and thus try to develop an overarching definition. Staub (1987) suggested the grouping of empathy into: cognitive empathy (perspective taking), that requires an understanding of another's state; participatory empathy (affective empathy, parallel empathy), that requires a 'tuning in' into the other's experience, which can result in 'false' empathy when the experience is not accurately perceived (and thus not fully informed by Theory of Mind); and reactive empathy (sympathy), that requires a response, rather than a simple reproduction of the other's feelings. It is important to remember that one can empathise with a broad range of affects - positive as well as negative. Empathy needs to be differentiated from sympathy and from personal distress. Sympathy involves 'feeling for' someone and involves feelings of concern, as well as a reaction (most often a pro-social action). Personal distress is experienced as an

aversive state that leads to self-focus and the attempt to reduce one's own discomfort, by either avoidance and 'tuning out' or helping (Batson, Fultz, & Schoenrade, 1987). Finally, altruism has been described as an intentional, voluntary behaviour that benefits another, irrespective of aversive stimuli, and is motivated by factors other than empathy or sympathy, for example by internalised moral values (Eisenberg & Miller, 1987a; Eisenberg & Miller, 1987b; Mehrabian, Young, & Sato, 1988).

After having suggested some definitions, it is useful to explore the context and the reason for empathy. The first explanation for empathy comes from socio-biology and it highlights survival and communication functions (Brothers, 1990; Plutchik, 1987; Staub, 1987). Empathy allows bonding between individuals in a group, especially between mother and infant, thus it is suspected to be genetically coded. Modelling and the maturing cognitive processes of understanding one's own and other's affect contribute to the further development. Strayer and Eisenberg (1987) emphasised that being empathic is not synonymous with being nice, kind, or loving, and that affective arousal is a necessary precondition for the process that results in empathy. Individuals high in arousability process more information and screen fewer stimuli and their arousability has been found to correlate with emotional empathy (Mehrabian et al., 1988). This has been confirmed by the fact that high-empathy persons show a higher heart rate and increased skin conductance as a response to a mildly distressing stimulus.

Children initially respond to others in distress vicariously, until they become more sophisticated in their reactions, which allows them the choice to initiate pro-social acts (Thompson, 1987). From birth onwards infants are responsive to emotions in others (contagion), and imitation of others begins in the first days of life. During the second year they start to infer other's perspectives (Theory of Mind) and to display cooperation and pro-social behaviours. This development is either furthered or hindered by caregiver sensitivity, modelling, and attachment processes (Barnett, 1987; Feshbach, 1987; Mehrabian et al., 1988). An ideal environment for the development of empathy has been described as follows: satisfying the child's own emotional needs and thus minimising self-concern; encouraging the child to identify, experience and express a wide range of emotions; and providing

opportunities to observe, and interact with, and practice sensitivity (Zahn-Waxler & Radke-Yarrow, 1990).

The moral component of empathy has been mentioned by several writers: "Empathy is an important component of the 'principle of caring' as well as the 'principle of justice" (Hoffman, 1990, p. 156). Empathic distress can generate caring and guilt feelings, and combined with previously encoded moral principles, can thus pave the way for moral action (Hoffman, 1987; Zahn-Waxler & Robinson, 1995). Individuals who have not achieved a differentiation of self from others, are not able to recognise that they are the origin or the target of someone else's emotions, and therefore will not be able to experience remorse, shame, or guilt; empathy and pro-social orientation are impaired as well. The first step is the recognition of another person in need, seen as 'perspective taking', which can increase the empathic emotion, and might lead to helping behaviours. It needs to be stressed again, that perspective taking on its own does not directly affect helping, rather it might affect helping via empathic emotion (Coke, Batson, & McDavis, 1978). Earlier it has been shown that psychopathic individuals often possess the ability to cognitively understand another person's situation, which does not translate into empathy, helping, or any other pro-social expression. Blair et al., (1996) were able to show that the psychopathic individual does not have a Theory of Mind deficit, rather he lacks in the emotional reaction to another's distress, and fails to show arousal responses to distress cues.

Basic empathy can be elicited in the observer by merely viewing the other person's emotion and facial expressions, which has been called 'emotional contagion' (Levenson, 1996). For example, women hearing crying infants responded with large SC increases and reported a desire to act. Levenson concluded that the human organism can transmit information automatically (contagion of facial expression), or deliberately (cognitions, symbols, e.g., language), and that the physiological synchronicity (physiological matching of the target individual) appears to be an integral feature of the transmission of emotional information. Interestingly he also discovered that individuals who deliberately created certain facial expressions, experienced the appropriate autonomic nervous system changes in parallel. Thus, mimicking someone's facial expressions might give access to

supplementary information regarding the accuracy of one's perception. The more similar the object of empathy is in age, sex, culture, or socio-economic status, the easier it is to create a matching vicarious emotional response (Feshbach & Roe, 1968). Research also found that individuals are able to detect very subtle cues in facial expressions, that women perform significantly better than men in decoding facial expression, and that the early stages of an expression convey the most information (Edwards, 1998).

Emotional responsiveness and social perspective taking are both elements of empathy; however only the latter requires cognitive skills. Bryant (1987) found in her analyses that mental health of children was related more to affective empathy than to social perspective taking. It has been mentioned previously that externalising, antisocial, and aggressive behaviours in particular, are inversely related to empathy (and sympathy) (Miller & Eisenberg, 1988). Whether the individual reacts with a reduction of antisocial behaviour, or an initiation of pro-social behaviour, is dependent on the degree of arousal and distress. Both, the cognitive and the affective components of empathy influence aggressive behaviour, in combination with situational factors such as the degree of similarity with the victim. Psychopathic delinquents typically exhibit a basic defect in impulse control once they are agitated, and demonstrate little anxiety and little guilt, and the victim's expression of pain can increase aggression in an angered and aroused perpetrator (Lee & Prentice, 1988; Ohbuchi, 1988). Familiarity has been found to facilitate empathy, whereas the disclosure of pain and fear only reduced aggression in non-angered, non-hostile aggressors who were able to experience affective empathy (Ohbuchi, Ohno, & Mukai, 1992). Richardson, Hammock, Smith, Gardner, and Sigo (1994) confirm that perspective taking is positively related to aggression inhibition, only under conditions of moderate threat and arousal. Additional information regarding the ability to experience empathy and perspective taking, regulate emotions, and its impact on social behaviour has been obtained via neuropsychological studies: Frequently empathic changes are evident after prefrontal cortex damage or closed head injury (Eslinger, 1998), which supports the notion of biological underpinnings in empathy.

Empathy is a multi-dimensional construct, which includes a cognitive dimension, as well as an affective dimension. The cognitive approach, including perspective taking, role-taking, and Theory of Mind has been highlighted by several authors such as Dymond (1950), Chandler (1973), and Strayer and Eisenberg (1987). The affective approach, featuring vicarious emotional responding, has been endorsed by authors such as Stotland and Dunn (1963), Mehrabian et al. (1988), and Bryant (1982). Increasingly, combined approaches have been chosen, for example by Feshbach and Feshbach (1969) or Eisenberg et al. (1988). Empathy has a dispositional aspect, shaped by parenting, social and biological variables, as well as a situational aspect, influenced by similarity and level of arousal.

It seems obvious that a multimodal approach is the most promising way to measure empathy. Assessment instruments for empathy should not confuse 'verbal ability' (for example social intelligence scales) with empathy. Similarly the lack of empathy cannot be deduced from a lack of pro-social behaviour (for example prison files). Therefore it is generally suggested to combine several assessment approaches such as self-reports, observations, questionnaires and physiological indices to arrive at the most stable conclusion. There are obvious differences in the emotional functioning of psychopathic individuals, especially in relation to empathy. Emotion regulation has been identified as another area where psychopathic individuals demonstrate distinctive deficits.

3.3 Emotion Regulation

> *Emotion regulation also figures prominently in psychological and physical health. Over half of the Axis I disorders and all of the Axis II personality disorders involve some form of emotion dysregulation (Gross, 1999, p. 542)*

Closely related to the topic of emotional intensity in empathic responding is the issue of emotion regulation. Several research findings were summarised which postulate that emotion regulation is a pre-requisite for empathic concern; i.e., that optimal arousal levels facilitate the orienting response, a state of 'other-focus', and empathy. In contrast, deficient regulation can lead either to over-arousal, emotional distress and a state of 'self-focus' (Eisenberg et al., 1994), or to under-arousal (as

measured in conduct disordered and psychopathic individuals), a lack of emotional and perceptual processing, low activation, impaired orienting response and thus a state of 'self-focus' and lack of empathy (Raine, 1996; Raine, 1997). The effects of under-regulation and high emotional reactivity are additive and have the potential to lead to over-arousal and personal distress, anxiety, discomfort, sadness, or helplessness (Derryberry & Rothbart, 1988; Eisenberg et al., 1996). Children who were identified as 'under-controlled' at age three years were in adulthood more likely to be diagnosed with ASPD or convicted for a violent offence.

Emotion regulation can be automatic or controlled, may be conscious or unconscious, and can involve changes in latency, rise time, magnitude, and duration of responses in behavioural, affective, and physiological domains (Gross, 1999). Because emotion involves physiological arousal, neurological activation, cognitive appraisals, and attentional processes, there are various ways to regulate emotion. The underlying physiological mechanism for the regulation of emotion is the interplay between the 'vagal brake' and the 'sympathetic accelerator' (Gottman et al., 1997, p. 99). The para-sympathetic nervous system is associated with high vagal tone, good attention abilities, and emotion regulation abilities; the sympathetic nervous system is associated with endocrine secretion of catecholamines, cardiovascular reactivity, attention, and behavioural responses (Thompson, 1988; Thompson, Flood, & Lundquist, 1995). A child's baseline vagal tone is related to reactivity as well as to self regulation: "It appears that ... basal vagal tone and the ability to suppress vagal tone in response to attentional demands may prove useful in our theory as indices of the child's developing emotion regulation skills." (Gottman et al., 1997, p. 99).

Attentional processes are highly connected to vagal tone. According to Porges (1976) the initial reaction to a stimulus is passive, involuntary, reactive and depends on the stimulus characteristics (mediated by sympathetic nervous system excitation or vagal inhibition), the resulting attentional response to the stimulus is voluntary, active, regulatory, and includes a reduction in HR, as well as respiratory and motor inhibition (mediated by the para-sympathetic nervous system). Thus, it appears that the suppression of vagal tone is necessary for sustained attention (Thompson et al., 1995).

It seems that the core experience of primary emotions may be similar for most infants, but the individual development of regulatory processes modifies and influences emotions until they change meaning to become a uniquely personal emotional experience. The growth of emotion regulation skills is seen as the foundation for the development of social skills (Thompson, 1988). The early rudimentary (mostly reflexive) repertoire to modulate states of heightened arousal includes sucking, gaze-aversion, or rocking. These skills are initially expanded by modelling, reinforcement, or active induction of affect, and later include discourse about emotions, and active emotion-coaching. The exogenous influences operate in combination with the endogenous abilities that the individual system contributes. Neurophysiological processes need to mature, (for example response inhibition is linked to the maturation of the frontal cortex), and cognitive abilities develop (Gottman et al., 1997; Thompson et al., 1995). The development of self-regulatory abilities determines the individual differences in empathic behaviours as early as two years of age (Ungerer et al., 1990). It is obvious that individual differences in emotion regulation are more malleable in early life, and the interruption of the development via intruding major life events (for example child abuse) can result in the dysregulation of emotional responding (Dodge, 1989). Once more the diathesis-stress theory can be applied.

The role of optimal regulation in relation to empathy, perspective taking, sympathy, and personal distress has already been mentioned. Eisenberg et al., (1994) proposed a model to explain the interaction of regulation and emotional reactivity: Three levels of 'regulation style' (highly inhibited, optimally regulated, and under-regulated) interact with two levels of emotional intensity (high or low) to result in six distinct reaction patterns. For example under-regulated individuals with high emotional intensity are prone to reactive aggression and explosive violence, whereas under-regulated individuals with low emotional intensity are expected to be low in pro-social behaviour, to be sensation seeking, and prone to instrumental aggression. On the other hand the over-regulated individuals with high emotional intensity would be expected to be shy, prone to anxiety and personal distress. This model places the psychopathic and the anxious individual at the opposite ends of the continuum. These individual differences can be partly explained via the differences

in vicarious emotional arousal: In the first group are people high in regulation (attention and activation control, and inhibition) who can modulate negative emotional states and thus maintain an optimal level of emotional arousal, which allows them to be empathic, other-focused, use perspective taking, and to display sympathy. In the second group are individuals who are low in regulation ability but high in emotional intensity, who become easily distressed, over-aroused, and anxious, and are less socially skilled, less able to be empathic, more self-focused, and who might even respond aggressively due to their distress. In a third group are the individuals who are low in their regulation ability and also low in their level of emotional arousal, and it has been suggested before that this group may include the un-empathic, self-focused, under-aroused, sensation-seeking, reward-dominant, un-inhibited, and antisocial psychopath. Embedded in these findings is the conclusion that emotions play a crucial role in social functioning and that therefore the development of regulation processes needs to be a focus in early childhood (Eisenberg et al., 1996; Gurthrie et al., 1997).

Vagal tone (in HR) is often used as an index of dispositional emotional regulation and sustained attention, and thus can be linked to empathy, and sympathy; whereas physiological arousal reactions (in HR and SC) are seen as indicators of situational vicarious emotionality. Fabes, Eisenberg, and Eisenbud (1993) summarized these interactions as follows: "Children who are reactive to others in distress but who are able to regulate this reactivity are relatively likely to respond sympathetically to others. This increase in sympathetic responding appears to be linked with pro-social behaviour across a variety of situations" (p. 662).

The central skill in emotion regulation is the ability to maintain a tolerable and flexible level of arousal that enables adaptive and pro-social behaviours (Galyer, 1999). In regard to antisocial populations it has already been demonstrated that they may display orienting deficits, poor conditionability, slower SC recovery after arousing stimuli, or lower resting HR. The inability to regulate their negative emotions and physiological arousal needs to be added to this list (Hughes, White, Sharpen, & Dunn, 2000; Scarpa & Raine, 1997b). Cicchetti, Ackerman, and Izard (1995) added that emotions may become maladaptive in two situations: one is when emotions are unconnected to cognitive or affective control structures, the other

involves emotional flooding, where an emotion overwhelms control structures and strategies.

It has to be stressed that childhood dysfunctions such as anxiety, autism, or CD cannot be reduced to problems of emotional management. However, an understanding of the developmental pathways may contribute to treatment and the teaching of successful coping strategies. Emotion regulation is seen as pre-requisite for the development of empathy or sympathy, and for the change from self-focus to other-focus. For example, regulation for highly aroused, distressed, and anxious children (overly vicariously responsive) may include measures to reduce the emotion to an optimal level; whereas regulation for hypo-aroused, emotionally 'blunted', and unresponsive children (lack of vicarious responsiveness) may include measures to increase the emotional systems to an optimal level.

Based on the overview of relevant literature it has been possible to describe the role of emotions in general and empathy in particular, for the profile of the psychopathic individual. Again, biological factors (such as predisposition in arousal levels and affect) have been shown to interact with environmental influences (such as social learning and modelling). Cognitive understanding is an additional component that determines whether empathy will result in pro-social behaviours. Finally, the ability to regulate emotions and to achieve optimal arousal levels appears to be crucial for other-focus and pro-social behaviours.

In a next step, these findings will be summarised as they correspond to the overall objective of the present research. This in turn has led to the formulation of the research questions for this study.

CHAPTER 4

4.1. Summary of Theoretical Constructs

This introduction provided evidence for the hypo-responsiveness towards others in distress, which has been demonstrated as a major deficit in psychopathic individuals. This is especially evident in empathy-inducing situations. Moreover, it has been shown that this deficit can be inferred from psychophysiological observations. Thus, the physiological signals of chronic hypoarousal of the central nervous system and autonomic nervous system, and the low reactivity of the autonomic nervous system can be used to validate the psychological, theoretical constructs of deficient conditionability, lack of regulation, and defective empathic processing (Blackburn, 1979; Blair et al., 1997; Cacioppo & Tassinary, 1990a; Lynam, 1996).

The particular anomalies in HR and SC responding have been explained by some theorists as indication of 'lack of fear' and an increased 'seeking of sensation', and by others as a side effect of a cognitive deficit in processing aversive and punishing stimuli (i.e., lack of attentional processing). The 'fearlessness' theory connects the physiological indicators of low HR resting levels and low SC levels with the resulting reduction in behavioural inhibition and low regulation. This has been hypothesised to underlie behaviours as seen typically in aggressive and hyperactive children and psychopaths; and low levels of resting HR have been described as 'best replicated biological correlate of childhood antisocial behaviour and thus an early biological marker for later aggression' (Raine, 1998; Raine, 1996a; Raine & al., 1997; Scarpa et al., 1997).

However, psychophysiological research has to be integrated with the findings from social and cognitive psychology and there is evidence for a bio-social pathway to persistent criminal behaviour. The greatest degree of violence has been exhibited by individuals who had both, minor physiological anomalies and had been raised in unstable/ non-intact families.

It has been mentioned before that a dimensional approach to research with psychopathic individuals represents an acknowledgement that antisocial behaviour can be found outside of clinical groups or prisons.

Before translating the theories, which were presented in the introduction, into a research design, it was useful to review some of the previous findings related to psychopathy (Arnett, 1997; Arnett & Newman, 2000; Fowles, 1980; Lilienfeld, 1998). The field of psychopathy research has developed and expanded since Cleckley (1955) first described the psychopathic personality. Today, the models in Table 2 are the most accepted basic descriptors of the behavioral, biological and environmental characteristics related to psychopathy. The present study builds on those existing findings.

Table 2

Findings of Seminal Research Related to Psychopathy

(Cited in Arnett, 1997; Arnett & Newman, 2000; Fowles, 1980; Lilienfeld, 1998).

Descriptors related to psychopathic individuals
Deficiencies in role taking
Defective fear conditionability/autonomic insensitivity to punishment/poor avoidance learning
Two factor learning theory re deficient avoidance learning/classical and operant conditioning
Reward dominance excitement craving/sensation seeking/chronic under-arousal
Biological personality theory (extroverts/introverts/psychotic)
Lack of skin conductance response conditioning in response to other's pain, i.e., 'inability for empathy'
Ability to respond to punishment is mediated by reward salience
Deficits in orienting response
Low levels of spontaneous SC/chronic hypo-arousal/stimulus-seeking/screening of 'irrelevant stimuli' such as other's distress

Table continues

Table 2 *(continued)*

Three arousal model (BIS/BAS/NAS) as psychophysiological adaptation of 2-factor-learning theory (poor avoidance due to weak BIS and/or overactive BAS)
Deficient response-modulation (regulation)/ difficulty of disengaging, attention-shifting in reward situations (salience of reward vs. punishment)
Inadequate autonomic nervous system response to orienting, lack of affect and emotional responsivity
Weak orienting response/deficit in allocation of attention resources/weak avoidance learning/decreased arousability (SC), i.e., emotional intensity/decreased HR baseline levels, i.e., decreased attention/orientation
Hyper-activation of left frontal lobe, i.e., reward sensitivity
Deficits in frontal/temporal lobes/ lack of hemispheric imbalance in language processing/ deficits in decoding verbal and facial emotional cues
Deficient Violence Inhibition Model

4.2. Overall Objective

This study was motivated by the proposition that early detection is crucial for any chance of successful intervention or treatment in truly psychopathic individuals. Detection can take advantage of a key feature of the psychopathic presentation, which is the measurable difference in physiological reactions to other people's emotions and distress, i.e., the physiologically measurable absence of empathic emotions. This significant feature in the psychopathic presentation could be utilised for detection and possibly for treatment purposes as well. The debate as to what degree individual response patterns in physiological reactivity are genetically determined or shaped via early experiences/environment remains unresolved. Nevertheless, it seems promising to attempt to uncover and confirm the described patterns and relationships, especially when the proposed system of interactions might facilitate the early detection of young children at risk. Biofeedback methods might provide a tool to modify certain aspects of the unique psychophysiological processes displayed by psychopathic individuals, and thus might be able to influence the

deficient emotional processing; of course in concert with various other promising intervention methods.

4.3. Research Questions

It has been argued that the most promising early diagnostic feature of the psychopathic presentation is the measurable difference in physiological reactions to other people's emotions and distress, that is, the measurable absence of empathic emotions. Based on this principle, the present study will endeavour to answer the following three core research questions:

1. Is there an inverse relationship between psychopathy Factor I and affective empathy?
2. Will it be possible to discriminate non-empathic children (i.e., psychopathy-analogues) from highly empathic children?
3. Which diagnostic instruments will prove most useful? – Questionnaire measures or physiological data?

In order to answer these three core research questions, several specific auxiliary research questions will be addressed first, related to two separate experimental Phases A and B.

In Phase A the following auxiliary research questions will be explored (first session of the study based on questionnaire data):

A1. Which of the dispositional empathy measures are most consistent? (Relation of scores)

A2. Which of the dispositional psychopathy measures are most consistent? (Relation of scores)

A3. Are selected empathy measures inversely related to selected psychopathy Factor I measures? (Relation of scores in questionnaire data)

In Phase B the following auxiliary research question will be explored:

B1. How do psychophysiological reactions (for example, heart rate and skin conductance) map onto the constructs of empathy and psychopathy, in empathy inducing situations?

Combining Phase A with Phase B the following auxiliary research question will be explored:

C1. Which of the selected dispositional (paper/pen) measures correspond best to the physiological classification of empathy-analogues and psychopathy-analogues?

The present study used a community sample of 50 five-year-old Pakeha (Caucasian) boys, who had just started school and could be tested in their natural environment at school, in order to minimise settings bias and increasing ecological validity and generalisability. In the first phase of the experiments (Phase A), the 50 boys were assessed with conventional rating scales and checklists, which were selected to measure the constructs of empathy and psychopathy (or absence of empathy). In the second phase (Phase B), the same children were assessed for their physiological reactions (i.e., HR, SC, and respiration), in response to empathy- and distress-inducing video-segments. Again, the goal was to discriminate between empathic children (i.e., empathy-analogues) and non-empathic children (i.e., psychopathy-analogues), in order to corroborate the data from Phase A.

The described procedure was chosen following advice in the literature that a multi-trait-multi-method matrix, including various stimuli, promises the highest convergent validity for the measurement of the construct 'affective empathy' (for example, Eisenberg et al., 1996; Hughes at al., 2000). It is expected that each different index (self-reports/teacher-reports/observations/physiological data) will differ in predictable ways across the situations, thus distinguishing the psychopathy and empathy populations. It is further expected that at least some of the findings from previous research will be replicated and confirmed.

However, the participating children are not expected to solely, or even mostly, represent the extreme values on the continuum. Rather they are considered to be empathy- or psychopathy-'analogues', and to represent a trend.

An underlying issue of the present study is the demonstration that it will be possible to accomplish psychophysiological data collection, with young children in their naturalistic environment. This would allow for more ecological valid assessments and would result in more valid and generalisable data.

METHOD

CHAPTER 5

In order to develop the research design and method for this study, it was necessary to explore issues related to the specific methodology of empathy and psychopathy research, as well as psychophysiology research. Within these areas special emphasis was placed on the issues related to studying very young children in naturalistic settings.

The findings of this preliminary work (as they pertain to the final development of method for this study) are presented in detail in Appendix A.

5.1. Participants

Fifty Pakeha boys, aged 5.4 to 5.8 years, participated and all completed the study. The rationale for selecting very young Pakeha boys is explained in the Methodology section (Appendix A). Children who enter the school system are often for the first time in a different sphere of influence, and thus teachers as 'neutral and objective' observers are frequently the first person to notice that a child displays any form of concerning behaviours (this information was verified during focus group discussions and interviews with teachers). The considerations regarding the restriction of age (5.4 to 5.8 years), gender (boys), and ethnicity (Pakeha), in order to achieve homogeneity of the participants and avoid maturation effects, have been detailed in the Methodology section (Appendix A). For ethical and procedural reasons, children with a possible history of trauma/anxiety related to experiences with fire and similar accidents were excluded, as well as children who were regularly taking medication, or who were diagnosed with childhood disorders (except Conduct Disorder, Oppositional Defiant Disorder, and ADHD).

The participating 50 boys from 22 schools (meeting the above stated criteria), were pre-selected by their teachers, to fit either at the upper or lower end of the empathy/non-empathy continuum. Teachers had been asked to nominate two boys within their new entrant class, who would be as much as possible opposites of each

other regarding empathic responding (group membership was unknown to researchers, participants, and any third party). See Table 3 for a summary of demographic data of the participants.

Table 3

Demographic Data of Participants

Age	5.4 to 5.8 years
Living conditions	44% rural 56% urban
Family status	72% with 2 caregivers 26% with single caregiver 2% other
Socio-economic level	38% upper 23% middle 39% lower
Position in family	8% only child 24% oldest child 24% middle child 44% youngest child
Bullying	28% described as bully 34% described as victim (14% as both)
Behaviour difficulties (parental report)	20% with internalising problems (sleep, eating, anxiety) 22% with externalising problems (social, attentional, and learning problems)
Parent perceptions (on a scale 1 to 5)	0% = very good 6% = good 54% = OK 28% = some problems 12% = many problems
Teacher perceptions (on a scale 1 to 5)	10% = very good 4% = good 52% = OK 30% = some problems 4% = many problems

Note. This information was obtained from the screening questionnaire. More detailed information related to the sample can be found in Appendix B.

As mentioned before, there was no expectation to find, within the normal school population, children who would represent the extreme ends of the polarity; rather it was hoped that it would be possible to identify two groups with 25 children each, of low-empathy and high-empathy 'analogues'.

5.2. Materials and Apparatus: Recruitment Phase

During the recruitment phase teachers and parents were asked to provide information about the participating children. While the parents provided information for the consent form and checklist, the teachers completed questionnaires (see Appendix C for excerpts). The principal materials of interest were:

1. Child Behaviour Checklist (Teacher report form) for general information regarding externalising and internalising behaviours. The data from this questionnaire (in T-scores) can be grouped into an 'Adaptive Functioning' Profile for boys only (normed for age group 5-11 years), with sub-scores for 'working hard', 'behaving appropriately', 'learning', and 'happy'; and into a 'Problem Scales' Profile, with sub-scores for 'Internalising', and 'Externalising'. This instrument was complemented by qualitative comments of the teachers for certain children, and it served as a general screening instrument grouping the children into 'normal', 'borderline', or 'clinical range' (test-retest reliability, inter-rater agreement, internal consistency, content validity, and criterion-related validity are excellent).

2. Aggression-Mood-Learning (AML) Quick Screening Device. Norms for the AML are available for urban/non-urban, and female/male. The AML scales have been shown to discriminate efficiently between well- and maladjusted children and it has been used as a promising instrument for the screening of wider populations and in school settings (Lorion, Cowen, & Caldwell, 1974).

3. Children's Behavior Questionnaire (CBQ), with sub-scales. The CBQ is a 327 item (7- step Likert) scale, with 23 factors. The four selected sub-scales were: Empathy, 14 items; High intensity of pleasure, 13 items; Approach, 13 items; Sadness, 12 items. The resulting questionnaire consisted of 52 items, based on 4 factors (Derryberry & Rothbart, 1988; Rothbart, 2000).

4. Criterion Based Test, developed for assessment of dispositional empathy, approach, and social behaviours (according to procedures described by Miller and Jansen op de Haar, 1997; or Guthrie et al., 1997). Four empathy items were combined with two items of sensation seeking, and with six items of social functioning. These items were selected from existing questions that were recommended in the relevant literature related to empathy and psychopathy. The items were selected to avoid duplication, and to supplement the other measurement

scales in the multi-item battery. The resulting 12-item, 3-factor, 'Criterion-based Scale for Dispositional Emotions and Social Functioning' had been evaluated during its development via focus groups for face validity, tested in pilot assessment sessions, and in its final form agreed upon by consensus of the researcher and the research assistants.

5. Psychopathy Screening Device (PSD) for dispositional psychopathic traits, which is designed to be completed by parents or teachers (20 items, 3-point Likert), and is based on two factors (callous/unemotional versus impulsivity/conduct problems). Preliminary data provide promising support for its construct validity, and its psychometric properties have been described as very satisfactory (Lilienfeld, 1998; Lynam, 1996).

6. Child Psychopathy Scale (CPS), for dispositional psychopathic traits and antisocial behaviours. Of the existing 14 sub-scales eight were chosen to be used in the present research, which resulted in a questionnaire of 33 questions (response choice = Yes / No): 'Boredom Susceptibility', 5 items; 'Manipulation', 3 items; 'Lack of Guilt', 3 items; 'Poverty of Affect', 8 items; 'Callousness', 5 items; 'Behavioural Dyscontrol', 3 items; 'Impulsiveness', 3 items; 'Grandiosity', 3 items. The CPS has been normed, was found to be internally consistent (.91), and it correlates well with self-, teacher-, and observer-reported measures (Lynam, 2000).

Materials used during the pre-selection process (such as cover-letters or consent forms) will be described in more detail in the Procedure section (see also samples in Appendix C).

5.3. Materials and Apparatus: Phase A

During Phase A of the experiment the boys were assessed with self-report questionnaires (see Appendix D for excerpts). The principal materials of interest were:

1. Structured interview to obtain general information. It consisted of 13 questions (Yes / No format), based on four factors: family-support, social, medical , and fears. The overall score from this screening questionnaire was used as an 'alert-index', (none of the children had to be excluded from the research based on this information).

2. Bryant Empathy Index (adapted), to measure for dispositional empathy/sadness. This 22-item index is focused on personal distress, sympathy, and emotional contagion. Psychometric properties of the scale were examined and described as very satisfactory by several reviewers. For the usage in the current research only the 'male' worded items were used, thus the questionnaire consisted of 18 questions (Yes / No format) (Strayer, 1987).

3. Interpersonal Reactivity Index (IRI) (shortened and adapted version), to assess for dispositional empathy and distress. The final version of the eight-item, two-factor, adapted IRI included the empathic concern and the personal distress dimensions. For further ease of administration the response structure was changed from the Likert scale to a dichotomous format 'Not me'/ 'Me' (Davis, 1983).

4. Physiological Reactivity Questionnaire (PRQ) (adapted), for self-report of emotion regulation and physiological reactivity. The full version of the questionnaire contains 281 items, to be scored on a 7-point Likert scale. The items are grouped into 22 temperament scales, and for the current study the two sub-scales Autonomic Reactivity with 15 items, and High Intensity Pleasure' with 12 items, were selected. The final assessment instrument contained 15 items in total, with an answer format of 'me'/ 'not me' (Derryberry & Rothbart, 1988). (As in all previous self-report measures the children again had the choice to indicate their answer by selecting the appropriate card).

5. Wechsler Preschool and Primary Scale of Intelligence – Revised (WPPSI-R), short version (first half), for assessment of intellectual functioning. The norms, validity, reliability and its general psychometric properties are highly recognised (Wechsler, 1949). The original scale consists of 12 sub-tests, on two dimensions: Performance IQ and Verbal IQ. Ten sub-scales, with selected items were administered and corrected for scoring; the reported correlations between full and partial administration are .96, .93, and .97 for verbal, performance, and full scale score (Yudin, 1966).

6. Interpersonal Measure of Psychopathy (IM-P), completed by the author and the research assistant, was used to collect observational data regarding psychopathic indicators (very satisfactory reliability and validity). Each child was rated for both sessions (Phase A and Phase B) by both researchers who were present,

which resulted in four scores. These were averaged for each child into a total observation score (Kosson, Gacono, & Bodholdt, 2000).

Further standard equipment that was used during the first session included: cardboard signs for non-verbal 'me'/'not me' answering; plain Calico doll (photo in Appendix D) gender neutral, no facial features; presents; and thank you note for parents. At the end of each session the most salient features of the session were recorded and coded as qualitative/naturalistic observations (by researcher and assistant). This observational classification was useful to detect possibly invalid data from children who did not engage with the tasks, were extremely stressed, or did not watch the video clips.

5.4. Materials and Apparatus: Phase B

During Phase B of the experiment the children were assessed for their physiological responses, observed, and asked for their self-reports. The procedure during this second session with the child (Phase B) was again governed by a script (see Appendix E), in order to standardise data collection procedures, to minimise extraneous interferences, and to ensure that all assistants were adhering to the same routine. The principal materials of interest were:

1. WPPSI-R. At the start of the second session, the second half of the previously described Wechsler Preschool and Primary Scale of Intelligence – Revised (WPPSI-R), (short form) was administered.

2. Physiograph. The equipment for the gathering of psychophysiological data was a multi-channel, portable physiograph PowerLab 4ST, with amplifiers, extensions and transducers; and a portable laptop computer with the compatible software 'Chart 4.0 for Windows' application program (see Photo in Appendix D). (A video recorder and a TV monitor were used in order to present the stimuli). The recording instrument measured electrical signals (positive or negative) directly or through Bio Amplifiers (for example for ECG) and transducers (for example for respiration). The electrical signals were filtered and displayed on the computer screen for in vivo monitoring. Online computation transferred the electrical HR trace (derived from ECG) into frequency of BPM (sampling rate of 100/s, with 1mV transformed into 200BPM). The interbeat-intervals (IBI, 500-800ms) were computed

online from the R-R intervals (Gale & Edwards, 1983a). For each stimulus-event (i.e., each critical sequence of about 5s to 35s duration, during the four different film segments) the equipment recorded pre-stimulus levels (pre), the levels during the critical sequence (crit), and post-stimulus levels (post). The psychophysiological information was transformed into mean values, standard deviations, or slope values.

Table E1 (in Appendix E) shows the settings on PowerLab that were used during data recording (ADInstruments, 1999c; Venables & Christie, 1980).

Each individual recording took a baseline (subject zero) into account before data collection started. Analogous to the HR measurement procedure, the PowerLab recorded baseline, pre-stimulus data, data during evocative portions of the film segments, and post-stimulus data; which allowed for similar computations as described for HR: maximum values, minimum values, range, slope (rise time and recovery time), means, and standard deviations.

In the present study the recording of SC data was limited to the size of the signal, that is the amplitude, (as opposed to the periodicity, i.e., its frequency). The information from the amplitude domain allowed for comparisons between the high-empathic and low-empathic groups of children for baseline levels, slope data, or variance. From the degree of slope at stimulus onset rise time might be inferred. (SR response rise time offers the same information as half recovery time). (Cacioppo & Tassinary, 1990b; Venables & Christie, 1980).

3. Video tapes. The stimuli used during Phase B were combined on a 20 min video tape. The video was composed of five film segments, separated by 10 seconds of white noise. The selection of the evocative (critical) segments in each film was based on consensus of several psychologists and graduate students, as well as on the information in the literature from previous studies, (Eisenberg & Fabes, 1990; Eisenberg et al., 1989). The five film segments were as follows:

The Baseline film segment 'Dolphins' (twice on tape), shows a group of dolphins swimming and playing in the sea, with 'calming' music in the background. This film was used by Eisenberg et al. (1996) and Guthrie et al. (1997) and the permission to use this film was obtained from the author (Eisenberg, 1999), who also kindly offered to provide a copy of the videotape (155s in length). The baseline data for HR, SC, and Respiration (mean and variability) were collected twice, in order to

be averaged: first sampling at the 50s mark (duration of 10s); and second sampling at the 1min mark (duration of 50s).

'Jamie', the Empathy- and distress-inducing film segment, shows a girl in her room at bedtime, when suddenly an electrical fault of her lamp causes a burst of flames ('fire', Jamie segment A) and her parents jump out of bed in response to her screaming (distress); the next scene shows the girl's mother on the phone in hospital ('phone', Jamie segment B), explaining the fire accident and the burns injuries (sympathy/perspective taking); this is followed by scenes of rehabilitation in the hospital ('hallway', Jamie segment C), covered in bandages (sympathy/empathy); finally she is shown back at school eating lunch and being teased by younger children ('teasing', Jamie segment D) (empathy/sympathy/perspective taking). This video had been used by the same authors (Eisenberg et al., 1996; Gurthrie et al., 1997), and again the permission to use this film was obtained with a copy of the video tape (321s in length). The mean values of the HR, SC and Respiration data were calculated from the four evocative segments in the video clip. For each evocative segment pre-sequence (pre), critical sequence (crit), and post-sequence (post) data were collected for analysis (see Table 4).

Table 4

The Four Selected Jamie Film Segments; Starting Points and Durations (in Brackets) of the Pre-Sequences (pre), Critical Sequences (crit), and Post-Sequences (post)

Film segments	*Durations of pre, crit, and post*
'fire'/ Jamie segment A	pre at 5.05min mark (20s)
	crit at 5.25min mark (10s)
	post at 5.35min mark (15s)
'phone'/ Jamie segment B	pre at 5.53min mark (10s)
	crit at 6.03min mark (5s)
	post at 6.08min mark (10s)
'hallway'/ Jamie segm. C	pre at 6.21min mark (5s)
	crit at 6.26min mark (10s)
	post at 6.36min mark (15s)

'teasing'/ Jamie segment D	pre at 7.04min mark (20s)
	crit at 7.24min mark (10s)
	post at 7.34min mark (5s)

The arousal inducing film segment 'Roller Coaster' depicted scenes from the video tape 'America's Greatest Roller Coaster Thrills'. The scenes are viewed from the perspective of the head car, riding the tracks, with the original sound of carriages and people (sensation seeking, increase of arousal). The combined scenes resulted in a film that was 156s long. This film was used to assess the difference in reaction between non-empathic and empathic children to stimuli of 'pure arousal induction' without any empathy/sympathy component. The mean HR, SC and respiration data were calculated from one evocative segment in the video clip. Only a pre-sequence (pre), at the 7.39min mark (5s), and a critical sequence (crit), at the 8.05min mark (15s) were collected for analysis. (The post-sequence data could not be collected with any certainty as the distinction with the start of the next film became too blurred.)

'Dolphins', repeat of the first baseline film, was shortened to 110s. This was necessary to allow the HR and SC values 'to reset' after the arousal inducing roller coaster stimulus. The data were collected at the 10.30min mark (40s).

'Bambi', empathy, sympathy, distress inducing film segment, was a combination of sequences from the original Disney animated film 'Bambi'. The scenes were combined into a 'mini-story' of a total length of 422s: stimulus 'hungry' (Bambi, segment A), (empathy/sympathy); stimulus 'shots' (Bambi, segment B), (distress/empathy); stimulus 'calling' (Bambi, segment C), (empathy/sympathy); stimulus 'father' (Bambi, segment D), (distress/empathy/sympathy). This film was used as a different approach to empathy induction. It was hypothesised that five-year-old boys might identify in a different way with a cartoon character than with a nine-year-old girl and that their ability to empathise might be influenced by the protagonist of the story. The mean HR, SC, and respiration data were calculated from the four evocative segments (Bambi, segments A, B, C, and D) in the video clip. For each evocative segment the pre-sequence (pre), critical sequence (crit), and post-sequence (post) data were collected for analysis (see Table 5).

Table 5

Selection of 'Bambi' Film Segments; Starting Points and Durations (in Brackets) of the Pre-Sequences (pre), Critical Sequences (crit), and Post-Sequences (post)

Film segments	*Durations of pre, crit, and post*
'hungry'/ Bambi segm. A	pre at16.11min mark (15s)
	crit at 16.26min mark (5s)
	post at 16.31min mark (15s)
'shots'/ Bambi segment B	pre at 16.50min mark (10s)
	crit at 17.00min mark (35s)
	post at17.35min mark (10s)
'calling'/ Bambi segment C	pre at17.45min mark (15s)
	crit at 18.00min mark (35s)
	post at 18.35min mark (10s)
'father'/ Bambi segment D	No pre possible (blurred)
	crit at 18.46min mark (15s)
	post at 19.01min mark (20s)

4. Self-report of emotions to assess situational emotionality (happy, sad, sorry, upset), (see Appendix E for excerpt). After the viewing of the four video films, the children were asked to indicate non-verbally the degree of affect (or the 'amount' of the experienced emotion, i.e., 5-point Likert) during each film, using stacks of checkers in five different heights. 'A whole lot' meant the highest stack, and 'not at all' was indicated by the lowest stack.

5. Observations. Again, both the researcher and the research assistant completed one form of the Interpersonal measure of Psychopathy (IM-P), recording observational data regarding psychopathic indicators. At the end of the second session the researcher and assistant again noted the most salient features of the session, (e.g., situational information regarding functioning of equipment, any external interferences, or specific child behaviour), which were registered as qualitative/naturalistic observations.

Further standard equipment that was used during the second session included: heater and thermometer; a Calico doll that had been named and personalised by the child during the first contact; a watch in the form of a half-ball

filled with fluid and an object that moves when the watch is moved, (this watch was used during the 'competition' when the children were asked to keep their arm still during SC measurement); 'Thank you' note for parents; present (i.e., a picture book).

5.5. Procedure: Recruitment Phase

In preparation for this research project, several experts in the area of child development and clinical psychology were consulted. Some of them were invited to be part of a focus group, which was especially important regarding specific issues of face validity and reliability during the modification/adaptation of questionnaire measures.

After having obtained the ethical approval from the University of Waikato's Research and Ethics Committee in the Department of Psychology to conduct the study, letters were sent to the principals of 35 primary schools in the Waikato area (mix of rural and urban, and of different decile rankings). Attached to the letters was a research outline explaining the principles of the proposed research project (see Appendix C for samples). Twenty-two of the contacted schools were prepared to support the research project. One of the schools was also prepared to serve as pilot school for initial testing of the research procedure.

Six research assistants (graduate students in psychology) were briefed about the project and trained in the exact procedures (see scripts in Appendix D and E). The teachers were given an empathy pre-screening checklist, which listed some descriptors for identifying highly empathic children (or non-empathic children by way of contrast). A similar selection procedure had been used for example by Locraft and Teglasi (1997). These pre-screening procedures helped to maximise the teacher- and research-time by trying to increase the difference-scores between the groups and by minimising on ambiguous data 'middle values' (i.e., enhancing 'diagnostic purity') (Patrick & Iacono, 1989).

Once the participating teachers had made their choice of two children fitting the criteria, they contacted the caregivers/parents, informed them about the study taking place at the school, and handed them an envelope containing: A cover letter asking parents to allow their children to participate in the study and explaining the basic structure of the research; with an attached 'Research Outline for Parents'; as

well as a 'Participation Consent Form'; with attached 'Checklist for Parents/Caregivers', to provide information regarding exclusion criteria for the children. This information was collected to be used as co-variables, to exclude the possibility that main effects obtained from the physiological or questionnaire measures might be artefacts or side-effects of socio-demographic variables. (Children who were diagnosed with childhood disorders or were taking medication needed to be excluded to avoid confounding factors.)

At the same time the teachers were given an envelope containing rating scales that needed to be completed for each boy: Child Behaviour Checklist (teacher report form), Child Behaviour Questionnaire, Criterion-based test, Psychopathy Screening Device, Child Psychopathy Scale. The completed questionnaires and caregiver information were coded to preserve anonymity and the researcher and his assistants were never aware which child had been nominated for which group.

In order to obtain ecologically valid and more generalisable data, it was decided to try and test the children in their familiar school environment (using ambulatory psychophysiological measurement) (Sturgis & Gramlin, 1998). This would offer the advantage that their anxiety levels and novelty reactions might be kept at a minimum and that they were more easily available during school hours. Additionally, such a procedure offered the benefit that the parents/caregivers of these children did not have to become involved in the research process (once they had given their initial consent for the research). This also eliminated a possible source of bias: e.g., the parents' (un)willingness to provide time and transport, or the characteristics of the relationship between the boy and his caregivers. However, testing children in their school environment required an increased involvement of the various schools (principals and teachers) as they were asked to provide a room for the experiment to take place (one hour each, for Phase A and Phase B), and to allow the children to miss some parts of their lessons.

While the process of obtaining consent from parents and collecting completed questionnaires was ongoing, the first three children were pilot-tested. It was essential to test the assessment instruments with pilot groups in order to ascertain their face validity. This pre-testing procedure resulted in some modifications for several questionnaires, mostly in order to simplify and clarify the

questions. During the pilot phase of the present study, it was discovered that the reworded items were still too complex and needed additional modification. This further simplification was again achieved via focus groups and pilot testing, until the final version (for example of the of the adapted Interpersonal Reactivity Index, IRI) was acceptable for the present study.

It was also necessary to adapt the Interpersonal Measure of Psychopathy (IM-P) for the use with young children. After consultation with the author (Kosson, 2000), the scale was modified and shortened to 17 items, using the previously described procedures of focus group discussion and pilot testing. Additionally, the research assistants were trained how to understand the scale items in the context with young children. The modified versions were tested again and finally approved via agreement among the researcher, focus group members and research assistants. For all of the self-report questionnaires the children had the choice to either respond verbally or to manipulate 'me'/'not me' cards to indicate their answers.

5.6. Procedure: Phase A (Questionnaire Sessions)

The first session for each participant lasted for about 40 minutes. It was held at the children's school, in separate rooms. The aim was to collect the questionnaire information (see materials in Appendix D) and to build rapport.

The boys were contacted by the researcher and an assistant in their classroom at a pre-arranged time. The procedure during the first session (Phase A) was standardised as much as possible by the adherence to a prepared script (which had been refined after pilot testing). This script was used to train all research assistants in order to make sure that all sessions were conducted in the same way.

Part of the initial rapport building procedures was the Calico doll, which was given to the boys to give a name and to paint a face and clothes onto it. (This procedure was suggested by the play therapist of the Waikato hospital to establish rapport with children who need to undergo physiologically intrusive procedures, i.e., application of electrodes). While the boys were drawing on the doll, the principal researcher asked the first few general questions from the structured interview.

The structured interview, at the start of the first session, with each boy was used to collect important background information. The data that had been obtained

during the consent process from the parents/caregivers, was thus supplemented and corroborated at this stage. This information was needed to determine that none of the boys showed any of the previously defined (via focus group) exclusion criteria, for example: A medical history that might interfere with psychophysiological arousal measures, or a trauma history that might be aggravated by the film stimuli (fire) (Sattler, 1992). The information obtained from this screening interview was also crucial to assure a random distribution of socio-economic and family status variables.

The children were given the option to respond kinaesthetically by placing a token onto marked cards 'me'/'not me'. Most children preferred to answer the questions verbally.

The last task during this session was the Wechsler Preschool and Primary Scale of Intelligence – Revised (WIPPSI-R) (first half). At the end of the first session the children were able to choose a reward. They were shown a book of the cartoon 'Bambi' with original pictures and it was explained to them that they would view a video next time.

Immediately after each session the researcher and assistant completed the Interpersonal Measure of Psychopathy (IM-P), and salient features of the research process and the child's behaviour during testing were recorded as 'naturalistic observations'. Again, all of the collected data were anonymised for coding and for blind analysis. (See Appendix D for details of equipment).

5.7. Procedure: Phase B (Experimental Psychophysiological Sessions)

The second session for each participant recorded psychophysiological responses for the 5 film segments on the 20 min. video-tape. The second sessions were held within two to four weeks after the first session and lasted 40 to 60 minutes. As the circadian rhythm has been shown to affect HR measures (i.e., higher HR values in the afternoon), the majority of the psychophysiological measurements were obtained during the morning sessions.

Most of the equipment used (PowerLab, VCR etc.) was concealed under a cloth. The seat was prepared for each boy so he could rest his left arm (with the SC

electrodes), would not dangle his legs, and was within 50cm to 1m from the screen. A heater was installed and the temperature checked.

As with Phase A sessions, each boy was again met in his classroom. All of the children remembered the researchers. Rapport was recaptured by giving the boy his doll and reminding him about details of the last session. Familiarity was increased by administering the second half of the WPPSI-R.

Next, the boys were connected to the psychophysiological recorder (PowerLab). First they were shown on their doll what would happen and they had a chance to put spare electrodes on the doll themselves. Each participant was connected via three disposable, self-adhesive electrodes (thus there was no need for skin abrasion or cream); the positive and negative electrodes were placed on the lower chest to the left and right of the heart, and the ground electrode on the lower right leg (specifications taken from the PowerLab applications manual and from relevant literature), (ADInstruments, 1999b; Gottman et al., 1997; Guthrie et al., 1997; Heslegrave, Ogilvie, & Furedy, 1979). The respiratory belt transducer was fastened around their chest, and finally the Electrodes for SC measurement were to be placed on the index and middle finger. The boys were given a watch that contained a moving object and they were told that they would win a prize if they could keep still (i.e., arm and hand with the attached SC electrodes). Some of the children were curious to see their HR and respiration traces on the laptop screen, but most boys were not interested and thus the video clips were started as soon as possible after the placement of the electrodes was completed.

The researcher used the marker keys on the keyboard to indicate talking, interruptions, movements, and the beginning and end of pre-selected critical segments during the video clips. This in vivo monitoring of the psychophysiological traces allowed for immediate detection of irregularities and mistakes, which could be corrected immediately.

At the end of the video-tape the child was detached from the equipment and moved to another table to arrange the five stacks of checkers for the self-report regarding the three main film segments (Jamie / Roller coaster / Bambi).

Again, the two researchers completed an Interpersonal Measure for Psychopathy form each, and recorded their most salient impressions. All of the data were anonymised for scoring and blind analysis.

5.8. Data Preparation and Statistical Procedures

The following section describes how the data analysis was approached in order to answer the research questions. The description presents the chosen bootstrapping process towards a classification system, by detailing the various procedures of data analysis that were employed. The data analysis can be grouped into three main steps: correlation procedures for the questionnaire data (Phase A); clustering, discriminant analyses, and correlations for classification of physiological data (Phase B); and clustering, discriminant analyses, and t-tests for combining the findings from Phase A and Phase B, to explore and confirm the group classification 'empathy analogue' versus 'psychopathy analogue' (via individual profiles).

Questionnaire Data: Data from the screening forms (teacher and parent), questionnaires, and experimenter observations were coded (see Appendix F) and entered into an SPSS spreadsheet. The screening data and experimenter observations were recorded as categorical variables. The questionnaire data (in form of raw scores or standard scores) were transformed into z-scores for all scales.

Psychophysiology Data: The raw psychophysiological data for HR, SC and Respiration Rate measures for the twelve critical sections (crit) of the chosen film segments were summarised using PowerLab software. The pre-sections (pre), and post-sections (post) measurements were summarised as well (except for 'Dolphins'). The pre sections provided within-film baseline data, which was important information regarding the 'law of initial values'; the post sections provided information regarding regulation and speed of recovery from emotional reactions (especially for SC half-way recovery times).

Visual inspection of the data trace from the recording as well as the event markers that were placed during recording were used to identify any contaminated data (e.g., talking, moving, coughing). The recorded respiration trace was additionally consulted to examine the effects of these artefacts on HR, and SC data. In case of contamination during a critical section, that portion of faulty data was

eliminated and replaced with the average of the data points before and after the event; the amended portions never constituted more than 1/10 of the whole section, (this procedure to deal with contaminated data has been suggested by several authors, e.g., Eisenberg et al., 1996). The edited measures were transformed/calculated by the computer programme and the following variables were chosen for statistical analysis (resulting in a total of 280 variables for all film segments, with pre, crit, and post sections): Mean HR; Mean SC; Standard Deviation HR; Standard Deviation SC; Slope HR; Slope SC; Maximum value HR; Maximum value SC; Minimums value HR; Minimum value SC.

The 'Inter Beat Intervals' (IBI) for HR were calculated and compared with their 'Beats per minute' (Bpm) counterparts, (according to suggestions in the literature, such as Heslegrave et al., 1979). The results were clearly comparable, and thus it was decided to base the overall statistical analysis for HR on the Bpm data.

Appendix G shows how statistical/mathematical operations resulted in data transformations and data reductions, which led to appropriate mean values, which in turn were congruent with particular theoretical constructs. These mean values were ultimately grouped (clustered) into 'high' versus 'low' z-scores and used as classification for 'empathic' versus 'non-empathic' participants.

Analysis Procedures: The main research question asked whether it would be possible to discriminate non-empathic children from high empathic children. A simple correlational design, combined with case-by-case classification (profiling) via discriminant analyses and cluster analyses, were selected as the primary statistical procedures (Coakes & Steed, 1999; Norusis, 1998; Statistical Package for Social Sciences, 1998). The research design was based on the suggestions in the literature that a mixture of measures leads to higher levels of validity. Thus it was the aim in this study to focus on the individual person as much as on particular variables.

The profile of individual cases can be built via various techniques and the 'bootstrapping' approach has been recommended to continually refine group membership. This procedure has been selected to combine the information of several discriminant analyses in cumulative fashion, in order to identify cases and their group membership (i.e., non-empathy analogues versus empathy analogues).

To answer the research questions related to Phase A (A1, A2, and A3) of the study, the various empathy and psychopathy measures were correlated (Aldenderfer, 1984). These statistical procedures were employed to distinguish the most useful assessment instruments for psychopathy and empathy, respectively. This was followed by correlations between empathy data and psychopathy data, to uncover their relationship.

To answer the question (B1) related to Phase B of the study, the quantified theoretical constructs were firstly used to form clusters of low- and high-empathic children. The choice of an appropriate clustering method was based on advice in the literature. The results from the clustering procedures were then further explored via discriminant analyses to confirm cluster-membership for each theoretical construct separately and also overall. The procedure of discriminant analysis was employed to allocate group membership to individual cases, but also to find the variables/constructs that would produce the most accurate classification of cases into the known groups. It was also attempted to discover which physiological measures resulted in more reliable groupings.

To answer the research question (C1) combining Phases A and B, the two groups of low versus high-empathic children, which had been identified via discriminant analyses in Phase B, were mapped onto the questionnaire data. Additionally, the paper/pen data were subjected to discriminant analyses (each test singly and also group-wise). Finally, t-tests were used to identify the variables with the highest discriminative power to classify the cases into non-empathic and empathic analogues with statistical significance.

The above described procedures resulted in individual profiles for each child, summarising how well a particular case fits within the group, how much fluctuations there are and whether these fluctuations are random or centered around a certain measurement event. It also allowed for identification of outliers and cases that cannot be grouped because they scatter around the 'middle values' (Aldenderfer & Blashfield, 1984; Betz, 1987; Borgen & Barnett, 1987; Coles, Donchin, & Porges, 1986; Corning, 1986; Epstein, 1979; Kazdin, 1980).

In the next section the results will be presented, in parallel to the specific statistical procedures that were employed in the process.

RESULTS AND DISCUSSION

The results for each of the core and auxiliary research questions will be presented in the pages that follow.

CHAPTER 6

Research Questions Phase A

A1: Which of the Dispositional Empathy Measures Are Most Consistent ? (Relation of Scores)

To answer Question A1, the relationship among the dispositional empathy related measures was examined. Correlation procedures were combined with principal component analyses and in several stages (bootstrapping approach) the initial number of measures was narrowed, until only those remained, which seemed to represent the empathy construct most consistently.

All data from the children had been anonymised and it was not known to the researchers into which teacher-pre-selected group (i.e., psychopathy-analogues or empathy-analogues) each child belonged. Appendix H offers a complete descriptive analysis (raw data) of the main variables that were used in Phase A (and Phase B) of the research (i.e., questionnaires and self-report data); in the form of mean values and standard deviations, and characteristics of the sample distribution for each variable. Table 6 shows a summary of the 41 variables (questionnaires and sub-scales) that were used in the first step of Phase A for the initial correlation procedures.

Table 6

Initial Selection of 41 Possibly Empathy-Related Measures

Measure	*Mean*	*SD*	*Distribution*
Aggression-Mood-Learning 'mood'	5.7	2.0	s
Aggression-Mood-Learning 'learning'	6.9	3.2	s
Aggression-Mood-Learning 'total'	19.6	7.4	b
Bryant Empathy scale	8.9	2.7	n
Interpersonal Reactivity Index 'personal distress'	1.8	1.2	n
Interpersonal Reactivity Index 'empathic concern'	2.8	1.3	b

Interpersonal Reactivity Index 'new total'	11.4	4.2	b
Eisenberg Empathy Criterion	3.8	1.4	b
Criterion-based 'empathy'	2.9	0.9	b
Criterion-based 'social skills/ psychopathy'	3.5	1.1	s
Criterion 'psychopathy/soc. skills/sensation seeking'	5.4	2.1	b
Criterion 'empathy/soc. skills/sensation/psychopathy'	9.5	2.9	b
Criterion 'empathy/soc. skills/psychopathy'	5.3	2.3	b
Psychopathy mean observation (IMP)	23.8	6.4	b, s
Physiological Reaction Questionnaire 'high pleasure'	5.5	1.5	n
Physiological Reaction Questionnaire 'reactivity'	2.8	1.5	b
Self-report film 'empathic concern Jamie'	9.3	3.6	b
Self-report film 'empathic concern Bambi'	9.8	3.4	b
Self-report film 'empathic concern total'	19.2	5.9	n
Self-report film 'personal distress Jamie'	2.2	1.7	b
Self-report film 'personal distress Bambi'	2.7	1.9	b
Self-report film 'personal distress total'	4.8	3.0	b
Self-report film 'total empathic concern/distress'	23.9	7.9	n
Child Behaviour Questionnaire 'empathy'	4.4	0.4	n
Child Behaviour Questionnaire 'pleasure'	4.5	1.0	b
Child Behaviour Questionnaire 'approach'	4.7	1.0	n
Child Behaviour Questionnaire 'sadness'	4.7	0.9	n
Child Behaviour Questionnaire 'total'	4.4	0.4	n
Child Psychopathy Scale 'lack of affect'	2.2	N/A	N/A
Child Behaviour Checklist 'attention total'	9.7	9.8	a
Child Behaviour Checklist 'adaptive functioning total'	48.0	8.6	b
Child Behaviour Checklist 'functioning work'	48.5	8.1	b
Child Behaviour Checklist 'functioning behaviour'	48.6	7.8	b
Child Behaviour Checklist 'functioning learning'	47.7	8.8	b
Child Behaviour Checklist 'functioning happy'	50.5	6.9	b
Child Behaviour Checklist 'thought problems'	0.7	0.9	a
Child Behaviour Checklist 'total alert'	49.9	8.7	b
Child Behaviour Checklist 'problem internalising total'	49.9	8.7	b
Child Behaviour Checklist 'withdrawal'	1.4	1.8	a
Child Behaviour Checklist 'somatisation'	0.3	0.6	a
Child Behaviour Checklist 'anxiety'	3.3	3.4	a

Note. n=normal distribution (calculated); b=bi-modal distribution (based on visual inspection of graphed data); s=skewed (biased) towards 'no problem'; a=around 10% of the cases were at the extreme end of the identified scales and were marked with an 'alert' code (extreme value). The means of the raw data are not comparable, as the raw score range is different for each scale. The means are calculated for all 50 children as their classification into analogues of group empathy and group psychopathy is unknown at this stage.

In the initial, non-parametric correlation procedure (Kendall's Tau, due to the non-normality of some of the data), all 41 variables were included, (including sub-scales). These included all specific empathy measures with sub-scales, as well as all measures possibly related to the construct of empathy (such as Child Behaviour Questionnaire, sub-scale Sadness, and Aggression-Mood-Learning questionnaire).

The variables had been tested for normality (Shapiro-Wilks) and for skewness. The clearly bi-modal distribution of 23 variables reflected the fact that the sample was pre-selected according to the criterion of empathy- or psychopathy-analogues. Therefore roughly half of the children's responses were inverse to the other half. Interestingly, the scores from the Wechsler Preschool and Primary Scale of Intelligence – Revised were among the data that displayed normality.

The initial goal was to reduce the data set by either building composite scores or by selecting the most powerful sub-scale from each assessment instrument (i.e., most likely to be measuring the empathy construct). It was not expected that all sub-scales would be useful (or even related) to the measurement of empathy, and it did not appear practical to deal with a huge number of test scores. The 41 values (from 11 scales) that were possibly related to the construct empathy were transformed into z-scores (to be comparable) and then entered into a correlation matrix (see Appendix H). The inspection of the initial correlations confirmed the prediction that some of the sub-scales did not correlate significantly with any of the other variables.

Next, the measures were rank-ordered according to the strength of their correlations and it was hypothesised that those variables with consistently low correlations were not measuring the construct under investigation (i.e., empathy/non-empathy) and thus they were omitted. Sub-scales (and composite scores derived from these scales) with high correlations were disregarded as they were indicative of double weighting; measures with highly negative correlations (such as Aggression-Mood-Learning, mood sub-scale) were eliminated as empathy variables, but later included in the selection of psychopathy measures (to answer Question A2). It was considered as important to retain a mix of self-report and other-report data and therefore some self-report scales with lower correlations were retained. Finally, it was decided to retain the 'gold-standard' empathy measures (such as Bryant Empathy scale), which had frequently been used in previous empathy studies, despite the comparatively low correlation and extraction values. Following these criteria, 12 variables were identified during this data reduction procedure and retained for further analysis.

In parallel, a principal component analysis (factor analytic procedure) was performed with all 41 measures to confirm the steps towards a simplification and

homogenisation of the data set; in order to arrive at a smaller number of measures, that were tapping into the same construct.

The two described procedures (correlation and principal components analysis) complemented each other in reducing the data set to a selection of 12 variables, which provided the highest communality to the underlying construct, with the highest correlation values to each other (considering the previously explained criteria). Thus, the 29 variables with the weakest communality to the empathy construct and the weakest correlations to each other were permanently removed from further analysis.

The cross-correlations of these 12 most powerful empathy measures are shown in Table 7 (non-parametric procedure Kendall's Tau, because the assumption of normality was violated). Most teacher-report measures show high correlations with each other and the self-report measures are correlated with each other as well (although less highly than teacher-reports). The negative correlations indicate whether the empathy concept had been expressed in positive values (i.e., high empathy scores, such as Criterion empathy) or negative values (i.e., lack of empathy, such as Child Behaviour Questionnaire 'intensity pleasure').

The correlations of the variables Criterion empathy (4), and Criterion combined (5) showed similar values and thus the 'pure' empathy measure Criterion empathy was the preferred choice during further data reduction. Among the sub-scales Child Behaviour Questionnaire 'empathy' (7), Child Behaviour Questionnaire 'intensity pleasure' (8), and Child Behaviour Questionnaire 'total' (9), the Child Behaviour Questionnaire 'empathy' showed the highest correlations and was selected as the variable with the best fit to the other selected empathy measures. Thus, eight dispositional variables (indicated in bold in Table 7) were retained for further analysis, as their correlations indicated high consistency with each other and with the underlying empathy construct (while eliminating double weightings). (Child Behaviour Checklist 'attention' and 'total adaptive' are derived from different sets of raw scores and thus were retained, because both contribute to the information in the data set).

Table 7

Non-Parametric Correlation Matrix For Empathy Measures, (Kendall's Tau)

	1	2	3	4	5	6	7	8	9	10	11	12
1. **+Bryant**	-	.23*	.41**	.17	.11	.21*	.21*	-.18	-.06	.04	.06	-.05
2. **+IRI**		-	.39**	.13	.06	.09	.12	.09	.13	-.12	.22	-.04
3. **+Eisenberg empathy crit.**			-	.13	.02	.14	.07	.05	.14	.01	.05	.05
4. **+Criterion empathy**				-	.71**	.04	.70**	-.43**	-.02	-.46**	.42**	-.56**
5. +Criterion combined					-	.01	.60**	-.43**	-.19	-.58**	.50**	-.49**
6. +EC and PD total						-	.13	-.11	.11	-.11	-.08	-.18
7. **+CBQ, 'empathy'**							-	-.36**	-.09	-.45**	.44**	-.53**
8. -CBQ, 'intensity pleasure'								-	.34**	.25*	-.16	.40**
9. -CBQ, total									-	.13	-.04	-.02
10. **-CBCL, 'attention'**										-	-.55**	.36**
11. **+CBCL-TRF, 'total adaptive'**											-	-.34**
12. **-CPS, 'lack of affect'**												-

Note. *p<.05, **<.01 (two tailed); bold = signals the most powerful empathy variables on the basis that a mix of self-report and teacher-report had to be retained; and that double-loadings had to be eliminated (i.e., choice of 4. or 5.; and choice of 7.or 8. or 9.). +/- = positive/negative valence of empathy. Thus those cross-correlations are negative.
1. = Bryant Empathy scale; 2. = Interpersonal Reactivity Index 'empathic concern'; 6. = self-report after films empathic concern and personal distress; 7. = Child Behaviour Questionnaire ' empathy'; 8. = Child Behaviour Questionnaire 'intensity pleasure'; 9. = Child Behaviour Questionnaire ' total'; 10. = Child Behaviour Checklist 'attention'; 11. = Child Behaviour Checklist ' teacher-report form 'total adaptive'; 12. = Child Psychopathy Checklist.

It can be seen in Table 7, that the final selection (in bold) of self-report measures (1,2,3) are significantly correlated with each other; and the final selection of teacher report measures (4,7,10,11,12) are highly significantly correlated with each other. Overall, the correlations among the teacher reports are stronger than among the self-reports.

The Bryant empathy scale (self-report) seems to be measuring a slightly different dimension of empathy (i.e., low or no correlations with all other measures), but surprisingly is correlated with the CBQ empathy dimension (which measured overt behaviours). This finding corresponds with previous research (e.g., Eisenberg et al., 1988), which has shown that parts of the Bryant scale tap into the dimensions of 'sadness' and 'sympathy', as opposed to 'vicarious empathy'.

It is also interesting to note that the self-report measures are not correlated with the teacher reports (except the previously mentioned Bryant scale). As stated

previously, this seems to indicate that the measures are not targeting the same aspect of the empathy construct. It has been suggested that other-reports (e.g., from parents or teachers) are focussed on overt behaviours and thus are a measure of social adaptiveness and pro-social behaviour (i.e., 'good boy'); whereas the self-reports of very young children might lack the necessary introspection and often tap into 'sadness' and 'being upset', and don't seem to be very consistent (e.g., Eisenberg et al., 1989; Miller, 1988). To examine this suggestion the Criterion sub-scale 'social skills' (as a typical measure of social skills) was correlated with selected teacher-reports (data normally distributed), which resulted in significant correlations (r = .63, .75, .80, p< .05). This seems to confirm that teachers deduce empathy (or lack thereof) from pro-social behaviours.

Simultaneously, the 12 remaining measures (after the initial simplification and homogenisation of the data set) were analysed via principal component analysis (see Table 8). This procedure supported the reduction of the number of empathy measures, which had been achieved via rank-ordering of the correlations. Table 8 shows the extraction values for the 12 variables, (communality of the items to the underlying construct; the communality of items is demonstrated by high 'extraction' values, with 1 = highest communality/perfect correlation, and 0 = no communality/no correlation). It can be seen that these values indicate a high communality between all of these assessment instruments. However, the selected self-report measures, namely the Bryant Empathy scale, the Interpersonal Reactivity Index - sub-scale for empathic concern, the Eisenberg empathy criterion, and the self-report after films – empathic concern and personal distress, show the lowest extraction values. This supports the previous suggestion that these self-reports of empathy were measuring a different construct to other-reports.

A principal component analysis (with Varimax rotation) clearly confirmed the two-factor structure, with teacher report measures loading on component 1 (values .79 to .94) and self-reports loading on component 2 (values .72 to .83). The information in Table 8 was used to corroborate the previous steps (based on rank-ordered correlations) towards further simplification of the data set.

Table 8

Communalities to the Factor 'Empathy'

(1 = High Communality; 0 = No Communality, or Different Underlying Construct)

Variables	*Extraction*
1. Bryant Empathy scale	.702 S
2. Interpersonal Reactivity Index, 'empathic concern'	.678 S
3. Eisenberg empathy criterion	.640 S
4. Criterion empathy	.841 T
5. Criterion combined, empathy/soc skills/SS	.899 T
6. Self-report after films, empathic concern and personal distress,	.721 S
7. Child Behaviour Questionnaire, 'empathy'	.842 T
8. Child Behaviour Questionnaire, 'intensity pleasure'	.843 T
9. Child Behaviour Questionnaire, total	.903 T
10. Child Behaviour Checklist, 'attention'	.743 T
11. Child Behaviour Checklist-Teacher, 'total adaptive'	.755 T
12. Child Psychopathy Scale, 'lack of affect'	.784 T

Note. Extraction method: Principal Component Analysis; S= self-report; T= teacher-report; The extraction values indicate that the 4 self-report scales display less communality to the teacher construct empathy, than the teacher-report measures.

From the above findings, it seems that it can be safely concluded that the eight measures of dispositional empathy selected are consistent in measuring the same construct. (However, the discussed discrepancy between self-report and teacher-report measures needs to be taken into account.)

A2: Which of the Dispositional Psychopathy Measures Are Most Consistent? (Relation of Scores)

In order to answer research question A2, the relationships among psychopathy related measures were examined. The same statistical procedures as described in the previous section were used to select the most consistent psychopathy measures.

Thirty-eight variables were included in the initial correlation matrix, (see Table 9 for summary). Appendix H offers a descriptive analysis (raw data) of the main variables that were used in Phase A (and Phase B) of the research.

Table 9

Initial Selection of 38 Measures Potentially Related to the Construct of Psychopathy

Measure	*Mean*	*SD*	*Distribution*
CBCL-teacher 'total functioning'	48.0	8.6	b
CBCL-teacher 'work'	48.5	8.1	b
CBCL-teacher 'behaviour'	48.6	7.8	b
CBCL-teacher 'learning'	47.7	8.8	b
CBCL-teacher 'happy'	50.5	6.9	b
CBCL-teacher 'externalising'	51.1	9.8	s
CBCL-teacher 'soc.problems'	2.1	2.3	a
CBCL-teacher 'thought problems'	0.7	0.9	a
CBCL-teacher 'attention problems'	9.7	9.8	a
CBCL-teacher 'delinquency'	1.4	2.0	a
CBCL-teacher 'aggression'	7.5	10.0	a
CBCL-teacher 'total alert'	4.4	3.3	a
AML 'aggression'	7.1	3.9	b
AML 'learning'	6.9	3.2	s
AML 'total'	19.6	7.4	b
CBQ 'intensity pleasure'	4.7	1.0	n
CBQ 'approach'	4.7	0.9	n
CBQ 'total'	4.4	0.4	n
Criterion 'sensation seeking'	2.9	1.2	n
Criterion 'empathy + soc.skills'	3.5	1.1	s
Criterion 'soc.skills + psychopathy'	5.4	2.1	b
Criterion 'soc.skills + sensation'	9.5	2.9	b
Criterion 'empathy + soc.skills + psychopathy'	9.5	2.9	b
PSD 'total'	11.4	9.3	a.
PSD 'callous'	4.0	3.3	a
CPS ' total without grandiosity'	8.6	7.9	s
CPS 'sensation + boredom+control+impulse'	3.4	3.5	b, s
CPS ' manipulation'	1.5	NA	
CPS ' lack of guilt'	0.6	NA	
CPS 'lack of affect'	2.2	NA	
CPS 'callousness'	1.3	NA	
CPS 'behaviour dyscontrol'	0.8	NA	
CPS 'impulsiveness'	1.3	NA	
IMP 'total'	23.8	6.4	b, s
IMP 'alerts'	1.4	1.6	s, a
PRQ 'pleasure'	5.5	1.5	n
PRQ 'total'	2.8	1.5	b
Self report film 'sensation seeking'	12.3	1.5	n

Note. CBCL= Child Behaviour Checklist; AML=Aggression-Mood-Learning; CBQ=Child Behaviour Questionnaire; PSD = Psychopathy Screening Device; CPS=Child Psychopathy Scale; IMP=Interpersonal Measure of Psychopathy; PRQ Physiological Reaction Questionnaire; n = normal distribution (calculated); b=bi-modal distribution (based on visual inspection of graphed data); s = skewed (biased) towards 'no problem'; a=around 10% of the cases were at the extreme end of the identified scales and were marked with an 'alert' code The means of the raw data are not comparable, as the raw score range is different for each scale. The means are calculated for all 50 children (their classification into analogues of group empathy and group psychopathy is unknown at this stage).

Again, the initial goal was to reduce the data set by selecting the most powerful sub-scale from each assessment instrument. The 38 variables (from 9 instruments) were transformed into z-sores and tested for normality (Shapiro-Wilks). As most of the data had bi-modal distributions, Kendall's Tau was used as the procedure for the correlations. It was not expected that all sub-scales would be useful for the measurement of the psychopathy construct and the correlation-matrix (see Table H2 in Appendix H) confirmed that some of the sub-scales did not correlate significantly with any of the other variables.

All 38 variables were rank-ordered according to the strength of their correlations and it was reasoned that those variables with consistent low correlations to the 'gold standard' measures of psychopathy (such as Child Psychopathy Scale) were not measuring the construct under investigation (i.e., psychopathy FI). Therefore they were omitted from further analysis. High correlations among sub-scales (derived from the same raw data) were also disregarded as they were indicative of double weighting, and it was decided to retain the validated 'gold standard' psychopathy measures, that had been used most frequently in psychopathy research. Following these criteria, seven variables were selected for further analysis (this bootstrapping process of data reduction was conducted in several stages, and during each intermediate step the same procedures and criteria were applied). The seven remaining assessment measures were expected to prove most consistent and powerful in the measuring of the psychopathy Factor I construct.

Table 10 shows the cross-correlations of the remaining 7 most consistent psychopathy Factor I measures (non-parametric procedure Kendall's Tau, because assumptions of normality were violated). These correlations are highly significant, which indicates that the measured construct seems to be homogenous for the selected variables. The sub-scales with double weightings have been eliminated; the three remaining Child Behaviour Checklist sub-scales for attention, externalising, and social problems are based on different raw scores each and thus were adding to the information in the data set. Negative correlations with variable 2 (Criterion combined) indicate that the psychopathy concept is expressed in reversed values (i.e., low scores for high psychopathy).

Table 10

Non–Parametric Correlations for Psychopathy Measures (Kendall's Tau)

	1	2	3	4	5	6	7
1. - AML, 'aggression'	-	-.66**	.64**	.58**	.71**	.74**	.56**
2. + Criterion combined		-	-.76**	-.64**	-.58**	-.66**	-.51**
3. - PSD total			-	.70**	.52**	.66**	.45**
4. - CPS without GR				-	.57**	.62**	.55**
5. - CBCL, 'attention'					-	.64**	.68**
6. - CBCL, 'externalising problems'						-	.58**
7. - CBCL, 'social problems'							-

Note. **p<0.01, (two-tailed); AML = Aggression-Mood-Learning; PSD = Psychopathy Screening Device; CPS = Child Psychopathy Scale, without 'grandiosity; CBCL=Child Behaviour Checklist;
+/- =positive/negative valence of psychopathy.

It has been previously mentioned that there are no true self-report measures in the area of psychopathy; apart from attempts at indirect assessment via reports of emotion regulation and physiological reactivity, as for example in the 'Physiological Reaction Questionnaire' or in the 'Self-report after film viewing'. But both measures were eliminated as they did not correspond to the other selected measures very well, possibly measuring sensation seeking instead. Similarly, the observational data from the Interpersonal Measure of Psychopathy were not significantly correlated to the selected instruments (and had low extraction values). As noted before, this might suggest that the observational data are measuring a different construct than the rating scales.

Principal component analyses were performed at each intermediate stage of data reduction and data homogenisation, in order to confirm that the selected measures were tapping into the same construct. The seven remaining variables showed high factor loadings from .77 to .96 on only one remaining factor (1 = highest communality/same underlying construct, and 0 = no communality/different underlying construct), which confirms the uni-dimensionality of their common construct. It seems safe to assume that this single underlying construct might be related to psychopathy Factor I, as it is central to the specific scales and questionnaires.

The previously described procedures (correlations and principal component analysis) complemented each other in reducing the data set to a selection of the seven variables, which provided the highest communality to the underlying construct, while evidencing the highest correlations with each other (based on the described criteria). Thus, the 31 measures with the weakest communality to the psychopathy Factor I construct and the weakest correlations to each other were permanently removed from further analysis.

From the above findings it can be assumed that the remaining selection of the 7 dispositional psychopathy rating scales was consistent in measuring the underlying construct.

A3: Are Selected Empathy Measures Inversely Related to Selected Psychopathy Factor I Measures? (Questionnaire Data)

In an attempt to answer Question A3, the relationship between the selected empathy and psychopathy measures was examined. The assessment instruments, which were identified as 'promising' (i.e., consistent in measuring either construct), using the previously described statistical procedures, were correlated with each other (Table 11). For the assessment of empathic behaviour, eight questionnaires had been selected, and for the assessment of psychopathic behaviour, seven questionnaires had been selected.

In Table 11 it can be once more seen that the empathy measures (1 to 6) are clearly split into two groups: 1 to 3 for self-reports, which are significantly correlated with each other; and 4 to 6 for teacher-reports, which are highly cross-correlated as well. Similarly, the psychopathy measures 10 to 14 show highly significant correlations as well.

Most interesting are the cross-correlations between 'pure' other-report empathy measures (positive valence to empathy (+), such as 4 and 5) and 'pure' psychopathy measures (negative valence to empathy (-), such as 10 to 14). All of these correlations are negative and they are highly significant, as emphasised within the darkly shaded area.

Figure 1 makes these strong negative correlations visible for two examples. The left scatterplot reveals the negative relationship between the 'pure' empathy

Table 11

Correlation Matrix: Empathy (E) vs. Psychopathy (P) Measures (Kendall's Tau)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. + Bryant E	-	.23*	.41*	.17	.21*	.11	.04	-.05	.06	-.01	-.18	-.13	-.03	.07
2. + IRI, 'empathic concern' E		-	.39*	.13	.12	.06	-.12	-.14	.22*	-.11	-.08	-.08	-.03	.00
3. + Eisenberg empathy criterion E			-	.13	.07	.02	.01	.05	.05	-.04	.05	.02	-.02	.08
4. + Criterion empathy E				-	.70**	.71**	-.46**	-.56**	.42**	-.56**	-.61**	-.58**	-.51**	-.83**
5. + CBQ 'empathy' E					-	.60**	-.45**	-.53**	.44**	-.46**	-.60**	-.53**	-.49**	-.34**
6. + Criterion combined P (E)						-	-.58**	-.49**	.50**	-.66**	-.76**	-.64**	-.66**	-.51**
7. - CBCL, 'attention' E (P)							-	.36**	-.55**	.71**	.52**	.57**	.64**	.68**
8. - CPS 'lack of affect' E (P)								-	-.34**	.44**	.56**	.68**	.44**	.42**
9. + CBCL-TRF 'total adaptive' E (P)									-	-.49	-.43**	-.46**	-.40**	-.39**
10. - AML aggression P										-	.64**	.58**	.74**	.56**
11. - PSD total P											-	.70**	.66**	.45**
12. - CPS without GR P												-	.62**	.55**
13. - CBCL 'externalising problems' P													-	.58**
14. - CBCL 'social problems' P														-

Note. * $p<0.05$, **$p<0.01$ (two tailed); The measures 6–9 are assessing both the empathy and psychopathy constructs; +/- = positive/negative valence regarding the construct empathy; 1-3 are self reports, the others are teacher reports; IRI = Interpersonal Reactivity Index; CBQ = Child Behaviour Questionnaire; CBCL = Child Behaviour Checklist; CPS = Child Psychopathy Scale; AML = Aggression-Mood-Learning; PSD = Psychopathy Screening Device; The high negative correlations demonstrate that the two types of measures are consistently inversely related to the same underlying construct; E = related to empathy construct; P = related to psychopathy construct. The shaded areas indicate the strong cross-correlations of teacher-report data related either to the empathy (E) or psychopathy (P) construct, or both (E+P). (Positive or negative correlations are determined by the valence of the construct to empathy). Within these constructs, the 'pure' empathy measures 4 and 5 are clearly negatively correlated to the 'pure' psychopathy measures 10-14.

measure Criterion empathy (4) and the pure psychopathy measure Child Psychopathy Checklist without grandiosity (12), while the right scatterplot shows the correlation between the Child Behaviour Questionnaire 'empathy' (5) and Psychopathy Screening Device (11). These distributions seem to be representative for all the highly significant cross-correlations in Table 11. Both graphs show that the highly empathic children, represented by symbols on the top left corner of both graphs, belonged to a more homogeneous group (scores were less scattered) than the children with low empathy/high psychopathy scores. This may reflect the reluctance of some teachers to 'label' children negatively (resulting in a less homogenous group) and the fact that it was difficult to pre-select as many psychopathy-analogues as empathy-analogues.

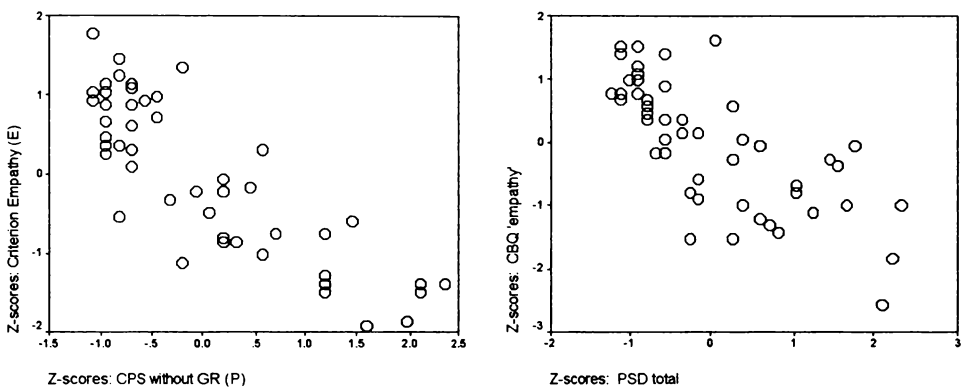

Figure 1. Samples for inverse relationship between empathy and psychopathy measures. The two scatterplots illustrate high negative cross-correlations between 'pure' empathy and 'pure' psychopathy measures (z-scores, n=50). The left graph shows the correlation of Criterion empathy (see 4 in Table 11) with Child Psychopathy Scale (CPS) without grandiosity (12); r = -58. The right graph shows the correlation of Child Behaviour Questionnaire 'empathy'(5) with Psychopathy Screening Device (11); r = -60.

Some of the measures (4 to 9 in Table 11) are related to aspects of empathy as well as those of psychopathy, depending on their valence to the underlying construct. The cross-correlations of these measures, which are related to both constructs, are highly significant as well, which can be seen in the lightly shaded area of Table 11; (negative or positive correlations depending on the valence [+ or –] to the construct of empathy).

The data in Table 11 also confirm the previous finding that there are no significant correlations between self-reports (1 to 3) and any of the teacher-reports; neither empathy-scales nor psychopathy-scales (4 to 14). Therefore there are neither significant positive, nor significant negative correlations.

The presented analyses of the questionnaires measures (Phase A) seem to indicate that they are either measuring different constructs, as evident among the empathy measures; or that their information value is reduced, as there is only one source of data, (evident among the psychopathy measures, which are based solely on teacher reports).

From the above findings it can be concluded that the selected empathy measures (+ valence) are highly and consistently negatively related to the selected psychopathy measures (- valence). This could be indicating that they are tapping into the same constructs and that therefore empathy and psychopathy Factor I are highly inversely related.

In response to auxiliary research question A1, it was possible to identify a selection of the 8 most consistent empathy measures. In response to auxiliary research question A2, it was possible to identify a selection of the 7 most consistent psychopathy measures. In response to auxiliary research question A3, it was possible to demonstrate that the selected empathy measures are indeed strongly inversely related to the selected psychopathy Factor I measures. From these findings follows that core research Question 1 can be answered in the affirmative: There seems to be an inverse relationship between the constructs of affective empathy and of psychopathy Factor I.

CHAPTER 7

Research Question Phase B

B1: How Do Psychophysiological Reactions Map Onto the Constructs of Empathy and Psychopathy, in Empathy Inducing Situations? (Heart Rate and Skin Conductance)

In order to answer question B1 various psychophysiological measures were recorded during empathy-inducing situations. While the children were watching four different films (Dolphins, Jamie, Roller coaster, and Bambi), their responses to the empathy or distress segments were recorded via data calculated for HR levels, HR reactivity, HR variability, HR slope, and SC reactivity. It was hoped that the psychophysiological data would support the group membership of the boys into either a low-empathic, behaviourally dysfunctional, and hardly aroused group of psychopathy-analogues; or a behaviourally well regulated, highly empathic and optimally aroused (or distressed) group of empathy-analogues. These groups had been pre-selected by their teachers during the recruitment phase to allow for a dichotomous approach and in order to facilitate the interpretation of the psychophysiological and questionnaire data. However, this classification was unknown to the research team (blind condition).

As mentioned previously, it was not expected that the participating children would represent the extreme values on the empathy - psychopathy continuum. Rather they were considered to be empathy- or psychopathy-'analogues' and it was hypothesised that their data would constitute a trend, distinguishing the two groups.

Table 12 shows the descriptive data for HR, recorded for all 50 children (means and SD). The data had been obtained during the various empathy or distress-inducing film segments (A, B, C, and D), each in three sections, such as pre-critical section (pre), critical section (crit), and post-critical section (post); for Dolphin, Jamie, Roller coaster, and Bambi. (Comparable data can be found for SC in Appendix I, Table I1.)

During the course of coding and data transformation it became evident that the measures from the second occurrence of the baseline video Dolphins (C) were too variable (too many artefacts) and the marker comments revealed that most of the children 'were too bored to watch the Dolphin film a second time' and were not paying attention.

Table 12

Descriptive Raw Data for HR (Mean and SD); Reported Separately Per Film Segment for Pre, Crit, and Post Sections; Calculated for Overall Mean, SD, Slope, Maximum, and Minimum.

Heart Rate Measures (Bpm)

	Mean (SD)			SD (SD)			Slope (SD)			Max (SD)			Min (SD)		
	pre	crit	post	pre	crit	post	pre	crit	post	pre	crit	post	pre	crit	post
Film Dolphins															
Segment A	-	95.2	-	-	7.0	-	-	0.12	-	-	106.4	-	-	82.3	-
(baseline)	-	(8.7)	-	-	(3.0)	-	-	(1.0)	-	-	(7.2)	-	-	(12.3)	-
Segment B	-	94.8	-	-	7.5	-	-	.02	-	-	110.4	-	-	77.56	-
(baseline)	-	(8.7)	-	-	(2.7)	-	-	(.1)	-	-	(8.2)	-	-	(11.3)	-
[Segment C]	-	96.6	-	-	7.54	-	-	.04	-	-	11.1	-	-	79.01	-
	-	(9.4)	-	-	(2.9)	-	-	(.2)	-	-	(8.3)	-	-	(13.5)	-
AB combined	-	95.0	-	-	-	-	-	-	-	-	-	-	-	-	-
(baseline)	-	(8.4)	-	-	-	-	-	-	-	-	-	-	-	-	-
Film Jamie															
fire A (distress;	97.2	93.7	96.5	6.7	6.5	6.3	-.00	-.07	-.03	109.1	105.1	107.3	82.6	82.1	83.8
empathy)	(9.0)	(9.6)	(9.0)	(3.1)	(2.5)	(2.3)	(3.5)	(1.1)	(.6)	(8.0)	(8.2)	(9.0)	(14.0)	(11.9)	(11.7)
[phone] B (sympathy	97.2	96.0	94.3	6.7	5.9	7.2	.04	.11	-.05	107.2	104.7	105.8	84.5	85.6	80.7
perspective taking)	(10.6)	(10.8)	(9.2)	(3.2)	(3.0)	(3.3)	(1.1)	(2.7)	(1.2)	(8.2)	(9.1)	(18.2)	(14.2)	(13.7)	(11.8)
hallway C (sympathy;	94.0	92.7	93.8	5.3	6.2	6.4	.13	.19	-.01	102.0	102.8	105.4	85.2	81.4	82.1
empathy)	(9.3)	(9.8)	(9.7)	(2.5)	(2.9)	(3.0)	(2.2)	(.8)	(.6)	(8.6)	(7.8)	(8.5)	(11.6)	(12.6)	(12.5)
tease D (empathy;	94.8	95.3	95.7	6.4	6.5	6.2	.15	-.35	-.82	106.3	106.1	104.9	82.1	83.6	85.7
sympathy, persp. taking)	(9.4)	(9.4)	(10.0)	(2.8)	(3.5)	(4.0)	(.4)	(.8)	(2.9)	(7.6)	(8.0)	(7.9)	(13.1)	(12.7)	(13.3)

	Mean (SD)			SD (SD)			Slope (SD)			Max (SD)			Min (SD)		
	pre	crit	post	pre	crit	post	pre	crit	post	pre	crit	post	pre	crit	post
Film Roller coaster R															
(arousal)	93.8	93.2		6.4	6.5	-	-.11	.07	-	103.5	103.8	-	83.5	79.2	-
	(9.2)	(9.0)		(3.3)	(2.7)	-	(3.0)	(.5)	-	(7.8)	(8.0)	-	(12.0)	(11.4)	-
Film Bambi															
[hungry] A (distress,	94.5	96.3	95.5	6.3	5.7	7.0	-.09	-.12	-.15	105.5	104.6	107.6	82.0	86.6	81.7
empathy; persp. taking)	(9.7)	(11.5)	(9.9)	(2.1)	(3.1)	(3.2)	(.5)	(2.1)	(1.7)	(8.2)	(9.1)	(7.8)	(13.2)	(15.2)	(14.5)
shots B (distress;	93.5	98.5	99.2	5.8	2.3	6.3	.43	.18	-.27	103.6	112.6	109.0	82.8	81.7	87.3
empathy)	(9.4)	(9.4)	(11.4)	(2.6)	(2.6)	(2.7)	(1.0)	(.3)	(1.0)	(7.5)	(8.4)	(9.4)	(12.3)	(12.8)	(14.7)
calling C (empathy;	96.7	94.7	91.9	6.5	7.7	6.9	.06	-.14	-.84	107.5	109.6	103.1	82.7	77.1	79.5
sympathy)	(10.0)	(9.3)	(9.7)	(2.6)	(2.8)	(2.7)	(1.6)	(.2)	(1.0)	(9.2)	(7.4)	(7.1)	(12.8)	(12.8)	(12.3)
father D (distress;		93.0	93.6		6.4	6.8		.20	.05		104.0	106.6		80.5	80.7
empathy)		(9.3)	(9.7)		(2.5)	2.8)		(.6)	(.5)		(7.6)	(7.4)		(11.8)	(12.6)

Note. pre=film-sections preceding the critical film scene; crit=critical film-section; post=film-section following the critical film scene; film-segments in [] were omitted from further analysis, due to incomplete or faulty data; the means for Roller coaster post-section could not be calculated due to insufficient amount of valid data; the means for Bambi 'father' pre-section could not be calculated due to insufficient amount of valid data.

Thus, it was decided to rely on the averaged value of segments Dolphin A/ 1st baseline and Dolphin B/ 2nd baseline to form the mean baseline AB for the HR resting values data.

Similarly, it became obvious that the information obtained from the segments Jamie 'phone' (B) and Bambi 'hungry' (A), was not complete. Inspection of the qualitative information and the marker comments revealed that both segments were heavily based on the understanding of spoken language; which in the 'Jamie' video was difficult to understand due to the American accent, and in the 'Bambi' segment due to muffled sound. It seems reasonable to assume that the understanding of these two film segments required some level of 'perspective taking' and/or Theory of Mind to elicit empathy. Thus it was decided to rely on data from the remaining 7 film segments and to discard the Jamie B and Bambi A data. There was insufficient complete data to calculate the mean for the Roller coaster post-section, as most children remained excited after the film's end; similarly there was insufficient complete data to calculate the mean for the Bambi 'father' pre-section, as most children's HR was still influenced from the previous section 'calling'.

7.1. Heart Rate Mean Data and First Step in Classification; (Baseline for Dispositional; Reactivity for Situational)

As previously discussed in the introduction (see also methodology in Appendix A), the information from the HR baseline (dispositional data; resting HR) provides an important indicator regarding psychopathy traits in early childhood (e.g., Blair, 1997; Raine, 1997). Thus, it was decided (based on the literature) to rank-order the HR baseline scores and to use cluster analysis procedures to arrive at a preliminary dichotomous classification of the 50 boys. These procedures were combined with discriminant analyses to confirm and refine the mapping of the children onto the empathy- or psychopathy construct, respectively (i.e., a bootstrapping approach). This process was repeated for each set of psychophysiological data (such as HR reactivity, HR variability, or skin conductance).

In a first step of data exploration the mean HR data for all participants (n=50) were visually inspected for patterns related to the presented film stimuli (for 7 film segments, separated into pre, crit, and post sections). This provided information

regarding attention reactions to the specific stimuli, as well as patterns of recovery, and information of fluctuations around the baseline mean.

The means of the HR data (n=50) were tested for normality (Kolmogorov-Smirnov), which were confirmed as acceptable for all but the two sections Bambi 'calling' (pre) and Bambi 'father' (post). Figure 2 shows that the mean values for HR in the Jamie crit-sections 'fire' and 'hallway', and Bambi 'calling' and 'father', were lower than the comparable means for Jamie 'tease' and Bambi 'shots'. This might indicate that the former segments elicited more HR deceleration (reactivity), which is indicative of more situational attention, and/or that the latter segments are more distressing (HR acceleration/ distress-reactivity). However, most segments show an overall decrease (i.e., attention/reactivity) in HR for the crit sections, which was expected; except for Bambi 'shots', which seems to have been distressing/startling (HR acceleration). The Jamie 'tease' segment shows a slight HR increase, possibly indicating that the children's attention span for the first video (Jamie) was declining (i.e., getting overall more restless and less attentive) returning to baseline levels (marked by an increase in HR); this explanation might be applicable for the same pattern in Bambi 'father'. The Roller coaster segment surprisingly elicited a decelerated HR crit value, which suggests attentiveness, rather than the expected distress or 'pure' arousal.

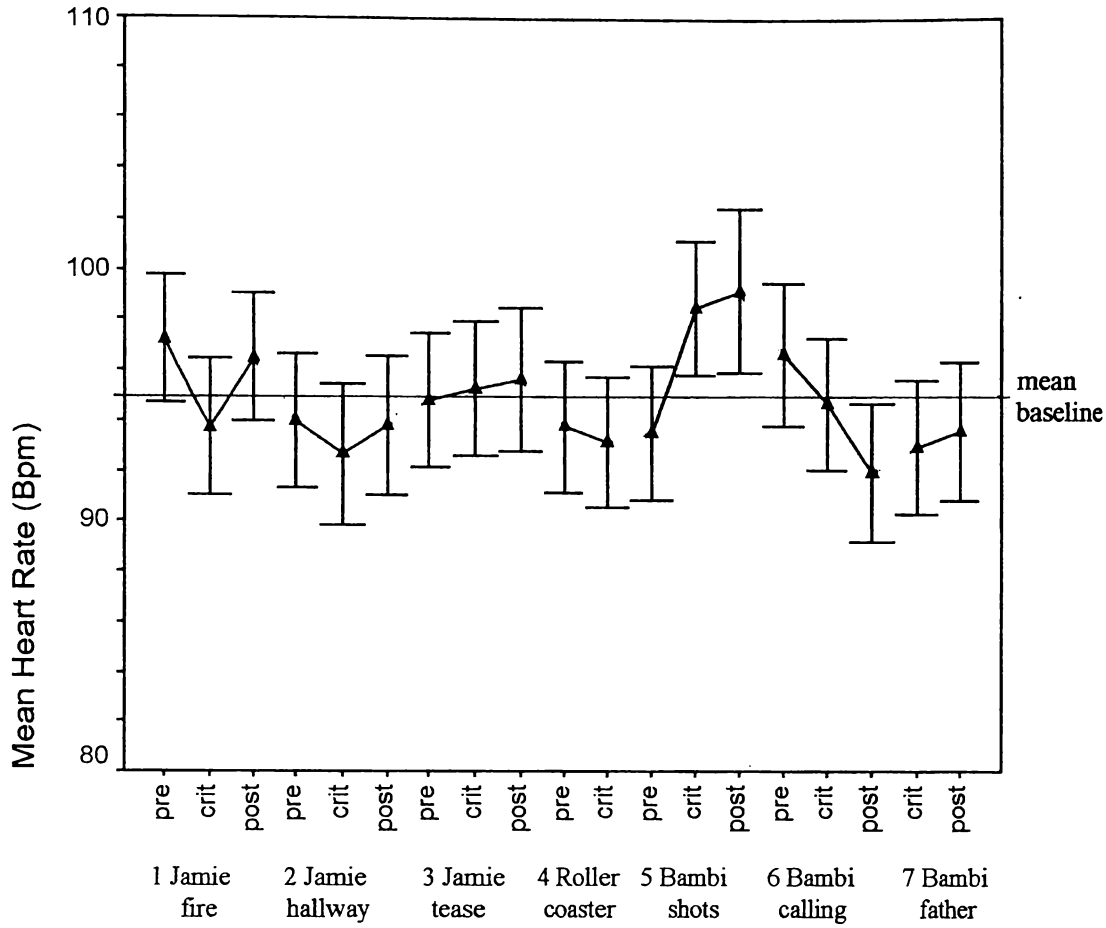

Figure 2. Mean HR values of the 50 participants for the pre, crit, and post sections of the 7 film segments. Error bars are indicating 95% confidence intervals.

Participants' HR resting levels were then ranked to form three groups: High (empathy-analogues) n=17; Low (psychopathy-analogues) n=17. Their mean HR group-data were again visually inspected for each film segment and the corresponding sections. The 16 participants falling into the middle of the range were not included in subsequent steps in order to accentuate the differences between the two groups of interest.

After splitting the participant data into a High and Low group (see Figure 3), the distribution of their HR resting levels was noted. It can be seen that the two groups (empathy-analogues and psychopathy-analogues) are not only clearly distinguishable based on their HR resting levels, but these values also seem to be normally distributed. This can be interpreted as an indication that these two groups really belong to different populations, reflecting the pre-selection by their teachers.

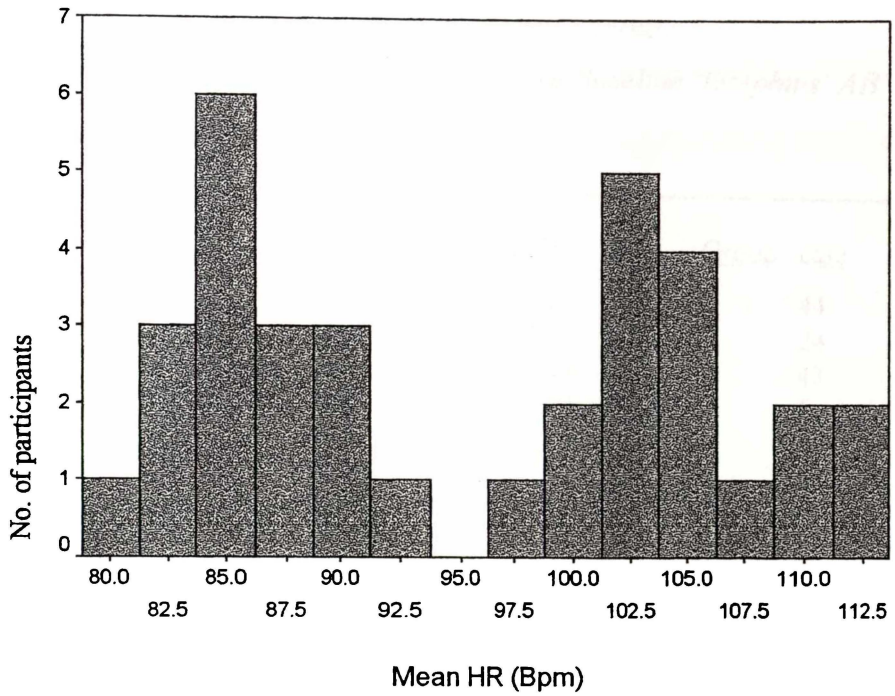

Figure 3. Mean HR baseline (Dolphins AB) separated for the group Low (psychopathy-analogues, n=17) on the left side and group High (empathy-analogues, n=17) on the right side.

The classification in Table 13 identifies which individual cases have been allocated membership into which group. This represents the first step in the classification of the children into 'Low' resting HR values (i.e., psychopathy-analogues) and 'High' resting HR values (i.e., empathy-analogues). The 'Middle' group (n=16) is shown in this table also, which could potentially be allocated to either group High or group Low.

Table 13

First Step to Define Group Membership (Bootstrapping);

Based on Rank-Ordered Mean Resting HR From Baseline 'Dolphins' AB

Group	case	M(AB)	Group	case	M(AB)	Group	case	M(AB)
L	21	80.68	L/M	2	91.35	H	44	98.33
L	18	81.84	L/M	47	91.39	H	24	99.05
L	12	82.03	L/M	5	91.44	H	43	100.04
L	28	82.83	L/M	49	91.50	H	6	101.36
L	48	83.98	L/M	35	91.96	H	15	101.81
L	33	84.29	L/M	30	92.50	H	26	102.22
L	25	85.32	L/M	23	92.73	H	16	102.40
L	34	85.47	L/M	42	93.63	H	19	103 41
L	3	85.84	-----Split 25 : 25-----			H	40	103.90
L	29	86.11	H/M	17	94.43	H	22	104.00
L	10	88.23	H/M	36	94.75	H	50	104.36
L	41	88.45	H/M	8	95.84	H	39	106.01
L	46	88.69	H/M	9	96.33	H	38	107.21
L	1	89.16	H/M	14	96.57	H	20	109.04
L	45	90.73	H/M	4	97.25	H	27	110.29
L	37	91.16	H/M	31	97.61	H	32	111.39
L	11	91.33	H/M	13	97.64	H	7	112.24
	Mean	86.24					Mean	104.53

Note. This first step towards classification is based on the ranked means of HR baseline (Dolphins AB); L= low HR; H = high HR; L/M = low middle values HR; H/M = high middle values.

Visual inspection of the HR mean data for the two groupings (High and Low) in Figure 4 reveals that the data spread in High is smaller compared to the Low group, which might be an indication of the predicted better emotion regulation. It is also visible that all of the HR means for the High group are close to, or below mean baseline levels (Dolphins AB), except for the distress response in Bambi 'shots' (crit). This response pattern could indicate the expected attentiveness in response to the presented stimuli in the crit sections. The recovery (post) after the stimuli was mostly consistent with expectations as well, with either increase after attentiveness in crit, or decrease after distress (such as in Bambi 'shots', post). In comparison, the Low (n =17) group data fluctuate above and below the mean baseline value, indicating more random variability, less responsiveness to the film-stimuli, and less regulation. In addition, the recovery after

the distress reaction in section Bambi 'shots' (post) is much slower (i.e., the HR data are still increasing), and it appears that the HR trace is less related to the presented stimuli and more randomly variable.

Overall, it can be seen that the 95% confidence intervals of the data for both groups never overlap, suggesting that the data are derived from two different populations, and could well reflect the two groups previously selected by their teachers.

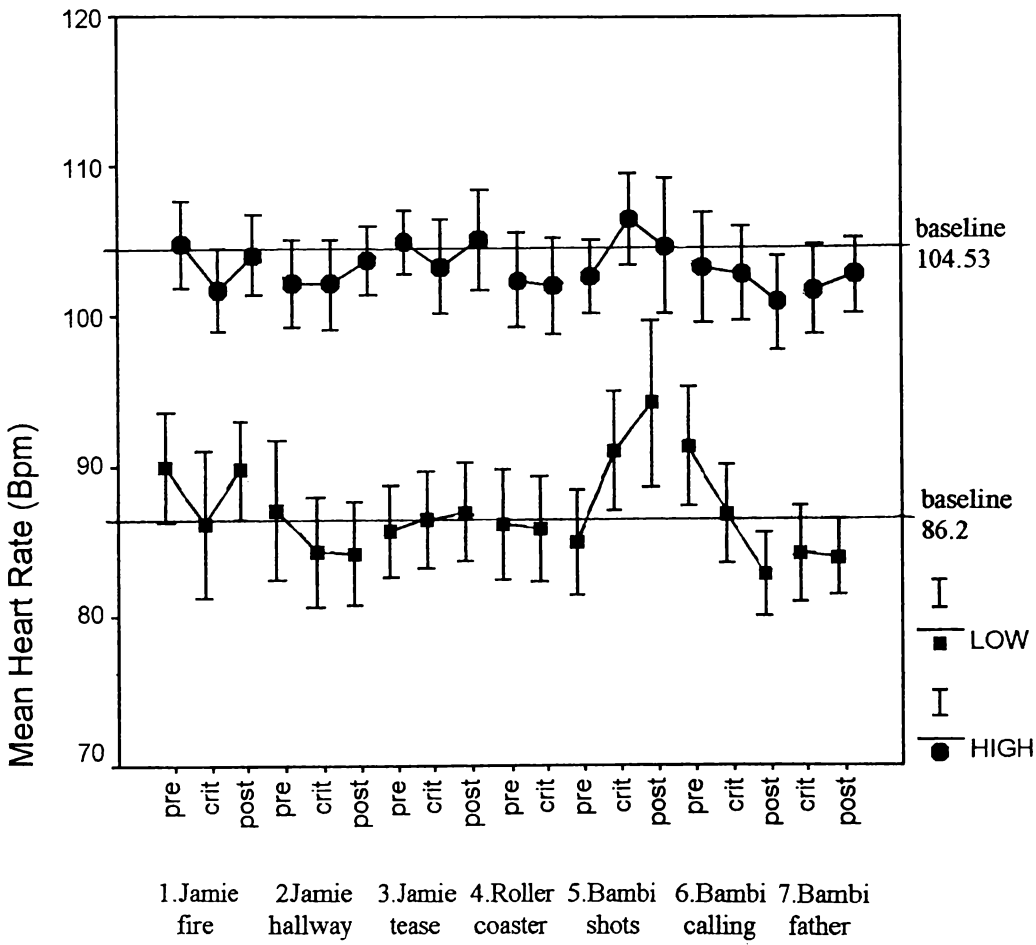

Figure 4. Mean HR graphed separately for the Low (n=17) and the High (n=17) groups; for the pre, crit, and post sections of the seven film segments. Error bars indicate 95% confidence intervals. The horizontal lines are the mean HR baseline levels (Dolphins AB) for each group.

This is also illustrated in Figure 5 via the two sample HR (Bpm) traces of two typical exponents of the Low- (n=17) and High-group (n=17), respectively. The figure depicts five seconds of original HR raw-data recording per film-section (pre, crit, and

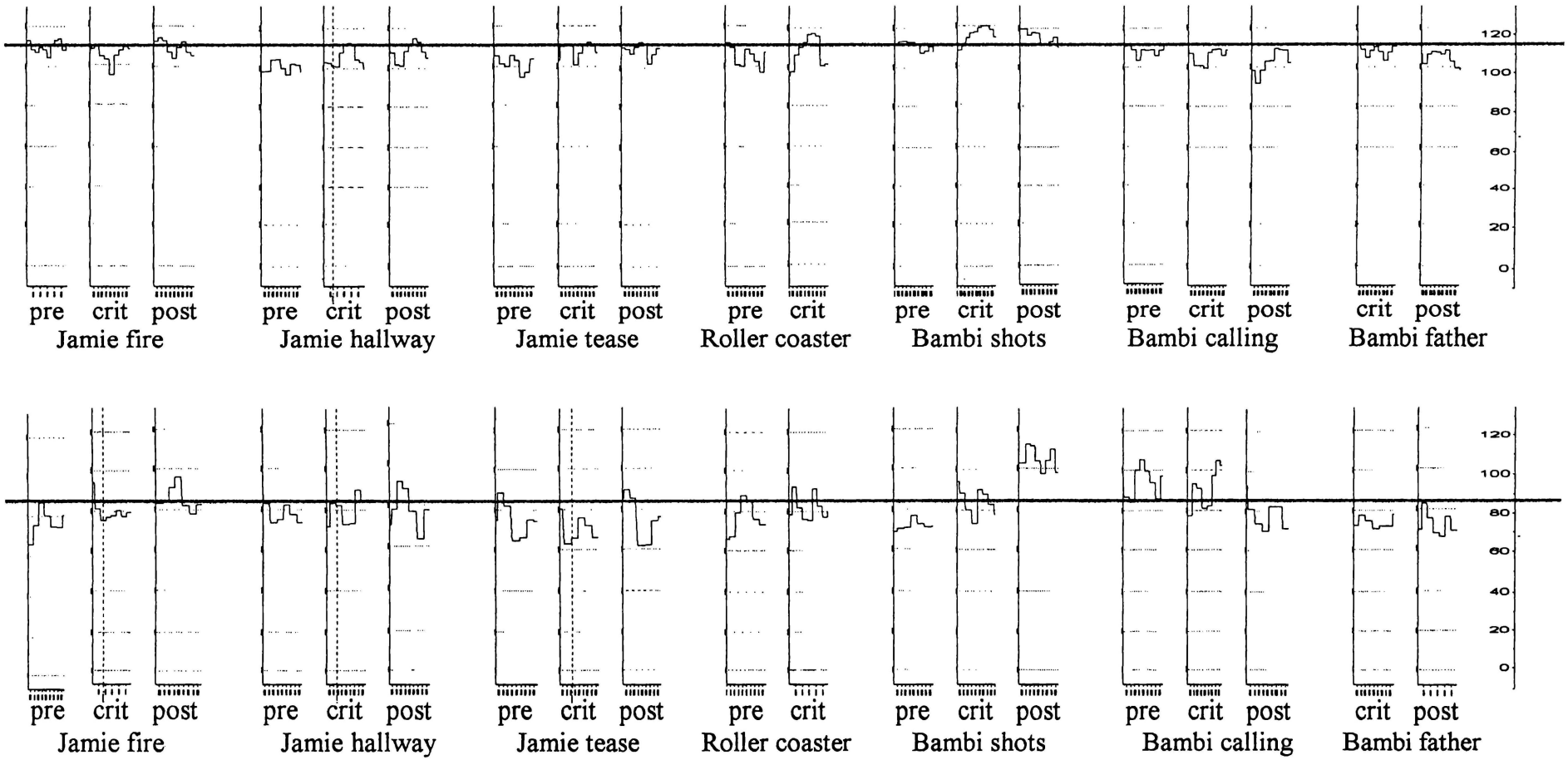

Figure 5. Original data for HR (Bpm), as recorded by PowerLab for two sample children; one from the High group (at top) and one from the Low group (at bottom); 5 seconds per section (pre/crit/post) of each film segment.

post) and per film-segment (which is shorter than the entire segments that were used to calculate mean HR data). This figure demonstrates the previously described findings. The HR trace of the Low-group child is lower than for the High-group child; Low-group reactions were more variable (greater range; less regulation); the recovery (post) in Bambi 'shots' was delayed; and the fluctuations around the baseline (Dolphin mean AB) were more variable for the Low-group child compared to the High-group child (for values increase and values decrease equally, and thus cannot be explained solely by the 'law of initial values' or 'ceiling effect'). Most HR recordings for the crit-sections were below mean baseline (Dolphin AB) for the High-group child (i.e., attentive behaviour to stimuli).

7.2. HR Reactivity Data (situational)

In the next stage of data analysis it was decided to further explore the first step of classifying the Low-group and High-group children based on the HR baseline data. HR reactivity data were chosen to verify and refine the previous grouping, leading to the second classification step. HR reactivity is assumed to be low for psychopathy-analogues as they are not attentive/reactive to social stimuli, especially when these do not include tangible rewards/punishments. Reactivity to stimuli is understood to be high for empathic individuals, whereas, non-empathic individuals usually don't react to other's distress. HR reactivity was calculated as composite of the crit minus pre values, crit minus baseline Dolphin AB values, and crit minus post values.of the film-segments.

First, clustering procedures with the 34 selected children were performed in order to detect naturally occurring homogenous sub-groups in the data, and to test whether the same individual children would map onto comparable groupings of High and Low; which resulted in a second classification. This procedure was then extended to include all 50 children, using the 25:25 split (see Table 13), in order to take account also of the Middle group during this second step of classification, (based on the original recruitment procedure of participants there should be 25 High and 25 Low).

The resulting groupings from the above clustering procedure, based on HR reactivity data (second classification into High, Low, and Middle), and the rank-ordered groups based on HR baseline data (first classification into High and Low), were then compared and verified, using various discriminant analyses in an additive fashion. The

two classification procedures (i.e., rank ordering of HR baseline data and clustering of HR crit-section data) were combined to be used as grouping variable for discriminant analyses, to be matched with predictor data based on reactivity. This led to the third grouping procedure via successive discriminant analyses, which identified with increasing consistency, which individuals were part of which grouping. It was not expected that the Middle group, which included fluctuating values (for example changing from High to Low, depending on film segment), could be eliminated completely. However, it was aimed to reduce the size of this group, and this in turn resulted in more cases being reliably allocated to either Low (psychopathy-analogues) or High (empathy-analogues).

Table 14 shows the results of the first clustering procedure including the 34 children from High and Low grouping. The inspection of the data in Table 14 shows clearly that the HR reactivity data were separated into two distinct clusters of 17 : 17. This duplicates the original first classification, which had been achieved by rank-ordering HR baseline data. In stage 4 of clustering the reactivity data (3rd column from the right) it can be seen that the two groups are clearly distinct from each other. However, by eliminating outlier-cases 12, 18, and 48, the split would already appear as early as the 2nd stage of clustering (i.e., first column from right). It is interesting to note that the reactivity data of the High group are more homogenous (all coded 1), than the values of the Low group, whose data are more variable (mainly code 2, but outliers for cases 1, 12, 18, 37, 46, and 48). Again, this confirms the expectation (and the previous findings, which were discussed for questionnaire data; Figure 1) that the group of the psychopathy-analogues (Low) will be less homogenous. This is also reflecting the fact that it was difficult for the teachers to nominate as many psychopathy-analogues as empathy-analogues.

Table 14

Membership of the High Group (at Top) and the Low Group (at Bottom) Within 2 to 6 Clusters, Based on HR Reactivity Data, for all Film Segments Combined

Case codes	Number/stages of clusters 6	5	4	3	2	
6	1	1	1	1	1	
7	1	1	1	1	1	
15	1	1	1	1	1	
16	1	1	1	1	1	
19	1	1	1	1	1	
20	1	1	1	1	1	
22	1	1	1	1	1	
24	1	1	1	1	1	
26	1	1	1	1	1	High group (empathy-analogues)
27	1	1	1	1	1	
32	1	1	1	1	1	
38	1	1	1	1	1	
39	1	1	1	1	1	
40	1	1	1	1	1	
43	1	1	1	1	1	
44	1	1	1	1	1	
50	1	1	1	1	1	Suggested split
1	2	1	1##	1	1	← between the High and the
3	3	2	2	1	1	Low groups (clearly
10	3	2	2	1	1	visible at stage 4)
11	3	2	2	1	1	
12	4	3	3	2	2#	
18	5	4	4	3#	1	
21	3	2	2	1	1	
25	3	2	2	1	1	
28	3	2	2	1	1	Low group,(psychopathy-analogues)
29	3	2	2	1	1	in bold
33	3	2	2	1	1	
34	3	2	2	1	1	
37	1	1	1##	1	1	
41	3	2	2	1	1	
45	3	2	2	1	1	
46	1	1	1##	1	1	
48	6	5	4	3#	1	

Note. # outlier; ## closer affiliation to H-cluster than to L-grouping; case codes denote individual children (n=34).

These results demonstrate that the clustering procedure, which was performed with a different set of data, arrived at the same dichotomous classification (High versus Low group) for the 34 individual cases, as the rank-ordering procedure of HR baseline data (Dolphins AB) had already provided. These data again support the hypothesis that the two groups represent distinct populations.

Further exploratory analyses were conducted by clustering the data of all 50 children for each film segment separately. The results of these clustering procedures were analysed additively to confirm/disconfirm the split of the identified individuals into High versus Low group. The results identified 15 of the High group (empathy-analogues) and 12 cases in the Low group (psychopathy-analogues) by combining all the different clustering procedures via visual inspection. (The rest of the children, n=23, were fluctuating from Low to High, depending on film segment). Because these grouping procedures were based on all 50 cases, it was possible to eventually allocate some cases from the middle group into High or Low; on the other hand the repeated clustering resulted in some re-allocation (fluctuations) of previously defined cases. Table 15 shows the new groupings: in former group High, there are 10 confirmed cases for classification into empathy-analogues (code High), and 7 cases had some fluctuations during the course of the several clustering procedures for different film segments; in former group Low, there are 8 confirmed cases for classification into psychopathy-analogues (code Low), and 9 cases had some fluctuations during the successive clustering procedures (and one was re-allocated into High). In the new Middle group it was eventually possible to allocate 4 cases to High and 4 cases to Low, based on their consistent pattern during the additive clustering procedures.

This cluster analysis was conducted to confirm the validity of the original first classification, in order to distinguish High group (i.e., empathy-analogues) from Low group (i.e., psychopathy-analogues). These steps of classifying the children into two distinct groups, with clearly defined physiological reaction patterns, are important in the process of answering core research question 2, whether it will be possible to discriminate non-empathic (psychopathy-analogues) from highly empathic children.

Table 15

Second Step to Refine Group Membership (Bootstrapping Approach) of All 50 Boys; Based on Cluster Analysis of HR Reactivity Data.

Former High Group	Classification Code	Former Low Group L	Classification Code	New Middle Group M	Code
7	High	3	Middle	2	High
19	High	10	Low	4	High
20	High	11	Low	5	Middle
26	High	18	Middle	8	Middle
27	High	21	Low	9	Low
32	High	25	Low	13	Middle
38	High	29	Low	14	Middle
39	Middle	33	Low	17	High
43	High	34	Middle	23	Middle
6	Middle	1	Middle	30	Low
15	Middle	28	Middle	31	Low
16	Middle	45	Middle	35	Low
22	High	48	Low	36	Middle
24	Middle	37	Middle	42	Middle
40	High	41	Low	47	Middle
50	Middle	46	High	49	High
44	Middle	12	Middle		

Note. This represents the second step in the classification of the children into psychopathy-analogues (Low group) or empathy-analogues (High group), (based on HR baseline data and refined via HR reactivity data).

Discriminant analyses predicting group membership for all 50 participants were used as an additional check on the accuracy of the two existing classification systems (chance number of correctly classified cases is 33.3%, as there are three possible groupings; High, Middle, Low). The first discriminant analysis was conducted with HR baseline as grouping variable and reactivity raw scores (HR) from all film-segments as predictors (HR reactivity was expressed either as values of crit, of crit – baseline, of crit–pre, or crit–post). This analysis resulted in 98% correctly classified cases (simultaneous method).

The predicted group membership was then compared case-by-case to the group membership identified earlier. The rank-ordering of HR baseline data (first classification) was matched with the second classification from the clustered crit-section data, and this resulted in a match for 27 children, who clearly belong into Low (psychopathy-

analogues) or High (empathy-analogues). This was confirmed by the discriminant analysis procedure (Table 16), where it can be seen that 94% (=47 cases) were correctly identified to belong into group High (=15), Low (=11), and Middle (=21). This shows that the two original classifications were robust in consistently identifying the two groups of children as Low (psychopathy-analogues) or High (empathy-analogues), (see Tables 13 and 15). (The grouping variable was a combination of clustered HR crit data with ranked HR baseline data, and the 21 predictor variables were based on HR reactivity.)

Table 16

Classification Matched Between

Predicted and Original Group Membership (Classification Results)

Original	Predicted Group Membership			Total
	Low	Middle	High	
Low	**11**	1#	0	12
Middle	1#	**21**	1#	23
High	0	0	**15**	15
Low	**91.7**	8.3	.0	100
Middle	4.3	**91.3**	4.3	100
High	.0	.0	**100**	100

Note. 94% of original grouped cases were correctly classified by discriminant analysis; # 3 misclassified cases (2 for middle, one for low); The grouping variable (original) was a combination of clustered HR crit data with ranked HR baseline data; and the 21 predictor variables were based on HR reactivity for all film segments (z-scores); (simultaneous method).

The case wise statistics table (Table 17) identifies which individual cases were misclassified: case 31, case 39, and case 42. All other 47 cases were correctly allocated to group High, Low, or Middle.

Table 17

Case wise Statistics (Discriminant Analysis) Using the Second Classification (Clustering of HR Reactivity Data Combined With Ranked HR Baseline Data) as Grouping Variable

Case number	Grouping variables	Predicted Group	Squared Maha-lanobis distance to centroid	Case number	Grouping variables	Predicted Group	Squared Maha-lanobis distance to centroid
1	2	2	1.216	26	3	3	3.857
2	3	3	1.196	27	3	3	1.947
3	2	2	0.267	28	2	2	2.029
4	3	3	1.281	29	1	1	2.591
5	2	2	3.772	30	1	1	0.040
6	2	2	0.300	31	1	2#	0.724
7	3	3	1.299	32	3	3	0.471
8	2	2	0.426	33	1	1	4.009
9	1	1	0.76	34	2	2	0.820
10	1	1	2.827	35	1	1	5.057
11	1	1	0.888	36	2	2	0.062
12	2	2	1.507	37	2	2	0.516
13	2	2	3.149	38	3	3	1.800
14	2	2	2.924	39	2	3#	2.880
15	2	2	0.102	40	3	3	2.288
16	2	2	0.838	41	1	1	5.685
17	3	3	0.659	42	2	1#	2.143
18	2	2	0.828	43	3	3	2.119
19	3	3	0.416	44	2	2	1.627
20	3	3	1.428	45	2	2	3.072
21	1	1	1.360	46	3	3	3.453
22	3	3	0.536	47	2	2	0.195
23	2	2	1.003	48	1	1	3.523
24	2	2	1.943	49	3	3	4.081
25	1	1	0.063	50	2	2	1.242

Note. #= the Discriminant Analysis classifies 3 mismatched cases; 1 = Low; 2 = Middle; 3 = High; Grouping variable = Derived by using ranked baseline HR data combined with clustering of HR reactivity data; Predicted data: 21 variables based on HR reactivity data for 7 film segments; 47 matching cases; Mahalanobis distance identifies closeness of individual cases to centre of grouping variable.

This result demonstrated that the combination of clustering HR reactivity values and ranking HR baseline values seemed to be an excellent system to classify the children into the High group (empathy-analogues) or into the Low group (psychopathy-analogues). Consistently there were the same individual children identified to belong into one or the other group, based on their HR data, while they were watching various films. Thus, the same children who were identified to have low baseline HR, were also identified to have less reactivity to empathy-inducing stimuli. Thus, according to literature, they could potentially be part of the group of psychopathy-analogues. Whereas the children with high baseline HR and high attentiveness/reactivity are likely to belong into the empathy-analogues group.

However, there were still 23 children in the fluctuating Middle group. Further exploratory discriminant analyses were used to clarify the group-membership for some of these children. As grouping variable the combination of ranked HR baseline and clustered HR reactivity data was retained, which had led to the previous second classification. However, as predictor variables the HR reactivity data were chosen in successive, single steps for a series of discriminant analyses. The case-wise statistics of these analyses were visually inspected and, in additive fashion (bootstrapping), their information was combined to clarify the group membership of nine more cases, which were previously not yet identified as High or Low (rather they were allocated to the fluctuating Middle group). These further analyses led to the third grouping of classifying children into High (empathy-analogues) or Low (psychopathy-analogues).

Table 18 shows this latest step of grouping, and it can be seen that 16 children could reasonably be allocated to High group (empathy–analogues) and 11 children were allocated to Low group (psychopathy-analogues). Again, this corresponds to the expectation that it would have been more difficult for the teachers to pre-select children according to the psychopathy criteria and that therefore there might be less psychopathy-analogues than empathy-analogues in this study.

These successive classification procedures have been able to address research question 2, as it seems possible to discriminate empathy-analogue from psychopathy-analogue children. Auxiliary question B1 has been answered so far for HR baseline and HR reactivity data. Both have been found to map very well onto the constructs of empathy and psychopathy, and both data sets discriminate between the two groups High

Table 18

Third Step to Refine Group Membership (Bootstrapping) of the 50 boys Into a High-Group (Empathy-Analogues) and Low-Group (Psychopathy-Analogues) Based on Additive Discriminant Analyses; (Third Classification System)

High Group	Classification Code	Low Group L	Classification Code	Middle Group M	Code
7	High	3	**Low**	2	High
19	High	10	Low	4	High
20	High	11	Low	5	Middle
26	High	18	Middle	8	**High**
27	High	21	Low	9	Low
32	High	25	Low	13	Middle
38	High	29	Low	14	**High**
39	**High**	33	Low	17	High
43	High	34	**Low**	23	Middle
6	**High**	1	Middle	30	Low
15	**High**	28	**Low**	31	Low
16	**High**	45	Middle	35	Low
22	High	48	Low	36	Middle
24	**High**	37	Middle	42	**Low**
40	High	41	Low	47	Middle
50	**High**	46	High	49	High
44	Middle	12	Middle		

Note. Grouping variable = combination of first and second classification (i.e., ranked HR baseline and clustered HR reactivity data); Predictor variables = HR reactivity data (crit-baseline, crit-pre, crit-post), entered each singly and in succession (for all segments).
Bold = changed coding for individual cases; Total of 23 High, 16 Low, and 11 Middle.

empathy and Low empathy by consistently identifying the same individuals. These results clearly confirm the theoretical underpinnings that HR baseline and HR reactivity are valuable tools for empathy and psychopathy research, and that they might be useful for profiling empathy- and psychopathy-analogues.

In the next step of the study it was aimed to explore how the measure of HR variability could contribute to these findings.

7.3. Heart Rate Variability (derived from SD data)

Heart rate standard deviation scores represent variability, or the dispositional measure of vagal tone. High variability should be found in baseline segments (Dolphins AB and pre-sections of the films) of individuals who lack emotion regulation and thus display large spontaneous HR fluctuations; that is in psychopathy-analogues. Similarly, in

the crit-sections of the films, high SD values are believed to represent lack of attention, i.e., the fluctuations are not suppressed (due to the lack of emotion regulation). Finally, it was expected that the lack of emotion regulation is displayed in the post-sections by the psychopathy-analogues as they do not recover well (fast) after 'sensation seeking' stimuli and their SD values remain high (see methodology in Appendix A).

Based on the previous findings, it was decided to confirm/disconfirm the grouping (empathy-analogues versus psychopathy-analogues) one more time with a different set of data. This replication of the previous procedures, using HR variability (calculated from SD of the HR data), is expected to validate the High/Low classification and to add new information regarding individual children, who have not yet been grouped with certainty.

The HR variability data were checked for normality, skewness and kurtosis (Kolmogorov-Smirnov), which were found to be acceptable. Figure 6 shows overall SD mean values for each film segment (averaged pre, crit, post sections), for all 50 children. It can be seen that the overall mean SD values per film-segment show that variability is indeed changing from segment to segment. The Jamie fire, Roller coaster and Bambi calling film segments have the highest HR variability scores, which is congruent with the theory that emotion regulation would be decreased in distress and 'pure' arousal segments. The Jamie hallway film segment induced the smallest fluctuations (lowest HR variability scores), which might indicate greatest attentiveness (i.e., suppression of HR variability).

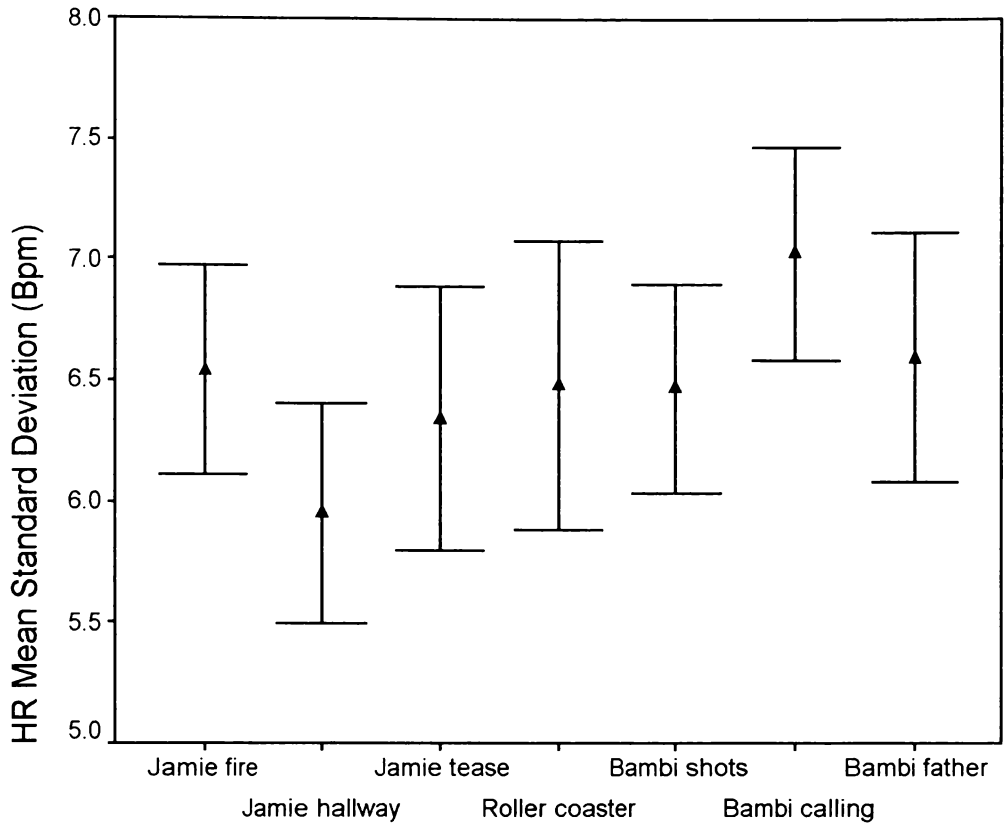

Figure 6. Fluctuations of HR mean SD values for the 7 film segments; n=50. Low values indicate small variability, high values indicate high variability.

This overall information was explored in more detail for groups Low and High (n=17 each), separately (split based on previous classification, see Table 15). In Figure 7 it can be seen that the mean SD values for psychopathy-analogues are consistently higher for each film segment. This confirms the theoretical assumption that they would be less regulated and that their HR data would be more variable (more fluctuating). It also confirms that the classification has indeed identified two separate groups who consistently display different data from each other. The Low group values for HR baseline and HR reactivity were lower, and the HR SD values are now significantly higher in relation to High group (i.e., none of the 95%-confidence intervals are overlapping).

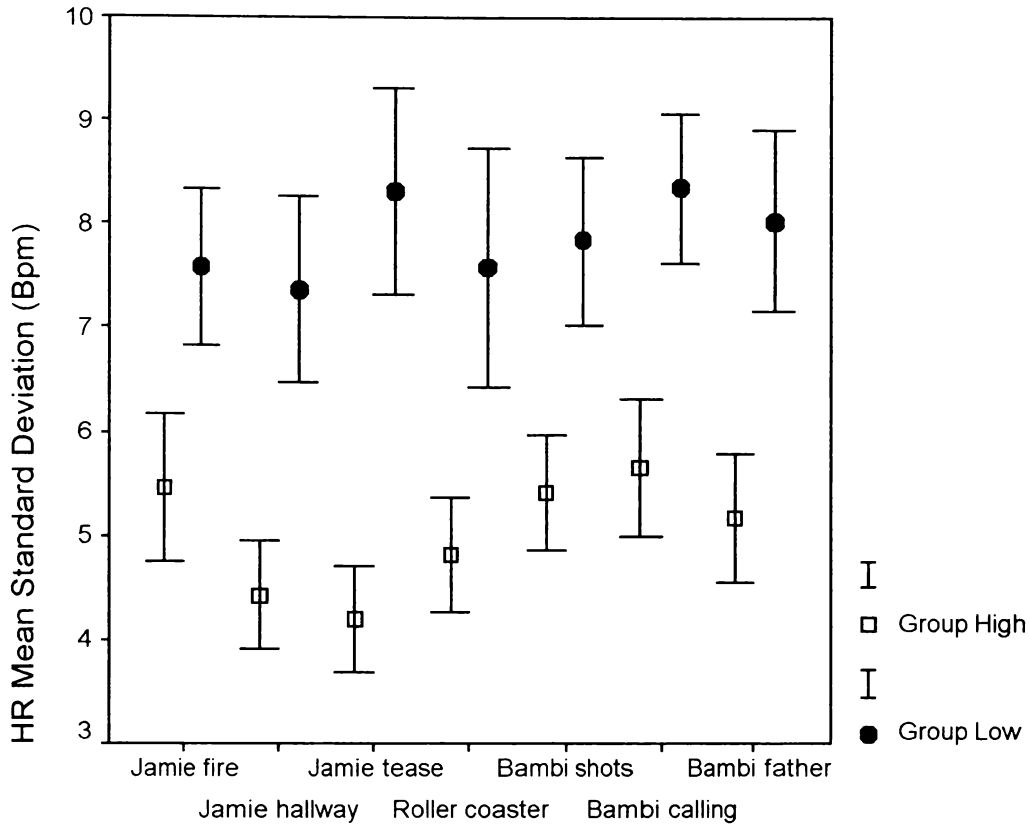

Figure 7. Fluctuations of HR mean SD values for all film segments for the Low and High groups (n=17). The Low Group (psychopathy-analogues based on HR mean baseline) is now high for HR variability and vice versa for the empathy-analogues.

It was decided to validate the above result by exploring the SD data set with discriminant analyses. The grouping variable was based on the previous findings, where all 50 children had been classified into High or Low, based on their HR baseline values combined with their HR reactivity values (see grouping results in Table 18). The predictor variables for the discriminant analyses were derived from the HR variability data set. Table 19 shows the correctly classified, or misclassified individual cases for each successive discriminant analysis.

The high percentage of correctly classified cases (72 – 84%) is a strong indicator that the grouping criteria, which were used in the third classification step, are robust. It also has to be mentioned that with increasing elimination of the Middle group the fluctuations within group Low and High will increase, as they will not represent a 'core-group' any more; rather there will be a grouping of 'more or less' empathy- or psychopathy-analogues, with corresponding fluctuations. The information from the

individual cases regarding their pattern of fluctuation can be useful now in order to refine and modify the classification system.

Table 19

Discriminant Analyses with SD Data to Confirm Classification

Grouping variable HR baseline with HR reactivity	Predictor variables	Correct classified in %	No. correct in High	No. correct in Low	No. correct in Middle	total misclassified#
see above	HR pre-sections with SD baseline	72%	20	8	8	14
see above	HR SD crit-sections	84%	22	18	2	8
see above	HR SD post-sections	72%	16	16	4	14

Note. n=50; # the visual inspection of the misclassified cases revealed that most misclassifications were related to the Middle group, and furthermore that these were mostly the same individual cases which were fluctuating between the various groupings.

This overall information was differentiated for group Low and group High (n=17 each) by coding the raw data, using criteria from the second Classification (see Table 15). Figure 7 shows that the mean SD values of psychopathy-analogues were on average higher (compared to group High) for each film-segment. The psychopathy-analogues showed signs of attention (suppression of variability) for the 'sensation seeking' segments (Roller coaster and Bambi shots), and they displayed reduced or no attention (indicated by great variability) during 'pure' empathy segments (such as Jamie tease or Bambi calling). However, their SD fluctuations seem more randomly distributed (i.e., spontaneous fluctuations) and less related to the film stimuli. On the contrary, it seems that the empathy-analogues were responsive to the film stimuli, that they were paying attention, and that they were regulating their emotions, which is indicated by suppressed variability (i.e., low variability scores); especially for segments Jamie hallway, Jamie tease, and Bambi father. Segments Jamie fire and Bambi shots were expected to elicit

some distress reaction; distress also seems to be evident in Bambi calling. Again, in the segment Roller coaster, surprisingly there is evidence of attentiveness (low SD values), rather than the expected arousal/distress.

As mentioned before, it appears that the successive classification procedures were able to address research question B1. The various psychophysiological reactions, as they are expressed in HR data (such as HR baseline values, HR reactivity, or HR variability) have been mapped successfully onto the theoretical constructs related to empathy and psychopathy. This led to the successful classification of the participants into two groups of either empathy-analogues or psychopathy-analogues. These grouping-criteria were used for the classification within separate data sets and thus it has been demonstrated that the various physiological measurements led to a robust and replicable classification.

Owing to the high predictive power of the variables employed thus far (and time constraints of the analyses) the data from HR slope were not analysed. An exploratory analysis of skin conductance (SC) data, however, was performed and is described below.

7.4. Skin Conductance Data

As mentioned earlier, a detailed analysis of the Skin Conductance (SC) data was beyond the scope of this study. Nevertheless, an exploratory analysis of the SC data was conducted because it was considered important to include a psychophysiological measure, which is completely independent of the HR measures.

Firstly, the theoretical assumptions were explored using the collected SC data. Then, it was investigated whether the classification for individual cases, that was developed for HR data, maps onto the various SC data sets as well, (only a selection of the performed analyses will be presented).

The SC data were tested for normality, skewness and kurtosis in all segments (Kolmogorov-Smirnov). The results were satisfactory. It was found that there was consistently a group of 6 outliers (i.e., extreme SC values), which was taken into consideration for later case-by-case classifications. Additionally, it can be seen in Table 20 that there was a trend for the mean SC values (pooled over pre, crit, and post sections) to increase over time during the data gathering. This was expected and predicted by theory, but should be explored further in a detailed data analysis (see Appendix A).

Table 20

Mean SC (μS) Values Combined for all Sections and 7 Film Segments

Segments	*Film-sections*		
	pre	*crit*	*post*
Dolphins AB	-	2.29	-
Jamie fire	3.90	4.50	5.55
Jamie hallway	6.10	6.07	5.69
Jamie tease	6.04	6.22	6.46
Roller coaster	6.72	9.17	-
Bambi shots	7.10	9.21	10.73
BC calling	10.37	9.85	9.50
Bambi father	-	9.76	9.50

Note. n = 50

Figure 8 shows the mean values for each film segment, separated into High and Low (according to the grouping criteria, which were developed during the HR data analysis). It was expected that the baseline (tonic) SC levels would be higher for the empathy-analogues group than for psychopathy-analogues.

The effect of higher arousal/emotional intensity for group High compared to group Low is visible in all film segments. Lower SC data are a signal of less emotional activation, as predicted by theory.

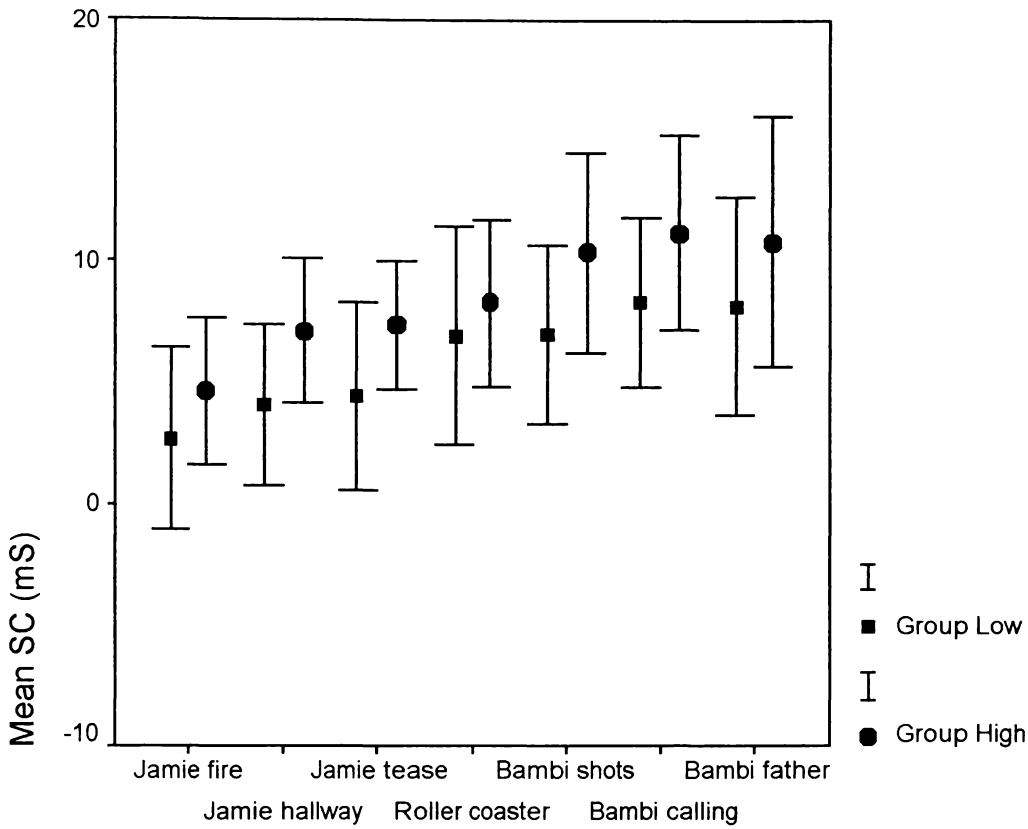

Figure 8. Mean SC baseline data per film-segment, separated into group High (n=23) and group Low (n=16), based on the third classification (Table 18).

Based on the previously delineated considerations for HR, the data were then categorised via discriminant analysis; (grouping variable = third step of HR classification, predictors = baseline SC, Dolphins AB and pre segments combined). The results are shown in Table 21.

Table 21

Discriminant Analysis with SC Data to Confirm Classification

Grouping variable	*Predictor variable*	*% correct classified*	*No. of correct cases per grouping*	*No. misclassified*
HR baseline combined with HR reactivity	SC baseline values	60%	High Low Middle 18 8 4	20

Note. n = 50; outliers were still included during these grouping procedures.

Eighteen empathy-analogues and 8 psychopathy-analogues (and 4 cases of the Middle group) were correctly classified for 60% of all cases. Again, most of the 20 misclassifications were due to the higher variability associated with the Middle group. This is especially true for psychopathy-analogues. (Also, it has to be remembered that these analyses are based on all 50 children and thus still include the previously identified outliers).

In general, it seems that the classification code, which was developed in relation to HR data, seems to confirm the overall trend in group-membership for the SC data as well. This means that the developed classification is not only applicable for various HR constructs, but also for a different psychophysiological modality (i.e., skin conductance).

Next, the grouping into High and Low will be scrutinised for the last time by statistically (t-tests) comparing the two groups; separately for each theoretical construct.

7.5. Comparison of the Distinction between Psychopathy-Analogues (Low) and Empathy-Analogues (High), Based on Psychophysiological Measures

In order to contrast empathy and psychopathy constructs across all of the psychophysiological measures a final analysis was conducted using discriminant analyses and individual t-test comparisons of the empathy-analogue and psychopathy-analogue groups. The discriminant analyses used only High and Low categories (as dichotomous groups) for all 50 boys during this procedure. The third classification step (see Table 18) was thus modified accordingly and served as the grouping variable for this stage of analysis. Table 22 shows a summary of the results from the discriminant analyses and the t-tests that were performed with some of the data sets.

Data set 1 is based on the theoretical construct that low HR baseline is potentially able to indicate psychopathy. It was possible to predict 84% of the cases into the correct grouping, and the means of these two groups were significantly different when compared with an independent samples t-test. Data set 2 is based on the assumption that low HR reactivity levels might be indicative of psychopathy. Again, it was possible to correctly predict 90% of the cases and the t-test indicated a significant difference. Data set 3 is based on the theory that low HR reactivity scores might be indicative of psychopathic tendency and it was possible to predict 74% of the cases correctly (for $n = 34$), and again the t-test was significant. The theoretical construct for data set 4 postulates that a lack of

HR recovery is indicative of possible psychopathy and it was possible to predict 76% of the cases correctly into High or Low group, with significant results of the t-test. For data set 5, the theory related to HR reactivity was tested again with data combined from crit – pre, crit – baseline, and crit – post (for n= 50). Again the correct classification was possible for 76% of the cases, and the t-test results were significant. For data set 6 the theory predicts that high HR variability is predictive of a psychopathic tendency, and it was possible to predict 96% of the children into the correct grouping. The t-test was significant as well. For data set 7 all previous constructs related to HR data (1 – 6) were combined and these aggregate scores were able to predict 94% of the cases, and the significant difference between the two groups was confirmed with t-test.

The theoretical underpinning for data set 8 is the prediction that low SC (tonic) baseline levels are related to psychopathy. Again it was possible to correctly identify 76% of the cases into the two groups. However, the groups were not significantly different from each other (t-test). Similarly it was possible to correctly predict 78% of the cases based on data set 9, which postulates that low SC reactivity is related to psychopathic individuals. The difference between the groups was not significant. Data set 10 includes SC variability data (SD) and the theoretical construct predicts low variability for individuals with psychopathic tendency. The correct classification was possible for 80% of the cases, although the group differences on this measure failed to reach statistical significance. The three data sets (8 – 10) that are related to SC were again summarised into aggregate scores and combined with the aggregate HR data, and it was possible to predict 92% of the cases correctly based on the resulting data set 11. This grouping into High and Low was significant when tested with an independent sample t-test.

The summarised HR data information clearly indicates that most of the chosen theoretical HR constructs seem to correspond very well with the developed classification of psychopathy-analogues and empathy-analogues. This is also true for the data based on SC values. The lack of significance in the SC data does not mean that the measures/ constructs are less useful for classification of children (as the very satisfactory DA results demonstrate).

The visual inspection of the sorted composite scores, combining the various data sets (HR and SC) confirmed that it is possible to dichotomise the 50 cases into psychopathy-analogues and empathy-analogues. In the third step of the final grouping

Table 22

Summary of the Evaluated Psychophysiological Data Sets, and Their Usefulness in Discriminating Empathy From Psychopathy

Data Set/ Predictors	*Results discriminant analyses Grouping variable= third grouping criteria revised (no Middle group)*			*Results Independent Samples t-test*		
	% correct classified	No. correct High	No. correct Low	z-scores Low group	z-scores High group	
1. HR baseline AB	84%	22	20	-.69	.59	significant t(48)=5.8 (p<.05)
2. HR crit values	90%	25	20	-4.66	3.97	significant t(48)=6.7 (p<.05)
3. HR reactivity crit-pre)	74%	(based on 17 : 17)		-4.78	1.59	significant t(32)=3.7 (p<.05)
4. HR recovery (post)	76%	22	16	-7.22	6.15	significant t(48)=4.8 (p<.05)
5. HR reactivity (crit-pre)	76%	22	16	-6.20	5.28	significant t(48)=4.5 (p<.05)
6. HR SD (all combined)	96%	26	22	3.71	-3.16	significant t(48)=5.6 (p<.05)
7. HR aggregate (1.-6.)	94%	26	21	-5.2	4.5	significant t(48)=5.6 (p<.05)
8. SC baseline	76%	25	13			t-test not significant
9. SC reactivity crit-pre	78%	23	16			t-test not significant
10. SC SD	80%	24	16			t-test not significant
11. All HR+ SC aggregate	92%	27	19	-6.2	4.7	significant t(48)=4.5 (p<.05)

Note. A detailed description of the way the theoretical constructs were operationalised into the data sets can be found in Appendix G. Each set of data served as basis to verify the classification of cases into empathy-analogues or psychopathy-analogues via discriminant analyses. The higher the % of correct classification the more useful the set of data was considered for successful grouping. The t-test results indicate whether the High or Low groupings were significantly different from each other (within each data set).

there were 23 empathy-analogues in group High and 16 psychopathy-analogues in group Low. This bias favouring classification of children as empathic is perhaps not surprising given the previously described reluctance of teachers to 'label' 'problem' children; despite the requirement to pre-select the boys from either side of the empathy continuum. Thus, it can be stated with some confidence, that the formulated classification coding, developed from psychophysiological measurements via bootstrapping methods, has the potential to distinguish non-empathic from empathic boys. So far the coding has been developed, tested, and confirmed with assessment instruments in the area of psychophysiology. In the next step it will be explored whether the classification system can be valid with the conventional assessment instruments like questionnaires, self-reports, and observations.

Overall, it can be stated that there seems to be a clear dichotomy between psychopathy-analogues and empathy-analogues within the HR measures as well as within the SC measures (although less pronounced). Thus, the identification and the classification of children into High and Low groupings has been shown to be successful across different modalities of psychophysiological assessments. This seems to answer the auxiliary research question B1 by relating the empathy construct successfully to psychophysiological measurements. In addition, it also provided the answer to core question 2 by demonstrating the successful classification of the participants into groups of empathic and non-empathic children, respectively.

CHAPTER 8

Research Question Relating to Phases A and B

C1: Which of the Selected Dispositional (Paper/Pen) Measures Correspond Best to the Physiological Classification of Empathy-Analogues and Psychopathy-Analogues?

In Chapter 7, grouping criteria in order to classify the participants into empathy-analogues and psychopathy-analogues were developed. Their usefulness and ability to discriminate between the groups was explored, as they were applied to psychophysiological assessments. In Chapter 6 usefulness and correlations of a selected number of questionnaire measures in the area of empathy and psychopathy were assessed. Now the developed classification criteria will be evaluated for their potential to be applied to questionnaire measures as well. In other words, the goal of the final step in the data analysis was to determine whether the developed grouping criteria (High, Low) would also separate the empathy-analogues from the psychopathy-analogues, based on their questionnaire scores, (obtained during Phase A).

Empathy Self-Reports: A discriminant analysis using the final classification (see Table 18) as grouping variable, and the three self-report measures Bryant Empathy Scale, Inter Personal Reactivity Index sub-scale empathic concern, and Eisenberg Criterion as predictors, showed agreement in the classification of 30 of the 50 participants; 15 from the Low group and 15 from the High group.

A detailed analysis of the mismatched cases for each measure, indicated that Bryant Empathy Scale seemed to be the best measure to detect psychopathy-analogues (i.e., non-empathy) children, whereas the Interpersonal Reactivity Index, sub-test empathic concern, seemed best to detect empathy-analogues (i.e., high empathy and distress).

Empathy Teacher Reports: The three selected self-report empathy measures were then compared with three teacher-report empathy measures: Criterion Empathy, Child Behaviour Questionnaire scale empathy, and Child Behaviour Checklist adaptive functioning, via discriminant analyses, using the final classification again as grouping

variable. (These measures were selected by examining the discriminant function coefficients for those variables with the comparatively highest loadings.)

The results of the discriminant analyses showed that 64% of the children could be correctly classified, based on their questionnaire scores (11 for Low and 21 for High). This means that 32 individual children, who had been identified by their physiology responses to be either psychopathy-analogues or empathy-analogues, were also identified accordingly by their teacher's responses on empathy questionnaires.

Next, a discriminant analysis was conducted with a selection of 24 empathy measures as predictors, (grouping variable as before). The results showed an increase of correctly matched cases to 72%, (14 for Low group and 22 for High group). This means that 36 individual children can be identified via a series of empathy questionnaires to be part of either group Low or High (initially classified via psychophysiological measures).

It appears that the z-scores of the empathy assessment instruments (used as a composite indicator) generally supported the soundness of the classification criteria of group Low and group High. Conforming to expectations, it also seems that the empathy measures are better at predicting empathy-analogues (High), than psychopathy-analogues (Low), (i.e., less mismatched cases in High than in Low).

Psychopathy Assessments: The same procedures were used to conduct discriminant analyses with psychopathy assessments (11 selected psychopathy questionnaires, with eliminated duplicating sub-tests as predictors; final classification as grouping variable). This resulted in a correct classification of 76% (14 for group Low and 24 for group High). Thus, it was also possible to match the classification (based on psychophysiological data) of 38 children, by analysing their psychopathy-test scores.

Further elimination of variables (via examination of their discriminant function coefficients for loadings) resulted in the following group of six most powerful psychopathy measures: Interpersonal Measure of Psychopathy, Psychopathy Screening Device, Child Psychopathy Scale total, Child Psychopathy Scale manipulation, Child Behaviour Questionnaire intensity pleasure, Child Behaviour Checklist attention.

Combined Empathy and Psychopathy Assessments: Finally, all empathy and psychopathy assessment variables (scales and sub-scales), which were explored via descriptive analyses, were screened and the overall number were reduced to 28 by

eliminating collinearity, eliminating double weighting, and choosing highest loadings on discriminant functions.

A discriminant analysis with the remaining 28 variables as predictors resulted in 82% correctly classified cases: 19 for Low group (psychopathy-analogues) and 22 for High group (empathy-analogues).

The reported findings suggest that the particular choice of certain tests did not matter that much, and that aggregates of tests seem to lead to increased matching with the grouping classification (obtained via psychophysiology). The information of single tests or sub-tests did not seem to lead to an equally successful discrimination between psychopathy- and empathy-analogues.

A final discriminant analysis was therefore conducted with a mix of 65 of the original empathy and psychopathy measurements as predictors (tests and sub-tests included; the final classification remained as grouping variable). The result showed that 38 children were correctly classified (76%) into either Low (=16) or High (=20), or Middle (=2).

The percentage of correct classifications increased to 82%, for 28 selected variables, (increased from 76%, when all 65 variables were included). Thus, it can be said that even when 'non-optimal' assessment instruments are included into the composite mix of all variables, it is still possible to match the classification criteria to a very high degree. However, it also confirms the previously stated assertion that aggregate information of scores is more useful than single scores from individual tests.

This result is very encouraging as it demonstrates firstly, that the classification into group High and group Low is replicable for various data sets, and even for completely different modalities (such as questionnaires versus psychophysiological measures). Secondly, it shows that the two groupings of psychopathy-analogues and empathy-analogues, respectively, are significantly different from each other.

In summary, it can be said that all of the auxiliary research questions have been answered in the affirmative. Specifically:

It was possible to show that dispositional empathy measures were positively correlated with each other, which confirms the unidimensionality of the empathy construct; (however, there is a distinct split between self-report measures and teacher-

report measures). It was possible to demonstrate that the dispositional psychopathy measures were positively related to each other, which confirms the psychopathy construct. It was also possible to show that empathy assessments and psychopathy assessments were negatively correlated with each other (except self-reports), which seems to confirm that the two constructs are related to different populations.

The results from the experimental procedures in Phase B revealed that it is possible to structure psychophysiological data (HR and SC) into distinct populations of empathy-analogues and psychopathy-analogues. Thus it appears that the constructs of psychopathy and empathy have been successfully paralleled by a classification, which was developed on the basis of psychophysiological data.

The results also confirmed that it was possible to map the classification, which distinguished psychopathy-analogues from empathy-analogues (based on their psychophysiological reactions), onto the different modality of questionnaire assessments from Phase A. Although there was not any one particular instrument that would perfectly match the developed classification into dichotomous groups, it was possible to demonstrate high congruence with different assessment instruments pooled into composites. A chosen sub-set of questionnaires (six empathy measures; six psychopathy measures) was thus able to match the classification system to a very high degree and to confirm its practical usefulness.

The presented results that were able to address the auxiliary research questions are now helpful to answer the over-arching core-questions:

1. The results seem to confirm that Psychopathy FI and affective empathy are inversely related. This can be confirmed via the development of a classification system that is capable to dichotomise individuals either into a psychopathy-analogues group or an empathy-analogues group. This replicated a dichotomy that had already been found via correlations of psychopathy and empathy assessments.
2. The results seem to confirm that it is possible to discriminate non-empathic children from highly empathic children, by analysing their psychophysiological data during empathy-inducing situations. The resulting classification system thus dichotomises the children into two distinct groups of empathy-analogues and psychopathy-analogues based on their (non)-empathic reactions.

3. The results seem to indicate that psychophysiological instruments are very useful and reliable as diagnostic tools in order to develop a classification, with the aim to dichotomise children into empathy-analogues and psychopathy-analogues. Questionnaires are valuable instruments as well, but less singly, and rather used in a composite fashion (as each seems to address different aspects of the empathy- or psychopathy construct).

GENERAL DISCUSSION

The rapidly developing technology of psychophysiology has made possible the observation of hiherto invisible responses and has opened a vast new frontier of clinical research. The initial exploration of this frontier has already begun to pay dividends and further advances can be anticipated in the future. It is hoped that someday this research will lead to a much more complete understanding of the nature and causes of psychopathology and to more adequate means of prevention or treatment (Fowles, 1975, p. 221)

The present study was inspired by the suggestion that the analysis of physiological response patterns in young children could help to clarify the relationship between empathic responding and Factor I psychopathy. Further, it was hoped that the results would add to the increasing list of tools for the early detection of problem behaviours (such as lack of empathy), which has been acknowledged as the most effective basis for prevention and change.

The rising concern about serious antisocial behaviours among youths and the call for effective prevention measures has been documented in detail (e.g., Lochman, 1995). This led to the exploration of issues surrounding delinquency, antisocial behaviours, and psychopathy. Literature in the area of psychopathy was surveyed and it was possible to conclude that psychopathy can (and should) be discriminated from delinquent behaviours. The affective dimension appears to be an important defining marker, which includes emotions and emotion regulation. Thus, psychopathy has been established as an accepted classification, which can be identified as a separate dimension (Factor I) via measurement instruments like the Psychopathy Checklist-Revised, (Hare, 1991). However, the Diagnostic and Statistical Manual of Mental Disorders (4th. ed., 1994) does not include psychopathy as a diagnostic category yet, and there is still some discussion regarding the dimensional versus categorical definition of psychopathy.

The proponents of the psychopathy taxonomy were cited, emphasising the importance of genetic and biological components for the understanding of the

development and behaviour of psychopathic individuals (e.g., Scarpa & Raine, 1997a). It is however important to emphasise that biological influences do not act in a vacuum and that environment and upbringing play an important part in the shaping of the psychopathic individual. This diathesis-stress paradigm proposes a genetic-biological view of personality in which biological individual differences interact with situational variables to produce overt behaviour (Fowles, 1975). The diathesis-stress model provides on one hand the theoretical foundation for the clinical application of psychophysiology, and on the other hand it leads to the conclusion that psychopathy FI is present in early childhood.

The childhood presentation of psychopathy has been explored by various researchers (e.g., Frick et al., 2000), who found that callous-unemotional traits are closely parallel to the FI dimension of adult psychopathy. Based on the presented evidence regarding the childhood manifestation of psychopathy, it seemed even more imperative to focus on prevention and early detection of children 'at risk'.

Deficits in emotional responding and emotion regulation have been demonstrated in psychopathic individuals (adults as well as children). Empathy was mentioned several times as a crucial emotion which seems to be lacking in psychopathic individuals. However, it has been demonstrated that it is important to separate empathic reactions into the cognitive component of perspective taking, which is not deficient in psychopathic individuals, and into the affective component of 'vicarious feeling with' or even personal distress, which is lacking in psychopathic individuals (e.g., Eisenberg & Strayer, 1987).

In order to develop a system for early identification and prevention of children 'at risk' it was crucial to firstly identify a reliable marker, and to secondly develop a reliable classification system (see Lochman, 1995). Based on the presented information and empirical evidence, it can be stated with some confidence that empathy may be a promising marker for psychopathy research. The aim of the present study was therefore to develop a classification system, which could be based on affective empathy as the main distinguishing factor.

It has been mentioned before that the demonstrated genetic/biological component in psychopathy FI allows for the use of psychophysiological assessment measures.

Therefore it seemed reasonable to expect that lack of empathy (lack of vicarious emotions) in psychopathic individuals could be detected via psychophysiological measurements. Thus, in the present study emotional reactivity, intensity, and arousability have been investigated via heart rate (HR) and skin conductance (SC) measures.

During the review of previous research findings it became evident that many researchers aim to combine findings from biology, genetics, and sociology; as well as from different fields of study such as developmental, psycho-social, or psychophysiological; as well as from different specific research areas within psychology such as aggression, attachment, empathy, or biology. This multimodal perspective has been adopted for the experimental phases of the present study as well: during Phase A, self-report measures have been combined with other-reports, as well as with observations; and the questionnaire assessments from Phase A have been combined with the findings from the psychophysiological assessments obtained from Phase B. This approach finds its logical continuation, when a combination of treatment strategies is suggested.

The first overarching research question led to the investigation in Phase A whether psychopathy and empathy are negatively correlated and possibly opposites on the same continuum. Evidence that this was the case can be taken as support that lack of empathy can be regarded as a reliable marker for psychopathy. The overarching question was specified by three auxiliary research questions, which were related to questionnaire measures of empathy and psychopathy and were aimed at detecting correlations within and between the empathy and psychopathy questionnaires and rating scales.

In replication of previous findings (e.g., Mehrabian, 1997) it was possible to demonstrate that empathy and psychopathy (non-empathy) measures were negatively correlated. This finding supports previous results (see Miller & Eisenberg, 1988), that were presenting low to moderate negative relations between empathy and aggression/ antisocial behaviours. It has to be stressed that this study did not expect to find 'psychopathic' children, rather the boys in this study were expected to represent empathy- and psychopathy-'analogues'; based on the theoretical assumption that psychopathy is a dimensional as opposed to a categorical construct. Thus, it can be

argued that the results might be clinically significant, even if some did not reach statistical significance.

The analysis revealed that the empathy self-report measures were correlated with each other (they were measuring the same empathy-construct); the teacher-report empathy measures were correlated with each other (they were measuring the same construct); and the teacher-report psychopathy measures were correlated with each other (they were measuring the same construct). However, the relations of empathy-self-report measures did not correlate well with either teacher's empathy, or psychopathy measures. This indicates that children and teachers were reporting on different aspects of empathy, (when each measure is really measuring empathy). Thus, it could be suggested that the teacher perceptions were based on the children's outward behaviours (i.e., social competence or possibly sympathy), whereas the child responses reflected their 'inner' experience of sadness and distress. It has been suggested by other researchers (Eisenberg et al., 1989) that children have difficulties to report on their emotional states, which would partly explain the divergent findings.

The above identified difficulty, that different instruments possibly assess different dimensions of the empathy construct, (such as personal distress, sympathy, concerned attention, perspective taking, orienting, pro-social behaviours), is relevant for the questionnaire measures in Phase A, as well as for the psychophysiological measures in Phase B. This re-affirms the previous recommendation that a multi-method approach with a combination of results leads to increased validity. Thus the present study used an aggregate of empathy measures and of psychopathy measures for the final set of correlations. This approach has also been chosen to aggregate various theoretical constructs regarding psychophysiology, in Phase B of the study.

The finding that psychopathy and empathy are negatively correlated and possibly on opposite ends of the same continuum, affirms the choice of empathy as marker variable for the detection of psychopathy. It has also been used by other researchers to conclude that empathic responsiveness may be a crucial element in psychopathy and aggression.

First, in Phase B, it was clearly demonstrated that it is possible to collect valid psychophysiological data from young children in their natural environment. An important aim of this study was to apply more ecologically valid assessment procedures to empathy and psychopathy research in early childhood. Investigators agree that research findings that are obtained in the natural environment are more likely to provide generalisable data, and are more relevant and valid; 'experimental precision' (laboratory) has to be balanced with 'generality of research' (natural environment), (see e.g., Kazdin, 1980; Sturgis & Gramling, 1998).

The psychophysiological data were complete for all 50 children and no information was lost; however it was decided, after detailed analysis, to omit the data of two film segments and two sections, mainly due to ambiguity in interpretation. Furthermore, qualitative observation during the experiments in Phase B confirmed, that the children felt 'at ease' and behaved naturally, which allows for the expectation that their psychophysiological data (HR and SC) are a reflection of their 'true' emotional state/responding without undue 'setting-bias', (for baseline values, as well as empathic reactivity). A limitation of the present study is the fact that the psychophysiological procedure required a close control of all extraneous influences that could possibly cause artefacts in the data. Thus, it is not possible to generalise the findings of the present study to girls, or children of other cultures and ethnic groups, or older children. It will be necessary to replicate the findings for these different participant groupings, possibly in different settings.

Next, the study approached the second overarching research question regarding the possibility of a classification system to distinguish empathic from non-empathic (psychopathic) individuals, based on their psychophysiological responding. Additionally, it was of general interest to explore how the psychophysiological reactions of the young children in this study were related to the construct of empathy and non-empathy (i.e., psychopathy).

The bootstrapping approach that was employed to develop the classification system was initially based on several steps of clustering and sorting the mean HR data of all the boys. This earliest classification was then confirmed and refined via several steps

of discriminant analytic procedures, and further clustering. During each additional step the original classification of the boys into empathy-analogues and psychopathy-analogues was validated by being matched/compared to a different theoretical construct. Ultimately, the results seem to confirm that it was possible to develop a grouping system, based on psychophysiological data, that would allow the distinction of low- from high-empathic children; or in other words that would allow the early detection of psychopathy-analogues. Each step of the analysis was based on a different theoretical assumption and thus they have been used in additive fashion to confirm and enhance the classification. An added benefit of this procedure is the possibility that the information from each step can be accumulated in order to establish a profile for individual cases, (for example where certain cases are suspected to be outliers, or where there is concern about the level of distress demonstrated by individual boys; this last suggestion does not apply to the present study as all data have been anonymised, but could prove very valuable for clinical applications). The advantage of the chosen principal statistical procedure (discriminant analysis) lies also in its practical usefulness and its resilience to violations of linearity and normality assumptions (Betz, 1987). Similarly, it was of main importance that the overall pattern of the findings is consistent with the theoretical models, even though the findings for some individual variables are statistically weak or not significant (Greenfield & Sternbach, 1972; Kazdin, 1980).

The first grouping was based on the assumption, that mean HR levels of psychopathic individuals are comparatively low during baseline (low vagal tone), (see Raine, 1997b). This reduced HR level has been said to contribute to fearlessness/ antisocial behaviours and to conditioning deficits (i.e., lack of avoidance learning). Thus it was possible to develop the first stage of the classification without emotion induction, as baseline levels are independent of empathic reactivity.

This classification was well supported by the data from the HR variability (SD). The model suggests that high HR variability indicates a lack of emotion regulation and focussed attention, which have been found in psychopathic individuals (Scarpa et al., 1997), compared to low variability which is found in attentive and empathic individuals, who are 'other-focussed'. These empathy-analogues were highly attentive during all of the film segments and sections, which was demonstrated by decreased HR variability.

The results show a strong congruence between high scores on mean HR levels and low scores on HR SD scores, and vice versa, which has been interpreted as indicating high empathic versus low-empathic (psychopathic) individuals. These results were confirmed via high percentage values for correct classification via discriminant analysis, and statistical significance (t-test) was confirmed as well.

A further model employed to test the validity of the discrimination into the two groups was based on HR reactivity, which signals the intensity of reaction to empathy-inducing stimuli. The interpretation of reactivity data is slightly more challenging, as highly empathic individuals can also 'over-react' due to distress, and non-empathic individuals can be attracted to 'sensation seeking' stimuli, without experiencing any empathy (see Eisenberg et al., 1989). However, it was possible to confirm the developed classification via case-to-case comparisons and discriminant analyses; (statistical significance was confirmed as well).

Following the multi-method approach, the psychophysiological measures included SC data to complement the findings from the HR data. However, a detailed analysis of the skin conductance data was beyond the scope of this study and the data were analysed in an exploratory fashion, primarily serving as a means for comparison with the HR findings. Nevertheless, it was again possible to confirm the established core-groups of the psychopathy-analogues and the empathy-analogues and thus to validate the developed classification system. The models underlying the SC data suggest: that psychopathic individuals show reduced arousal (i.e., lower SC baseline/tonic levels); that they show poorer orienting (i.e., lack of SC reactivity, with zero or small change from baseline in reaction to empathy inducing stimuli); or that they show longer half-recovery times (i.e., slower SC recovery after emotional stimulation), (Raine 1996). The data of the participating children in this study supported the described SC models to a high degree (although the groups were not statistically significant). The SC data were also very useful to support the HR models, and most importantly to validate the classification system, which is based solely on psychophysiological measurements.

There were two main weaknesses associated with the skin conductance results in this study. Firstly, as already mentioned in the literature it is suggested to analyse SC 'half-recovery-time' (the time it takes the SC response to recover to half of its size),

which requires the analysis of the phasic responses via specialised computer software. The analysis in the present study was limited to the exploration of the amplitude dimension in the SC data and it is expected that the analysis of the frequency dimension would add to the clarity of the results. Secondly, skin conductance has often been described as 'index of distress' (e.g., Eisenberg & Fabes, 1990), rather than of empathy or sympathy; with psychopathic individuals 'under-reacting' to emotion eliciting stimuli, but reacting normally to neutral or exciting content. Thus, it is possible that the emotion inducing segments of the films were not perceived as distressing by the psychopathy-analogues. They might have reacted neutrally/normally or even excitedly (with no empathy) to the empathy-eliciting segments, instead of showing a complete lack of reaction (see Blair et al., 1997). This might contribute to the lack of significant difference between the two groups. The SC data can be further explored to clarify the above issues.

A related issue concerns the difficulty in determining which film-segment or film-section elicits which kind of emotional response. It has been mentioned previously that some segments seem to be distressing, whereas others require Theory of Mind, and others result in sadness. It has also been stated that psychopathic individuals can react with HR acceleration and SC increase if the stimulus is interesting and stimulating enough (no distress or empathy required). However it was beyond the scope of the study to evaluate the differences between the films, the segments, and the sections. Rather it has to be stressed once more, that a combination of data from the various segments has been advocated to address several constructs and to lead to the most promising results. This strategy has been followed in the present study. The same rationale has been applied when the measures from the various physiology constructs were combined, first into aggregates of the HR and the SC dimension and then into a composite index of all measures, to increase the reliability of the whole (e.g., Eisenberg & Fabes, 1990; Piacentini et al., 1992).

It can be said, however, that it was possible to find a pattern in the results, revealing how psychophysiological reactions, measured in HR and SC, map onto the psychopathy and empathy construct. It was also possible to develop an approach towards classification, that allows the distinction between empathy-analogues and psychopathy-analogues. Furthermore it has been demonstrated that the ranking of HR resting values

seems to be a promising first step in the development of the classification for high-empathic and low-empathic (psychopathic) individuals.

The next step of the analysis was aimed at combining the findings from Phase A and Phase B. It was of interest whether the developed classification system would generalise across modalities, or in other words, whether a distinction which was based on psychophysiological data (HR and SC) would also be valid for questionnaire data (self- and other-reports).

In order to map the enhanced version of the developed classification system onto the data from the rating scales, a series of discriminant analyses was performed. The empathy and psychopathy assessments were used as predictor variables either singly or in groupings (for example, all of the assessments including sub-tests, or selected scales for empathy and psychopathy, separately, or combined). Overall, the psychophysiological classification did correspond to a high degree with the scores from the questionnaires, thus it can be said that the results confirmed the classification for the core-groupings of psychopathy-analogues and empathy-analogues.

Interestingly, the analysis of the results showed that the correspondence of the classification was much more consistent for the empathy-analogues; for psychopathy assessments as well as for empathy assessments. That means it was easier to identify the highly empathic children than the non-empathic children (the correct classification percentages of discriminant analyses included most of the identified empathy-analogues, and only a small core group of the classified psychopathy-analogues). This observation applies to empathy assessments, as well as to psychopathy assessments. In other words: empathy measures were able to identify highly empathic children, as they are supposed to; while psychopathy measures (taken as inverse scores) were also better at identifying the highly empathic children, which was unexpected, as they are supposed to identify non-empathic/ psychopathic children. It was even more intriguing to find that the empathy measures were better at identifying the non-empathic children (61%) than the psychopathy measures (55%), and that the psychopathy measures were better at identifying the empathic children (92%) than the empathy measures (82%). These results can possibly be explained by a general reluctance to 'label' children. This leads to the

paradoxical result that the assessment instruments seem to provide the best information regarding high or low empathy/psychopathy scores by way of default, (i.e., by 'non-identifying' the psychopathy-analogues, the empathy-analogues are identified and vice versa).

This allows the conclusion that assessment instruments based on teacher-reports have several limitations. Firstly, the understanding of the construct 'empathy' (and its opposite 'psychopathy') seems to be based on social skills and behavioural indicators such as verbal skills, compliance, and pro-social/antisocial acts; (which is the FII dimension of psychopathy). This perspective might have guided the pre-selection of the boys for this study, as well as the completion of the questionnaires. Secondly, the reluctance in 'labelling' children has been described in detail before. However, this biased reporting does not apply to all teachers equally. It has been observed (via qualitative analysis of the data) that teachers from schools with low decile ranking seem to report on average more positively and seem to be less critical of their pupils, than teachers from schools with high decile ranking. This leads to discrepancies in the data.

Assessment instruments based on self-reports of children have several limitations as well. Firstly, it has been mentioned before that children may not have the verbal ability or emotional maturity to identify and report their emotional state (e.g., 'sadness' might be confused with 'distress'). For example Eisenberg & Strayer (1987) have demonstrated that young children often report to be 'happy' regardless of antecedent conditions or events. Secondly, in the present study it was observed that several children were uncomfortable and expressed annoyance about repeated questions related to their feelings, especially when they were not really sure how to answer. Additionally, lengthy questionnaires were perceived as 'boring' and thus, due to their decreasing attention, they started to give random answers. Thirdly, the lack of correlations with teacher reports, has shown that children's self reports seem to address a different dimension of empathy. It is interesting that the teacher report measures were in closer correspondence with the psychophysiological classification than children's reports. This confirms the expectation that children's reports are not congruent with their physiological responding. It is however surprising and unexpected, that teacher's observations of outward behaviours are related to the physiological responses of the children.

Again, the results during this part of the analysis support the idea that it is best to combine the measures, as the error associated with particular instruments is averaged out and aggregation increases the reliability of the measures (Miller & Eisenberg, 1988; Eisenberg & Miller, 1987). Considering the limitations of questionnaire data, there was no expectation that the measures from Phase A would correlate with the classification established in Phase B (neither singly nor as a group). Therefore it was an unexpected finding that the composite of a selection of empathy and psychopathy instruments was in close correspondence with the psychophysiological classification. This result offers increased validity for the developed classification system, as well as the selection of the empathy and psychopathy measures; (with the previously explained exception of self-reports). This result also provided the answer to the research question C1 (Phase A and B), by revealing that none of the measures were individually optimal, rather that they were most useful as an aggregate (especially regarding the identification of psychopathy-analogues).

Simultaneously, these data seem to provide the answer to the overarching research question 3 as to which diagnostic instruments prove most useful for the detection/identification of psychopathic individuals. The advantages of psychophysiological data collection have been already presented, and researchers agree that physiological measures can be useful markers of empathy related responses (see Eisenberg et al. 1989; Eisenberg & Fabes, 1990). Obviously, the combination of various measures is even superior: "...the use of physiological measures is a promising method for studying children's emotions...it would be productive to use physiological measures in combination with facial and self-report indices to provide a multimethod assessment of children's emotional responses" (Eisenberg et al., 1988, p. 245).

It can be argued that the results in the present study serve to demonstrate the usefulness and reliability of ambulatory psychophysiological assessment procedures to develop a classification system, in order to distinguish empathy-analogue from psychopathy-analogue children. Based on the findings from this thesis it would appear that the HR data would be most suited to this purpose; and within HR, that baseline and HR variability appear to be the most promising. The method of psychophysiological data

collection and analysis, in order to identify children 'at risk' in their natural environment, has been presented and scrutinised in detail. This procedure has additional advantages: it is mostly free of bias (thus highly objective), as the discussion relating to teacher-reports and self-reports has already addressed; it is fast, flexible, and easy to use, and does not involve teacher-time; it is non-invasive and entertaining for young children (there are no missing data due to discontinuation); it can be used for community samples of (disruptive) children, whereas previous studies involving antisocial behaviours were conducted with clinical samples; it is relatively affordable, especially in comparison to the health costs involved when children 'at risk' are not detected; the initial grouping can be refined in stepwise fashion (with optional inclusion of questionnaire data or information from observations) and may lead eventually to an individual profile for each child, (depending on the number of steps during the modification of the classification, the profile is more or less elaborate).

Several researchers have stressed that "targeted interventions require powerful and accurate methods for early identification" (Lochman, 1995, p. 551), and the stepwise method has been advocated as an useful and valid screening procedure. The present study has hopefully been able to demonstrate that psychophysiological methods can add to the range of existing approaches, which brings early detection of children 'at risk' one step closer (Stattin & Magnusson, 1989). The promise of early detection leads to the hope of possible intervention.

Factor I psychopathy has been examined from various perspectives, and although it is a complex construct, several key features have been discovered. Most salient are the psychopath's deficits in understanding emotions and the measurable differences in psychophysiological activity. In accepting the fact that 'true' psychopathy has its origins partly in biology, it becomes obvious that any attempt at treatment must begin early, while physiology and behaviour are still malleable. Fortunately, advances in interventions, for example for Asperger's disorder or childhood schizophrenia, have taken advantage of the plasticity of the brain and have been able to demonstrate that dysfunctions which have been regarded as 'hardwired' are susceptible, to some degree of modification. As mentioned before, the timing is crucial and early detection is the key (Lykken, 1995).

As would be expected, there are controversies over the treatability of individuals with psychopathic disorder or extreme aggressiveness, and again, a multi-modal approach is suggested, which takes cognitions, emotions, and consequences into account (Herpertz & Sass, 1997). Psychosocial therapies for children emphasise the need to consider the context as well, for example, living conditions, parental attitudes, or the maturational stage of the child (Burns, Hoagwood, & Mrazek, 1999; Cohen, 1995; Kovacs & Lohr, 1995; Weisz & Weiss, 1989; Weisz, Weiss, Han, Granger, & Morton, 1995). Strategies that include parents in prevention and treatment have been found to be most effective (Dishion & Andrews, 1995; Evans, Okifuji & Thomas, 1995; Moffitt et al., 1994; Raine, 1998; Webster-Stratton, Kolpacoff, & Hollinsworth, 1988; Wiehe, 1997).

Training of empathy to children and adolescents has been attempted several times. The training procedures include role reversal, role taking, social perspective taking, or affect-labelling procedures and have demonstrated short-term effects in younger children, whereas the results for older children and in the long term have been mixed. Although it has to be remembered that perspective taking as part of empathy, is a cognitive skill, in which psychopaths have not shown any deficits. Therefore it is likely that this kind of intervention is successful mainly for perpetrators of reactive aggression (psychopaths FII), (Chalmers & Townsend, 1990; Eisenberg & Miller, 1987b; Erera, 1997; Feshbach & Feshbach, 1982; Iannotti, 1978; Kendall & Panichelli-Mindel, 1995). Ascione and Weber (1996) attempted to teach 10 year old children how to treat animals more humanely, with the aim that the new attitude would generalise into empathy towards humans, and they reported that their intervention was successful. Unfortunately it is not clear whether there were any 'psychopathic' children (FI) included in the treatment group.

Mealey emphasised that the effectiveness of any treatment depends on the accuracy of the diagnosis, and thus it will be important to effectively discriminate between primary psychopaths and secondary sociopaths (Mealey, 1995a). The suggestion to restructure the attachment schemas and Theory of Mind the psychopath might be only successful for Factor II psychopathy (Novak & Harlow, 1975; VanIjzendoorn, Juffer, & Duyvesteyn, 1995), whereas pharmacotherapy (Mulder, 1996)

might be successful for both types of presentation. Even so, several authors point out that any attempt at treatment or prevention has to begin very early in life (Kazdin, 1987; Moffitt at al. 1996).

A different approach to deal with psychopathic personalities includes the perspective that some of their attributes, sometimes labelled as 'leadership qualities', can be channelled into positive and constructive outlets and acceptable behavioural roles. This approach is based on the fact that psychopathic individuals are able to learn, to avoid punishment, and to modulate their responses, when and if they are motivated to do so by relevant and tangible rewards (Newman et al., 1997; Schmauk, 1970; Wallace et al., 1999).

Again, it needs to be said that approaches to treatment and intervention may have failed so far because they deal with only one half of the bio-social equation; either they deal with social deficits alone or they deal with biological deficits alone (Raine, 1998). Most interventions that were presented so far are concerned with the social aspects, one alternative suggestion to deal with the biological deficits has been presented by Raine and Lui (1998): Antisocial individuals could be trained to increase their arousal levels through biofeedback techniques (Lazarus, 1975). These techniques have already shown short-term behavioural improvement for children with conduct problems. The idea that loss or disruption of function due to brain injury or damage can be reversed, has been the basis of many studies, such as Luria's work (Luria, 1963), and the notion of brain plasticity has been increasingly accepted in the field of mental health. Manipulation of EEG rhythms via biofeedback has been reported by Arnold as treatment for ADHD (Arnold, 1995); Cobb and Evans (1981) report the use of biofeedback techniques for behavioural and learning problems; and Crits-Christoph and Schwartz (1983) report successful empathy training for therapists. Biofeedback could be a useful tool to learn self-regulation of emotion. It could be used by over-aroused individuals in order to decrease their distress, as well as by non-reactive individuals in order to increase their emotional responsivity (to increase their HR), (Raine et al., 1997). This leads to the conclusion that there might be prevention and treatment approaches available for psychopathic individuals that can be helpful in modifying and balancing the early influences of dysfunctions in physiology, deficits in environment and upbringing, and

their interaction in personality development. This supports the rationale for early detection and prevention of individuals with psychopathic tendencies.

It has already been mentioned that a more comprehensive analysis of the SC data, which was beyond the scope of this study, could possibly add further information. Especially, it is expected that the analysis of SC frequency information (in particular 'half-recovery-time') would improve the correspondence of the SC data with the established classification (based on HR).

As regards the practical considerations of the methodology, it became obvious during the experimental phase of the study, as well as during the analysis, that the nature of the film stimuli was extremely important. First of all, the film segments need to be simple enough to be understood without highly evolved verbal skills or ToM (for example, the phone-segment in the Jamie film required cognitive role taking and verbal skills). The protagonist of the film (i.e., the person to empathise with) needs to match the child very closely in age, gender, culture and ethnicity. Thus, in further research the films need to be tailored to the group of research participants. It is also important to select empathy inducing situations that are not resulting mainly in distress, as distress can be stimulating for psychopathic individuals and thus they will not be discriminated by their 'non-reactivity'. Additionally, it is important to chose a neutral film, which is not boring and not too long, for the children to watch in the baseline condition. Children start to be restless when they are not interested in watching the films, which can compromise the data acquisition in the crucial phase of HR resting levels. However, any shortcomings of particular film-segments in the present study have been minimised via the procedure of averaging the information from the various segments. This procedure could be condensed when the segments would be clearly tailored to the particular population.

Finally, it may be interesting to discover how the qualitative and demographic information maps onto the developed classification system. The correlations of the teacher comments, parent comments, and observations from the research procedures, with the data from Phase A and B are expected to provide further useful information that can enhance and improve the developed classification system.

Conclusion

The results of this study have been able to demonstrate that psychopathy FI and affective empathy are inversely related and possibly at opposite ends of the same continuum (for children as well); that it is possible to discriminate non-empathic children (children with psychopathic tendencies) from highly empathic children, via a classification system based on psychophysiological data; and that psychophysiological measures, especially HR resting values and HR vagal tone, seem to be the most useful diagnostic instruments to initially develop a classification.

These findings can possibly be translated into clinical usefulness by transforming theory into praxis. If it is possible to easily and reliably identify emergent psychopathy in early childhood via psychophysiological measures, then it seems possible and conceivable that prevention and early intervention measures can be developed, based on biology as well. This approach has been advocated by several researchers and dispels the myth of 'biological determinism' (e.g., Miller & Eisenberg, 1988; Raine et al., 1997). Obviously, newly developed treatment tools based on psychophysiological responses (such as bio-feedback) will need to be combined with the already existing conventional methods, into a multi-method approach.

> *"...Violence is a multidetermined phenomenon and its comprehensive understanding requires an interdisciplinary approach spanning economic, sociopolitical, psychological, sociological, and criminological, as well as biomedical, considerations. Moreover, it is our view that nature (biology) and nurture (experience, context) are fundamentally inseparable. Biology may affect experience or context, but experience or context also influences biology. Because of the reciprocal interplay we must continue to study both"*
> *(Stoff & Cairns, 1996, p. xiv)*

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APPENDICES

APPENDIX A

Methodological Issues

- How to Operationalise Theory into Praxis
- Psychophysiology in Praxis: How to Measure Empathy
- Issues in Psychophysiological Methodology
- Questionnaires and Complementary Assessments

APPENDIX A

METHODOLOGICAL ISSUES

How to Operationalise Theory into Praxis: Practical Considerations

The use of multiple psychophysiological indices was expected to clarify the distinction between non-empathic and empathic responding by combining the information from different response patterns. For example Eisenberg et al., (1992) placed some focus on indices of HR reactivity: "HR deceleration during exposure to a distressed person has proved to be a reasonable marker ... of sympathy, whereas HR acceleration appears to be a marker of anxiety and distress. However, we do not view HR deceleration as a direct index of emotion - only as a marker of outward focus of attention." (p. 388). Scarpa et al., (1997) on the other hand focus on HR resting levels "several researchers have found lower resting HR levels in children engaging in disruptive behavior in school and participants who later engaged in criminal behaviour" (p.154). The present study aimed at combining several of these indices, with the goal to differentiate between individual children whose responses could be classified as empathic (empathic concern as well as distress) or as non-empathic (potentially psychopathic Factor I). Obviously there are a variety of measurement instruments that can be used to supplement the dispositional information obtained from psychophysiological data, such as facial indices, self-reports, observations, and the traditional questionnaire measures. Among the questionnaire indices of emotion, the Bryant Empathy Scale (Bryant, 1982), and the Interpersonal Reactivity Index (IRI) (Davis, 1983) have been advocated by most writers in the field of empathy research; whereas in the field of psychopathy research the Psychopathy Checklist-Revised (Hare, 1991; Hart, Cox & Hare, 1995; Hart & Hare, 1996a) and the Psychopathy Screening Device (PSD), (Frick & Hare, 1994) have been mentioned consistently as most reliable and valid indicators for psychopathy Factor I. The Child Behaviour Checklist (CBCL), (Achenbach & Edelbrock, 1979) adds additional information regarding pro-social or anti-social

behaviours and expressed emotions, and has been frequently used in similar studies (for example Raine et al., 1997).

The described multimodal approach has been chosen in order to obtain enough convergent data from multiple sources to test the prediction that it will be possible to discriminate between empathic and non-empathic children on the basis of psychophysiological markers. Scarpa et al., (1997) chose a similar approach to distinguish between inhibited (anxious) as opposed to disinhibited (psychopathic) children; Raine et al., (1997) distinguished between groups with high resting HR (non-aggressive), as opposed to groups with low resting HR (aggressive, sensation seeking); and Blair et al., (1997) arrived at the distinction between a group of individuals whose lack of a 'Violence Inhibition Mechanism' (psychopaths), contrasted with the group whose 'Violence Inhibition Mechanism' was activated (empathic).

The empathy construct has been explained as multidimensional and it is to be expected that the various assessment instruments will approach the measurement from different angles: perspective taking, ToM, emotional intensity, ability to regulate emotions, or personal distress. Similarly there are different aspects of the psychopathy construct that are targeted by different instruments: behaviours, versus affect, versus personality dimension. It has been mentioned that abusive and aggressive behaviour was negatively related to empathy; for dispositional (trait), as well as situational (state) measures. An aspect of empathy is 'personal distress', which has been described as an over-response of empathic individuals who are not able to regulate, that means in this context to decrease their arousal levels. Personal distress (e.g., helplessness or sadness) often leads to self-focus, impaired social behaviours, and can even be associated with aggressive behaviours (the 'fight' component in fight/flight reactions). Based on this description, a person who exhibits empathic personal distress would seem to be the exact opposite (in psychophysiological measures) to the previously described psychopathic individual, whose skills deficiency in the regulation of emotions may result in non-optimal flat affect, and the inability to increase attention, stimulation and arousal to desired and optimal levels.

It was crucial to scrutinise the assessment measures in order to clarify which aspect of empathy certain instruments are really measuring: empathic concern, perspective taking, Theory of Mind, or personal distress. The degree of correlation of physiological data with self-report and other-report indices will depend on whether the same underlying construct is being measured (for example sadness as opposed to distress), (Eisenberg & Fabes, 1990; Eisenberg, McCreath, & Ahn, 1988; Eisenberg et al., 1989; Eisenberg et al., 1994; Feshbach & Feshbach,1969; Miller & Eisenberg, 1988; Perry, 2001; Scarpa & Raine, 1997b).

Research has shown that the basic processes reflecting empathy are well developed by kindergarten age, which allows for the study of empathic/un-empathic traits with very young children, and thus the avoidance of confounding factors such as educational achievement, alcohol and drug-related interference, or effects of peer-pressure. Obviously there are disadvantages in the research with young children, such as their limited access to verbal expressiveness, or lack of accurate insight regarding their emotional responding. However, there is the advantage that they are not yet motivated to falsify their emotional responses, or to use pretence due to social desirability factors.

The measurement of emotions is only possible in an indirect way, via inferences based on self-report, observations, or physiological responses (Eisenberg et al., 1988; Eisenberg et al., 1992). It is important to remember that there are no unique one-on-one relationships between psychophysiology and specific emotions. Nevertheless, because it is known that for example the sympathetic nervous system is sensitive to stress and emotional arousal, Skin Conductance (SC) activity (as part of the sympathetic nervous system) can be used as index to stress reactivity to aversive/arousing events. Thus SC can be seen as a useful measure of autonomic arousal (Raine, 1996a).

Psychophysiology rests at the interface between psychology and physiology and is therefore uniquely placed to provide important insights into emotional behaviours. Originally, arousal was welcomed as a universal indicator for emotionality; independent of the valence or type of a particular emotion (Neiss, 1988). The arousal construct was simple, unidimensional, and quantifiable and thus replaced drives and motives. The theory of optimal arousal suggested that

individuals strive to achieve an optimal state of arousal. But subsequent research demonstrated that various emotions have their own pattern of expression and that the notion of undifferentiated arousal is an oversimplification. Arousal has been differentiated from activation (arousability); Arousal and activation are coordinated by effort (i.e., self-regulation) due to motivation. It has been established that physiological responding can take the form of acceleration/increase, or deceleration/decrease, or no-change, in the frequency or amplitude domain; and that the unique response pattern depends on the nature of the stimulus and on the individual differences in responding (Ekman et al., 1983; Gross, 1999; Neiss, 1988).

Craig and Lowery (1969) were able to demonstrate response specificity when they discovered that HR deceleration occurs during vicarious experiences and HR acceleration during direct exposure. It was discovered that distress-reactions usually do not show decelerative HR patterns, rather that 'orienting' to stimuli from the environment, learning, and generally attentional processes are related to HR deceleration. The possible elements that could be taken into consideration when measuring emotions can be listed as follows: onset- or peak-intensity (negative or positive) of the emotional reaction; variations in emotional tone/intensity (range); lability (fluctuations or variability) of emotional responsiveness; onset-latency or peak-latency of the emotional reaction; rise time; recovery; persistence of the emotional response. All emotions provoke some body reactions and it is important to choose the most appropriate dimension for interpretation (Krantz & Falconer, 1995; Lacey, 1958; Scarpa & Raine, 1997b; Thompson, 1988).

HR has been described as the most reliable and most easily obtainable psychophysiological measure (Bellack & Hersen, 1998; Grings & Dawson, 1978; Sturgis & Gramling, 1998). The sympathetic nervous system is involved via norephineprine and epinephrine to increase HR, whereas the parasympathetic nervous system influences HR via the vagus nerve and the release of acetylcholine (increase of HR can be due either to weak parasympathetic reaction or due to strong sympathetic input); The central nervous system is involved as well, via neurotransmitters and neurohormones. HR is sensitive to fear/anxiety and accompanies fight/flight reactions and attentional processes. As mentioned before, low resting HR (tonic level) has been thought to reflect under-arousal/fearlessness

and has been associated with antisocial groups. Phasic changes in HR are more difficult to assess and artefacts such as sinus arrhythmia and prestimulus levels have to be taken into account: "The 'law of initial value' states that the magnitude of a particular physiological response to a given stimulus or situation depends on the prestimulus level.... The higher the prestimulus level of the response, the smaller the increase in the response", (Sturgis & Gramling, 1998, p. 131). Nevertheless, most studies report reduced phasic change (acceleration as well as deceleration) for psychopathic populations, in response to empathy inducing stimuli (Scarpa & Raine, 1997b).

Electrodermal activity is measured either as skin resistance, or its reciprocal value skin conductance. The conductance response (which is easier to analyse) also increases and decreases corresponding to arousal levels and thus represents a measure of arousability, reactivity and anxiety. As with HR, the electrodermal measures can be expressed as basal/tonic levels, spontaneous electrodermal activity, or phasic/temporary changes in activity (Grings & Dawson, 1978; Sturgis & Gramling, 1998). Generally, SC indicates the amount of neural sympathetic nervous system activity via the sweat glands and can be used to index stress reactivity to aversive and arousing events. Personal distress responses are defined by high skin conductance levels, slow habituation of the orienting response, and greater SC phasic reaction; whereas psychopathic individuals evidence low skin conductance levels, increased non-specific fluctuations, reduced SC orienting, and longer SC half-recovery times to aversive stimuli. The interpretation of electrodermal activity is complicated by influences of age, gender, hormonal fluctuations, ethnicity, and situational variables such as air temperature, hydration of the sweat glands, and time of day. Thus it is imperative to take the individual baseline into account and not to compare absolute levels of responses across sessions (Bellack & Hersen, 1998; Scarpa & Raine, 1997b). The additional measurement of respiratory activity can be used to control for artefact in HR and SC data. Coughs, sneezes, crying, talking, or deep breathing can cause changes in the responses and the information from the strain gauges can be used to detect poor or misleading data.

Based on the presented information the importance of choosing the appropriate measurement(s) and marker(s) becomes evident. Consistently, in the

literature the multi-method approach has been advocated to assess emotional responding. As each type of index has its particular strengths and weaknesses, conclusions can be drawn with greater confidence if the findings of various types of indices converge. For the present study HR and SC were chosen as useful and informative measures based on an overview of previous research (Bellack & Hersen, 1998; Eisenberg & Fabes, 1990; Eisenberg at al., 1989; Eisenberg et al., 1994; Gurthrie et al., 1997; Kazdin, 1980; Raine et al., 1990a). The choice of stimulus conditions is equally important to obtain accurate results.

Psychophysiology in Praxis: How to Measure Empathy within Psychopathy

Despite some complications in interpreting data that might reflect multiple simultaneous emotional reactions, most researchers agree that physiological indices appear to be the most promising methods for future research, especially with children (Eisenberg & Strayer, 1987; Ekman et al., 1983).

The choice of the appropriate psychophysiological measure and the selection of the appropriate dimension of responses (e.g., amplitude, frequency, lability, latency, or recovery time) is most important and has to be guided by previous research. Grings and Dawson (1978) presented a summary of the six major response measures in the sympathetic nervous system and parasympathetic nervous system dimension (see Table A1). These responses can be recorded in basal/tonic levels or phasic changes and the collected data may allow for inferences to the defined theoretical constructs.

The techniques in psychophysiology have been simplified due to advances in technology, which translates into increased reliability of the obtained data. The system that was used for the current study has been developed to offer the flexibility of ambulatory research and to provide absolute safety especially for use with small children (ADInstruments, 1999a; ADInstruments, 1999b).

Table A1

Grings and Dawson's (1978) Six Major Response Measures

Response system	*Unit*	*SNS*	*PNS*	*Recording*
HR	beats p/min	increase	decrease	electrodes (heart)
Blood pressure	mm of mercury pressure	increase	decrease	pressure cuff (arm)
Blood volume/ peripheral	change in mm	decrease	none	plethysmograph
Skin conductance	micromhos/microSiemens	increase	minimal	electrical voltage
Muscle potential	mc/ mm volts	none	none	electrodes (skin)
EEG	mc volts	none	none	electrodes (scalp)

Note. SNS = sympathetic nervous system; PNS = parasympathetic nervous system

Electrocardiography (ECG) and Heart Rate

The computation of rise-times and recovery-times, and the consideration of baseline comparisons to account for the effects of 'law of initial values' is an important feature of the apparatus used in this study. Event markers allow for online commenting regarding extraneous stimuli (for example coughing, moving, talking, or third party disruptions) for later removal of these artefacts. The used procedure in this study resulted for each child in two parallel traces (ECG and the computed HR), which were observed online during recording. (See sample for ECG trace Figure A1, bottom.)

That physiological indicators can be useful as unbiased and non-verbal markers of vicarious emotional responding has been mentioned previously. A further advantage is that compared with traditional questionnaire information the psychophysiological data collected allows for analysis of change over time. HR beat-by-beat information can be correlated with various behavioural and psychological events as cardiovascular reactions vary in their magnitude and in their patterning, depending on the eliciting situation. Heart rate data are typically measured by counting the heart rate, measuring the interbeat interval (IBI), or examining the

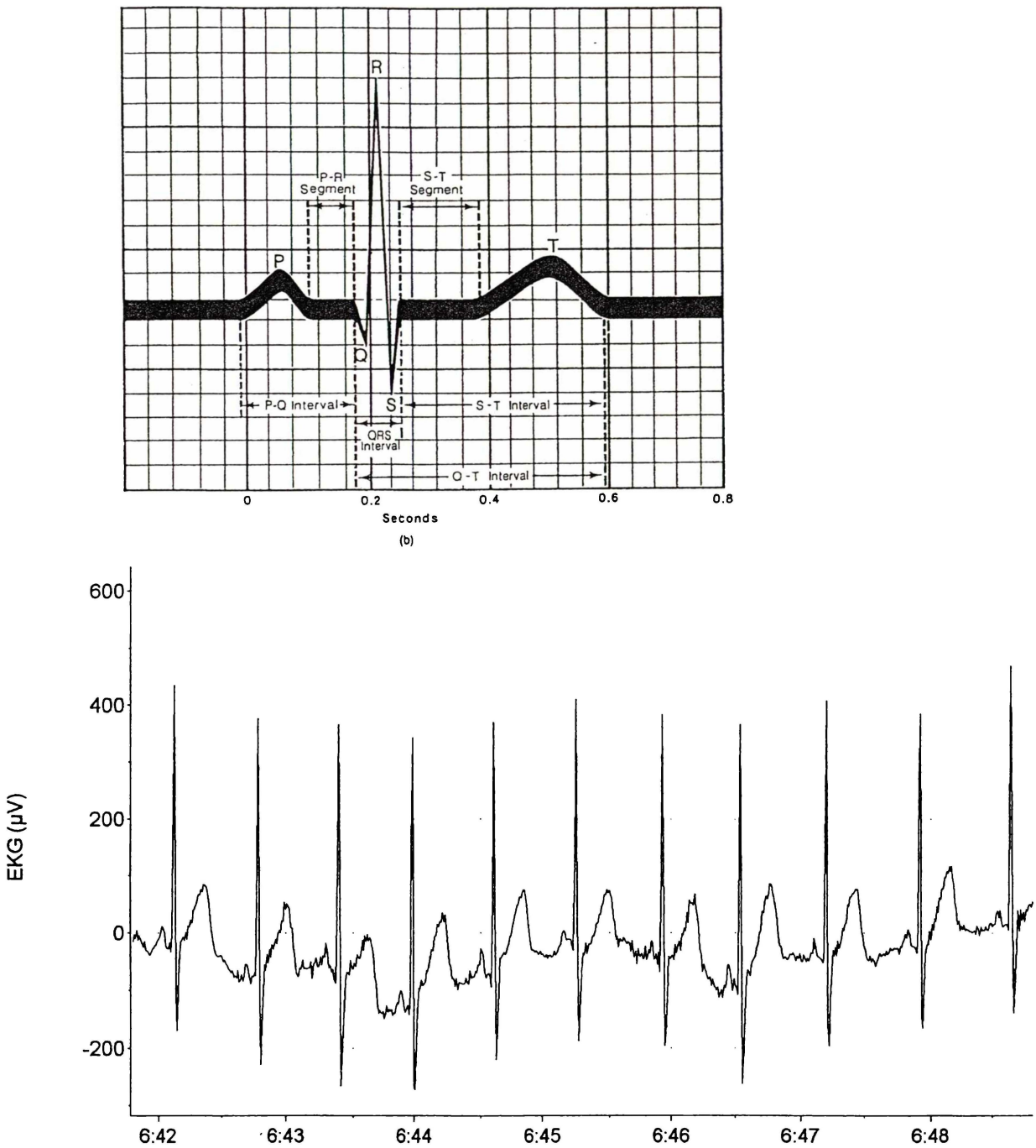


Figure A1. Schematic ECG representation (top) and ECG sample trace from the present study (bottom).

contours of the signal (Eisenberg & Fabes, 1990; Eisenberg et al., 1989; Krantz & Falconer, 1995; Sturgis & Gramlin, 1998).

HR resting levels are influenced via sympathetic nervous system and parasympathetic nervous system and are used to assess the extent of the autonomic arousal. They have been described as easiest and most reliable signals that can be recorded in ambulatory settings, and thus are used most often. Low resting levels in particular have been a strong characteristic of the violent offender, of low sympathy, and of children with disinhibited temperament (Eisenberg et al., 1996; Raine et al., 1997; Scarpa & Raine, 1997b).

HR variability is a further source of information that can be obtained from dispositional cardiac recording. Vagal tone is connected to self-regulation, emotionality, attentional processes, information processing, and is often predictive of sympathy reactions. HR variability is an index of parasympatheric activation of the heart and tends to be reduced during focussed attention. High HR variability is expected to be associated with a lack of regulation and with disinhibition in the non-empathic (psychopathic) participants (American Heart Association, 1996; Fabes et al., 1993; Gale & Edwards, 1983b; Gottman et al., 1997; Mezzacappa, Kindlon, & Earls, 1996; Porges, 1976).

HR phasic responses are dependent on the interplay of sympathetic nervous system 'accelerator' and parasympathetic nervous system 'brake' effects. HR deceleration during exposure to distress has proven to be a reasonable marker of empathic concern, outward attention, intake of information, and sympathy, whereas HR acceleration appears to be a marker of self-focus, over-arousal, active coping, aversive reaction, anxiety and distress. Reduced orienting, that means neither acceleration, nor deceleration of HR to aversive or neutral stimuli has been connected to un-emotional, non-responsive, un-attentive, and potentially aggressive (psychopathic) populations (Blair et al., 1997; Eisenberg & Fabes, 1990; Eisenberg et al., 1988; Eisenberg et al., 1992; Gurthrie et al., 1997; Raine, 1996a).

Additionally, it is important to consider the influence that breathing has on psychophysiological indices. During exhaling parasympathetic influence slows HR down and during inhaling sympathetic influence speeds HR up. This rhythmic change is called Respiratory Sinus Arrhythmia (RSA) and it is suggested that a

visual inspection of the HR trace is performed to exclude irregularities and that HR data are averaged over a period of time to account for this pattern (Gottman et al., 1997; Mezzacappa et al., 1996).

Recording of Skin Conductance

Skin Conductance (SC) has also been known as Psychogalvanic Reflex, Galvanic Skin Response (GSR), or Electro Dermal Activity (EDA). The tonic level of skin resistance or skin conductance is the absolute level in the absence of any phasic response. Superimposed on the tonic level are phasic changes: skin resistance responses and skin conductance responses. The change in conductance is a function of sweat gland activity, which varies because of sympathetic nervous system activity. Recording of SC results in a skin conductance trace like the sample in Figure A2.

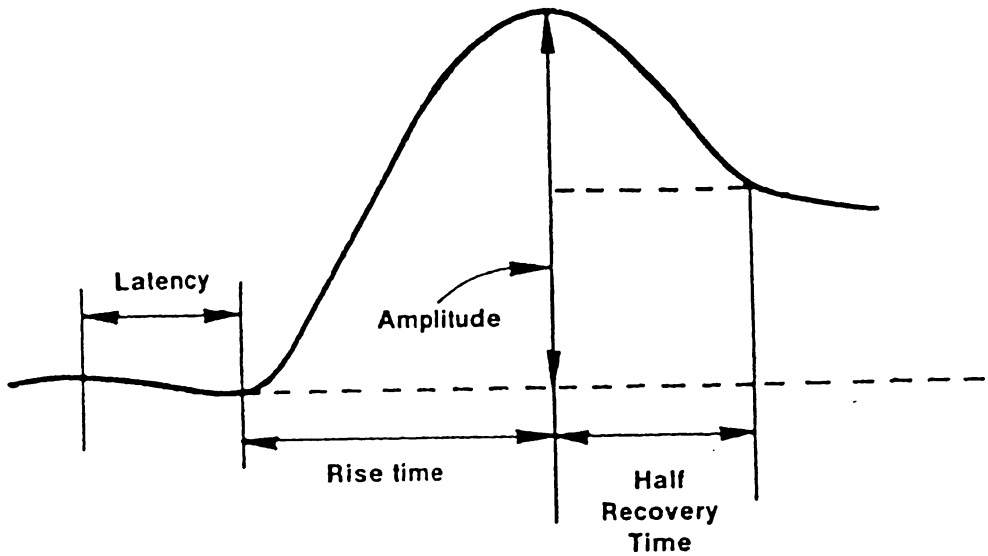
The SC response system has been closely linked with the psychological concepts of emotion, arousal, and attention, and typical measures are presented in Table A2 (Cacioppo & Tassinary, 1990b).

Table A2

Typical Measures for SC

Measure	*Definition*	*Value*
SCL	Tonic level of electrical conductivity	20-20μS
Change in SCL	Gradual changes in SCL	1-3μS
Amount of non-specific SCR	Number of SCRs with no stimulus	1-3p/min
SCR amplitude	phasic increase in SC after stimulus	0.2-1μS
SCR latency	Interval btw stimulus onset and SCR	1-3s
SCR rise time	Interval btw SCR start and peak	1-3s
SCR half recovery time	Interval btw SCR peak and 50% recovery	2-10s
SCR habituation (number)	No. of stimulus presentations till no response	2-8 times
SCR habituation (slope)	Rate of change for SCR amplitude	.01-.5μS

Note. SCL = skin conductance level; SCR = skin conductance response.



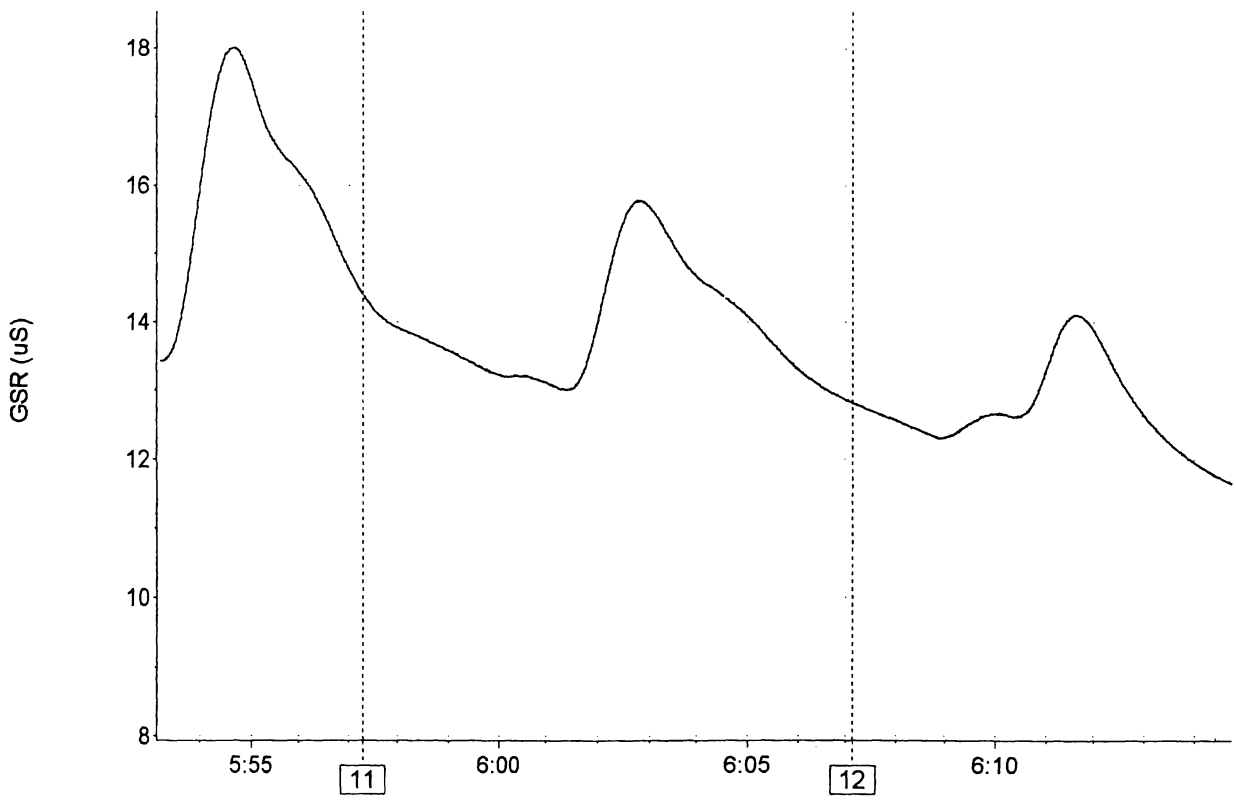


Figure A2. Schematic SC representation (top) and SC sample trace from the present study (bottom).
Note. GSR = galvanic skin response = SC.

Unlike HR, which is related to attention and information processing, SC appears to be mainly determined by emotional reactivity, motivation and arousability. SC is seen as a rough marker for the intensity of autonomic emotional arousal and is sensitive to the significance of particular stimuli, which can lead to emotional distress reactions in empathy inducing contexts. The innervation of the eccrine glands occurs solely via the sympathetic nervous system; (in response to thermal as well as signal stimuli). High SC reactivity is seen as an indication of effective orienting and defensive responding (Craig, 1968; Eisenberg & Fabes, 1990; Gurthrie et al., 1997; Raine, 1996a; Sturgis & Gramling, 1998). It has been mentioned before that SC (as opposed to skin resistance) has been elected as measure of choice for the present study, based on recommendations in the literature (Venables & Christie, 1980).

The SC level normally decreases with rest and rapidly increases with novel stimulation (arousal). When there are SC responses in the absence of an obvious stimulus they are recorded as 'non-specific SC responses' (similar to HR variability due to breathing etc.) and individuals with high frequency of non-specific SC responses are termed 'labiles' (as opposed to 'stabiles'); they evidence sustained vigilance, are better focussed on tasks, and show a better orienting response. The SC frequency measures are generally more reliable than the amplitude measures, as the latter are affected by factors such as the thickness of the skin or the number and size of the sweat glands. Therefore it is important to determine the baseline (i.e.,'subject zero') for each individual prior to each new session in order to minimise this variability within and between the participants (Raine, 1996a; Raine et al., 1997).

The SC orienting response (reactivity) has been defined as increase in amplitude greater than 0.05μS. According to the theoretical construct, psychopathy-analogues are expected to be non-responders for SC, which is evidenced by a lack of SC response to aversive stimuli and a reduced SC response frequency (i.e., less orienting) to novel (neutral and aversive) stimuli (ADInstruments, 1999a; Blair et al., 1997; Brennan, 1997; Lynam, 1996; Scarpa & Raine, 1997b; Raine, 1996b; Raine et al., 1996). Raine (1996) summarised the relevant SC patterns for psychopathic, fearless, and uninhibited individuals as follows: reduced tonic arousal (SC level); few non-specific fluctuations; reduced SC response to aversive stimuli;

longer SC half-recovery to aversive stimuli (i.e., slow fear dissipation, reduced avoidance learning). Conversely, it seems obvious that increased SC levels are expected in inhibited, well regulated, and anxious children (Gurthrie et al., 1997).

Respiration

The third psychophysiological measure of interest is respiration. The resulting data can be evaluated as a check for artefacts in the HR and SC measures, which might be due to coughing, sneezing, or talking (Sturgis & Gramling, 1998).

Overview

In the preceding pages and in the introduction of this study the concepts that relate to the research areas of psychopathy and empathy were explored. It has become apparent that a multi-modal approach is needed to combine the findings of psychopathy research with those of empathy research and to join the information that can be gained from dispositional approaches with that from situational ones. The assessment of vicarious emotional responding (in particular affective empathy) for psychopathic Factor I populations can be divided into dispositional and situational measures (see Table A3).

Table A3

Dispositional or Situational Measures for High or Low Empathic Individuals

	Dispositional measures	*Situational measures*
High empathic individuals (highly regulated)	-paper/pen measures (self- or other report) -low vagal tone (HR variability) -high SC baseline (tonic) values, indicating pro-social emotional reaction and regulated distress	-self-reports regarding emotion- eliciting stimuli -HR reactivity (acceleration, deceleration) -SC increase to emotional reaction (also distress)
Low empathic individuals (psychopathy-analogues)	-paper/pen measures (self- or other report) -low HR baseline (resting) levels -high (unregulated) HR variability	-standardised in vivo observations -lack of HR reactivity (or possibly HR deceleration in case of cognitive processing) -flat SC reaction and slow SC recovery

Figures A3a. and A3b. show how the various theoretical concepts were operationalised and connected with each other to arrive at the research design of the present study; (based on previous research and published findings; e.g., Gottman et al., 1997). The sequence of the theoretical constructs shows the progression from one concept to the next.

In the first step (shown in Figure A3a, first column), 'true' psychopathy was defined and further research has focussed on this group only (first box with bold outline). In the next step modes of expression were considered, as they apply to Factor I psychopathy (shown in Figure A3a, second column). Social emotions, such as empathy, were identified as important and only those were considered for further research (second box with bold outline). The next sub-grouping (shown in Figure A3a, third column) distinguished affective empathic responses from other aspects of empathy (such as cognition). Again, only the subgroup that shows physiologically measurable effects was analysed further (third box with bold outline). This led to the exploration of various tools for the measurement of affective empathy (shown in Figure A3a, fourth column). Of those only ECG and SC were considered for further analysis (fourth box with bold outline).

Figure A3a illustrates the process of the development of the design for the present study, as described in the introduction. Various areas of literature relating to psychopathy research were explored In each specialised field the decision to focus on particular issues led to the next area, and finally to the chosen design and method.

In the final step (Figure A3b), the information from psychophysiological indices is grouped into the *non-empathic* (left column) and the *empathic* (right column) stream. Each pathway describes the operationalised theoretical constructs as they have been proposed for psychophysiological research.

In the introduction and the beginning pages of Appendix A, it has been described that individuals, who are either high or low in empathy, show differences in their HR and SC responding to various stimuli (i.e., situational responding). This distinction has been shown to apply also to dispositional measurements of HR and SC (i.e., baseline and vagal tone). Figure A3b summarises these findings by grouping them into dispositional versus situational, and HR versus SC, respectively. In each instance the expected data pattern is described (e.g.acceleration/deceleration,

Sequence of theoretical constructs

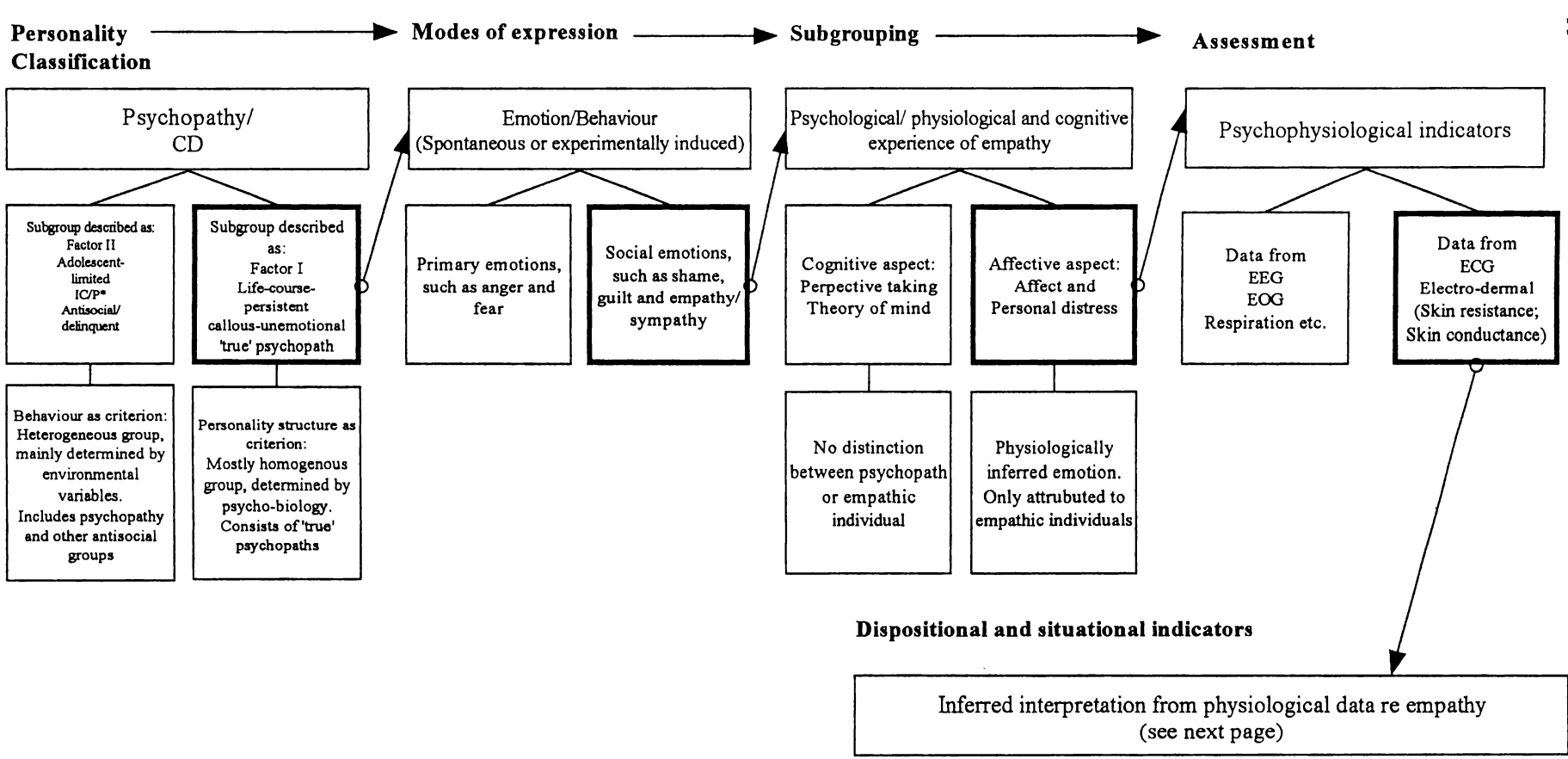


Figure A3a. Sequence of theoretical constructs (part 1) and their operationalisation for research design.
Note. IC/P = poor impulse control/conduct problems; EEG= electro encephalogram; ECG = electro cardiogram; EOG = electro oculogram

Dispositional and situational indicators

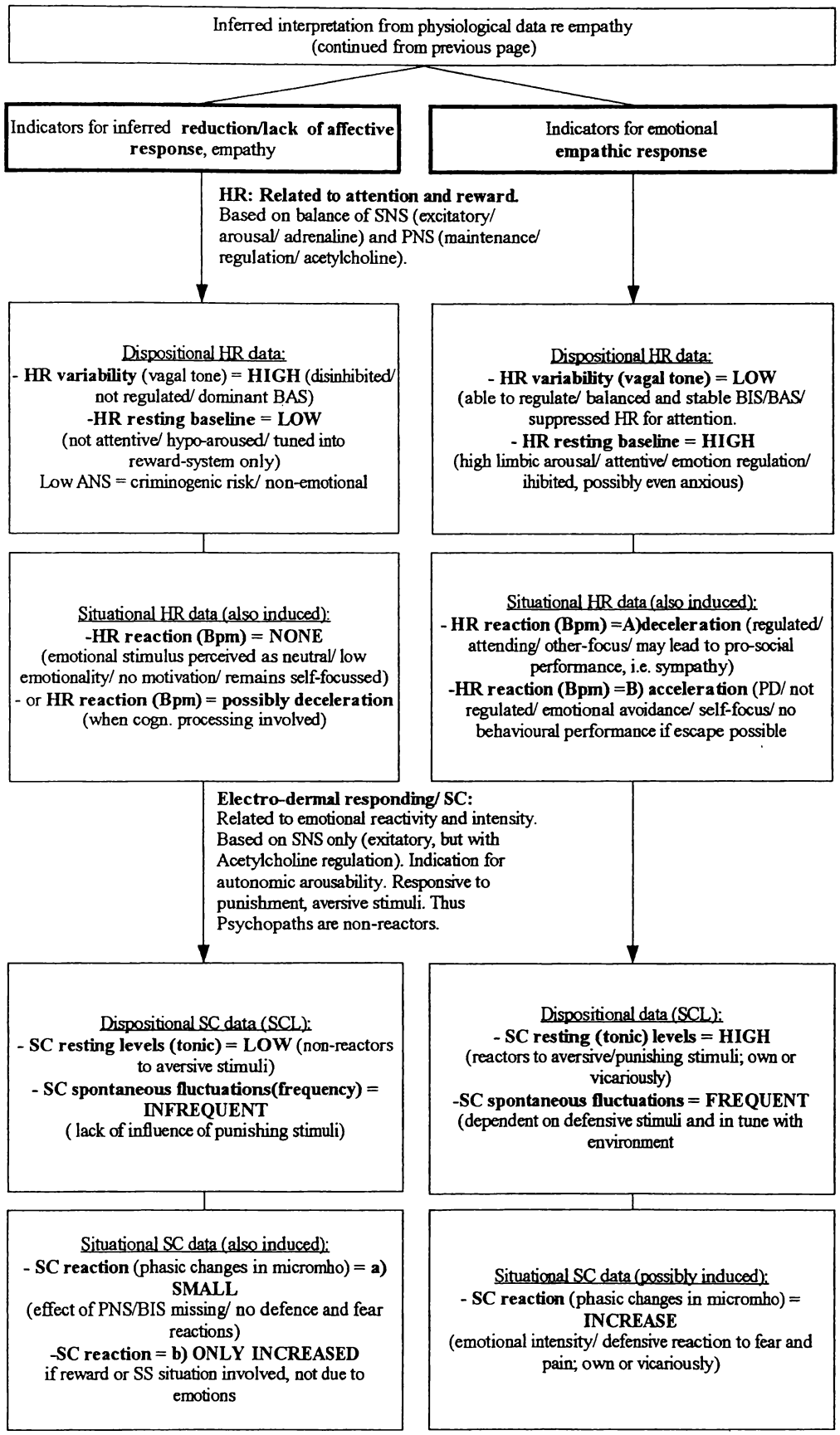


Figure A3b. Sequence of theoretical concepts (part 2) and their operationalisation for research design regarding psychophysiology.
Note. SNS = sympathetic nervous system; PNS = para-sympathetic nervous system; ANS = autonomic nervous system; PD = personal distress; SS = sensation seeking

or increase/decrease, or high/low) and the relation to the underlying theoretical constructs is mentioned. The theoretical paradigms are operationalised into physiologically measurable models, which can be used to infer and interpret emotional states. Thus, these tools might allow for the possible distinction between empathic and non-empathic individuals, based on their distinct physiological responses to empathy-eliciting situations.

This inferred interpretation of empathy from physiological data has been at the core of the present study.

Issues in Psychophysiological Methodology

There are several additional issues that need to be taken into account in psychophysiological studies (Fowles, 1975). For example there is the 'unanimous concern to minimise heterogeneity' within the selected group of participants:

Age has been found to influence the level of responding for some of the psychophysiological measures (e.g., basal metabolism, maximum breathing capacity, or endocrine secretion), and several studies have conclusively demonstrated that the cardiac orienting response is influenced by age (Greenfield & Sternbach, 1972; Raine et al., 1997). Additionally, it can be assumed that the choice of very young participants minimises the confounding influences of drug taking, alcohol consumption, prolonged medication, sustained exercise, over-exposure to violence on TV and in videos, and hormonal influences of puberty (Eisenberg et al., 1992). Very young children have also been found to be mostly unaffected by demand characteristics (reduced capability for Theory of Mind), and this allows for the neglect of social desirability measures. Based on these considerations and to avoid maturational influences the present study included very young participants in a very narrow age band: from five years four months to five years eight months.

The sex of the individual being measured also needs to be considered. There are indications for gender differences in blood pressure, respiration rates, basal SC levels, and electrodermal responsivity. Additionally there is evidence that males score higher on certain paper/pen measures of psychopathy (Lilienfeld, 1998), and that females tend to score higher on self-report indices of distress (Eisenberg et al., 1988). Thus, it was decided to exclude gender heterogeneity by selecting exclusively

male participants for the present study; which also corresponds well with the research findings that most children who are diagnosed or suspected with conductive disorders are male.

Race in relation to psychophysiological measures has been shown to affect electrodermal responding (lower skin resistance for Caucasians), as well as for blood pressure levels (lower for Caucasians), (Greenfield & Sternbach, 1972; Sturgis & Gramling, 1998). Further research findings have discovered differences in cardiovascular and SNS reactivity between African American and White Americans (Anderson, McNeilly, & Myers, 1992). Again, to reduce heterogeneity the participants of this study were selected from Pakeha/European populations.

Further subject variables include family background and socio-economic status. The importance of family and environmental factors for the development of personality and physiological response patterns was highlighted during the introduction. Despite some suggestions, there are no conclusive findings linking social class with specific psychophysiological patterns, and Raine et al., (1997) report that the effects of low HR levels in correlation with later aggression remained, even when 'family discord' or 'socioeconomic deprivation' were excluded from the analysis. Thus it was not necessary to pre-select participants from a defined socioeconomic group or family constellation.

Issues in mental and physical health of the participants can potentially introduce bias in the research data. For example brain injuries or medication have been demonstrated to influence central nervous system and autonomic nervous system functioning and thus can exaggerate or mask any psychophysiological effects of empathy inducing stimuli. Therefore it is recommended to use a screening questionnaire to collate information from the caregivers and children regarding health and trauma issues in an attempt to minimise these confounding influences.

There are a number of session variables that can compromise the validity and reliability of psychophysiological data: food and beverage intake (metabolic influences) can affect psychophysiological data; the circadian rhythm has been shown to affect HR measures (i.e., higher HR values in the afternoon), (although Raine et al., (1997) found that the correlation effects of HR baseline and aggression were robust, despite changes in day time). The electrodermal response is affected by

changes in temperature and humidity (higher SC values result from higher humidity and temperature values), which needs to be taken into account; effects of gross body movement on HR and SC measurement have been mentioned before and need to be prevented.

The previous section explained some of the practical and methodological issues that had to be taken into account, especially in the area of psychophysiology. Next follows an overview of the relevant self-reports and rating scales that had been considered to assess empathy and psychopathy. The selection process regarding the traditional assessment instruments, rating scales, self reports, and observations is presented in some detail, resulting in the actual choice of assessment tools.

Questionnaires and Complementary Assessments for Empathy and Psychopathy

So far theoretical constructs related to psychopathy and empathy were listed and their operationalisation regarding psychophysiological responding has been detailed.

However, psychophysiological measurement is only one dimension of assessment; other approaches include traditional questionnaire methods (self- and other reports) as well as behaviour observations. These data provide supplementary information on the situational and dispositional levels of empathic/non-empathic responding of the target population.

It has been stated before that multiple assessment strategies are useful in research, especially with children, and techniques include clinical interview; self-monitoring; behavioural observations; standardised testing; rating forms from parents; teachers and peers; and self-report measures (Franz & Gross, 1998). Unfortunately, it has been found that correlations between children's, mothers', and teachers' reports were only low and that there was little agreement between these sources of information. It is believed that this may be explained by the fact that different people focus on different aspects of behaviour in different contexts when making their ratings (Lewis, 1999). Locraft and Teglasi (1997) confirmed this when they hypothesised that teachers' perceptions of empathy and social competence were based on the children's outward behaviours (i.e., Factor II psychopathy or poor impulse control/conduct problems), whereas children's self-reports reflect their inner

world (i.e., empathic affect); and that these two sources of information illuminate different aspects of empathy. Thus, compliant behaviour in the classroom should not be confused with other-oriented moral reasoning (Eisenberg & Fabes, 1990). The highest correspondence was generally found between parent and teacher ratings, in particular for externalising problems (Kolko & Kazdin, 1993; Lochman & the Conduct Problems Prevention Research Group, 1995). Thus, several measures might assess different aspects of a construct, which can help to determine whether two constructs are related (convergent validity) or different (divergent validity). Following is a short overview of frequently used questionnaires in this area, and of the process for selection, adaptation, and modification of the questionnaires (Kazdin, 1980). (Excerpts of rating scales, self-reports, and observations can be found in Appendices C, D, and E).

Rating scales: Child behaviour in general

Behaviour rating scales are most often checklists, with Likert classification, that allow the collection of information about the child from a variety of informants, which is then compared to normative data. The danger of rater bias has been mentioned before and this issue appears to be particularly salient for the assessment of children. However, it was found that teachers' reports are very informative as they can observe aspects of children's functioning that are not evident to parents or clinicians (Achenbach, 1991; Dean, 1980). This source of information has to be complemented via children's self reports and in vivo observations to corroborate the previously presented psychophysiological measurements.

Among the more general child behaviour indices the Child Behaviour Checklist (CBCL, with versions for teachers, parents, and self-report) (Achenbach, 1991; Achenbach & Edelbrock, 1979; Edelbrock & Achenbach, 1984) has been described as "undoubtedly one of the most well-developed, empirically derived rating scales currently available for the behavioral assessment of children" (Franz & Gross, 1998, p. 365). Thus, for the present research the CBCL/Teacher Version was chosen as the overall behavioural assessment instrument. The CBCL is a 113-item rating scale, covering a wide range of externalising and internalising behaviours, for children aged 5 to 18 years (Jensen et al., 1996). The CBCL has been the basis for

the development of the AML Quick-Screening Device (aggression/mood/learning). The AML is a brief, 11-item scale (5-point Likert) designed for teachers to identify new entrant children experiencing difficulties on the three dimensions: AML-A, aggressive acting out; AML-M, moody, withdrawn behaviours; AML-L, difficulty learning (Cowen et al., 1973).

Several other instruments have been considered and they have not been chosen for various reasons, such as: Age restrictions, lack of norms, unfavourable reviews in the Mental Measurement Yearbooks, or exact duplication of already chosen instruments.

Rating scales: Empathic responding

Most assessment instruments for affective empathy seem to be based on self-report and therefore many authors in the area of empathy research have developed their own rating scales for parents/teachers, based on the existing self-report indices. Miller and Jansen op de Haar (1997) explain a procedure called criterion-based selection, where a set of criteria or attributes for study are established and the children are then matched to these criteria. They generated a 10-item checklist to describe children who are especially skilled in empathy and altruism. Similarly, Eisenberg et al., (1996) based the development of their Children's Sympathy Scale on items from the Bryant (1982) Empathy scale that were factored together with items they generated during previous research, and via a similar procedure Gurthrie at al., (1997) arrived at their 19-item Ego-Control Scale/Distress regulation. The present study adopted the described procedure to construct the Criterion-based Scale for Dispositional Emotions and Social Functioning. This scale has been specifically designed to fit into the research design for the present study and was expected to discriminate between highly empathic and non-empathic (possibly psychopathic) children.

Rating scales in the area of empathy do not always measure the construct of pure affective vicarious empathic responding. The Children's Behavior Questionnaire (CBQ) is a scale, (Derryberry & Rothbart, 1988; Rothbart, 2000) which measures the ability to regulate emotion and to shift attention. Emotion regulation has been shown to be closely related to empathic responding and of

particular interest were four sub-scales: empathy, high intensity of pleasure, approach, and sadness.

Rating scales: Assessment of psychopathic tendencies

In the area of psychopathy most of the assessment instruments are rating scales and there are hardly any self-report measures for children. Most measures are only weakly correlated to each other, which is due to the previously mentioned disagreement regarding the psychopathy construct. The principal methodological achievement has been represented by the development of the Psychopathy Checklist (PCL) and its revision PCL-R by Hare (Hare, 1985; Hare, 1991). These measures are based on the assessment of personality features (Factor I and Factor II), instead of behaviour-based criteria. The PCL-R is a semi-structured interview, consisting of 20 items (3-point Likert), and is supposed to be complemented with file-data. The psychometric ratings are all very satisfactory and the checklist is recommended as 'state of the art'; even for adolescents (Bodholdt et al., 2000; Brandt, Kennedy, Patrick, & Curtin, 1997; Cooke & Michie, 1997; Fulero, 1995; Wong, 1988). The diagnostic threshold is set at a score of 30 and above, which revives the issue whether psychopathy should be seen as a categorical or dimensional construct (Hart, Cox & Hare, 1995; Lilienfeld, 1998).

The PCL-R was used by Frick et al. (Frick & Hare, In press; Frick et al., 1994) as template to develop the Psychopathy Screening Device (PSD) for the assessment of psychopathic traits in children. The PCL-R was used by Lynam (1997) as well to develop an alternate technique to assess childhood psychopathy. His 55-item Childhood Psychopathy Scale (CPS) integrates information from the CBCL, with the 'California Child Q-Set', and the PCL-R.

One other method frequently employed to evaluate 'reported problem behaviour of the child' is the 'Conners' Ratings Scales', which is based on conduct problems, learning problems and hyperactivity, and thus does not tap into the Factor I dimension of psychopathy (Martens, 1991).

Self-Reports: General information

Self-report measures for children have received the least empirical support, because reading and general verbal ability are required and because the ability to self-monitor is dependent on developmental progress. Nevertheless, several researchers have found that children are able to self-report reliably on their own behaviours, cognitions, and affective experiences. However, the information has to be obtained within the format of a guided interview (Franz & Gross, 1998).

A structured interview can provide important background information, as well as a chance for rapport building. The data obtained from the parents/caregivers or teachers can be supplemented and corroborated at this stage.

Self-reports: Empathy

In the 1980s self-report measurements were the norm in empathy research, as they are easy to administer and take less time than observations. Children's self-reports of emotional affect are often not correlated to pro-social behaviour, which has been variously interpreted as a lack of insight into their emotional responding, or a lack of verbal skills to express their emotions correctly, or a reduced ability to actually take action and thus reduce distress (i.e., helplessness) (Eisenberg & Fabes, 1990; Eisenberg et al., 1988). Due to the above described restrictions it is important to administer the questionnaires verbally to very young children and to make sure that they understand the questions.

The earliest assessment tools for empathy were the 'Picture/Story Assessments' developed by Feshbach and Roe (1968). However critics pointed out that it may be hard for children to shift from one emotion to the next, or that the hypothetical stories might not create sufficient emotional response (Kestenbaum, Farber, & Sroufe, 1989). Mehrabian and Epstein's (1972) scale of Emotional Tendency has been the most frequently used index for empathic responding for adults and was adapted for children by Bryant in 1982 (Bryant, 1982; Miller & Eisenberg, 1988). This 22-item Bryant Index of Empathy for Children and Adolescents taps into distress, sympathy, and emotional contagion, (Strayer, 1987).

The Interpersonal Reactivity Index (IRI), (Davis, 1983) was developed by Davis to incorporate the multidimensional nature of empathy. He aimed at

combining the cognitive approach (e.g., Hogan, 1969) with affective approaches (e.g., Mehrabian & Epstein, 1972) and constructed a 28-item self-report measure with four sub-scales: Perspective taking; Fantasy; Empathic Concern; Personal Distress. Each sub-scale taps (via 5 point Likert) into a separate construct, which is demonstrated by the distribution of their correlation scores with other measures (Eisenberg et al., 1994). For the present study the empathic concern and personal distress sub-scales seemed most relevant. The original IRI was designed to assess adult participants and thus needed to be adapted for use with young children. Litvak-Miller, McDougall, and Romney (1997) had reworded the questionnaire for their research via pilot studies and attained satisfactory internal reliabilities as well as test-retest reliabilities for their modified child-version.

There are many more self-report measurements for the assessment of dispositional empathy, and they can be complemented via assessment instruments with focus on emotional regulation.

Self-reports regarding emotional regulation are reliant on the ability of the subjects to be aware of the different facets of their own emotions and to be able to verbalise these differences. There has been considerable doubt whether young children have the necessary insight to self-report on their affective states (Eisenberg, 2000a). The approach of integrating information regarding physiological reactivity has been extended into self-report scales developed by Derryberry and Rothbart in 1988 (Grossenbacher, Rothbart, & Derryberry, 1990). The Physiological Reactivity Questionnaire (PRQ) is used to assess regulation.

One further measure of self-report was added in the present study to determine whether the boys were able to self-report their feelings. It was of interest whether children would be able to report feelings of empathic concern, of distress, or of excitement. This measure was modelled after similar measures used by Eisenberg et al. in several previous research projects.

Self-report of affect intensity has previously been used by several researchers and it is assumed that affective responsiveness/emotional reactivity is connected to arousal regulation and ultimately to temperament (Eisenberg et al., 1994; Larsen & Diener, 1987). Again, there is the specific problem regarding the ability of very young children to analyse and describe their own feelings (Strayer, 1987).

Self-reports: Psychopathic tendencies

It has already been mentioned that self-reports regarding psychopathic tendencies cannot be recommended as a reliable assessment information. Lilienfeld, Purcell, and Jones-Alexander (1997) reported that most self-report psychopathy measures correlate neglibly with Factor I. Rather they correlate with Factor II and are thus markers for behavioural deviance. Hare (1985) agrees with this view by adding that Factor I psychopaths lack the insight and the will to honestly provide reliable self-reports. For adult populations frequently used self-report measures are the Minnesota Multiphasic Personality Inventory (MMPI), Psychopathic Deviate and Hypomania Scales; the California Psychological Inventory (CPI), Socialisation Scale; and the Millon Clinical Multiaxial Inventory II (Millon), Antisocial Scale (Hare, 1985; Hare, Hart, & Harpur, 1991; Laufer, Skoog, & Day, 1982). However, there are no similar measures for children and thus it seems more promising to complement the data from the teacher reports with observational information.

Complementary assessments

The Interpersonal Measure of Psychopathy (IM-P) was developed by Kosson et al. (Kosson, Gacono, & Bodholdt, 2000; Kosson, Steuerwald, Forth, & Kirkhart, 1997). Its goal is to examine whether increased attention to interpersonal behaviours, during the interview, would improve assessments of the personality core underlying psychopathy. The items were selected to be rated by the interviewer during the assessment process and to quantify aspects of verbal interaction and of non-verbal behaviours. The original 21 item (4-point Likert) rating scale was able to predict 'dominant behaviour' in adult populations and did correlate highly with the Factor I and Factor II dimensions of the PCL-R. This was taken as indication that the IM-P was assessing many core deficits in affect display and it is believed to be a promising, additional measure of interpersonal behaviours that are not well captured by the PCL-R (Kestenbaum et al., 1989; Lilienfeld, 1998). The scale was shortened to 17 items during its adaptation for child populations.

Finally, data of the above sort should be complemented with IQ information for each child, to exclude any alternative explanation of future findings. According to the presented theories, psychopathy Factor I or high empathic responding are

consistently independent of intelligence levels; (as opposed to antisocial or delinquent behaviour in Factor II, which often is related to IQ). IQ in children is typically assessed via the Wechsler Preschool and Primary Scale of Intelligence - Revised (WPPSI-R), (Wechsler, 1949). The WPPSI is a very useful instrument to build rapport with children during the initial stages of a session (e.g., puzzles, picture cards, block design) however, the administration of the entire version is often judged to be too time consuming. Thus the WPPSI can be administered in an abbreviated form, according to suggestions from Yudin (1966).

Overview of Assessment Tools

Table A4 contains a summary of the most promising assessment methods for use with children. No single measure of empathy nor of psychopathy is ideal and a multi-method approach has been recommended by various researchers (e.g., Kazdin, 1980). Overall, it was found that empathy indices were negatively related to aggression, externalising and antisocial behaviours, and that the relation was most significantly negative when empathy was assessed with questionnaires. The association of empathy and pro-social behaviours was less consistent for very young children, nevertheless there is support for the notion that empathic responding may inhibit antisocial behaviours (Miller & Eisenberg, 1988).

Table A4

Selection of Assessment Tools for Children, With Their Significance for Empathy and Psychopathy Research

Instrument	*Construct*	*Rater*
Parent questionnaire	G	O - parent
Child Behaviour Checklist-Teacher	G / P	O - teacher
Aggression-Mood-Learning	P / G	O - teacher
Child Behaviour Questionnaire	E / PY	O - teacher
Criterion-based scale for emotions & social functioning	E / PY	O - teacher
Psychopathy Screening Device	P	O - teacher
Child Psychopathy Scale	P	O - teacher
Structured interview	G	S
Bryant Empathy Index	E	S
Interpersonal Reactivity Index	E	S
Physiological reactivity Questionnaire	PY	S
Self-report feelings re videos	PY / E	S
Interpersonal Measure of Psychopathy	P	O - researcher
Naturalistic observation	G	O - researcher
Wechsler Preschool and Primary Scale of Intelligence – Revised	G	S

Note. E=empathy; P=psychopathy; G=general; PY=physiology; S=self; O=other

APPENDIX B

Demographic Information of Sample

Participant Characteristics (n = 50)/ Data obtained from Screening Questionnaires

Variables	%	M (SD)
Living Conditions		
- Rural	44	
- Urban	56	
Family status		
- 2 caregiver family	72	
- single caregiver family	26	
- other	2	
Socio-economic level		
- Upper	37.5	
- Middle	22.9	
- Lower	39.6	
Position in family		
- only child	8	
- oldest child	24	
- middle child	24	
- youngest child	44	
Medication/Diagnosis		
- regular medication (asthma)	16	
Trauma experience	44	
Bullying		
- Being bully	28	
- Being victim	34	
- Bully and victim	14	
Behaviour difficulties (parental report)		
- Internalising problems (eating/ sleeping/ anxiety etc.)	20	
- Expressed problems (social, learning, attention)	22	
Parental involvement		
- detailed comments re child	60	
- negative comments	42	
- positive	18	
Parent comments re child problems		
- child very good/ no problems	0	
- child good/ rarely problems	6	
- child OK/ few problems	54	
- child some problems	28	
- child many problems	12	
Teacher comments re child problems		
- child very good/ no problems	10	
- child good/ rarely problems	4	
- child OK/ few problems	52	
- child some problems	30	
- child many problems	4	

(table continues)

(continued)

Observations during session A (questionnaires)	
- happy	26
- OK	58
- unhappy/intense	16
- active	54
- average	22
- passive	24
- attentive	38
- average	30
- distracted/fiddly	32
- mature	14
- average	52
- 'young'	34
- confident/boisterous	46
- average	24
- shy/distressed	30
- accepts food	84
- engages with doll	88
- enjoys toys	88
- responds easily to questionnaires	58
- participates for WPPSI	76
- alert rating (b) for problematic session	20
Observations during session B (Physiograph)	
- happy	16
- OK	52
- unhappy/intense	32
- attentive	28
- average	24
- distracted/fiddly	48
- mature/ understand	18
- average	58
- 'young'/ not understand	24
- confident/boisterous	28
- average	44

(table continues)

(continued)

- shy/distressed	28	
- engages with doll	80	
- participates for WPPSI	68	
- OK with physiograph/ electrodes	76	
- high concentration during videos	8	
- more than average concentration	26	
- average attentiveness	16	
- less than average attentiveness	18	
- poor concentration on video	32	
- alert rating (b) for problematic session B	32	
Screening questionnaire (self-report)		
- Family support (Range 0 - 3)		2.2 (.63)
- Level of socialisation (Range 0 - 4)		3.2 (.82)
- Level of health (medical) (Range 0 - 2)		1.9 (.39)
- Level of confidence (lack of fears) (Range 0 - 3)		1.7 (.93)
- Level of well-adjustment (support) (Range 0 - 11)		8.4 (1.59)
- Overall alerts b (Range 0 - 6)	22%	2.2 (1.67)

APPENDIX C

Materials and Apparatus: Recruitment Phase

- Recruitment Letter School
- Research Outline School
- Pre-selection of Participants (School)
- Pre-screening Checklist for Teachers
- Cover Letter Parents
- Research Outline Parents
- Consent Form
- Checklist for Parents/Caregivers
- Children's Behaviour Questionnaire (CBQ)
- Criteria Based Scale for Emotions and Social Functioning
- Childhood Psychopathy Scale (CPS)
- Psychopathy Screening Device (PSD)
- Aggression-Mood-Learning Scale (AML)

Appendix C

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Primary School
att. principal

Hamilton

re: Research into empathic ability in young children
"Do children know how others feel?"
8 July, 2000

Dear

My name is Veronika Isler. I am currently in my second year of PhD studies at University of Waikato. Being a parent of two children (now 15 and 12 yrs), I have spent many hours observing and supporting children at Kindergarten and at school (as parent help and teacher aid). During that time I became interested in the fact that children are very different in their empathic responding to another person's distress. It became also obvious that those children who seem to be unable to recognise someone else's feelings and who don't respond to others in need are also prone to show additional problems in their behaviour, and some might even become a burden for society later in their development.

Therefore I am very interested in the possibility that the presence or absence of empathy early in life might be a valuable and important indicator of general development, and might aid in the detection and prevention of behavioural difficulties: The goal of my PhD is to test new entrant children (after they have adapted to the school) for presence or absence of either empathy or behavioural difficulties.To test these children I will be using some questionnaires and interviews, and I am also planning to show the children some films, while I am recording their heart rate and sweat gland activity (with a portable physiograph, that can be brought into your school, so the children don't have to leave their safe environment).

I hope that the results of this study will demonstrate that lack or presence of empathy can provide an easy and quick way to detect children who need extra support in their social development. It is also planned, in future research, to teach these children to increase their empathic responding to a desired level, and thus to minimise or reverse behavioural issues.

To be able to undertake this research, I would like to ask for your support: With the assistance of your new entrant teacher/s I would like to identify (with a short checklist) one possibly high empathic and one possibly low empathic boy. Then I would be very grateful for your permission to contact the caregivers of these children (possibly via your school) to ask for their consent, so the child can be interviewed and shown the videos. I will visit the two boys for only two sessions, and each session will take a maximum of 45 minutes (the child will receive a little reward for the participation). Once I have collected and analysed my data, a summary of the findings will be of course available to your school and I hope that it will be a helpful aid for teaching staff to recognise children who need support in developing empathic behaviour.

I am aware that I am asking for your time, but I am convinced that this study will provide valuable results for the long-term goal of early detection and prevention of concerning behaviours in childhood. Thus, I would like to thank you in advance for considering my request. The summarised details of my research are enclosed (including the proposed letter to caregivers) and I would be pleased to provide more information to you or your BOT. Thus, would you allow me to call you within a week to possibly arrange an appointment, where we can discuss further details.
Thanks again for your support and your time.
Yours sincerely

Veronika Isler Dr. Samuel Charlton

PS: This research is being supervised by Dr. Samuel Charlton and Prof. Ian Evans at the University of Waikato (07/856 2889), and the University Ethics Committee has granted ethical approval for this study.

Research project: 'Empathy in Children' - "Do children know how others feel?"
Researcher: Veronika Isler, University Waikato, Dept. Psychology, 838 4466

RESEARCH OUTLINE

(For schools)

Individual differences in emotionality and regulation play a significant role in social behaviour. The construct of empathy has been described as a marker of emotional responding towards others. A deficiency in the capacity to respond empathically seems to be a crucial indicator of dysfunctions in social interactions.

The description of children with behavioural disorders often includes difficulties in regulating emotions and emotionally driven behaviour. Long-term predictions include the negative consequences for children's socio-emotional development and its effects on society.

Psychophysiological variables (e.g. heart rate or skin conductance levels) are components of a web defining the construct of empathy. These measures of autonomic responses can be related meaningfully to measures obtained from inventories or observations. Thus, the present research suggests that the study of physiological response patterns in young children will help to clarify the relationship between arousal levels and pro-social/ anti-social responding (i.e. empathy or its lack). Hopefully, the results will also add to the increasing list of tools for early detection of problematic behaviours, which has been acknowledged as the most effective basis for prevention and change.

Participants: 40 Pakeha boys, age 5 years 5-7 months (at the time of testing)
of either low or high empathic ability.
(Selection criteria have been chosen to match with similar existing studies).
These boys will be recruited from schools throughout the Waikato region.

- It will be necessary to continuously approach parents/caregivers until the two groups of 20 /20 boys are established. (Some children might not participate through all phases and thus the numbers need to be replenished to maintain the 20 /20 ratio). There will be only two children per each class of new entrants.
- The children will be tested one after the other, on the school grounds, by the same researcher, accompanied by a research assistant at all times
- The children and parents/caregivers have the right to withdraw from the research at any time
- Participant's names will not be recorded in any reports and individual information will not be released (unless there are any safety concerns)

Research procedure:

Pre-screening phase (ca. June/ July 2000)

- According to advice from the teacher (with the help of a short checklist) children are pre-selected for participation and their parents/caregivers are asked for written permission and for some confidential, statistical information, (the selection criteria will be explained in detail). The parents/caregivers are welcome to contact/meet the researcher if they would like to. / Time needed: about 10 min.

Phase a) First visit (ca. July to November 2000)

- The researcher meets each boy at school to establish trust, to conduct an interview and to fill in some questionnaires. This provides information regarding general development, regarding empathy levels and regarding behavioural difficulties. During testing the child will be allowed a break for a small fruit snack (provided); and at the completion of testing the child will be rewarded with a small stationery item/book voucher. / Time needed: about 35 min.
- This information will be supplemented with data obtained from teachers (via checklists and questionnaires). / Time needed: about 40 min.

Phase b) Second visit (also July to November 2000, 2-4 weeks following the first visit)

- The researcher will show each child 4 short video clips with different arousal inducing content (cartoon, roller-coaster ride, educational video about fire danger relating to electricity, dolphins). During the video screening the boy's heart rate and skin conductance will be measured with a portable physiograph and the child will be observed. / Time needed: about 40 min.
- At the end the children have a chance to tell the researcher how they felt and can describe their impressions. Again they will receive a small reward for their patience and participation. / Time needed: about 10 min.

At the conclusion of the data collection the results will be analysed. The research data will be made anonymous and will be made available to the school and parents.

Appendix C

Research project: 'Empathy in Children' - "Do children know how others feel?"
Researcher: Veronika Isler, Dept. of Psychology, University Waikato,
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PRE-SELECTION OF PARTICIPANTS FOR RESEARCH

Dear teacher

I am grateful that the Board of Trustees and the school management have agreed to support this research, which is part of my PhD (see details in the enclosed letter and research outline). They also agreed that I may make contact with you.

I would like to ask for your help in identifying two children for my research. As you might be already informed, I will be testing new entrant Pakeha boys for their ability to empathise with others. One of my aims is to determine whether some particular tests are providing accurate information. Therefore I need two groups of children at the opposite ends of empathic ability.

As a first step for categorising these boys into

GROUP A) = Difficulties with Social Behaviours **OR** **GROUP B) = Highly Empathic**

I would like to ask for your recommendation as to whether you have a child in your classroom that would possibly fit into GROUP A) and one that could possibly fit GROUP B).
Enclosed you find a checklist that should be helpful for you to pre-select the children for the two groups. Please decide on a **YES/NO** basis whether the description applies to the child most of the time. (This is only a pre-screen and will be later verified). I would like to ask you to make your choice without informing anyone (this includes the research team) to which group either child belongs.
Based on your recommendation I will approach (via the school) the caregivers/parents of these two children to ask for consent that their boy can participate in the study.

Ultimately I hope to be able to teach those children how to better empathise; but first it is important to find a way to easily identify the existing level of empathy. In a later stage of the research (after I have enough consenting parents allowing participation for boys in each group), I will be using a few questionnaires to obtain more detailed information about the child's emotions and behaviours. During that phase I will be asking again for your help for filling out a few forms (about 40 minutes in total), describing each selected child.

I am very aware that my asking of your time is increasing the pressure on your busy schedule. However, I am convinced that the results of this research will be directly beneficial for the children, and indirectly for all of us. Therefore I would be really grateful for your support.
Thanks in advance for all your help!
Yours sincerely

Veronika Isler

Pre-screening* checklist for teachers

DESCRIPTION OF A CHILD FROM GROUP B

- This child is strongly moved or has strong feelings when he sees another child in need of something, or having some kind of problem.
- This child seems to understand how other children and adults feel about things much better than other children his age.
- This child, all by himself, will think of something that benefits another child or adult in need.
- This child often feels sorry for others who are less fortunate.
- This child is good at taking turns.
- This child accepts set limits on his activity (play, space, material, type of activity).
- This child accepts responsibility for his own actions and does not blame others
- This child is not very easy to distract
- This child communicates his needs and wants appropriately - and does not use tantrums, crying or bullying.
- This child usually does not engage in behaviours that are dangerous to himself or others, and does nor ignore hazards
- This child does not demonstrate problems in his social conduct towards peers or authority figures (no aggression, breaking rules, harming others)
- This child shows affect, and emotions always seem genuine

Yes, this describes the child from group B

FOR A DESCRIPTION OF A CHILD FROM GROUP A: Use the opposites of the above descriptions

(*Children with diagnosed learning disabilities or mental retardation cannot be included in this research)

Research Project 'Empathy in Children' - V. Isler/ University of Waikato

Appendix C

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Can children feel for others the same way as adults do? When Baloo Bear seemed to have died in Disney's Jungle book, would all children feel sad? And if not - can we teach them

to feel happy

and sad

for others?

Dear parents/caregivers,
My name is Veronika Isler and I am delighted that your school is supporting my doctoral project which looks at questions like 'can a child understand the needs of his classmates?' or 'can a child at this age show concern for someone else's feelings?'. I am hopeful that the results of my research could lead to important insights which can be used to understand and influence children's emotions and their caring for others. Your school gave me permission to contact you. I would like to ask if you wish to take part in my project by allowing me to work with your son for my research. (I will be working at school with the help of a research assistant).

With your agreement, I would visit your son twice (between July and November) for only about 40 minutes each time. The first time we will get to know each other and I will fill in some checklists. The second time I will show him some short (G-rated) video clips and will measure some body responses such as his heart rate. If you would like to see the videos or want more information, please contact me at the provided telephone number. There is also some additional information in the attached 'research outline'.

I am sure that your son will see this as a pleasant and stimulating experience. He will get a small reward for participating in this study, regardless of whether he or you at any time decide that he doesn't want to take part in the research anymore. You and your son can withdraw your consent at any time. Your child's teacher is also filling in some forms and all this information will be put together and analyzed. The data will be made anonymous, therefore it will be impossible to identify your son. The details from the questionnaire and the other research findings will be treated confidentially and will not be released to the school or others; (refusal to give permission will not disadvantage your child).

I would be extremely grateful if you would sign the enclosed permission slip, and fill out the short questionnaire and send both back to school with your child, sealed in the enclosed envelope, so the teacher can pass it on to me.

THANK YOU SO MUCH!

Yours sincerely,

Veronika Isler

Dr. Samuel Charlton

P.S. This research has been approved by the Psychology ethics committee and will be supervised by Dr. Samuel Charlton and Professor Ian Evans, Tel. 07/ 856 2889. If you would like to know more about this study, please tick the box on the permission slip and I will contact you to answer your questions. Alternatively you may wish to contact me at University of Waikato, Tel 07/ 838 4466 (8922).

Research project: 'Empathy in Children' - "Do children know how others feel?"
Researcher: Veronika Isler, University of Waikato, Dept. of Psychology,
Tel. 07/838 4466 (8922)

RESEARCH OUTLINE

This study is interested in the relationship between emotions and social behaviour. Empathy is an important emotion regulating our responding towards others.

It is possible to measure emotional reactions by monitoring heart rate or other body responses (i.e. psychophysiological measurements). This research suggests that the study of emotional reactions in young children will help to clarify their level of understanding of someone else's needs and feelings.

Who can take part:

Forty boys (aged 5 years and 6 months) who have been selected by their teacher according to criteria relevant to the research, will be invited to participate. Of main interest are their emotional reactions. (Several schools in the Waikato area will be part of this study, with only two boys from each new entrant class).

What will happen:

1) The children are selected for participation and parents/caregivers are asked for written permission and for some statistical information. The parents/caregivers are welcome to meet/contact me for more information.

2) (Planned for about July to November 2000).

The researcher (and an assistant) meets each boy at school; conducts an interview; and fills in some questionnaires. This session will take about 35 minutes and the child will have a break for a small fruit snack (provided). At the completion of this first part the child will be rewarded with a small stationery item (e.g. pencil, rubber). This information will be combined with questionnaire data from the teachers.

3) (Planned for about two to four weeks after the first visit)

During the second visit the researcher will present four short video clips: a) The Disney cartoon 'Bambi' shows a little deer growing up und experiencing, funny, happy, and sad situations; b) the 'Roller coaster' video shows parts of a roller coaster ride from the perspective of a carriage; c) the 'Dolphin' video shows a group of dolphins playing with each other in the water; d) the 'Jamie Fort Story' is an educational video which shows the danger of fire in relation to faulty electricity. This video is included to assess the children's ability for concern and understanding if someone else in need: It shows a girl in her room - a faulty power cord - a burst of flames [the accident is not shown at all]- the child at rehabilitation in hospital - the mother on the phone telling the story - the girl back at school, dealing with teasing. Parents/caregivers are welcome to view the videos in advance or to contact me for more information on 07/ 838 4466 ext. 8922.

As part of this video screening this study aims to measure the children's emotional reactions, using a monitoring device for heart rate and perspiration. This device is essentially a laptop computer and the heart rate is measured from three points on the chest and the perspiration from two points on one hand.

This second session will last for about 40 minutes and at the end the boys have the opportunity to tell the researcher how they felt and can describe their impressions. Again, they will receive a small reward for their participation (book voucher).

-The children will be tested one by one, on the school grounds, by the same researchers.

-The children and parents/caregivers have the right to withdraw from the research at any time.

-Participant's names will not be recorded in any reports and individual information will not be released, (unless there are any safety concerns).

-At the end of the study the analysed and anonymous research results will be available through the school.

PARTICIPATION CONSENT FORM: Parent's copy

Project: 'Empathy in Children' - "Do children know how others feel?"
Researcher: Veronika Isler, Doctorate student at University of Waikato, Dept. Psychology
07/838 44 66 (8922)

I have received information about this study, and if I have more questions I know how to obtain the answers.
I give permission that my child ..... can participate in this research project and I am aware that I or my son may withdraw at anytime without negative consequences.

SIGNATURE:.....**Date:**.....

Printed Name:.....**School:**.....

If I have any concerns I can also contact the supervisor of this research Dr. S. Charlton, Dept. of Psychology, University of Waikato, or the convenor of the Research Ethics Committee.

✂----------

Please return the bottom half of this consent form in the enclosed envelope together with the questionnaire.

PARTICIPATION CONSENT FORM: Researcher's copy

Project: 'Empathy in Children' - "Do children know how others feel?"
Researcher: Veronika Isler, Doctorate student at University of Waikato, Dept. Psychology

I have received information about this study, and if I have more questions I know how to obtain the answers.
I give permission that my child ..... can participate in this research project and I am aware that I or my son may withdraw at anytime without negative consequences.

O Please contact me for further information: Tel.....

SIGNATURE:.....

Printed Name:.....

Date:.....

School:.....

If I have any concerns I can also contact the supervisor of this research Dr. S. Charlton, Dept. of Psychology, University of Waikato, or the convenor of the Research Ethics Committee.

CHECKLIST for PARENTS/ CAREGIVERS

CONFIDENTIAL

Child's name:..... School:.....
Parent's/ Caregiver's name:.....

Relationship to child: ☐ Mother.....☐ Father.....☐ Other (describe).....
Marital status:..... Age:.....
Occupation: Caregiver 1)..... Caregiver 2).....

Other people living in household (e.g. stepparent, older or younger siblings- please list with age):
.....age..... / .....age.....
.....age..... / .....age.....
.....age..... / .....age.....

Is the child receiving any kind of medication or other regular treatment (Please describe):
Since:.....
Since:.....
Since:.....

Has your child ever experienced a major traumatic event (for example been burned, witnessed violence or death, been involved in a car crash or anything similarly upsetting)? ☐ yes ☐ No
Please describe:.....

.....

Has your child ever been teased/bullied, or has bullied himself?..... ☐ yes ☐ No
Please describe:.....

.....

Have you ever been concerned about your child's sleeping/ eating, or anxiety/ irritability, or withdrawal/shyness? ☐ yes ☐ No
Please describe:.....

.....

Have you ever been concerned about your child's behaviour (tantrums/ lying/ trouble with others and so on)? Please describe: ..... ☐ yes ☐ No

.....

Have you ever been concerned about his concentration/ attention?..... ☐ yes ☐ No

.....

Are there any other factors in your child's life that we should know about? ☐ yes ☐ No
Please describe (also use the back of this page if needed):.....

.....

THANK YOU VERY MUCH FOR YOUR TIME! The provided information will be kept confidential and will only be used for this research. Please seal this form in the enclosed envelope and send it with your child to school (the teacher will then hand it unopened to the researchers).

Children's Behaviour Questionnaire - Teacher version / CONFIDENTIAL

Child-Code:..... Date of birth:.....
School:..... Teacher:.....

Instructions:
On the next pages you will see a set of statements that describe children's reactions to a number of situations. We would like you to tell us what the child's reaction is likely to be in those situations. There are of course no 'correct' ways of reacting; children differ widely in their reactions, and it is these differences we are trying to learn about. Please read each statement and decide whether it is a 'true' or 'untrue' description of the child's reaction within the past six months. Use the following scale to indicate how well a statement describes the child:

1	2	3	4	5	6	7
extremely untrue of child	quite untrue of child	slightly untrue of child	neither true nor false of child	slightly true of child	quite true of child	extremely true of child

If you cannot answer one of the items, then circle N/A

1) Likes going down high slides or other adventure[illegible]ities
1 2 3 4 5 6

3) Gets so worked up before an excitin[illegible]ouble sitting still
1 2 3 4 5 N/A

4) Is sensitive to how others
1 2 3 4 7 N/A

5) Cries sadly when a favourite [illegible]ets lost or broken
1 2 3 4 5 6 7 N/A

6) Likes to play so wild and recklessly that he might get hurt
1 2 3 4 5 6 7 N/A

7) When he sees a toy he wants, gets very excited about getting it
1 2 3 4 5 6 7 N/A

8) Doesn't care for rough and rowdy games
1 2 3 4 5 6 7 N/A

9) Seems upset when parents are in a bad mood
1 2 3 4 5 6 7 N/A

10) When he wants to do something, he talks about little else
1 2 3 4 5 6 7 N/A

11) Tends to feel 'down' at the end of an exciting day
1 2 3 4 5 6 7 N/A

12)* Tends to become sad if plans don't work out
1 2 3 4 5 6 7 N/A

13) Seems upset when he sees a hurt animal
1 2 3 4 5 6 7 N/A

14) Does not like to take chances for the fun and excitement of it
1 2 3 4 5 6 7 N/A

15) Becomes bothered when parents are upset
1 2 3 4 5 6 7 N/A

16) Seems to feel depressed when unable to accomplish some task
1 2 3 4 5 6 7 N/A

CONFIDENTIAL

Criterion based test for dispositional emotions and social functioning - TEACHER
(Based on pre-screening and literature from Miller & OpdeHaar, and Eisenberg)

Child-Code:..... Date of birth:.....
School:..... Teacher:.....

Use the following scale to indicate how well a statement describes the child:

1	2	3	4	5
Does not fit at all	Does not fit really	neither nor	Fits quite well	Fits extremely well

1) He often feels sorry for others who are less fortunate
   1 2 3 4 5
2) He is easily distracted
   1 2 3 4 5
3) He gets upset/ has strong feelings when he sees another child in distress or being hurt
   1 2 3 4 5
4) He engages in behaviour that could be dang[illegible] for others, and ignores hazards
   1 2 3 4 5
5) He seems to understand h[illegible] ...d adults feel about things much better than other children his age
   1 2 4 5
6) He does not show affect, and emotions seem shallow/ not genuine
   1 2 3 4 5
7) He, all by himself, will think of something or do something that benefits another child or adult in need
   1 2 3 4 5
8) He is good at taking turns
   1 2 3 4 5
9) He accepts responsibility for his own actions and does not blame others
   1 2 3 4 5
10) He demonstrates problems in his social conduct towards peers and towards authority figures (e.g. aggression, breaking rules, harming others, withdrawal)
   1 2 3 4 5
11) He accepts set limits on his activity (play, space, material, type of activity)
   1 2 3 4 5
12) He communicates his needs and wants inappropriately - with tantrums, crying or bullying
   1 2 3 4 5
13) Other notable characteristics:

   .....
   1 2 3 4 5

CHILDHOOD SCALE: TEACHER VERSION/ CONFIDENTIAL

Child-Code:..... Date of birth:.....
School:..... Teacher:.....

The following questions are about the child's personal style of doing things and about how he gets along with people. Remember that everybody is different. There are no right or wrong answers. If you cannot answer one of the items circle N/A.

1)	Is he a warm and kind person?	YES	NO	N/A
2)	Is he easily frustrated?	YES	NO	N/A
3)	Does he make close friendships with other people?	YES	NO	N/A
4)	Does he stay away from scary things and places?	YES	NO	N/A
5)	Does he try to act charming in order to get his way?	YES	NO	N/A
6)	Are his moods unpredictable? *(Do his feelings change often and quickly?)*	YES	NO	N/A
7)	Is he easily bored?	YES	NO	N/A
8)	Does he show his feelings openly?	YES	NO	N/A
9)	Is he protective of people who are close to him?	YES	NO	N/A
10)	Does he try to take advantage of other people?	YES	NO	N/A
11)	Is he considerate and thoughtful of other people?	YES	NO	N/A
12)	Is he mean to other people?	YES	NO	N/A
13)	Does he need to have people tell him that he is doing we" OK?	YES	NO	N/A
14)	Do his feelings come and go quickly?	YES	NO	N/A
15)	Does he use his head before doing or saying s-	YES	NO	N/A
16)	Does he have a hard time waiting for thi-	YES	NO	N/A
17)	Does he usually feel guilty after doi-	YES	NO	N/A
18)	Does he do dangerous things f-	YES	NO	N/A
19)	Does he have a low opinion	YES	NO	N/A
20)	Does he tease and pick on othe	YES	NO	N/A
21)	Does he concentrate well on thi.	YES	NO	N/A
22)	Do his feelings sometimes seem fake?	YES	NO	N/A
23)	Does it bother him when he does something wrong?	YES	NO	N/A
24)	Is he able to see how other people feel?	YES	NO	N/A
25)	Does he get irritated or mad over little things?	YES	NO	N/A
26)	Does he regret many things that he has done?	YES	NO	N/A
27)	Does he try to get others to do what he wants by playing up to them?	YES	NO	N/A
28)	Does he think about his actions and behaviour?	YES	NO	N/A
29)	Is he very sure of himself?	YES	NO	N/A
30)	Does he need to have things be exciting?	YES	NO	N/A
31)	Does he have a quick temper?	YES	NO	N/A
32)	Does he feel things very strongly? *(Are his feelings intense?)*	YES	NO	N/A
33)	Does he try not to hurt other people's feelings?	YES	NO	N/A

Appendix C

PSD (Teacher Version) CONFIDENTIAL

Child-Code:..... Date of birth:.....
School:..... Teacher:.....

Please read each statement and decide how well it describes the child. Mark your answer by circling the appropriate number (0 - 1 - 2) for each statement. Do not leave any statement unrated.

	Not at all True	Sometimes True	Definitely True
1) Blames others for his mistakes	0	1	2
2) Engages in illegal activities	0	1	2
3) Is concerned about how well he does at school or work	0	1	2
4) Acts without thinking of the consequences	0	1	2
5) His emotions seem shallow and not genuine	0	1	2
6) Lies easily and skilfully	0	1	2
7) Is good at keeping promises		1	2
8) Brags excessively about his abilities, accor or possessions	0	1	2
9) Gets bored easily	0	1	2
10) Uses or 'cons' other people to ge ıe wants	0	1	2
11) Teases or makes fun of other people	0	1	2
12) Feels bad or guilty when he does something wrong	0	1	2
13) Engages in risky or dangerous activities	0	1	2
14) Can be charming at times, but in ways that seem insincere or superficial	0	1	2
15) Becomes angry when corrected or punished	0	1	2
16) Seems to think that he is better than other people	0	1	2
17) Does not plan ahead or leaves things until the 'last minute'	0	1	2
18) Is concerned about the feelings of others	0	1	2
19) Does not show feelings or emotions	0	1	2
20) Keeps the same friends	0	1	2

Appendix C

AML Behavior Rating Scale – Revised (AML-R)

CHILD'S NAME _____ TODAY'S DATE ___/___/___
(LAST) (FIRST) (MM) (DD) (YY)

SCHOOL _____ TEACHER _____

SEX

RACE
- WHITE
- AFRICAN AM.
- NATIVE AM.
- ASIAN
- HISPANIC
- OTHER

DATE OF BIRTH

GRADE
- Pre-K
- K
- 1
- 2
- 3
- 4
- 5
- 6 - 8
- 9 - 12
- Other

CHILD ID NUMBER

Please rate the child's behavior, as you have observed and experienced it during the past month according to the following scale, by filling in the appropriate number:

(1) **Never** - You have literally never observed this behavior in this child.

(2) **Seldom** - You have observed this behavior once or twice.

(3) **Moderately often** - You have seen this behavior more often than once a month, but less than once a week.

(4) **Often** - You have seen this behavior more than once a week, but less often than daily.

(5) **Most or all of the time** - You have seen this behavior with great frequency, averaging once a day or more often.

This child:	Never	Seldom	Moderately Often	Often	Most or all of the time
1. gets into fights or quarrels with classmates					
2. has to be coaxed to play or work with peers					
3. is confused with school work					
4. is restless					
5. is unhappy					
6. gets off-task					
7. disrupts class discipline					
8. feels hurt when criticized					
9. needs help with school work					
10. is impulsive					
11. is moody					
12. has difficulty learning					

- USE NO. 2 PENCIL ONLY
- ERASE CHANGES COMPLETELY

Appendix A
AML-R
9

	A	M	L	TOTAL
RAW SCORE				
PERCENTILE				

SCANTRON FORM NO. F-5060-CCS

APPENDIX D

Materials and Apparatus: Phase A

- Structured Interview – Screening Questions
- Bryant Empathy Index
- Interpersonal Reactivity Index (IRI) / Eisenberg Criteria
- Physiological Reactivity Questionnaire (PRQ)
- Interpersonal Measure of Psychopathy (IMP)
- Photo Calico Doll
- Script for Session A

Screening questions for child (analogue to CBCL-TRF)

To complement/replace parent questionnaire, and for rapport building.
(To exclude Mental retardation/ Autism/ Aspergers/ Pica/ Tourette's/ Anxiety/ PTSD/ Abuse/ Trauma/ Drug influence e.g. Ritalin or Epilepsy drugs - But don't exclude ADHD/ CD/ ODD)

Child-Code:..... Date of birth:.....
School:..... Teacher:.....

1)	Have you got brothers and sisters?	Y	N
	Tell me:.....		
2)	Do you belong to any group? (Scouts and so on)	Y	N
	Describe:.....		
3)	Do you have any good friends?	Y	N
	How many?.....		
4)	Have you got any problems at school?	Y	N
	Describe:.....		
5)	Have you been bullied or teased?	Y	N
	Or do people say that you are a bully?	Y	N
	Comments:.....		
6)*	Are you afraid of some animals/ places etc. (Not	Y	N
	Tell me about:.....		
7)*	Do you go to the doctor a lot? Hurt yo	Y	N
	Describe (rashes/ headaches).....		
8)*	Do you know what a psycholo ? Have you ever been to one?	Y	N
	Tell me:.....		
9)*	Are you taking any regular me ion?	Y	N
	(for asthma/ ADHD).....		
10)*	Do you feel sleepy during the day?	Y	N
	Tell me about:.....		
11)*	Have you ever run away from home?	Y	N
	Tell me:.....		
12)*	Do you have bad dreams? Y N		
	Comments:.....		
13)*	Do you feel sad (or unhappy) quite a lot ?	Y	N
	Tell me:.....		

*Exclusion depending on answer

Bryant Index of Empathy for Children and Adolescents
(Y/ N answer format / Total score 0 - 22 / Box to place card: 'Me' - 'Not me')
* Adapted to gender-neutral / Assessment of empathy of children towards children

Child-Code:..... Date of birth:.....
School:..... Teacher:.....

1)	It makes me sad to see a child who can't find anyone to play with	Y	N
2)	People who kiss and hug in public are silly	Y	N
3)	Children who cry because they are happy are silly	Y	N
4)	I really like to watch people open presents, even when I don't get a present myself	Y	N
5)	Seeing a child who is crying makes me feel like crying	Y	N
6)	I get upset when I see a child being hurt	Y	N
7)	Even when I don't know why someone is laughing, I laugh too	Y	N
8)	Sometimes I cry when I watch TV	Y	N
9)	It's hard for me to see why someone else ge[illegible]	Y	N
10)	I get upset when I see an animal be[illegible]	Y	N
11)	Some songs make me so s[illegible]	Y	N
12)	Grown-ups sometimes [illegible] they have nothing to be sad about	Y	N
13)	It's silly to treat dogs and cats as though they have feelings like people	Y	N
14)	I get mad when someone in my class is pretending to need help from the teacher all the time	Y	N
15)	Kids who have no friends probably don't want any	Y	N
16)	I think it is funny that some people cry during a sad movie or while reading a sad book	Y	N
17)	I am able to eat all my cookies even when I see someone looking at me wanting one	Y	N
18)+/-	I feel upset when I see a classmate being punished by a teacher for breaking school rules	Y	N

IRI - adapted for young children

Child:..... Date of birth:.....

School:..... Teacher:.....

The following statements inquire about your thoughts and feelings in different situations. Tell me how well it describes you by choosing the appropriate place to put your answer token.
You can choose between 3 places (A//C//E). The one closest to you describes you very well and means **'I am exactly like that'** (E) and the one farthest away means that the statement does not describe you very well and it says **'I'm not like that at all' (A).** Listen carefully and answer as honestly as you can.

	Not me Don't know		me
4)- +/- 1) Sometimes I feel sorry for other people	A	C	E
6)+ 2) When there is danger I feel nervous and worried	A	C	E
13)- +/- 3) I get upset when someone gets hurt	A	C	E
14)- +/- 4) It does bother me when other people have r 'ems	A	C	E
18)- +/- 5) When someone is treated unfairly. r .n	A	C	E
22)+ 6) I am a caring (soft-hearted)	A	C	E
24)+ 7) In a difficult situat. .nicky (freak out)	A	C	E
27)+ 8) When someone badly n. .s help, I feel horrible	A	C	E

PD EC

Additional items from Eisenberg et al. 1996 for criterion based inquiry:

- When I see someone being picked on, I feel kind of sorry for them — Y (me) N (not me) N/A

- I often feel sorry for other children who are sad or are in trouble — Y (me) N (not me) N/A

Physiological Reaction Questionnaire / CONFIDENTIAL
Child-Code:.....Date of birth:.....
School:..... Teacher:.....

I will read a few statements to you that people sometimes use to describe themselves. Tell me how well each one describes you, by choosing the appropriate place to put your answer token.
You can choose between 3 places (1-3). The closest one describes you very well and means **'I am exactly like that'** (3) and the one farthest away means that the statement does not describe you very well and it says **'I am not like that at all'** (1). Listen carefully and answer as honestly as you can.

			Not me	don't know	me
1)	I would enjoy parachuting out of an aeroplane	N/A	1	2	3
2)	When I get excited, I get 'butterflies' in my tummy	N/A	1	2	3
3)	When something gives me a fright, my heart beats really fast	N/A	1	2	3
4)	I enjoy going to exciting new places	N/A	1	2	3
5) +/-	I would like going to a noisy party	N/A	1	2	3
6)	I would the heat of a hot pool	N/A	1	2	3
7)	My heart often pounds when I get excite	N/A	1	2	3
8)	When I get excited, my voice - ...n I'm talking	N/A	1	2	3
9)	I am keen to try out new things	N/A	1	2	3
10)	I would like to ski fast, down a steep mountain	N/A	1	2	3
11)	I have to go to the toilet more often when I get excited	N/A	1	2	3
12) +/-	I would like to be outside during a thunderstorm	N/A	1	2	3
13) +/-	I like to go fast in a car, on a bike or a motorbike	N/A	1	2	3
14)	I sometimes get goose bumps even if it's not really cold	N/A	1	2	3
15) +/-	I would like to go to new places	N/A	1	2	3

Appendix D

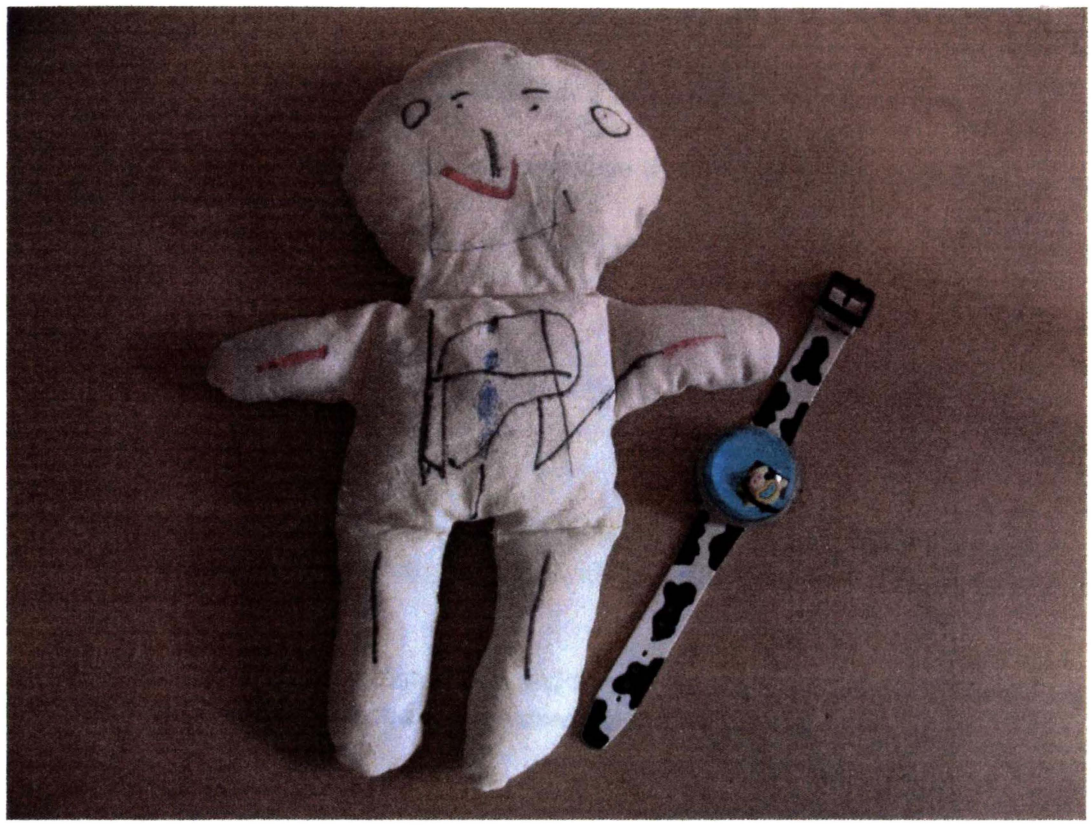
IMP / INTERPERSONAL MEASURE OF PSYCHOPATHY/ CONFIDENTIAL

Child:..... Date of birth:.....

School:..... Teacher:.....

Observation to be made by unbiased/neutral observer.

		Describes this child
1)	Interrupts .....Interrupted interviewer .....Interrupter interview	not at all–somewhat–very well–perfectly
2)	Refuses to tolerate being interrupted .....continued speaking .....increased volume of speech	not at all–somewhat–very well–perfectly
3)	Ignores personal boundaries .....touched or tried to touch interviewer .....stared at body part (other than face) .....leaned far forward	not at all–somewhat–very well–perfectly
4)	Makes request of interviewer .....wanted something small/tangible .....wanted something large (recommendation etc.)	not at all–somewhat–very well–perfectly
5)	Tends to digress .....provided very lengthy answers .....difficulty staying with questions .....changed answer in the middle	not at all–somewhat–very well–perfectly
6)	Cannot remain still (fills dead space)	not at all–somewhat–very well–perfectly
7)	Unusual calmness or ease .....puts his feet up .....stretches often	not at all–somewhat–very well–perfectly
8)	Very argumentative .....repeatedly tried to begin an argument .....became angry and frustrated when interviewer agreed	not at all–somewhat–very well–perfectly
9)	Perseveration .....returned often to one event/story .....returned often to one theme	not at all–somewhat–very well–perfectly
10)	Is 'moralistic' (ethical superior) ....expressed desire to help others ....at others are not as good as he ....made references to own truthfulness	not at all–somewhat–very well–perfectly
11)	Expressed superiority ....superiority ....uniqueness ....grandiosity	not at all–somewhat–very well–perfectly
12)	Seeking of alliance .....excessive smiling .....sought interviewers agreement .....verbal expression of commonality	not at all–somewhat–very well–perfectly
13)	Showing off .....display of large gestures .....dramatic language .....voice inflection to emphasize points	not at all–somewhat–very well–perfectly
14)	Angry .....facial expression .....clenched fists .....tone of voice	not at all–somewhat–very well–perfectly
15)	Impulsive answers .....changed answers after stating them .....answered very quickly	not at all–somewhat–very well–perfectly
16)	Expressed toughness .....referred to himself as tough/ dangerous .....referred to himself as brave	not at all–somewhat–very well–perfectly
17)	Intense eye contact .....almost constant eye contact .....looked at interviewer, when she looked away	not at all–somewhat–very well–perfectly



Script Phase a) (PhD V. Isler)

HI [name] has your mum told you that we are going to do some play-work together?

My name is and this is [ ] but you can call me
and I am [ ]

We are going to another room now and there I will ask you some questions.
- Is this OK with you?
Look, here is a doll. - Can you hold him? He will be with you when we work together and he will watch what we are doing.
You might think of a name for him?
- Shall we go now?

Do you now where the ....room is?
Have you thought of a name yet? - What about your best friend's one? Or .....?

OK, here we are
Can you sit down on that chair?
- Do you want to give [XY] a face or some clothes? - Here, you can paint it on with these pens.
Is he happy to see you doing some playwork with us? - OK then draw a happy face *(or adapt to specific answers)*

[Assistant to do observation questionnaire IMP throughout session / not necessarily fill in right then and there - but observe and fill in immediately after session]*

Now, are you ready to start?
(Cild can keep painting the doll or..)
- Do you want to hold [XY] or shall he just sit here?

✘**Q1** First I will ask you some questions about your family and your friends
.....*(13 screening questions)*
That went very well, didn't it?

-Probably you are ready now for a little snack, are you?
Do you like raisins, apples....? - Here you go.
(While eating)
Are you ready to answer some more questions?
First choose from this box one of the tokens you would like to use - Which one do you like best?
OK, hold on to it.
(Either work on table or floor)
- Here are two cardboard signs. This one says 'ME'/ YES and this one says 'NOT ME'/ NO.
I put the one that says 'ME' closest to you and the one 'NOT ME' is farthest away from you. Can you see that?
(Example) Now if I ask you if your name is [....] then you can answer me: 'Yes, this is exactly me' and you can put the token [insect etc.] on the sign here. - Or if I ask you if your name is [..wrong

name] then you answer me;'No, this is not at all me' and you put the token *[insect etc]* far away from you onto this sign.
Let's try another example: Do you like *[apples....]*? - OK if it is exactly like you - put it here, close by - if it is NOT you, put it far away.
[Keep practising and explaining and praising 'Well done']
Can you understand the rules of the game now? Shall we try with some other questions?

OK, I am going to ask you some more questions and you put [insect-token etc) in the right place. And if you are not sure, just ask and we will help you or *[Armon]* might do it for you.
Where do you want [doll XY] to be when we do that?
✘**Q2** .....
(Bryant: 18 questions) - *let them play with toys / blow bubbles/ choose another token/ let them choose a present already - if needed to make it more fun* .....

[keep explaining, encouraging and helping]

Now we are making it a little bit more complicated. Instead of just two signs 'YES/ME' and 'NO/ NOT ME' we have now three signs. The closest one is still 'ME' and the farthest away one is still 'NOT ME' but there is one in between, and when you are not really too sure you can choose something in between: Like 'I DON'T KNOW'.
-Do you want some more *[apple...] (Same story with distracting and playing etc.)*

OK lets try it:
✘**Q3** .....
(IRI: 10 questions) .....
[keep helping, explaining, encouraging]

Now comes the last one. Can we try it?
✘**Q4** .....
(Physiology: 15 questions) *Procedure as above*.....

Thank you, this was just great. Thank you very much for playing with us.
-Do you want to keep *[insect token]*?

(If there is still time....)
Shall we do some more out of this briefcase now?

✘**Q5 (IQ test)** OK - I know your name and can put it down here and I know your age. Is that right?
Now tell me
(Do ½ of the WPPSI if possible).....

-Did you enjoy our play-work?
-We did and we want you to choose a present from this box. Which one would you like?
[talk about it and why he likes it etc.]

- Now, [xy] comes back home with us today. But the next time when we meet, I will bring him with me again and then **you** can take him home. Is this OK? Would you like that?
-You know that [Armon] and I will be coming back for one more time don't you?
The next time we are going to watch some videos and I will not ask that many questions anymore. One of the videos will be about Bambi. Have you ever heard of Bambi? *(Discuss and show some of the book)*
-Do you want to come back and watch some videos? *[Discuss..]*
OK, I will bring [XY] with me again, too.

There is something else that I would like you to do:
- Could you please pop this letter for your parents into your bag as soon as we get back to the classroom. This letter tells your mum that we have done some playwork together today and that you have been a really good boy for the whole time.

-OK let's go back to the classroom now and you put all your presents and letters into the bag. And we will see what kind of present we can find for you next time.

- Thanks for helping us and see you again soon *[use also XY doll to say goodbye]*

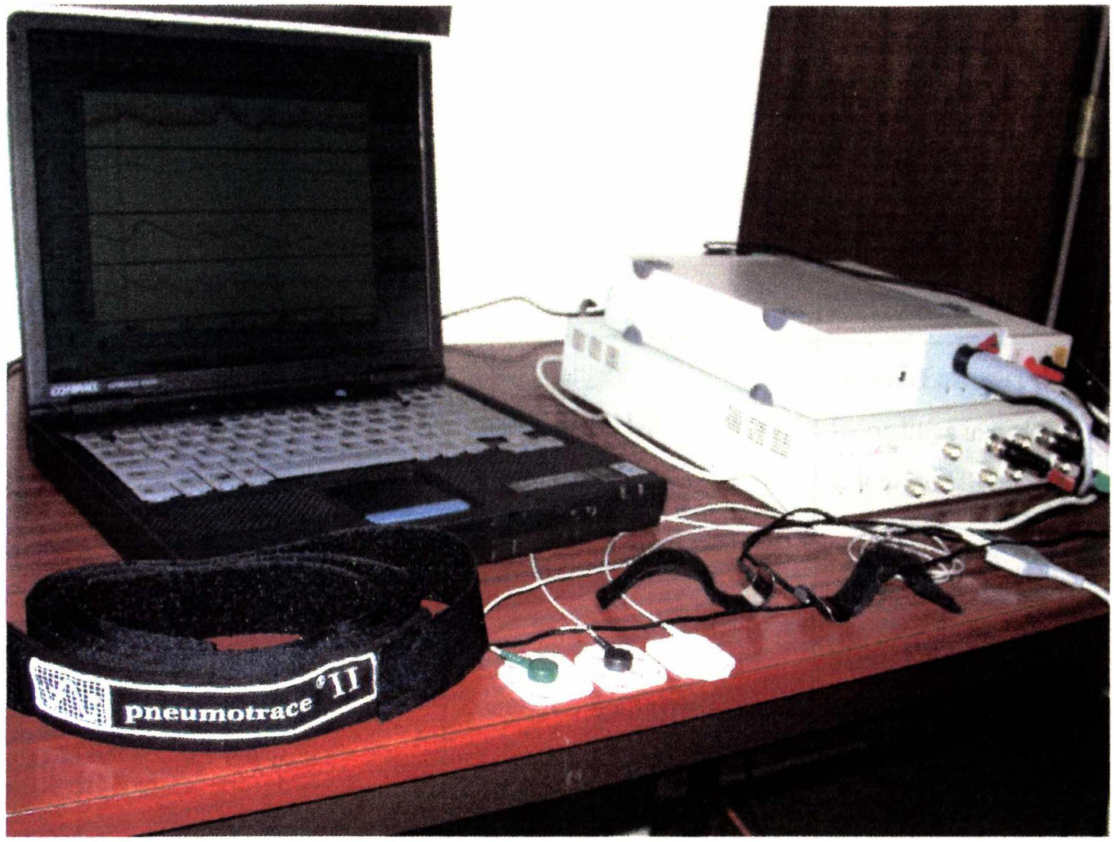
28/7/00
Veronika Isler

APPENDIX E

Materials and Apparatus: Phase B

- Photo Physiograph (PowerLab)
- Table of PowerLab Settings and Calculations
- Self-report after film segments
- Script for Session B

Appendix E



Appendix E

Table E1.

PowerLab settings, calculations and transformations

Collected data/ sampling 100/s	*Settings/ online calculations*	*Data pad transformations*
ECG in μV (slope in μV/s)	1MV(Range) amplified 50HZ 0.1HZ high pass 100HZ low pass Scale 0+/-1000	(PowerLab used the ECG recordings in order to calculate HB online)
HB in Bpm (slope in Bpm/s)	200Bpm computed input (from ECG) baseline reading: fast Range: 1mv Raw data input: 1 Function: rate meter, Average: 1 Scale: 0 +150	Mean BPM Standard deviation BPM Slope BPM Maximum BPM Minimum BPM Range BPM
SC in uS (slope in uS/s)	50ms View +15 / over 50 out of range Absolute conductivity: Circuit zero each time in mS	Mean SC Standard deviation SC Slope SC Maximum SC Minimum SC Range SC
Respiration in V (Slope V/s)	2V range Amplifier: 10KH Low pass View: +/- 0.00 F 0.02	Mean Respiration Standard deviation Resp. Slope Respiration Maximum Respiration Minimum Respiration Range Respiration

Appendix E

Self-report of feelings after each film segment

Child:.....Date of birth:.....

School:.....Teacher:.....

How much did you feel XY emotion (feeling happy
Feeling sad/ unhappy
Feeling sorry for others
Upset/ scared)

How did the film make you feel? - Put the answer token beside one of the five checker stacks. The highest means 'A whole lot'/ 'A whole pile' - lowest means 'Not at all'
(Examples with 'hungry' and 'tired' and 'hot/cold')

	Not at all	a little bit	A bit more	quite a bit	a whole lot	N/A
1) Fire accident						
Feeling happy	O	O	O	O	O	O
Feeling sad/unhappy	O	O	O	O	O	O
Feeling sorry for others	O	O	O	O	O	O
Feeling upset/scared	O	O		O	O	O
2) Roller coaster						
Feeling happy	O			O	O	O
Feeling sad/unhappy			O	O	O	O
Feeling upset/scared	O	O	O	O	O	O
3) Bambi						
Feeling happy	O	O	O	O	O	O
Feeling sad/unhappy	O	O	O	O	O	O
Feeling sorry for others	O	O	O	O	O	O
Feeling upset/scared	O	O	O	O	O	O

Script for Phase B) / PhD V. Isler

Get child from classroom and make sure they remember last session. Talk about last session and things that have happened in the meantime.
Give the doll to the child and ask if he remembers the name he gave it (remind him if necessary). Then talk about the doll and let the child hold his new 'friend' who will be with him during today's session and then he can take him home to keep and show [mum and dad...caregiver].
Sit child in front of the tv/video/computer/physiograph equipment (so he can get used to it) and explain what is going to happen:
"We will watch some short videos together and while you watch we will measure your heart beat with 'measuring buttons'. Your [mum/ dad/caregiver] has told us that you are OK with that". - Ask for OK from child.

"But first we will finish the games from the suitcase that we have started last time. Remember the puzzles? Today we have some mazes? Do you know what a maze is?" (Show picture and explain).

Test the child on the 2nd half of the WPPSI-R in front of the equipment so he can desensitise to the room and the set-up. Give toys or paper and feltpens if necessary.

Then show the child the sample electrodes and let him put them on the doll (Make procedure fun!) "Where is your tummy?, Back? Heart? Where is [...the doll's] heart? Where does the measuring button have to go? Do you want to help put it on? Do you want {...assistant] or me to do it?"
Put the three self adhesive electrodes on chest/left, chest/right and calf, and make sure that the child sits comfortably about 50 cm from the tv screen (use cushions etc to ensure that feet are not dangling and left arm (with ADA electrodes) can be placed on a cushion to be kept still).

Then attach respiration belt around chest. Let child lift both arms and make jokes about child being treated "like an astronaut in a spaceship - all hooked up. Soon ready to take off.."

"Which is your 'pointy' finger? Which is your middle finger? Look how I can put this on my hand. Do you think it will fit your fingers? Let's try"
Then fasten EDA electrodes to index and middle finger of left hand and position arm in a stable position so child will not have to move arm or hand during watching the videos.
And explain 'competition' to keep arm still: " Can you see this cow? It's actually a watch, but if you move it the cow moves too - Try it. Now I will ask you to keep your hand really still while you watch the films and make sure that the cow does not move at all. Do you think you can try? I put a prize [packet of sweets] right here in front of you, and when you can keep the cow still, you win that prize." (Make sure the child understands and repeat if necessary).

"Ready to watch the videos?" Explain that there will be 5 little videos and that he can ask questions between each of them when he needs to, but if possible should not talk during the films.
Start physiograph recording [and depending on child (curiosity versus apprehension) show or don't show them the HR/Bpm/EDA/respiration traces on the computer screen].
Start Videotape and physiograph data collection simultaneously when child indicates that he is ready.

Appendix E

Make sure the child is seated between the two researchers. One is monitoring the psychophysiological recording on screen, and marking each interruption (talking/ moving/ outside interruptions) with pre-coded markers. Also marking several pre-selected 'critical' segments in each video clip. The exact location on the timeline for start and end of the segments is tagged via a marker in the recording and it can be checked whether it corresponds with the chosen critical segment. The second researcher sits on the other side of the child, observes the child, encourages him to sit still, to keep watching, reminds him of the competition, praises him for sitting still, and answers (if necessary) during non-critical segments questions of the child; i.e. general check-up for well-being of the child.

Show baseline film 'Dolphins'; then keep tape going for 'Fire accident'; keep going for 'Roller coaster'; show baseline film 'Dolphins' again (to reset EDA and HR after the excitement of SS) and ask children to check "whether they are the same dolphins and how many there are"; finally show 'Bambi'. During whole procedure check for artifacts and make notes online. And make sure that child is OK and not too distressed.

At the end of screening take electrodes off, praise him for winning the competition, and give him the prize. Debrief with the child about the films and the whole experience and move away from table to another place where he can choose something to eat, and can help to put together the five stacks of checkers (in an row of consecutively increasing heights).
Then ask him to indicate (self-report) his feelings during the films by pointing to the checker-stacks of appropriate height. Practice the procedure first by asking "How much hungry [tired] [hot] [cold] are you? - Not at all - a little bit - a bit more - quite a bit - a whole lot?" Point to the stacks and explain until child understands.
Then ask "How did the film [name each one] make you feel? [happy, sad/unhappy, sorry for others/ upset/scared] - Not at all - a little bit - a bit more - quite a bit - a whole lot?" Ask for each emotion in each film while child eats and plays with doll.

Finally reward child with a present (Book), and let him choose which one, give him the note for the parents, make sure he has the doll and the prize and lead him back to classroom, while still debriefing if necessary.
Give thank-you present to teacher.

Both researchers then score the IMP with their impression of the current session.

APPENDIX F

Data Coding

Data Coding

Screening data

Information obtained from parents:

Categories/ Variables		Coding
Living:	rural	1
	urban	2
Family:	female and male caregiver	1
	either single male or single female	2
	female and male, living with family	3
	single caregiver, living with family	4
	flatting situation	5
	living with grandparents	6
Socio-economic status:	upper	1
	middle	2
	lower	3
Position in family:	only child	1
	middle child	2
	oldest child	3
	youngest	4
Regular medication:	yes	1
	no	2
	(The qualitative analysis revealed that asthma was the main reason for regular medication)	
Experience of trauma:	yes	1
	no	2
	(The qualitative analysis revealed that none of the children needed to be excluded from the research based on the trauma information)	
Being a bully:	yes	1
	no	2
Bully-victim:	yes	1
	no	2
Internalsing problems:	none	1
	eating problems	2
	sleeping problems	3
	anxiety	4
	shyness	5
	stubborness	6
	several	7

(Table continues)

(Continued)

Expressed problems:	none	1
	social introversion	2
	social extraversion	3
	learning problems	4
	concentration	5
Quality of parent comments:	no comments	1
	positive comments	2
	negative comments	3
	(Qualitative information was recorded in detail for further reference)	
Caregiver attitude to child:	child is very good	1
	child is good	2
	child is OK	3
	child has some problems	4
	child has many problems	5

The parent information was summarised on a Likert scale
1 (not worried at all)----to---- 6 (worried)

The parent attitude towards the research project was noted as follows:

no comments	1
no contact/ but comments	2
caring contact	3
concerned	4
worried	5

The qualitative comments of teachers (obtained from the rating scales) were categorised as well; scored as follows:

Teacher attitude to child:	child is very good	1
	child is good	2
	child is OK	3
	child has problems	4
	child has bad problems	5
	(Qualitative information was recorded in detail for further reference)	

The naturalistic observation resulted in information recorded during the first testing session A (from researcher and assistant), that was categorised for computer analysis as follows:

Happiness:	child very happy/ sociable	1
	child OK	2
	child very unhappy/ angry/ intense/ naughty	3
Activity:	child active	1
	child passive	2
	average activity level	3

(Table continues)

(Continued)

Attention:	child attentive	1
	child distracted/ fiddly	2
	average attention level	3
Maturity:	child young	1
	child mature	2
	average	3
Shyness:	child shy/ quiet/ fearful/ distressed	1
	confident/ boisterous	2
	average	3
Accepts food:	yes	1
	no	2
Accepts toys:	yes	1
	no	2
Accepts doll:	yes	1
	no	2
Cooperates during administration of self-reports: yes		1
	no	2
Cooperates during administration of WPPSI:yes		1
	no	2
General impression during first session:	no problems	1
	child has a few problems	2
	child has some problems	3
	child has quite some problems	4
	child has too many problems	5

The naturalistic observation resulted in information recorded during the second testing session B (from researcher and assistant) that was categorised for computer analysis as follows:

Happiness:	child very happy/ sociable	1
	child OK	2
	child very unhappy/ angry/ intense/ naughty	3
Attention:	child attentive/ keeps still	1
	average	2
	child distracted/ fiddly/ moves around	3
Maturity:	child young/ immature/ does not understand	1
	average	2
	child mature/ understands films	3
Shyness:	child shy/ fearful/ distressed	1
	average	2
	confident/ boisterous	3
Accepts doll:	yes	1
	no	2
Answers:	yes	1
	no	2
Acceptance of electrodes:	yes	1
	no	2

(Table continues)

(Continued)

Attention levels during film:	very attentive	1
	more than average attention	2
	average attention	3
	less than average attention	4
	not attentive during film at all	5
Observed coping mechanisms:	laboured breathing	1
	crying/ sadness	2
	gaze aversion	3
	increased talking	4
	generally upset	5
	no overt coping behaviours	9
General impression during second session:	no problems	1
	child has a few problems	2
	child has some problems	3
	child has quite some problems	4
	child has too many problems	5

The information from the structured interview has been coded into four areas:

Family-support	(Likert)	0 no caring------to-----3 very caring
Social/ school	"	0 unhappy ------to-----4 happy at school
Fears/ confidence	"	0 fearful---------to-----3 confident
Health issues	"	0 poor health---to----- 2 good health

The reduction of these data resulted in a total wellbeing/support index
from 0 low wellness--to----11high wellness
and an alert rating from 0 no worries----to-----6 high alert

Again, this information was collected and coded to be used for validation and confirmation of the scores from the rating scales and normed self-reports.

Observational information has been obtained from four separate sources/occasions (session A and B, researcher and research assistant) via the IMP (Interpersonal Measure of Psychopathy). 17 items had been retained from the original adult scale and they were scored on four levels:
1 (describes this child not at all)----2 (describes this child somewhat)----
3 (describes this child very well)----4 (describes this child perfectly)

Three items (only level 2, 3, and 4) were perceived as indicative for CD or psychopathy problems, and thus the averaged alert-score ranged from
0.5 (low alert)----to----12 (high alert)

The raw-scores were combined and averaged into one overall score ranging from
minimum 17 (no psychopathic traits)--- to maximum 68 (high possibility of psychopathy)
The raw-data were transformed into z-scores for comparison and statistical analysis.

(Table continues)

(Continued)

The scoring of the WPPSI resulted in three scores, which were already transformed into standard scores (SC):
Performance Scale
Verbal Scale
Total Scale (IQ)
The intelligence scores are an additional measure, which was included for screening purposes (as control variable to verify main effects).

All of the above information represents coded and scored qualitative data (i.e., quantified screening data) that was obtained to complement the traditional questionnaire measures for empathy and psychopathy assessment.

Next follows a description of the considerations and procedures that were relevant for scoring and data reduction of the self-reports and of the rating scales.

Self-reports

The Bryant empathy self-report resulted in raw scores from
0 (non-empathic)----to----18 (highly empathic)
which were transformed into z-scores for further analysis. (No data were missing, and no alert coding was extracted).

The IRI (Interpersonal Reactivity Index) resulted in two sub-totals and an overall score (factorised by the author), and had to be dichotomised from a Likert format to 'me' / 'not me' format. There were missing data for some participants, though this did not affect the mean values significantly.
PD scale 0 (no distress)----to----4 (distressed by other's problems)
EC scale 0 (no concern)----to----4 (empathic concern for others)
Total 0 (no empathy)---to----8 (maximum empathy)
For these data an alert coding was obtained for 'number of non-empathic responses', from
0 (empathic) ---- to---- 8 (non-empathIc)
and a new empathy total was calculated by substracting the total negative score from the total positive score (and adding 10 to the result to avoid negative scores).

Two additional screening questions provided further empathy-alert data which were transformed to fit on a scale of
0 (lack of empathy)---- to---- 4 (empathy) scale
These data were transformed into z-scores and used to calculate means of composite scores.

The PRQ (Physiological Reaction Questionnaire) had to be adapted/ shortened for the present study and two sub-scales were chosen for testing and scoring. The scoring key was simplified to 'me'/ 'not me', and there were only few missing values.

(Table continues)

(Continued)
The 'High Intensity Pleasure' scores (nine questions), ranged from a total of
0 (doesn't like intensity)----to-----9 (likes intensity)
the 'Autonomic Reactivity' scores (six questions) ranged from a total of
0 (not aware of ANS)------to-----6 (aware of autonomic responses)
The total score of 0--------to-----15 (physiologically reactive)
was complemented with the index of 'dislike/ un-awareness', and thus resulted in a new total score of
'true physiological reactivity' 0----to----30
(again the total scores had to be transformed into positive values). These data were again calculated into z-scores to be comparable to the other scales and for integration into composite scores.

Finally, the last self-report index was the evaluation of the film-viewing.
On a 5-point scale of 1 'not at all'----to----5 'lots'
the children indicated their feelings for 'happy', 'unhappy', 'sorry for others', which were summarised into an
EC raw-score (0 to maximum total raw score 40) and for
'upset/ scared', which was seen as
PD raw-score (0 to maximum total raw score 15).
The EC and PD scores were obtained for the films 'Fire', 'Bambi', and 'Roller coaster' separately and also combined into a total composite score for EC and PD.

Rating scales

The general information obtained from the teachers via the CBCL-TRF, regarding a boy's externalised or internalised behaviour at school was organised into sub-scales, and most of the data are expressed in T-scores.
The 'Adaptive Functioning' profile, with its total T-score is composed through four sub-scales (expressed in T-scores as well). The scales have suggested cut-off points to indicate 'sub-normal' performance and thus can be consulted for screening purposes (as alert information). The coding is indicated on a Likert scale
1 (much less than others)-----to-----7 (much more than others)
- 'working hard'
- 'behaving appropriately
- 'learning'
- 'happy'
The 'profile' from the 'Problem scales' is summarised into T-scores (with cut-off values) for 'Internalising'(I), 'Externalising'(E), and 'Total'. The contributing data from the sub-scales are calculated as raw-scores and needed to be transformed into z-scores for statistical comparison. Again, the cut-off points indicated an alert rating.

I = 'withdrawn'; 'somatic complaints'; anxious/depressed'
E= 'social problems'; 'thought problems'; 'attention problems'; 'delinquent behaviour'; 'aggressive behaviour' and 'Other problems'
The scores were indicated on a 3-point scale
0 (not true)----1 (sometimes true)----2 (very true)
Whether there was any cause for alert (i.e., scores beyond cut-offs) was separately coded
- cause for alert 1
- no data in alert range 2

(Table continues)

(Continued)

There were no missing data, although it could be suspected that for some participants the code 0 = 'not true' has been over-used as an equivalent to n/a responses.

The CBCL-TRF information was the basis for the scores on the AML quick screening scale. The raw scores of 12 selected items are summarised into three clusters, with indication of percentile cut-offs (at the 30th and 15th percentile respectively), for alert information. The 5-point scale was transformed into a 3-point scale to correspond with the CBCL data.
The scores on each scale were in the range from 0 to 18, with a possible total of 54 for all three clusters of 'Aggressiveness' scale; 'Mood' scale; 'Learning' scale:
1 (never)----2 (seldom/ moderately often)----3 (often/ most of the time)
The raw scores were converted into z-scores for statistical analysis.

The CBQ rating scale has been factorised by the authors. For the current research 4 sub-scales were chosen which are scored on a 7-point Likert scale
1 (extremely untrue)----to----7 (extremely true), with an additional category for n/a.
Some of the items were reverse-scored. The scores on each of the four scales were averaged into an overall raw-score between 1 and 7, and the total average for all four scales was calculated as well.
'Empathy' = 14 items; 'Intensity Pleasure' = 13 items;
'Approach' = 13 items; 'Sadness' = 12 items.
Again, there were no missing data but it is suspected that the category of n/a has been over-used for some respondents. Thus the final data needed to be scrutised for possible effects of this strategy on the reliability of the overall mean values that were extracted from these scales.

The criterion-based scale for emotions and social functioning contains three factors:
'Empathy' = 4 items; 'Sensation Seeking' (SS) = 2 items; 'Social Functioning' (SF) = 6 items. Each item was scored on a 5-point Likert scale
1 (does not fit at all for child)----to----5 (describes child extremely well)
Each factor was averaged into a total raw-score (1-5), and the SS and SF data have been combined into a composite score and transformed into z-scores for the statistical analysis.

The PDS (Psychopathy Screening Device) contains 5 items that have been described by the author to factor on the 'callous/ unemotional' trait (CU). All of the 20 items are scored
0 (not at all true)----1 (sometimes true)----2 (definitely true)
resulting in a total raw-score value of 0 to a maximum of 40 and
resulting in a CU raw-score value of 0 to a maximum of 12 (which also serves as an alert indicator).
For further analysis these scores had to be transformed into z-values.

The original CPS (Childhood Psychopathy Scale) contains 14 sub-scales. For the present study 8 sub-scales have been chosen, which resulted in a total of 33 items. The respondents could choose between 'Yes'= 1 and 'No' = 2 for scoring options, and for the present study the n/a choice was added, as a suggestion resulting from the focus group discussions), (some items were scored in reverse). The raw-scores from the sub-scales were combined into a total score (from 0 to a maximum of 33) and transformed into z-scores for statistical analysis.

(Table continues)

(Continued)
'Boredom Susceptibility' = 5 items; 'Manipulation' = 3 items; 'Lack of Guilt' = 3 items; 'Poverty of Affect' = 8 items; 'Callousness' = 5 items; 'Behavioural Dyscontrol' = 3 items; 'Impulsiveness' = 3 items; 'Grandiosity' = 3 items.
The addition of the n/a scoring choice resulted in a considerably lower overall score (for sub-scales as well as for total), as many respondents seemed to avoid 'labeling' statements. Thus the number of n/a responses had to be taken into consideration for the statistical analysis (as modifier of the total scores).

The above data were collected during session A and parts of session B. The reliability and validity data of the various instruments has been checked and discriminatory power was verified via visual inspection of the raw data from the questionnaires; none of the items were discarded based on that information. Due to the multi-modal approach for the assessment of empathy and psychopathy, there was a considerable number of measures available for analysis. In order to reduce this quantity, the data were standardised and then (where appropriate) averaged into composite scores (CS), (see similar procedures in e.g., Eisenberg, 1996). Those data that were not used to form composite scores or that were not part of group memberships served later to corroborate the results and findings.

APPENDIX G

Computations Translating Theoretical Constructs

Computations Translating Theoretical Constructs

Theoretical Construct ⟶	Computations/ Operation applied to test hypothesis of the construct
HR resting baseline (dispositional): -Low resting HR is indicative of emerging psychopathy (P), (lack of emotional responding) as opposed to -High resting HR values, which are indicative of attentiveness and emotions in empathic (E) individuals. P = psychopathy analogue E= empathy analogue	1) Mean baseline HR data Dolphin (Bpm, z-scores). First (A) and second (B) segments added and averaged for crit (Alternatively: There are other approaches to calculate mean HR baseline data, which have been considered and tested, However, M(AB) was found to be superior and thus was used during analysis
HR reaction levels (situational): -Low HR reaction is indicative of emerging psychopathy (lack of emotional responding) as opposed to -High HR reaction values which are indicative of emotional responding in empathic individuals	2) Mean HR data (Bpm, z-scores) of crit section for each film segment and/or 2a) Added and averaged mean HR data of the film segments
HR reactivity/ difference scores (situational): -No reaction to emotional stimuli is sign of low emotionality (self-focus) of emergent psychopaths or -possibly HR deceleration is sign of cognitive processing in psychopathic individuals (with no emotionality) as opposed to -high reactivity/ HR accelaration in relation to emotional input (i.e., distress) or possibly HR deceleration in case of empathic attending	3) Mean HR data (Bpm, z-scores) of crit sections minus the baseline value indicative for each film sequence and/or 3a) Mean HR data (Bpm, z-scores) of crit segments minus the pre sections, for each film segment and/or 3b) Sum of added 3) and 3a)

(Table continues)

(Continued)

HR recovery (situational):	
-Slow HR recovery (or increase) is indicative of lack of emotion regulation in emergent psychopaths (i.e., low values) as opposed to -fast HR recovery which signals optimal and/or emotion regulation of empathic individuals	4) HR mean data (Bpm, z-scores) of crit minus post sections for each film segment singly 4a) HR mean data (Bpm, z-scores) of crit minus post sections added and averaged from each film segment 4b) HR mean data (Bpm, z-scores) of post sections, added and averaged over all films
HR reactivity (difference scores), (situational): -No reaction, (or HR deceleration via cognitive involvement) is indicative of of low emotionality/ attention i.e., low difference scores (for attention increase as well as recovery) and low absolute values of crit data are part of the construct of emergent psychopathy as opposed to -High difference scores for reactivity/ recovery and high absolute crit values which are indicative of high emotionality/ attention	5) Sum and average of HR mean data - (Bpm, z-scores), averaged for each film section of crit minus base- line average; plus crit minus pre values; plus crit minus post values
HR variability (vagal tone), (dispositional): -High variability (spontaneous fluctuations) is due to lack of emotional regulation/ lack of attention and lack of recovery; and indicative of emergent and disinhibited psychopaths (dominant BAS) as opposed to -Suppressed variability during attention, which is indicative of high empathic individuals	6) The variability can be expressed via Max minus Min values or via variance. For the present analysis the calculated SD values from the data pad for each film segment were added. SD HR values for crit, pre and post all film segments added and averaged;
SC resting levels (tonic), (dispositional): -SC resting levels are low in non-empathic individuals as indication of non-reaction to aversive stimuli as opposed to -High tonic levels in 'reactors'; i.e., empathic inividuals	7) Mean SC data (z-scores, μmho) of crit data added and averaged for 'Dolphins', as well as averaged pre segments minus averaged baseline

(Table continues)

(Continued)

SC reactivity (situational): -Emergent psychopathy is indicated by non-reaction to emotional stimuli (no arousal/attention due to deficient BIS) (unless reward or SS is involved, which leads to increase in SC) as opposed to -Increased SC levels (i.e., phasic changes) as observed in empathic individuals in response to emotional cues	8) Mean SC data (z-scores, µmho) of crit data minus baseline levels of either pre or Dolphins; added and averaged for all films

The described mathematical operations resulted in several scores per child, which were transformed into z-scores for further statistical analysis.

APPENDIX H

Descriptive Data: Phase A

Phase A: Descriptive Data

Descriptive analysis of the main variables for Phase A

Measure	*M*	*SD*	*Dist*
Wechsler Preschool and Primary Scale of Intelligence (WPPSI) *(scaled scores)*			
Performance	98.1	14.7	n
Verbal	106.6	19.7	n
Total Score	102.9	16.2	n
Teacher Report:			
Child Behaviour Checklist (Teachers)/ CBCL-TRF *(T-scores)*			
Adaptive Functioning Total	48.0	8.6	b
Adaptive Functioning Working	48.5	8.1	b
Adaptive Functioning Behaving	48.6	7.8	b
Adaptive Functioning Learning	47.7	8.8	b
Adaptive Functioning Happy	50.5	6.9	b
Problem Scores/ Total	51.1	9.9	n
Problem Scores/ Internalised overall	49.9	8.7	b
Problem Scores/ Externalised overall	51.1	9.8	s
(Raw scores range)			
(0-8) Problem Scores/ Internalised 'withdrawn'	1.4	1.8	a
(0-3) Problem Scores/ Int. 'somatic complaints'	0.3	0.6	a
(0-14) Problem Scores/ Int. 'depressed'	3.3	3.4	a
(0-9) Problem Scores/ Int. 'social problems'	2.1	2.3	a
(0-4) Problem Scores/ Int. 'thought problem'	0.7	0.9	a
(0-33) Problem Scores/ Int. 'attention'	9.7	9.8	a
(0-8) Problem Scores/ Ext. 'Delinquency'	1.4	2.0	a
(0-41) Problem Scores/ Ext. 'Aggression'	7.5	10.0	a
(0-9) Problem Scores/ Other	4.4	3.3	a
Alert coding a was obtained for 54% of the sample			
Aggression/ Mood and Learning Questionnaire (AML) *(Raw scores range)*			
(4-16) Aggression	7.1	3.9	b
(4-12.5) Moody/ shy	5.7	2.0	s
(4-14.5) Learning problems	6.9	3.2	s
(12-36) AML total	19.6	7.4	b

(Table continues)

(Continued)

Child behaviour Questionnaire (CBQ)/ (Temperament)			
(Raw scores range)			
(1-7) Total	4.4	0.4	n
(1-7) Empathy	4.5	1.0	b
(1-7) Intensity of Pleasure	4.7	1.0	n
(1-7) Approach	4.7	0.9	n
(1-7) Sadness	3.8	0.9	n
Criterion Based Scale			
(Raw scores range)			
(1-5) Empathy	2.9	0.9	b
(1-5) Sensation Seeking)	2.9	1.2	n
(1-5) Social Skills/Psychopathy	3.5	1.1	s
(1-10) SS + Psypa/Soc. Skills	5.4	2.1	b
(1-15) Empathy + SS + Psypa/Soc.Skills	9.5	2.9	b
(1-10) Empathy + Social Skills/Psychopathy			
Psychopathy Screening Device (PSD)			
(Raw scores range)			
(0-60) Total	11.4	9.3	a
(0-12) Callous/unemotional subscale	4.0	3.3	a
Alert coding a was obtained for scores above critical threshold for 34% of the sample			
Child Psychopathy Scale (CPS)			
(Raw scores range)			
(0-33) Total	10.5	7.8	b,s
(0-30) Total without sub-scale 'Grandiosity'	8.6	7.9	s
(0-11) Sensation Seeking (3 sub-scales)	3.4	3.5	b,s
(0-11) Callous/ Unemotional (3 sub-scales)	2.9	3.3	b,s
(0-5) Sub-scale 'Boredom'	1.5		
(0-3) Sub-scale 'Manipulation'	0.6		
(0-3) Sub-scale 'Lack of guilt'	1.0		
(0-8) Sub-scale 'Lack of affect'	2.2		
(0-5) Sub-scale' Callous/unemotional	1.3		
(0-3) Sub-scale 'Lack of Control'	0.8		
(0-3) Sub-scale 'Impulsiveness'	1.3		
(0-3) Sub-scale 'Grandiosity'	1.9		
Observations:			
Interpersonal Measure of Psychopathy (IMP)			
(Raw scores range)			
(17-68) Total	23.8	6.4	b,s
(0-12) Sub-scale 'CD/ callousness' (3 items)	1.4	1.6	s,a

(Table continues)

(Continued)
Self Report:

Bryant Empathy Scale *(raw score range)* (0-18) Total	8.9	2.7	n
Interpersonal Reactivity Index (IRI) *(raw scores range)* *(0-4)* Personal Distress sub-scale *(0-4)* Empathic Concern sub-scale *(2-18)* Total (minus alert scores)	 1.8 2.8 11.4	 1.2 1.3 4.2	 n b b
Eisenberg Empathy Criterion *(raw scores range)* *(0-4)* Total Empathy (minus alert scoring)	 3.8	 1.4	 b
Physiological Reaction Questionnaire (PRO)/ Temperament *(raw score range)* *(0-9)* Subscores for 'High Intensity Pleasure' *(0-6)* Sub-scores for 'Autonomic Reaction' *(0-25)* Total Physiology (minus 'dis-pleasure')	 5.5 2.8 12.3	 1.5 1.5 4.4	 n b b
Self-report of feelings after film viewing *(raw score range)* *(3-15)* Empathic Concern re 'Jamie *(3-15)* Empathic Concern re 'Bambi' *(6-30)* Empathic Concern Total *(1-5)* PD re 'Jamie' *(1-5)* PD re 'Bambi' *(2-10)* PD Total *(8-40)* Total empathy *(3-15)* Sensation Seeking re 'Roller coaster'	 9.3 9.8 19.2 2.2 2.7 4.8 23.9 12.9	 3.6 3.4 5.9 1.7 1.9 3.0 7.9 8.8	 b b n b b b n n

Note. n = normal distribution (calculated); b = bi-modal distribution (based on visual inspection of graphed data); s = skewed (biased) towards 'no problems'; which confirms the expectation (based on literature) that most teachers avoid 'labeling' children with negative attributes, towards outsiders (i.e., the bi-modality which is apparent in the rest of the data is replaced); Dist = distribution;
a = around 10% of the cases were at the extreme end of the identified scales and were marked with an 'alert' code; (cumulative over all scales this resulted in an 'alert' coding for a certain percentage of the sample).

The above variables have been tested for normality and homogeneity, although according to literature, "in large samples normality and variance homogeneity are not important. Even for small samples with significant deviations from normality and homogeneity, the t and F tests may be 'robust' to such

(Table continues)

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violations" (Greenfield & Sternbach, 1972, p. 141). Moreover, "the presence or absence of a bimodal distribution of scores on some continuous variable is a criterion for the presence or absence of true types", (Corning, 1986, p. 354). Thus, the bimodality (b) of the majority of the analysed variables corresponds to their pre-selection procedure (i.e., empathic versus non-empathic children). It can be suspected that those assessment data, which do not result in bimodal distributions, but rather show normal distributions (n), might not be measuring the construct under investigation. For example the WPPSI data correspond roughly to the normal population distribution, which indicates that IQ is not related to absence or presence of empathy. (This might apply to the 'temperament questionnaires' as well).

Additionally, there seems to be a reluctance of most teachers to assign obviously negative scores to children; n/a or 'don't know' were preferred answering options in order to avoid clearly negative 'labels', resulting in skewed data distributions. Thus it can be suggested that covert questioning (in contrast to overt) might result in more accurate data, especially regarding psychopathy and behavioural problems.

Table H1

Correlations of 41 Potential Empathy Measures (Kendall's Tau)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.
1. AML-mood	1.00	0.16	0.41**	0.26*	0.09	0.13	0.10	0.12	-0.04	-0.08	0.13	-0.10	-0.04	-0.14	-0.26*	0.00	0.07	-0.11	0.01	-0.10	-0.10	-0.11	-0.02	0.02
2. AML-learning		1.00	0.75**	0.04	0.14	-0.06	-0.01	0.00	-0.44**	-0.51**	0.59**	-0.57**	-0.49**	0.15	-0.05	0.13	0.19	0.00	0.11	0.08	0.18	0.21	0.16	0.18
3. AML total			1.00	0.03	0.06	-0.05	-0.05	-0.01	-0.45**	-0.52**	0.60**	-0.58**	-0.50**	0.14	-0.08	0.08	0.13	-0.05	0.05	-0.02	0.12	0.11	0.09	0.14
4. Bryant				1.00	0.29**	0.23*	0.33**	0.41**	0.17	0.14	-0.08	0.11	0.17	-0.11	-0.01	-0.04	0.20	0.19	0.24*	0.00	0.16	0.10	0.21	-0.06
5. IRI distress					1.00	0.47**	0.66**	0.44**	0.04	-0.11	0.13	-0.08	-0.04	0.08	0.19	0.28*	0.10	-0.03	0.02	-0.17	-0.11	-0.12	-0.02	0.20
6. IRI concern						1.00	0.72**	0.39**	0.13	0.10	-0.02	0.06	0.11	-0.12	0.14	0.21	0.14	0.09	0.13	0.01	-0.07	-0.01	0.09	0.13
7. IRI total							1.00	0.49**	0.14	0.05	-0.01	0.05	0.09	-0.10	0.19	0.18	0.07	0.03	0.05	-0.18	-0.08	-0.12	0.00	0.10
8. Eisenberg								1.00	0.13	-0.01	0.03	0.02	0.06	0.17	0.24*	0.06	0.09	0.19	0.17	0.03	0.06	0.08	0.14	0.14
9. Crit. empathy									1.00	0.65**	-0.57**	0.71**	0.83**	-0.08	0.00	-0.03	-0.01	0.14	0.05	0.05	-0.06	-0.02	0.04	-0.02
10. Crit. social										1.00	-0.76**	0.80**	0.83**	-0.23*	-0.03	-0.07	0.02	0.16	0.09	0.03	-0.04	-0.02	0.05	-0.20
11. Crit. total											1.00	-0.86**	-0.69**	0.22	0.00	0.14	0.04	-0.10	-0.02	-0.01	0.08	0.07	0.01	0.27*
12. Crit. combined												1.00	0.81**	-0.19	0.01	-0.10	-0.03	0.10	0.04	0.02	-0.09	-0.06	0.01	-0.19
13. Crit. emp/Soc													1.00	-0.15	-0.01	-0.05	-0.02	0.15	0.07	0.02	-0.08	-0.05	0.04	-0.11
14. IMP														1.00	0.14	0.06	0.05	-0.04	0.00	0.18	0.11	0.18	0.07	0.09
15. PRQ pleasure															1.00	0.24*	-0.01	0.06	0.02	-0.03	-0.06	-0.02	0.00	-0.04
16. PRQ react.																1.00	0.03	0.00	0.00	0.08	-0.14	-0.04	0.03	0.10
17. Self. emp.fire																	1.00	0.31**	0.71**	0.36**	0.23*	0.32**	0.64**	0.03
18. Self. emp.Bambi																		1.00	0.67**	0.24*	0.34**	0.38**	0.62**	0.11
19. Self. emp. total																			1.00	0.34**	0.33**	0.41**	0.82**	0.10
20. Self. stress fire																				1.00	0.32**	0.69**	0.51**	0.03
21. Self. stress Bambi																					1.00	0.79**	0.52**	0.03
22. Self. stress total																						1.00	0.83**	0.05
23. Self EC and PD total																							1.00	0.11
24. CBQ total																								1.00
25. CBQ empathy																								
26. CBQ pleasure																								
27. CBQ approach																								
28. CBQ sadness																								
29. CPS lack of affect																								
30. CBCL attention																								
31. CBCL total adaptive																								
32. CBCL work																								
33. CBCL behaviour																								
34. CBCL learning																								
35. CBCL happy																								
36. CBCL thoughts																								
37. CBCL total alert																								
38. CBCL internalising																								
39. CBCL withdrawal																								
40. CBCL somatisation																								
41. CBCL anxiety																								

** Correlation is significant at the .01 level (2-tailed).

(Table continues)

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	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.	39.	40.	41.
1. AML-mood	-0.05	-0.09	-0.05	0.28*	0.10	0.31**	0.04	-0.02	0.03	0.14	-0.02	0.15	-0.26*	0.55**	0.35**	0.26*	0.57**
2. AML-learning	-0.41**	0.29**	0.42**	0.07	0.31**	0.78**	-0.59**	-0.66**	-0.58**	-0.49**	-0.24*	0.45**	-0.59**	0.12	0.26*	0.28*	0.02
3. AML total	-0.41**	0.26*	0.34**	0.14	0.34**	0.82**	-0.46**	-0.52**	-0.53**	-0.29**	-0.23*	0.49**	-0.60	0.26*	0.35**	0.35**	0.16
4. Bryant	0.21	-0.18	0.00	0.07	-0.05	0.04	0.06	0.01	0.07	0.02	0.13	0.05	-0.05	0.23*	0.09	-0.01	0.31**
5. IRI distress	0.00	0.04	0.09	0.18	0.08	0.08	-0.03	-0.05	-0.06	-0.09	0.06	0.07	0.09	0.05	0.00	0.06	0.07
6. IRI concern	0.12	0.09	-0.01	0.07	-0.04	-0.12	0.22	0.19	0.19	0.11	0.34**	-0.24*	0.20	0.03	-0.11	0.06	0.13
7. IRI total	0.07	0.04	-0.05	0.09	0.02	-0.08	0.13	0.12	0.13	0.02	0.21	-0.17	0.20	0.03	-0.06	0.01	0.09
8. Eisenberg	0.07	0.05	0.01	0.10	0.05	0.01	0.05	0.05	0.10	-0.01	-0.03	-0.06	0.12	0.23*	0.13	0.04	0.23*
9. Crit. empathy	0.70**	-0.43**	-0.21**	0.04	-0.56**	-0.46**	0.42**	0.41**	0.53**	0.29**	0.25*	-0.41**	0.28*	0.00	-0.19	-0.14	0.12
10. Crit. social	0.59**	-0.37**	-0.36**	-0.15	-0.48**	-0.49**	0.49**	0.46**	0.60**	0.30**	0.34**	-0.38**	0.43**	-0.02	-0.14	-0.18	0.08
11. Crit. Total	-0.52**	0.44**	0.37**	0.17	0.43**	0.58**	-0.49**	-0.49**	-0.62**	-0.31**	-0.30**	0.36**	-0.51**	0.06	0.19	0.27*	-0.05
12. Crit. Combined	0.59**	-0.43**	-0.33**	-0.13	-0.49**	0.58**	0.50**	0.51**	0.64**	0.34**	0.30**	-0.39**	0.46**	-0.04	-0.19	-0.23*	0.08
13. Crit. emp/Soc	0.67**	-0.40**	-0.30**	-0.07	-0.54**	-0.49**	0.47**	0.44**	0.59**	0.31**	0.32**	-0.41**	0.35**	0.00	-0.18	-0.15	0.11
14. IMP	-0.10	0.07	0.17	0.15	0.01	0.15	-0.18	-0.15	-0.27*	-0.10	-0.16	0.11	-0.16	-0.02	0.02	0.20	-0.10
15. PRQ pleasure	-0.05	0.07	-0.02	-0.10	0.09	-0.02	-0.03	-0.06	-0.05	-0.09	0.00	-0.15	0.16	-0.06	0.07	0.10	-0.11
16. PRQ react.	-0.07	0.09	0.10	0.05	0.13	0.16	-0.15	-0.15	-0.15	-0.16	-0.07	-0.01	-0.05	0.03	0.15	0.23*	-0.04
17. Self. emp.fire	0.04	-0.15	-0.03	0.18	-0.13	0.14	-0.12	-0.15	-0.09	-0.21	0.03	0.00	-0.02	0.12	0.13	-0.02	0.12
18. Self. emp.Bambi	0.19	-0.02	-0.03	0.07	-0.12	0.00	0.04	0.02	0.02	-0.07	0.14	-0.17	-0.01	0.15	0.17	0.07	0.11
19. Self. emp. total	0.14	-0.12	-0.03	0.15	-0.16	0.06	-0.04	-0.06	-0.03	-0.15	0.11	-0.10	-0.04	0.16	0.16	0.03	0.15
20. Self. stress fire	0.09	-0.10	0.00	0.11	-0.09	0.04	-0.12	-0.15	-0.07	-0.21	0.01	-0.20	-0.01	0.13	0.11	-0.04	0.15
21. Self. stress Bambi	-0.02	0.00	0.05	0.09	-0.21	0.12	-0.09	-0.16	-0.11	-0.07	-0.02	0.10	-0.11	0.03	-0.08	0.02	0.05
22. Self. stress total	0.04	-0.01	0.07	0.08	-0.14	0.14	-0.15	-0.20	-0.13	-0.20	-0.02	-0.02	-0.10	0.08	0.00	0.04	0.10
23. Self EC and PD total	0.13	-0.11	0.02	0.16	-0.18	0.11	-0.08	-0.11	-0.07	-0.16	0.06	-0.06	-0.04	0.17	0.13	0.05	0.17
24. CBQ total	-0.09	0.34**	0.55**	0.35**	-0.02	0.13	-0.04	-0.03	-0.11	-0.02	0.02	0.10	-0.19	-0.04	-0.08	0.06	-0.05
25. CBQ empathy	1.00	-0.35**	-0.12	0.05	-0.52**	-0.45**	0.44**	0.43**	0.52**	0.32**	0.35**	-0.30**	0.27*	-0.03	-0.22	-0.18	0.10
26. CBQ pleasure		1.00	0.39**	-0.09	0.40**	0.25*	-0.16	-0.16	-0.26*	-0.15	0.00	0.21	-0.13	-0.14	-0.02	0.21	-0.25*
27. CBQ approach			1.00	0.04	0.10	0.34**	-0.23*	-0.25*	-0.30**	-0.19	-0.03	0.35**	-0.31**	-0.12	-0.05	0.08	-0.14
28. CBQ sadness				1.00	-0.11	0.11	-0.03	0.00	-0.06	0.08	-0.16	-0.04	-0.21	0.24*	0.10	0.01	0.27*
29. CPS lack of affect					1.00	0.36**	-0.34**	-0.31**	-0.41**	-0.27*	-0.24*	0.39**	-0.21	0.10	0.27*	0.29**	-0.02
30. CBCL attention						1.00	-0.55**	-0.63**	-0.58**	-0.39**	-0.25*	0.46**	-0.61**	0.25*	0.39**	0.38**	0.11
31. CBCL total adaptive							1.00	0.85**	0.80**	0.74**	0.50**	-0.21	0.53**	0.08	-0.13	-0.24*	0.16
32. CBCL work								1.00	0.72**	0.72**	0.37**	-0.23*	0.53**	0.01	-0.17	-0.26*	0.10
33. CBCL behaviour									1.00	0.55**	0.42**	-0.29**	0.55**	0.06	-0.12	-0.34**	0.18
34. CBCL learning										1.00	0.30**	-0.07	0.37**	0.18	-0.06	-0.10	0.25*
35. CBCL happy											1.00	-0.10	0.21	0.02	-0.04	-0.23*	0.07
36. CBCL thoughts												1.00	-0.34**	0.10	0.24*	0.11	-0.01
37. CBCL total alert													1.00	-0.21	-0.29**	-0.26*	-0.12
38. CBCL internalising														1.00	0.61**	0.21	0.79**
39. CBCL withdrawal															1.00	0.18	0.36**
40. CBCL somatisation																1.00	0.07
41. CBCL anxiety																	1.00

Note. *p<.05, **p<.01 (two-tailed). AML=Aggression-Mood-Learning; Bryant=Bryant Empathy scale; IRI=Interpersonal Reactivity Index; Crit.=Criterion-based; IMP=Interpersonal Measure of Psychopathy; PRQ=Physiological Reaction Questionnaire; Self.=Self-report after film; EC=empathic concern; PD=personal distress; CBQ=Child Behaviour Questionnaire; CPS=Child Psychopathy Scale; CBCL=Child Behaviour Checklist.

Table H2

Correlations of 38 potential psychopathy measures (Kendall's Tau)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.
1. CBCL total funct.	1.00	0.85**	0.80**	0.74**	0.50**	-0.40**	-0.39**	-0.21	-0.55**	-0.37**	-0.37**	0.53**	-0.49**	-0.59**	-0.46**	-0.162	-0.23*	-0.04	-0.51**	0.48**	0.49**	0.49**	0.50**	-0.43**
2. CBCL work		1.00	0.72**	0.72**	0.37**	-0.39**	-0.40**	-0.23*	-0.63**	-0.35**	-0.38**	0.53**	-0.53**	-0.66**	-0.52**	-0.15	-0.25*	-0.03	-0.51**	0.44**	0.46**	0.49**	0.51**	-0.41**
3. CBCL behaving			1.00	0.55**	0.42**	-0.52**	-0.45**	-0.29*	-0.58**	-0.45**	-0.51**	0.55**	-0.64**	-0.58**	-0.53**	-0.26*	-0.30**	-0.11	-0.62**	0.59**	0.60**	0.62**	0.64**	-0.56**
4. CBCL learning				1.00	0.30**	-0.25*	-0.26*	-0.07	-0.39**	-0.26*	-0.24	0.37**	-0.31**	-0.49**	-0.29*	-0.15	-0.19	-0.02	-0.33**	0.31**	0.30**	0.32**	0.34**	-0.25*
5. CBCL happy					1.00	-0.18	-0.21	-0.10	-0.25*	-0.27*	-0.17	0.21	-0.26*	-0.24*	-0.23	0.00	-0.03	0.02	-0.27*	0.32**	0.34**	0.30**	0.30**	-0.32**
6. CBCL externalise.						1.00	0.58**	0.45**	0.64**	0.70**	0.92**	-0.49**	0.74**	0.56**	0.69**	0.33**	0.37**	0.13	0.61**	-0.58**	-0.60**	-0.66**	-0.64**	0.66**
7. CBCL soc. probl.							1.00	0.39**	0.68**	0.53**	0.60**	-0.62**	0.56**	0.52**	0.65**	0.19	0.21	0.18	0.51**	-0.42**	-0.45**	-0.50**	-0.49**	0.45**
8. CBCL thought probl.								1.00	0.46**	0.36**	0.47**	-0.34**	0.56**	0.45**	0.49**	0.21	0.35**	0.10	0.29*	-0.41**	-0.38**	-0.35**	-0.39**	0.39**
9. CBCL attent. probl.									1.00	0.56**	0.61**	-0.61**	0.71**	0.78**	0.82**	0.25*	0.34**	0.13	0.60**	-0.49**	-0.49**	-0.58**	-0.58**	0.52**
10. CBCL delinquent.										1.00	0.63**	-0.34**	0.66**	0.49**	0.61**	0.42**	0.30**	0.19	0.56**	-0.53**	-0.56**	-0.61**	-0.59**	0.67**
11. CBCL aggression											1.00	-0.49**	0.78**	0.57**	0.70**	0.35**	0.42**	0.17	0.57**	-0.60**	-0.62**	-0.65**	-0.64**	0.64**
12. CBCL alert total												1.00	-0.53**	-0.59**	-0.60**	-0.13	-0.31**	-0.19	-0.58**	0.35**	0.43**	0.51**	0.46**	-0.41**
13. AML aggression													1.00	0.66**	0.78**	0.36**	0.43**	0.17	0.65**	-0.59**	-0.57**	-0.65**	-0.66**	0.64**
14. AML learning														1.00	0.75**	0.29*	0.42**	0.18	0.60**	-0.49**	-0.51**	-0.58**	-0.57**	0.50**
15. AML total															1.00	0.26*	0.34**	0.14	0.61**	-0.50**	-0.52**	-0.60**	-0.58**	0.55**
16. CBQ pleasure																1.00	0.39**	0.34**	0.38**	-0.40**	-0.37**	-0.44**	-0.43**	0.46**
17. CBQ approach																	1.00	0.55**	0.35**	-0.30**	-0.36**	-0.37**	-0.34**	0.31**
18. CBQ total																		1.00	0.26**	-0.11	-0.20	-0.26*	-0.19	0.16
19. Criterion sensation																			1.00	-0.53**	-0.57**	-0.83**	-0.73**	0.65**
20. Criterion emp./soc.																				1.00	0.83**	0.69**	0.81**	-0.70**
21. Criterion social																					1.00	0.76**	0.80**	-0.72**
22. Criterion SS/soc.																						1.00	0.86**	-0.76*
23. Total criterion emp.																							1.00	-0.74**
24. PSD total																								1.00
25. PSD callous																								
26. CPS without GR																								
27. CPS SS																								
28. CPS manipulation																								
29. CPS lack of guilt																								
30. CPS poverty of affect																								
31. CPS callous																								
32. CPS dyscontrol																								
33. CPS impulsiveness																								
34. IMP total																								
35. MP alert																								
36. PRQ pleasure																								
37. PRQ total																								
38. Self-report SS																								

** Correlation is significant at the .01 level (2-tailed).

* Correlation is significant at the .05 level (2-tailed).

(Table continues)

(Continued)

	25.	26.	27.	28	29.	30	31.	32.	33.	34.	35	36.	37	38
1. CBCL total funct.	-0.51**	-0.46**	-0.39**	-0.45**	-0.38**	-0.34**	-0.38**	-0.29*	-0.59**	-0.18	-0.08	-0.03	-0.09	0.21
2. CBCL work	-0.48**	-0.47**	-0.41**	-0.43**	-0.38**	-0.31**	-0.37**	-0.34**	-0.60**	-0.15	-0.04	-0.06	-0.11	0.21
3. CBCL behaving	-0.61**	-0.57**	-0.49**	-0.51**	-0.43**	-0.41**	-0.48**	-0.37**	-0.61**	-0.26*	-0.17	-0.05	-0.11	0.16
4. CBCL learning	-0.33**	-0.32**	-0.25*	-0.36**	-0.31**	-0.27*	-0.21	-0.14	-0.43**	-0.10	0.04	-0.09	-0.14	0.18
5. CBCL happy	-0.40**	-0.26*	-0.23*	-0.26*	-0.25*	-0.24*	-0.25*	-0.11	-0.34**	-0.16	-0.15	0.00	0.02	0.19
6. CBCL externalise.	0.61**	0.62**	0.54**	0.56**	0.37**	0.44**	0.66**	0.39**	0.58**	0.22*	0.19	-0.01	0.08	-0.04
7. CBCL soc. probl.	0.38**	0.55**	0.46**	0.53**	0.41**	0.42**	0.53**	0.40**	0.49**	0.14	0.08	0.05	0.09	0.01
8. CBCL thought probl.	0.44**	0.38**	0.22*	0.46**	0.41**	0.39**	0.47**	0.02	0.28*	0.11	0.11	-0.15	-0.10	-0.01
9. CBCL attent. probl.	0.52**	0.57**	0.49**	0.51**	0.38**	0.36**	0.52**	0.36**	0.61**	0.15	0.09	-0.02	0.09	-0.11
10. CBCL delinquent.	0.62**	0.58**	0.44**	0.58**	0.41**	0.58**	0.63**	0.27*	0.55**	0.12	0.07	0.03	0.13	0.05
11. CBCL aggression	0.57**	0.61**	0.55**	0.55**	0.33**	0.43**	0.62**	0.43**	0.55**	0.22*	0.21	0.00	0.07	-0.02
12. CBCL alert total	-0.35**	-0.45**	-0.48**	-0.36**	-0.24**	-0.21	-0.42**	-0.44**	-0.56**	-0.16	-0.14	0.16	0.10	0.19
13. AML aggression	0.60**	0.58**	0.52**	0.54**	0.38**	0.44**	0.59**	0.33**	0.62**	0.23*	0.14	-0.07	-0.01	-0.10
14. AML learning	0.49**	0.49**	0.48**	0.46**	0.29*	0.31**	0.47**	0.28*	0.62**	0.15	0.09	-0.05	0.05	-0.14
15. AML total	0.51**	0.52**	0.48**	0.50**	0.34**	0.34**	0.55**	0.37**	0.61**	0.14	0.10	-0.08	0.00	-0.06
16. CBQ pleasure	0.38**	0.44**	0.39**	0.35**	0.17	0.40**	0.33**	0.16	0.40**	0.07	0.03	0.07	0.11	0.06
17. CBQ approach	0.26*	0.24*	0.34**	0.17	0.02	0.10	0.14	0.16	0.38**	0.17	0.13	-0.02	0.02	-0.01
18. CBQ total	0.00	0.13	0.30**	0.03	-0.15	0.02	0.00	0.14	0.24*	0.09	0.09	-0.04	0.01	0.16
19. Criterion sensation	0.52**	0.58**	0.62**	0.47**	0.27*	0.33**	0.53**	0.41**	0.69**	0.27*	0.21	0.00	0.07	-0.17
20. Criterion emp./soc.	-0.65**	-0.61**	-0.57**	-0.58	-0.36**	-0.54**	-0.64**	-0.41**	-0.51**	-0.15	-0.12	-0.01	-0.04	-0.01
21. Criterion social	-0.63**	-0.62	-0.58**	-0.57**	-0.31**	-0.48**	-0.67**	-0.43**	-0.55**	-0.23*	-0.21	-0.03	-0.04	-0.02
22. Criterion SS/soc.	0.61**	-0.64**	-0.64**	-0.54**	-0.29*	-0.43**	-0.62**	-0.44**	-0.65**	-0.22*	-0.18	0.00	-0.07	0.07
23. Total criterion emp.	-0.63**	-0.67**	-0.64**	-0.56**	-0.33**	-0.49**	-0.64**	-0.45**	-0.62**	-0.19	-0.15	0.01	-0.05	0.06
24. PSD total	0.77**	0.70**	0.59**	0.61**	0.38**	0.56**	0.68**	0.36**	0.62**	0.22*	0.21	0.03	0.09	-0.06
25. PSD callous	1.00	0.70**	0.49**	0.68**	0.52**	0.66**	0.63**	0.29*	0.56**	0.16	0.14	0.07	0.16	-0.11
26. CPS without GR		1.00	0.68**	0.79**	0.55**	0.68**	0.73**	0.46**	0.65**	0.16	0.13	0.12	0.13	-0.01
27. CPS SS			1.00	0.46**	0.23*	0.37**	0.52**	0.65**	0.75**	0.13	0.11	-0.07	-0.02	0.01
28. CPS manipulation				1.00	0.71**	0.68**	0.78**	0.28*	0.54**	0.17	0.14	0.18	0.14	0.02
29. CPS lack of guilt					1.00	0.54**	0.47**	0.11	0.33**	0.08	0.04	0.33**	0.32**	-0.14
30. CPS poverty of affect						1.00	0.59**	0.19	0.42**	0.01	-0.03	0.09	0.13	0.04
31. CPS callous							1.00	0.38**	0.56**	0.20	0.18	0.07	0.07	0.03
32. CPS dyscontrol								1.00	0.40**	-0.06	-0.02	-0.02	-0.05	0.00
33. CPS impulsiveness									1.00	0.25*	0.18	-0.06	0.00	-0.12
34. IMP total										1.00	0.74**	0.14	0.11	-0.09
35. MP alert											1.00	0.08	0.10	-0.08
36. PRQ pleasure												1.00	0.67**	-0.02
37. PRQ total													1.00	-0.04
38. Self-report SS														1.00

Note. *p<.05, **p<.01 (two-tailed). CBCL=Child Behaviour Checklist; AML=Aggression-Mood Learning; CBQ=Child Behaviour Questionnaire; PSD=Psychopathy Screening Device; CPS=Child Psychopathy Scale; IMP=Interpersonal Measure of Psychopathy; PRQ=Physiological Reaction Questionnaire; Self-report=self-report after films; SS=sensation seeking.

APPENDIX I

Descriptive Data: Phase B (for SC)

Table I1

Descriptive Raw Data for Skin Conductance (M and SD); Reported Separately Per Film Segment for Pre, Crit, and Post Sections; and for Calculated Values of Means, SD, Slope, Maximum, and Minimum.

	Mean (SD)			SD (SD)			Slope (SD)			Max (SD)			Min (SD)		
	pre	crit	post	pre	crit	post	pre	crit	post	pre	crit	post	pre	crit	post
Film Dolphins															
Segment A	-	.9	-	-	.3	-	-	-.01	-	-	1.4	-	-	.2	-
(baseline)	-	(6.3)	-	-	(.3)	-	-	(.1)	-	-	(6.4)	-	-	(6.0)	-
Segment B	-	1.4	-	-	.8	-	-	-.01	-	-	3.3	-	-	-.1	-
(baseline)	-	(6.6)	-	-	(.5)	-	-	(.1)	-	-	(7.0)	-	-	(6.4)	-
[C Segment]	-	9.0	-	-	1.0	-	-	-.05	-	-	11.2	-	-	7.1	-
(baseline)	-	(10.1)	-	-	(.8)	-	-	(.1)	-	-	(10.9)	-	-	(9.7)	-
Film Jamie															
Fire – A	3.9	4.5	5.6	.4	.7	.6	.01	.16	-.01	4.8	5.7	6.8	3.1	3.5	4.3
(distress, empathy)	(11.1)	(11.6)	(12.0)	(.5)	(.9)	(.6)	(.09)	(.3)	(.2)	(11.8)	(12.3)	(12.6)	(10.7)	(11.2)	(11.8)
[Phone] - B	5.7	5.7	6.0	.4	.3	.5	.03	-.01	-.04	6.5	6.2	6.9	4.9	5.3	5.1
(sympa., perspective)	(11.6)	(11.5)	(11.6)	(.5)	(.3)	(.5)	(.2)	(.2)	(.2)	(12.0)	(11.8)	(11.9)	(11.4)	(11.4)	(11.4)
Hallway - C	6.1	6.1	5.7	.2	.3	.4	-.04	-.03	-.03	6.6	6.8	6.6	5.6	5.4	4.9
(sympathy, empathy)	(11.6)	(11.6)	(11.2)	(.3)	(.4)	(.5)	(.2)	(.2)	(.1)	(11.8)	(11.9)	(11.7)	(11.4)	(11.3)	(10.9)
Tease - D	6.0	6.2	6.5	.6	.5	.4	.01	.03	.11	7.2	7.2	7.2	4.8	5.3	5.8
(emp.,symp., persp.)	(11.6)	(11.8)	(12.3)	(.6)	(.8)	(.6)	(.1)	(.3)	(.4)	(12.1)	(12.5)	(13.0)	(11.2)	(11.4)	(11.9)

Film Roller coaster														
(arousal)	6.7	9.2		.3	.6	-	-.04	.01	-	7.2	10.3	-	6.3	7.9	-
	(12.7)	(10.7)		(.3)	(.6)	-	(.3)	(.2)	-	(13.1)	(11.1)	-	(12.4)	(10.5)	-
Film Bambi															
[Hungry] - A	7.6	7.4	7.3	.5	.3	.7	-.05	-.04	-.01	8.6	7.9	8.7	6.6	7.0	6.0
(persp., emp., symp.)	(12.6)	(12.4)	(12.1)	(.5)	(.3)	(1.0)	(.1)	(.2)	(.2)	(13.1)	(12.6)	(13.1)	(12.4)	(12.1)	(11.6)
Shots - B	7.1	9.2	10.7	.4	.8	.5	-.04	.14	-.06	7.9	12.2	11.6	6.9	6.4	9.7
(distress, empathy)	(12.5)	(12.8)	(12.3)	(.5)	(1.6)	(.5)	(.2)	(.2)	(.2)	(12.8)	(13.3)	(12.9)	(12.4)	(12.1)	(11.9)
Calling - C	10.4	9.9	9.5	.6	.9	.6	.01	-.02	.00	11.6	11.8	10.6	9.2	8.1	8.6
(empathy, sympathy)	(12.3)	(12.2)	(12.0)	(.6)	(.7)	(.7)	(.2)	(.1)	(.2)	(13.0)	(13.0)	(12.7)	(11.8)	(11.6)	(11.6)
Father - D		9.8	9.5		.6	.7		-.00	.01		10.9	10.8		8.7	8.3
(distress, emp., symp.)		(12.2)	(12.3)		(.5)	(.7)		(.1)	.1		(12.8)	(13.0)		(11.9)	(11.8)

APPENDIX K

List of Abbreviations

ABBREVIATIONS

BAS	Behavioural Activation System
BIS	Behavioural Inhibition System
Bpm	Beats per minute
CD	Conduct Disorder
crit	Film segment containing stimulus event
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders IV
FI	Factor I Psychopathy
FII	Factor II Psychopathy
HR	Heart Rate
post	Film segment following stimulus event
pre	Film segment preceding stimulus event
SC	Skin Conductance
ToM	Theory of Mind