The impact of childhood maltreatment in a community sample of high-risk youth

Charlotte A. M. Cecil

Division of Psychology and Language Sciences
University College London, UK

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Prepared under the supervision of:
Dr. Eamon McCrory & Prof. Essi Viding

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Signed Declaration

I, Charlotte A.M. Cecil, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Abstract

Childhood maltreatment represents a global phenomenon and a major public health concern. Despite considerable advances in the field, a number of important gaps have yet to be fully addressed. The current thesis set out to empirically address four outstanding research questions using data drawn from a community sample of high-risk youth.

First, we examined whether childhood maltreatment and community violence exposure exert independent, additive or interactive effects on mental health (**Chapter 2**). Findings point to the existence of both common and distinct effects. While maltreatment predicted symptoms across a broad range of mental health domains, the impact of community violence was more constrained. Typically, these forms of adversity additively affected mental health.

Second, we explored whether distinct forms of maltreatment uniquely impact mental health functioning (**Chapter 3**). Maltreatment types were highly interrelated and frequently co-occurring. We identified both shared and unique effects of maltreatment types on mental health. Emotional abuse emerged as the sole unique contributor to internalizing difficulties and trauma symptoms.

Third, we investigated whether variants of callous-unemotional traits in youth are differentially associated with maltreatment history and markers of individual functioning (**Chapter 4**). Maltreatment was a key discriminating factor between variants. The combination of high anxiety and high callous-unemotional traits indexed a particularly vulnerable group of youth characterized by increased psychopathology and suicide risk.

Finally, we tested the psychometric properties of the first non-verbal screening tool of family aggression (**Chapter 5**). We found initial support for the reliability, validity and diagnostic accuracy of this measure in detecting multiple forms of family aggression, including direct victimization and exposure to intimate partner violence.

Overall, findings from the current thesis significantly advance knowledge of the processes by which interrelated forms of developmental adversity combine to affect mental health, as well as elucidating factors associated with individual heterogeneity to maltreatment responses.

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CHAPTER 1: General Introduction

Childhood maltreatment, correlates and consequences

Childhood maltreatment continues to represent a major public health concern across industrialised nations (Gilbert, Widom, et al., 2009). Globally, millions of children are exposed every year to abusive and neglectful experiences that negatively impact their development and violate their human rights (Butchart, Phinney Harvey, Mian, Fürniss, & Kahane, 2006). In the United Kingdom, it is estimated that as many as one in five children experience severe maltreatment by a caregiver, a figure comparable to that of other high-income countries (Radford et al., 2011). Some children die as a result of maltreatment, with approximately one tenth of all injury-related child fatalities worldwide attributed to experiences of abuse and neglect (Butchart et al., 2006). Of those children who survive maltreatment, many are at increased risk of developing psychiatric and medical disorders during their lifetime (Afifi, 2012; Danese & Tan, 2013). Indeed, the effects of maltreatment can extend well into the adult years (Pechtel & Pizzagalli, 2011).

In childhood, maltreatment can cause severe perturbations in emotional, psychosocial, and behavioural development, increasing risk for a variety of mental health and adjustment difficulties, including post-traumatic stress, anxiety, depression, conduct problems, substance use, and suicidality (see Cicchetti & Toth, 2005, for a review). Maltreated children also have been found to show greater difficulty in forming and maintaining healthy relationships, which can increase their vulnerability to future victimization (Cicchetti & Toth, 2005). In adult life, maltreatment has been associated with decreased educational attainment, lower earnings, poorer employment prospects and increased criminal involvement, in addition to poorer mental and physical health (Danese et al., 2009). At a societal level, maltreatment poses a significant financial burden on judicial and social welfare services (Currie & Widom, 2010). Factors such as physical injury and disability, psychiatric disorders, substance dependence, criminality, unemployment as well as decreased productivity over the long term all impact significantly governmental spending and wider societal cost (Butchart et al., 2006). As a result of the above, maltreatment is recognized as a salient developmental risk factor and as an important target for prevention and intervention efforts (Gilbert, Widom, et al., 2009).

Despite considerable advances in our understanding of the nature and scope of childhood maltreatment, a number of factors continue to challenge our ability to effectively identify and respond to incidents of child abuse and neglect. First, simply defining maltreatment has been problematic. There continues to be no consensus for

judging where normative parental practices end and maltreatment begins (Cicchetti & Rogosch, 2001) and such boundaries have been shown to differ across judicial, clinical and research contexts, as well as across cultures and historical periods (Cicchetti & Toth, 2005). Clear and commonly accepted definitions are necessary for improving identification of maltreatment, accurately estimating prevalence, as well as providing researchers with an operational framework for studying the causes, course and consequences of childhood maltreatment. Second, although it has been increasingly recognized that maltreatment types co-occur with one another as well as with a number of additional risk factors, such as poverty, witnessed inter-parental violence (IPV) and community violence exposure (CVE), consideration of these factors has yet to be fully integrated within maltreatment research and clinical practice (Finkelhor, Ormrod, & Turner, 2007a; Margolin & Gordis, 2000). Progress in this area is necessary to better understand how different forms of adversity relate to one another, and to estimate more precisely the unique effects of abusive and neglectful experiences on child development, which in turn may facilitate the identification of prevention and intervention targets. Finally, making sense of the complex and diverse nature of consequences associated with maltreatment remains a challenge for researchers and practitioners alike. Effects may depend on a variety of factors, such as timing, duration and severity of maltreatment, as well as the interaction of additional risk and protective factors in the child's environment (Cicchetti & Lynch, 1993; English, Bangdiwala, & Runyan, 2005; Lupien, McEwen, Gunnar, & Heim, 2009). Improved understanding of how maltreatment impacts developmental outcomes is important for clarifying heterogeneity in individual responses to maltreatment. In other words, there is much yet to learn as to why some individuals exposed to maltreatment go on to develop mental health difficulties while others do not.

The present introductory chapter is structured as follows. First, definitions of maltreatment are provided. Second, current prevalence estimates of maltreatment are reviewed, along with a discussion of methodological factors associated with estimate variability. Third, factors within the child, family and wider community that have been identified as increasing risk for maltreatment are outlined. Fourth, inter-relationships between maltreatment types are discussed, as well as associations between maltreatment and other forms of developmental adversity, with a particular focus on intimate partner violence (IPV) and community violence exposure (CVE). This is followed by a review of the evidence regarding psycho-emotional, behavioural, interpersonal and

neurobiological outcomes associated with maltreatment. Finally, four outstanding research questions are presented, each of which is addressed empirically in the current thesis.

1.1. Definitions

In order to understand the origin of current definitions of maltreatment, it is helpful to provide a brief historical context of how maltreatment became recognized as an important social problem warranting legal action. In Western industrialized countries, the 1870s marked an initial turning point for public awareness and increased recognition of maltreatment, resulting in the development of the first organization against child cruelty, the New York Society for the Prevention of Cruelty to Children. This was followed by the creation of the National Society for the Prevention of Cruelty to Children (NSPCC) in England in 1889, which coincided with the emergence of the first UK law dedicated to the protection of children from ill treatment (Radford et al., 2011). In the 1960s, further interest into child maltreatment was generated after American paediatricians coined the term "battered child syndrome", in light of radiological evidence that enabled them to identify unseen patterns of physical injuries resulting from childhood abuse (Kempe, Silverman, Steele, Droegemueller, & Silver, 1962). Two decades later, the first international treaty to provide norms and standards for the protection of children's rights was established, when the 1989 United Nations Convention on the Right of the Child set out to define universally recognized and legally binding rights for children. The Convention clearly stated that the best interests of the child are of paramount importance, and rights across three main domains were outlined. First, children have rights of protection, which include protection from any form of maltreatment, discrimination or exploitation that may jeopardize their survival, development or wellbeing. Second, children have a right of participation, thus enabling them to take an active role in decisions affecting them. Third, children have a right of provision, including the right to education. As such, the Convention marked a crucial step in providing a legal framework for recognizing maltreatment, implementing policy and accountability, as well as specifying the role of governments in ensuring that children's rights are protected.

According to the World Health Organisation (WHO), *childhood maltreatment* is defined as: "…all forms of physical and/or emotional ill-treatment, sexual abuse,

neglect or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power" (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002, p.59), where 'child' describes any person under the age of 18 years. Childhood maltreatment encompasses both acts of commission (e.g. abuse) and omission (e.g. neglect). It may occur in a range of settings, such as within family, institutional or community settings (UK Department for Education, 2013). Maltreatment may also occur at the hands of a variety of perpetrators, including parents or caregivers, family members, other acquaintances or strangers. Moreover, perpetrators may be either an adult or child, male or female. Maltreatment may result in harm or potential for harm.

The United States Centres for Disease Control and Prevention (CDC) defines *acts of commission* as: "Words or overt actions that cause harm, potential harm, or threat of harm to a child" (Leeb, Paulozzi, Melanson, Simon, & Arias, 2008, p.11). It is specified that such acts are deliberate and intentional, although the consequences of those acts need not to be. Physical, sexual and emotional forms of abuse are all generally regarded as acts of commission. In contrast, *acts of omission* are defined as "The failure to provide for a child's basic physical, emotional, or educational needs or to protect a child from harm or potential harm" (Leeb et al., 2008; p. 11). Here too, harm to a child may or may not be an intentional consequence of omission. Acts of omission generally encompass failure to provide (e.g. physical and emotional neglect) as well as failure to supervise (e.g. inadequate supervision, exposure to violent environments).

Significant harm is defined as "Any acute disruption caused by the threatened or actual acts of commission or omission to a child's physical or emotional health…which can affect the child's physical, cognitive, or emotional development" (Leeb et al., 2008, p.12). The Children Act 1989 further specifies that significant harm represents "…the threshold that justifies compulsory intervention in family life in the best interests of children, and gives local authorities a duty to make enquiries to decide whether they should take action to safeguard or promote the welfare of a child who is suffering, or likely to suffer, significant harm" (UK Department for Education, 2010, p.36).

Four types of childhood maltreatment are normally distinguished (Butchart et al., 2006). Specific definitions for these vary across countries. Below, we present definitions as outlined in the UK Department for Education governmental report 'Working Together to Safeguard Children' (2013), which provides guidance for healthcare organizations and professionals on how to work together across agencies to

promote and safeguard the welfare of children. Where appropriate, additional references are also provided.

1.1.1. Physical abuse

Physical abuse is defined as "…the intentional use of physical force against a child that results in, or has the potential to result in, physical injury" (Leeb et al., 2008, p.14). The World Health Organization broadens this definition to include "…physical force that results in – or has a high likelihood of resulting in – harm for the child's health, survival, development or dignity" (Butchart et al., 2006, p.10). Physical abuse may involve a wide range of acts, including beating, hitting, shaking, kicking, drowning, scalding, biting or suffocating, or in any other way causing physical harm to a child. Physical harm may also be caused when "…a parent or carer fabricates the symptoms of, or deliberately induces, illness in a child" (Department for Education, 2013, p.85). Physical abuse is often intended as a deliberate means of inflicting punishment or discipline. A large number of European countries include corporal punishment (e.g. spanking) in their definitions of physical abuse, although this is not the case in England, Australia and the USA.

1.1.2. Sexual abuse

Sexual abuse is defined as "…forcing or enticing a child or young person to take part in sexual activities, not necessarily involving a high level of violence, whether or not the child is aware of what is happening" (Department for Education, 2013, p.86). Sexual abuse can include activities that involve physical contact. Physical contact may include penetrative acts (e.g. oral or genital penetration), or non-penetrative acts (e.g. touching, kissing). Non-contact activities include "…involving children in looking at, or in the production of, sexual images, watching sexual activities, encouraging children to behave in sexually inappropriate ways, or grooming a child in preparation for abuse (including via the internet)" (Department for Education, 2013, p.86). Activities may be carried out for a number of reasons, including sexual gratification or financial gain (e.g. exploitation, prostitution). Perpetrators of sexual abuse may be adult males, females or other children.

1.1.3. Emotional abuse

Emotional abuse, also referred to as psychological abuse, is defined as "…the persistent emotional maltreatment of a child such as to cause severe and persistent adverse effects on the child's emotional development. It may involve conveying to children that they are worthless or unloved, inadequate, or valued only insofar as they meet the needs of another person. It may include not giving the child opportunities to express their views, deliberately silencing them or 'making fun' of what they say or how they communicate. It may feature age or developmentally inappropriate expectations being imposed on children. These may include interactions that are beyond the child's developmental capability, as well as overprotection and limitation of exploration and learning, or preventing the child participating in normal social interaction" (UK Department for Education, 2013, p.85). Other acts of emotional abuse include "…blaming, belittling, degrading, intimidating, terrorizing, isolating, restraining, confining, corrupting, exploiting, spurning, or otherwise behaving in a manner that is harmful, potentially harmful, or insensitive to the child's developmental needs, or can potentially damage the child psychologically or emotionally" (Leeb et al., 2008, p.16). In England, the USA and Canada, exposure to intimate partner violence is included in the definition of emotional abuse (e.g. hearing or seeing ill-treatment inflicted to others within the family context) (Munro, Brown, Sempik, Ward, & Owen, 2011). Serious incidents of bullying or cyber-bullying are also included in England. Emotional abuse may be involved in all types of maltreatment, although it can occur alone. In comparison to other forms of abuse, emotional abuse has been regarded as less overt and harder to operationalize, making prevention, identification and intervention particularly challenging (Behl, Conyngham, & May, 2003; Rees, 2010).

1.1.4. Neglect

Neglect is defined as "…the persistent failure to meet a child's basic physical and/or psychological needs, likely to result in the serious impairment of the child's health or development" (UK Department for Education, 2013, p.86). Neglect may occur prenatally (e.g. maternal substance use during pregnancy) as well as postnatally. It may include failure to provide adequate food, clothing or shelter, as well as access to medical care or education. Failure to provide also encompasses emotional neglect, which involves incidents such as ignoring the child or being unresponsive to the child's

emotional needs, calls for attention or attempts to interact (Leeb et al., 2008). Countries may vary as to whether failure to supervise is included in their definition of neglect. In England, failure to supervise is recognized and thought of as involving a lack of adequate supervision (e.g. leaving the child unsupervised or under the supervision of inadequate caregivers), as well as a failure to protect a child from danger or exposing a child to violent environments where there is a risk of harm.

1.2. Prevalence estimates

The true prevalence of childhood maltreatment remains unknown. First of all, efforts to gauge the exact magnitude of maltreatment are hampered by the fact that many incidents never come to light, either because they not reported, identified, investigated or pursued by local authorities (Fallon et al., 2010). Second, existing prevalence studies vary considerably in their estimates raising questions about their reliability, validity and comparability. A review of twenty-eight studies recently conducted within the UK and overseas found that reported lifetime estimates ranged between: (i) 1.8% and 34% for experiences of physical violence; (ii) 1.1% and 32% for experiences of sexual abuse; (iii) 5.4% and 37.5% for experiences of emotional abuse; and (iv) 6% and 41.5% for experiences of neglect (Radford et al., 2011). Although some of these variations may reflect real differences in the prevalence of maltreatment across countries, they may also result from a number of conceptual and methodological differences in the way studies obtain their estimates. Such differences limit our ability to measure how widespread maltreatment actually is, whether certain groups of individuals are more at risk than others, and whether maltreatment trends change over time, all of which are important for assessing the effectiveness of prevention and intervention initiatives.

Sources of variation across studies include the following. First, as mentioned in the previous section, definitions of maltreatment vary greatly across countries and may even vary nationally from one jurisdiction to the next. As a result, the use of different definitions makes the comparability of prevalence estimates challenging (Fallon et al., 2010). Second, studies may vary in the type of measures used; for example, whether or not maltreatment measures are standardized, whether the measures used include all forms of maltreatment or only some, and whether they record any additional information about maltreatment characteristics (e.g. identity of perpetrator) (Fallon et

al., 2010). Third, the recruitment source used may impact prevalence estimates, with samples ranging from large population-based random probability samples (resulting in lower estimates) to smaller clinically referred samples (resulting in higher estimates) (Radford et al., 2011). The statistics used to obtain estimates may also drive differences across studies. For example, thresholds for distinguishing maltreated from non-maltreated individuals may vary substantially, as do thresholds for classifying individuals who have experienced 'severe maltreatment'. Furthermore, some studies measure prevalence estimates for each form of maltreatment individually, others collapse forms of maltreatment together (e.g. emotional abuse and IPV exposure), while others still document how often different forms of maltreatment co-occur with one another (Radford et al., 2011).

The source of variability that has received the greatest attention, however, involves the methodology used to obtain ratings of maltreatment. Data sources come into two main forms: official reports and community-based studies. Official reports include any information gathered from statutory agencies, such as child protection services and police records. As such, studies based on official reports capture the prevalence of maltreated cases that have come to the attention of the authorities (e.g. Sullivan & Knutson, 2000). Although such studies have the advantage of recording substantiated cases of maltreatment, they have been criticised for considerably underestimating the true prevalence of maltreatment, as they are dependent on detection and investigation of cases by statutory agencies (Cichetti & Toth, 2005). In contrast, community-based studies make use of self-report measures to collect information about maltreatment experiences. Some studies ask adults about their retrospective history of childhood maltreatment (e.g. Cawson, Wattam, Brooker, & Kelly, 2000). Others directly ask children and youth about their past and current experiences of maltreatment, provided that they are old enough to participate in surveys (e.g. Finkelhor, Turner, Ormrod, & Hamby, 2009). Others still ask parents or caregivers to report on their child's experiences of maltreatment (particularly for very young children) as well as to provide information about their own patterns of parental care (e.g. Wolke, Woods, Bloomfield, & Karstadt, 2000). Estimates derived from community studies are generally far greater than those derived from official reports. Thus, self-report methods may provide a more valid and accurate insight into the prevalence of maltreatment. However, these too are prone to underestimate the true extent of maltreatment, as a result of difficulties with recalling maltreatment experiences, unwillingness to disclose, feelings of shame or

embarrassment, denial or deliberate concealment (Hardt & Rutter, 2004). Furthermore, parents or caregivers may be particularly unwilling to disclose their own abusive or neglectful behaviours. Despite this, evidence shows that accounts from caregivers are satisfactorily consistent with those obtained from youth (Finkelhor, Hamby, Ormrod, & Turner, 2005). Bearing in mind the relative advantages and disadvantages associated with each method of assessment, key statistics from both official studies and community studies are summarised below.

1.2.1. Official reports

According to official reports, approximately 5% of children in the USA and the UK are referred to social welfare. Of these, between 0.3 and 1% are substantiated cases of maltreatment (Gilbert et al., 2009). In the USA, figures from 2004 drawn from Child Protective Services show that circa 900,000 children were victims of maltreatment and that about 1,500 cases resulted in child fatality (DHHS, 2006). In England, figures from the Department for Education show that 39,100 children were the subject of a Child Protection Plan (CPP) in the year 2010. Of these, the majority were children aged between 1 and 4 years, followed by children aged 5 to 9 years. Neglect was the most common form of maltreatment assigned to cases, followed by emotional abuse, physical abuse and sexual abuse, which is consistent with other studies using official reports (Gilbert, Kemp, et al., 2009). Of the 39,100 cases recorded, more than 3,000 involved incidents of multiple co-occurring forms of maltreatment (UK Department for Education, 2010).

1.2.2. Community studies

Estimates drawn from community studies suggest that the prevalence of maltreatment far extends beyond substantiated cases of abuse and neglect. Based on a study using a large random probability sample of 6,196 parents, children and youth commissioned by the NSPCC, almost one in five individuals were found to have experienced some form of maltreatment during their childhood (Radford et al., 2011). Moreover, 5.9% of children under the age of 11 years, 18.6% of 11-17s and 25.3% of 18-24s were classified as having experienced severe maltreatment. Although differences in prevalence across age may reflect the use of different raters (e.g. parent-report vs. self-report), figures may also point to the accumulation of maltreatment experiences that

may occur over time. During the previous year, children under the age of 11 years were more likely to have experienced maltreatment at the hand of known adults (e.g. caregivers, relatives, family friends), while older age groups reported more maltreatment by unknown adults. A review of community studies carried out in high-income countries found that the cumulative prevalence of physical abuse ranged between 5-35% (Gilbert, Kemp, et al., 2009). The cumulative prevalence of sexual abuse ranged between 15-30%, with penetrative acts ranging from 5-15% in girls and 1-5% in boys. The cumulative prevalence of emotional abuse ranged between 4-9%, although this is likely to be particularly underrepresented given difficulties in measuring acts that constitute emotional abuse. The cumulative prevalence of neglect was found to range between 6 and 12%. With regards to experiences of repeat victimization, data from the NSPCC suggests that children who experience one form of maltreatment are two to three times more likely to also experience other forms of maltreatment and also to experience maltreatment by different perpetrators over time (Radford et al., 2011). Together, these figures highlight maltreatment as a highly prevalent phenomenon across countries that necessitates the implementation of effective prevention, identification, and treatment strategies.

1.3. Risk factors for childhood maltreatment

Great interest has been shown in identifying risk factors that increase susceptibility for child abuse and neglect, so as to better understand what leads some children to experience maltreatment. Although a number of factors have been associated with maltreatment, it is imperative to clarify that no factor alone has been found to either be necessary or sufficient for maltreatment to occur. Instead, it appears that maltreatment may result from the complex interaction of risk and protective factors at multiple levels of a child's environment. A specific factor may be labelled as a 'risk factor' if it is associated with increased susceptibility to maltreatment, or as a 'protective factor' if it is associated with decreased susceptibility to maltreatment (Cicchetti & Toth, 1995). Often, risk and protective factors may operate along a continuum, so that for example low socio-economic status may be associated with increased risk of certain forms of maltreatment, while high socio-economic status may be associated with decreased risk. Furthermore, risk and protective factors may be present across child, family or community levels of the child's ecology (Belsky, 1993). One longstanding challenge in

the identification of risk factors for maltreatment involves the issue of directionality of effects. First, many of the identified risk factors are correlated with maltreatment, as such it is difficult to establish whether these factors play a causal role in maltreatment or simply co-occur with it (Zielinski & Bradshaw, 2006). Second, studies have shown that children and parents can influence one another in a bidirectional way, so that parents may affect child development, and in turn child factors may influence parenting quality (e.g. Cecil, Barker, Jaffee, & Viding, 2012). Third, child effects on parental behaviours, such as corporal punishment, may be genetically mediated (e.g. evocative genetic effects; Jaffee, Caspi, Moffit, Polo-Tomas, Price & Taylor, 2004). Below we outline factors within the child, family and wider community context that may help identify children at increased risk of maltreatment (Goldman, Salus, Wolcott, & Kennedy, 2003).

1.3.1. Child factors

A number of child-specific factors have been identified as increasing susceptibility to child maltreatment. The presence of these factors in no way places any responsibility on the child; rather, such factors may be seen as exacerbating the effect of other influences in the child's environment. Young children appear to be particularly at risk of maltreatment, and are disproportionally represented amongst reported cases of abuse and neglect, particularly those resulting in child fatality. Global estimates of child homicide reported by the World Health Organization demonstrate that rates of fatalities within children aged 0 to 4 years are double those recorded for children aged 5 to 14 years, with head injury, abdominal injury and intentional suffocation being the most common causes of death (Butchart et al., 2006). In England and Wales, figures from 2008-9 also show that the highest homicide rates involved babies under 12 months of age at a rate of 27 per million, compared to 12 per million in the general population (Radford et al., 2011). It is possible that young children are particularly vulnerable to maltreatment and fatal non-accidental injuries due to their high dependency status, increased vulnerability, developmental immaturity and social invisibility. Adolescence is also a period associated with increased risk of maltreatment, with incidents of sexual abuse being most prevalent among teenage youth (Radford et al., 2011). A number of additional child risk factors have been associated with greater maltreatment, as they may increase strain on caregivers' ability to provide adequate parenting. These include:

(i) presence of a disability, illness or other special needs; (ii) irritable temperament characterized by persistent crying and resistance to soothing attempts; (iii) showing characteristics that are perceived as difficult, such as impulsivity or hyperactivity; and (iv) exhibiting conduct problems or other dangerous behaviours, such as self-harm, cruelty to animals or persistent aggression towards others (Butchart et al., 2006; Stith et al., 2009).

1.3.2. Caregiver and family factors

Caregiver factors that are associated with increased risk of perpetration have received particular attention within research examining the causes of maltreatment. Difficulty in bonding with the child, having unrealistic expectations of child needs as well as inferring intentionality to a child's behaviour that is developmentally inappropriate have all been associated with increased risk of perpetrating maltreatment (Butchard et al., 2006). These factors may be particularly present amongst parents who are younger, have a lower level of education and for whom the pregnancy was unplanned (Stith et al., 2009). Perceiving corporal punishment as an effective means of obtaining discipline is also associated with child maltreatment. Furthermore, some factors may interfere with a parent's ability to provide adequate care, such as parental mental illness, physical or cognitive impairment, involvement in criminal activity and substance abuse (Butchard et al., 2006). Finally, characteristics associated with parental affective functioning have also been associated with maltreatment, including poor self-control, greater anger, hostility and aggression as well as low capacity for empathy (Stith et al. 2009). Importantly, parents' own experience of abuse and neglect during childhood has been associated with elevated risk for perpetration of maltreatment, suggesting that, at least in some cases, there may be continuity of maltreatment from one generation to the next (Berlin, Appleyard, & Dodge, 2011; Dixon, Browne, & Hamilton-Giachritsis, 2005).

With regards to the family context, factors such as large family size, family breakdown, single parenting, social isolation, lack of support and financial hardship have been found to increase strain on the family and heighten risk for maltreatment (Butchart et al., 2006; Crouch, Milner, & Thomsen, 2001). In particular, violence within the family (e.g. intimate partner violence) has been identified as a factor robustly

associated with increased risk for child abuse and neglect (Finkelhor, Ormrod, & Turner, 2007b).

1.3.3. Community and wider societal factors

In addition to child, caregiver and family characteristics, factors within the community and wider society can also influence maltreatment risk. It has been repeatedly observed that cases of maltreatment tend to cluster in geographical areas characterized by increased poverty, unemployment and deprivation (e.g. Coulton, Korbin, Su, & Chow, 1995). Consistent with this, factors that are more prevalent within deprived neighbourhoods, such as poor school quality, low community cohesion and collective efficacy, child-care burden, inadequate housing and residential instability have all been associated with maltreatment (Sampson, Raudenbush, & Earls, 1997; Zielinski & Bradshaw, 2006). Furthermore, easy access to illegal substances, greater gang-related activity and high levels of community violence have all been shown to correlate with increased maltreatment risk (Cicchetti & Lynch, 1993; Margolin & Gordis, 2000).

Wider societal factors can also contribute to the incidence of maltreatment, including the presence of norms that promote or normalize violence (e.g. corporal punishment), those that support gender and social inequality, as well as norms that diminish the role of the child within parent-child relationships. In addition, the presence of inadequate policies to protect children from ill-treatment and exploitation as well as the presence of policies leading to poor living standards or social instability have been linked with increased maltreatment risk (Butchard et al., 2006).

1.4. Polyvictimization

Childhood maltreatment increases susceptibility to future experiences of victimization (e.g. Duncan, 1999a, 1999b). More specifically, violence exposure in one context has been found to elevate the risk of subsequent exposures, both within other settings and by different perpetrators (Foster & Brooks-Gunn, 2009). It has also been suggested that exposure to multiple forms of victimization may result from common risk factors at the child, family or community level, such as the ones described above (Finkelhor et al., 2007a; Finkelhor, Ormrod, Turner, & Hamby, 2005). As a result, maltreated children are not only more likely to experience subsequent victimization, but

are also more likely to experience multiple forms of developmental adversity concurrently (Moylan et al., 2009). Although it has been observed for some time that different forms of developmental adversity correlate with experience of maltreatment (i.e. they co-occur), consideration of these factors within research, legal and clinical settings is largely missing. Examining a comprehensive set of environmental risk experiences concurrently is important for understanding how different forms of victimization relate to one another as well as for establishing more clearly the unique effects of maltreatment on child development.

In this section, we focus on three particular areas of polyvictimization. First, we examine the concept of multi-type maltreatment, that is, the experiencing of different forms of abuse and neglect. This area is especially relevant as recent evidence points to the fact that maltreatment types rarely occur in isolation (Higgins & McCabe, 2001). Yet, the majority of studies continue to examine different forms of maltreatment as if they were independent from one another, without accounting for their interrelationship (Herrenkohl & Herrenkohl, 2009). Second we describe two forms of developmental adversity that have been found to correlate with experience of maltreatment: exposure to intimate partner violence (IPV) and community violence exposure (CVE). Even though these are generally examined separately, maltreatment, IPV exposure and CVE have been shown to involve a number of common features: (i) all are likely to evoke a combination of fear, helplessness and increased arousal in children (Foster & Brooks-Gunn, 2009); (ii) all involve threat to physical or psychological integrity as well as conveying to the child that the environment is unsafe; and (iii) all three forms of exposure have been found to predict similar psychosocial, emotional and behavioural outcomes (Margolin & Gordis, 2000). As a result, it appears important to acknowledge these factors within the study of maltreatment and associated sequelae.

1.4.1. Multi-type maltreatment

Up until the 1980s, most research examined global maltreatment or loosely defined ‘abuse’ and ‘neglect’, often failing to distinguish between different types of maltreatment (Behl et al., 2003). In time, maltreatment types have received increasing attention. The majority of research looking at individual types has focused on physical and sexual abuse, even though neglect is the form of maltreatment most represented in substantiated cases of maltreatment (Gilbert, Kemp, et al., 2009). Emotional abuse

continues to receive the least research attention, despite the fact that it is hypothesized to feature within all other forms of maltreatment and is also considered a key factor in the disruption of emotional development (Behl, Conyngham & May, 2003; Butchart et al., 2006). Although there has been an interest in examining whether different forms of maltreatment exert common or distinct effects on developmental outcomes, most existing studies have examined one form of maltreatment at a time, without controlling for the presence of interrelated types. Given that different types of maltreatment have been shown to co-occur, such studies may be potentially misleading and result in the overestimation of effects attributed to specific forms of maltreatment (e.g. Herrenkohl & Herrenkohl, 2009; Higgins & McCabe, 2001; Petrenko, Friend, Garrido, Taussig, & Culhane, 2012).

A recent review of the literature found that, amongst maltreated children, a considerable proportion had experienced multiple forms of maltreatment concurrently (Herrenkohl & Herrenkohl, 2009). Figures varied considerably across studies, possibly reflecting differences in data sources and thresholds used to define maltreatment. Nevertheless, estimates ranged between 33-94% for studies using data drawn from official records (e.g. Child Protective Services) and between 34-66% for community studies. The review also highlighted that, statistically, forms of maltreatment were positively and moderately correlated with one another, providing further evidence as to their co-occurrence. Other studies have supported these findings, showing a large degree of overlap between maltreatment types (e.g. Arata, Langhinrichsen-Rohling, Bowers, & O'Brien, 2007; Edwards, Holden, Felitti, & Anda, 2003; Higgins & McCabe, 2001). Together, the above evidence highlights the importance of examining multiple forms of maltreatment concurrently so as to disentangle unique associations between individual maltreatment types and developmental outcomes, as well as examining the cumulative effects of multi-type maltreatment.

1.4.2. Exposure to intimate partner violence (IPV)

Exposure to intimate partner violence has been found to be both a risk factor and a correlate of child maltreatment (Butchart et al., 2006; Herrenkohl, Sousa, Tajima, Herrenkohl, & Moylan, 2008). IPV is defined by the World Health Organization as "…any behaviour within an intimate relationship that causes physical, psychological or sexual harm to those in that relationship. It includes acts of physical aggression

(slapping, hitting, kicking or beating), psychological abuse (intimidation, constant belittling or humiliation), forced sexual intercourse or any other controlling behaviour (isolating a person from family and friends, monitoring their movements and restricting access to information or assistance" (Krug et al., 2002, p.89). Prevalence estimates from the NSPCC show that 12% of under 11 year olds, 17.5% of 11-17s and 23.7% of 18-24s had been exposed to IPV during their childhood, involving adults in their home (Radford et al., 2011). Importantly, the study also shows that youth who had experienced severe maltreatment by a caregiver were almost three times more likely to experience IPV exposure compared to youth who were not severely maltreated (Radford et al., 2011). Of these, children under the age of 11 years who had experienced severe physical abuse were at greatest risk of IPV exposure (five times more likely). Similarly, a study using a large nationally representative sample of youth found that more than half of those who had been exposed to IPV had also been maltreated (Hamby, Finkelhor, Turner, & Ormrod, 2010). These results are consistent with an emerging body of literature documenting the substantial overlap between child maltreatment (particularly severe maltreatment), and IPV exposure (e.g. Herrenkohl et al., 2008; Moylan et al., 2009).

1.4.3. Community violence exposure (CVE)

The most prevalent form of violence exposure amongst adolescents and young adults is community violence (Margolin & Gordis, 2000). Community violence is defined as "… deliberate acts intended to cause physical harm against persons in the community" (Cooley-Strickland et al., 2009, p.141) and as "…intentional threat or use of fear to physically harm, injure, or kill another person or persons…occurring in the child's environment—such as a neighborhood or school—but outside the child's home" (Aisenberg et al., 2007, p.24). Acts of community violence include chasing, threatening, beating up, robbing, mugging, stabbing and shooting another person. Multiple levels of exposure exist, such as hearing about incidents of violence, witnessing violence and being directly victimized (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009). The World Health Organization recognizes community violence as a major public health concern (Krug et al., 2002). A recent meta-analysis found that at least half of youth living in urban areas had either witnessed or directly experienced some form of violence within their community (Fowler et al., 2009). Furthermore, a review of the

literature carried out in the USA found that, depending on the nature of the sample and the geographical area examined, prevalence estimates ranged between 9-56% for witnessing stabbings, 4-70% for witnessing shootings and 1-47% for witnessing murder (Buka, Stichick, Birdthistle, & Earls, 2001). Similarly to child maltreatment, community violence is most prevalent in socio-economically disadvantaged areas characterized by increased poverty, crime, unemployment, and overcrowding (Cooley-Strickland et al., 2009). As a result, it is perhaps unsurprising that studies have found maltreatment to be positively correlated with exposure to community violence (Aisenberg, Garcia, Ayon, Trickett, & Mennen, 2007; Cicchetti & Lynch, 1993; Overstreet & Braun, 2000). Despite this, studies examining developmental outcomes have tended to focus on the role of maltreatment and community violence exposure independently of one another. This is problematic as failure to account for CVE may result in the overestimation of effects associated with maltreatment, and vice-versa. Furthermore, given that a common set of psychosocial, emotional and behavioural outcomes have been associated with both forms of adversity, this raises the question as to the possible presence of unique, additive and interactive effects of maltreatment and CVE on child development.

1.5. Developmental sequelae of maltreatment

Over the past decades, the deleterious effects of maltreatment on children's development have been well documented. However, identifying the specific processes by which maltreatment impacts developmental outcomes remains a challenge. Particularly, it has been difficult to discern why children vary widely in their responses to maltreatment. While many maltreated children go on to develop mental health difficulties, a proportion of them appear to be more resilient, showing no greater difficulties than non-maltreated children (Cicchetti, 2010). Resilience is, however, a dynamic concept varying across time and functional domains, so that maltreated children may be more resilient during specific developmental periods or in relation to some areas of individual functioning but not others (Afifi & MacMillan, 2011). Even when children do develop difficulties as a result of maltreatment, they may differ from one another in the type of difficulty experienced (Herrman et al., 2011). Understanding factors that underlie such heterogeneity in maltreatment response is imperative for facilitating the development of more effective prevention and intervention strategies, as

well as enabling the identification of maltreated children who may be at greater risk of experiencing more severe or long-term impairments in individual functioning.

Studies have pointed to a number of factors that appear to influence the impact of maltreatment on the developing child. According to the ecological-transactional model (Cicchetti & Lynch, 1993), the effects of maltreatment may depend on complex patterns of interactions between risk and protective factors present at multiple levels of the child's environment. Proximal factors (e.g. caregiver/family factors) are hypothesised to influence the effects of maltreatment more strongly than distal factors (e.g. community/societal factors). Moreover, enduring factors are thought to exert stronger effects than transient factors (i.e. only temporarily present). Thus, the balance of risk and protective factors in the child's environment, their physical proximity to the child and temporal stability may influence the extent to which a child will achieve developmental competence following maltreatment.

The characteristics of maltreatment are also thought to play an important role in determining the impact of maltreatment on development. These include (i) the frequency, duration and severity of maltreatment experienced (English, Upadhyaya, et al., 2005); (ii) the number of perpetrators involved as well as the type of relationship between perpetrator and child (e.g. caregiver vs. stranger) (Radford et al., 2011); and (iii) timing of maltreatment. In fact, age of onset appears to be a particularly important factor, given that the consequences of maltreatment may vary depending on the developmental stage of the child (Margolin & Gordis, 2000). Furthermore, it has been suggested that distinct types of maltreatment may exert specific effects on developmental outcomes. For example, evidence suggests that physical abuse may be a particularly strong predictor of later externalizing difficulties (e.g. Litrownik et al., 2005). However, much of the extant literature is mixed regarding the presence of distinct versus common effects of maltreatment types (Petrenko et al., 2012). This may result from the fact that studies rarely account for the interrelationship between maltreatment types, thus limiting the ability to examine the *unique* effects of each individual maltreatment type on developmental outcomes, above and beyond all other types (Herrenkohl & Herrenkohl, 2009).

Finally, the number of maltreatment types experienced has been shown to influence maltreatment effects. Multi-type maltreatment has been associated with poorer developmental outcomes following a dose-response gradient (Anda et al., 2006; Pechtel & Pizzagalli, 2011). More specifically, a positive relationship has been found between

the number of maltreatment types experienced and the severity of developmental outcomes examined (Arata et al., 2007; Edwards et al., 2003). Hence, multi-type maltreatment may exert additive and cumulative effects on child outcomes over time (Radford et al., 2011). However, it is important to consider that those children who have experienced multi-type maltreatment are also more likely to experience additional forms of developmental adversity, as discussed in the previous section (e.g. IPV exposure, CVE). Yet, the majority of studies reporting on maltreatment sequelae have failed to measure and statistically account for these additional sources of adversity, potentially overestimating the unique effects of maltreatment on developmental outcomes (Finkelhor et al., 2007a). Below we review outcomes associated with maltreatment across a number of functional domains.

1.5.1. Psychological and emotional functioning

A large body of evidence has documented the negative effects of child maltreatment on psychological and emotional functioning. Longitudinal studies have found that childhood maltreatment is prospectively associated with the emergence of a number of psychiatric disorders, including mood and anxiety disorders (Arseneault et al., 2011; Keyes et al., 2012; Phillips, Hammen, Brennan, Najman, & Bor, 2005). Maltreatment is also linked with greater prevalence of comorbid mental disorders (Oswald, Heil, & Goldbeck, 2010). Even when maltreatment does not lead to diagnosable disorders, it has been robustly associated with elevated internalizing symptoms, including anxiety, post-traumatic stress and depression (Cicchetti & Toth, 2005; Kearney, Wechsler, Kaur, & Lemos-Miller, 2010). These symptoms may be driven by atypical patterns of affective functioning that have been observed in maltreated children, including heightened emotional reactivity, hypervigilance and difficulties in emotional regulation (Kim & Cicchetti, 2010; Masten et al., 2008). It has also been shown that maltreated youth have greater difficulties identifying their own emotional states and distinguishing them from bodily sensations signalling arousal (i.e. alexithymia symptoms), as well as showing greater levels of irritability (Aust, Härtwig, Heuser, & Bajbouj, 2013; Cohen, Brown, & Smailes, 2001). Furthermore, maltreatment has been associated with increased feelings of helplessness in the child as well as lower self-esteem, greater negative self-perceptions and perceived external locus of control, all of which may exacerbate internalizing symptoms (Bolger & Patterson,

2001; Margolin & Gordis, 2000). Maltreatment has also been associated with increased suicide risk and non-suicidal self-harming behaviour (Johnson et al., 2002; Swannell et al., 2012).

1.5.2. Behavioural and interpersonal difficulties

Experience of maltreatment has been robustly associated with increased risk of developing externalizing difficulties (Oswald et al., 2010). Children who have been maltreated are more likely to be diagnosed with attention disorders (e.g. ADHD) as well as disruptive behaviour disorders, including oppositional defiant disorder (ODD) and conduct disorder (CD) (Burke, Loeber, & Birmaher, 2002; Green et al., 2010). Childhood maltreatment has also been associated with the development of antisocial personality disorder (ASPD) in adulthood and the emergence of substance use disorders (Fergusson, Boden, & Horwood, 2008; Johnson, Cohen, Brown, Smailes, & Bernstein, 1999; Widom, Marmorstein, & Raskin White, 2006). Even when maltreated children do not develop these diagnosable disorders, they are more likely to show elevated behavioural problems such as hyperactivity and conduct problems as well as greater engagement in delinquency and antisocial behaviour (Manly, Cicchetti, & Barnett, 1994; Stewart, Livingston, & Dennison, 2008). Although the evidence is currently mixed, a number of studies have further suggested that maltreatment is associated with elevated callous-unemotional (CU) traits in youth, which are a robust risk factor for severe antisocial behaviour and the emergence of psychopathy in adulthood (Kerig, Bennett, Thompson, & Becker, 2012; Kimonis, Fanti, Isoma, & Donoghue, 2013). Maltreatment has also been associated with greater violence perpetration, increased number of criminal convictions as well as higher rates of recidivism amongst juvenile offenders (Cottle, Lee, & Heilbrun, 2001; English, Widom, & Brandford, 2002; Maas, Herrenkohl, & Sousa, 2008). Furthermore, studies have found that maltreated youth are more likely to engage in greater risk taking behaviour, including alcohol use, illicit drug use and unprotected sex (Berzenski & Yates, 2011; Moran, Vuchinich, & Hall, 2004).

With regards to interpersonal functioning, maltreatment by caregivers has been robustly associated with disruptions in the development of a secure attachment style during infancy (Cicchetti, Rogosch, & Toth, 2006). Attachment describes the process by which an infant is able to use his or her caregiver as a secure base for exploration, and as a source of safety and comfort when in distress (Bretherton, 1992; Waters &

Cummings, 2000). Attachment insecurity during infancy has been associated with a multitude of negative developmental outcomes, including increased distress, poorer emotional regulation and greater behavioural problems in childhood (see Van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999, for a review). Attachment insecurity has also been documented in samples of maltreated children, adolescents and adults, suggesting that the effects of maltreatment on attachment quality may be enduring and contribute to long-term interpersonal difficulties (Cyr, Euser, Bakermans-Kranenburg, & Van Ijzendoorn, 2010; Styron & Janoff-Bulman, 1997). In particular, the experience of maltreatment has been associated with the development of a disorganized attachment style (i.e. featuring both anxious and avoidant attachment behaviours), which is a robust predictor of adult psychopathology and relationship problems (Cyr et al., 2010; Van Ijzendoorn et al., 1999). Furthermore, maltreatment has been associated with peer difficulties, including increased bullying, victimization and social withdrawal, as well as increased risk of dating violence in intimate relationships (Cicchetti & Toth, 2005; Wolfe, Scott, Wekerle, & Pittman, 2001).

1.5.3. Neurobiological and physiological correlates

A number of neurobiological and physiological processes are thought to underlie the link between childhood maltreatment and increased risk for internalizing, externalizing and interpersonal difficulties (McCrory, De Brito, & Viding, 2011). Findings from both experimental research in animals and observational studies in humans suggest that early life stress can impair the regulation of stress-sensitive and immune systems, triggering a cascade of biological reactions that increase vulnerability to both mental health and physical problems over the long term (Pechtel & Pizzagalli, 2011; Shirtcliff, Coe, & Pollak, 2009). Most notably, experience of severe or chronic stress during early life has been found to affect functioning of the hypothalamic-pituitary-adrenal (HPA) axis, which is involved in the regulation of neuroendocrine stress responses via the secretion of stress hormones (e.g. cortisol) (Tarullo & Gunnar, 2006). Consistent with this, maltreated children have been found to show higher basal (i.e. unstimulated) levels of circulating cortisol and more blunted cortisol levels in response to threatening situations, compared to non-maltreated children (Cicchetti & Rogosch, 2001; Danese & McEwen, 2012). It is important to note that the association between maltreatment and neurophysiological functioning may also vary as a function

of genetic influences. Gene-environment studies have found that environmental stressors such as maltreatment can interact with specific gene variants to increase or decrease biological vulnerability to stress (e.g. Caspi et al., 2002). Furthermore, emerging evidence suggests that environmental influences such as maltreatment can cause long-lasting changes to neuroendocrine and physiological function via the alteration of gene expression (i.e. epigenetics; Champagne, 2010; McGowan et al., 2009; McGowan & Szyf, 2010).

In turn, persistent alterations in neuroendocrine and immune function are thought to cause further impairments in neural development, including brain structure and function (see McCrory, De Brito, & Viding, 2011, for a review). Prolonged release of stress hormones in response to chronic stress has been associated with neuronal death and decreased neural plasticity (Lupien et al., 2009). Although inconsistencies have been found across studies examining neural correlates of maltreatment, structural and functional changes have been reported in a number of brain areas. At a structural level, maltreatment has been associated with reduced grey matter volume in a number of frontal and temporal regions important for memory, affective regulation and social functioning (De Brito et al., 2013; Hanson et al., 2010). At a functional level, maltreatment has been particularly associated with heightened amygdala activation in response to threatening stimuli (McCrory, De Brito, Sebastian, et al., 2011), even when these have been presented subliminally (McCrory et al., 2013). Such elevated amygdala reactivity may be involved in atypical patterns of social information processing observed in maltreated youth, including increased hostile attribution biases, hypervigilance to threat and difficulties in the processing of facial cues (Dodge, Pettit, Bates, & Valente, 1995; Masten et al., 2008).

It is important to note that the series of neurobiological and physiological changes associated with childhood maltreatment described above may originate from an adaptive process designed to maximise a child's chances of survival while growing up in an abusive environment. For example, hypervigilance to threat may be developmentally adaptive in a situation where a child is living with a caregiver who is prone to frequent and unpredictable abusive behaviours. Despite these proximal advantages, adaptive changes such as these may incur long-term costs for the child, ultimately increasing risk of mental health, behavioural and physical problems (McCrory, De Brito, & Viding, 2011).

1.6. Outstanding research questions

In this introductory chapter it has been shown that childhood maltreatment represents a significant public health concern that incurs heavy costs for both the individual and wider society (Radford et al., 2011). Undoubtedly, the last decades have seen major advances in our understanding of maltreatment and associated sequelae. There are, however, a number of gaps in the extant literature that have yet to be fully addressed. Four key gaps in our current understanding are presented and empirically investigated in the present thesis. These mark an important step toward (i) refining understanding of why maltreated individuals vary widely in the type and extent of difficulties experienced, (ii) facilitating the identification of individuals who may be at greater risk of experiencing more severe difficulties following maltreatment; and (iii) informing the development of more effective prevention and intervention strategies. A brief rationale is presented for each question and greater details are provided within subsequent chapters of the thesis.

1.6.1. Do childhood maltreatment and community violence exposure exert common or distinct effects on mental health outcomes?

Childhood maltreatment is significantly correlated with community violence exposure (CVE), suggesting that they co-occur (Margolin & Gordis, 2000). Both forms of adversity are most prevalent in neighbourhoods characterized by greater levels of poverty, crime, unemployment and deprivation (Butchart et al., 2006; Fowler et al., 2009). Furthermore, both forms of adversity have been associated with increased mental health and adjustment problems, including post-traumatic stress, internalizing and externalizing difficulties (Lynch & Cicchetti, 1998; Overstreet & Braun, 2000). Despite these similarities, childhood maltreatment and CVE are most often examined independently of one another (Aisenberg & Mennen, 2000). In particular, studies investigating the consequences of maltreatment have overlooked CVE as a potential correlate and confounding variable of interest. As a result, it is currently not known whether the failure to measure and statistically account for levels of CVE can potentially result in the overestimation of maltreatment effects on developmental outcomes (Aisenberg & Herrenkohl, 2008; Moylan et al., 2009). Furthermore, because maltreatment and CVE are examined separately, it is unclear whether these forms of adversity exert common or distinct effects on individual functioning when modelled

together. It is also unclear whether CVE moderates the association between childhood maltreatment and developmental outcomes (i.e. interactive effects) or whether CVE serves to increase risk for negative outcomes regardless of maltreatment history (i.e. additive effect). These issues need to be addressed in order to better understand: (i) the unique effects of maltreatment, above and beyond CVE exposure; (ii) whether maltreatment and CVE independently affect common or distinct areas of individual functioning; and (iii) whether maltreatment and CVE interact with one another or exert additive effects on individual functioning. Consideration of CVE in maltreatment research can help clarify the impact of violence exposure at a family and broader community level as well as refining potential targets for prevention and intervention.

1.6.2. Are individual maltreatment types uniquely associated with mental health outcomes?

Over recent years, there has been an increasing interest in trying to understand the effects of distinct forms of abuse and neglect on individual functioning. In particular, questions have been raised as to the existence of specific versus generic effects of maltreatment types on developmental outcomes (Torchalla, Strehlau, Li, Schuetz, & Krausz, 2012). Knowledge of potential differences across forms of maltreatment may carry important implications for individualized treatment formulation, resource allocation, and the development of tailored preventive strategies. Currently, studies have provided mixed support for the idea of differential effects (Petrenko et al., 2012). Inconsistencies in the literature may result from a number of factors. First, the vast majority of studies have examined only one form of maltreatment at a time. This is problematic given emerging evidence that different forms of maltreatment are highly interrelated (Herrenkohl & Herrenkohl, 2009). As a result, failure to simultaneously account for multiple forms of maltreatment may lead to (i) the overestimation of effects attributed to maltreatment types, as these may be driven by co-occurring forms of maltreatment, and (ii) difficulty in disentangling unique versus shared effects resulting from maltreatment types. Second, studies that have looked at different forms of maltreatment concurrently have rarely accounted for socio-demographic and neighbourhood characteristics as potential confounders. Finally, no study to date has examined whether maltreatment types exert unique effects on individual outcomes

above and beyond current levels of violence exposure, which may contribute to the effects observed (e.g. CVE). A more methodologically stringent approach is needed to address the above gaps in the literature and enable a more valid examination of unique effects associated with individual forms of maltreatment.

1.6.3. Do variants of callous-unemotional traits differ in history of childhood maltreatment and profile of individual functioning?

Callous-unemotional (CU) traits (e.g. lack of guilt and empathy), distinguish a particular sub-group of youth with conduct problems who are at increased risk of developing adult psychopathy (Frick & Viding, 2009). Youth with high CU traits are more likely to engage in early-onset, persistent and severe patterns of antisocial behaviour and to respond more poorly to traditional intervention strategies (Frick, 2009). As a result, great interest has been generated in trying to identify the developmental origins of CU traits, as this may carry important implications for prevention and intervention. Recent studies point to the possible existence of two distinct variants of CU traits (*Primary*: with low anxiety; *Secondary*: with high anxiety) that are hypothesized to result from separate aetiological influences (constitutional vs. environmental). Emerging evidence has found that only the secondary variant is associated with more severe trauma history and clinical symptomatology (e.g. Fanti, Demetriou, & Kimonis, 2013; Kimonis et al., 2013; Vaughn, Edens, Howard, & Smith, 2009). However, it is presently unclear whether distinct forms of abuse and neglect may be differentially associated with variants of CU traits. Furthermore, existing studies have compared variants of CU traits to a generic 'nonpsychopathic' reference group, limiting the ability to provide meaningful comparisons between youth with variants of CU traits and youth low in psychopathic traits, who can also vary in levels of anxiety. Finally, little is known regarding potential differences between variants across a wide range of functional domains that may be clinically relevant for informing risk assessment and intervention strategies. It is important to address the above gaps to clarify how variants of CU traits relate to maltreatment history and broad markers of individual functioning. Knowledge of similarities and differences between variants of CU traits may bear important implications for clinical practice and policy, particularly in the area of risk assessment and treatment formulation.

1.6.4. Can we develop a more effective and widely accessible screening tool for the detection of family aggression?

The past decade has seen a surge in the development of novel screening tools to facilitate detection of childhood maltreatment (Ohan, Myers, & Collett, 2002; Rabin, Jennings, Campbell, & Bair-Merritt, 2009; Tonmyr, Draca, Crain, & MacMillan, 2011). Effective screening tools are needed to improve prevalence estimates. In research, effective screening tools are necessary for studying the course, correlates and consequences of childhood maltreatment. In clinical practice, screening tools can help identify patterns of child maltreatment, facilitate risk assessment and inform decisions about appropriate interventions. Self-report instruments, in particular, have gained popularity as they are generally briefer, more cost-effective, easier to complete, and less invasive, compared to alternative methods (e.g. interview protocols). Despite these advantages, currently available screening tools have a number of limitations. First, few instruments exist that examine wider patterns of family aggression, integrating both aspects of child maltreatment and exposure to intimate partner violence (IPV). This is particularly important as both forms of adversity have been shown to co-occur (Herrenkohl et al., 2008). Particularly, IPV exposure has been identified as a risk factor for severe child maltreatment (Radford et al., 2011). Furthermore, experience of poly-victimization has been shown to exert a cumulative effect on developmental outcomes (Anda et al., 2006). Second, few instruments enable to record specific characteristics of family aggression (e.g. identity of perpetrator and victim; directionality of aggression). Third, currently available screening tools all rely heavily on respondents possessing the necessary verbal skills to understand the items presented, which may limit their applicability to a range of different populations. Reading difficulties are particularly prevalent among youth who have experienced maltreatment and IPV, suggesting that a proportion of these youth may find verbal screening tools especially challenging (Huth-Bocks, Levendosky, & Semel, 2001; Koenen, Moffitt, Caspi, Taylor, & Purcell, 2003; Thompson & Whimper, 2010). Furthermore, the use of verbal screening tools may be inadequate for individuals whose first language is not English (e.g. immigrants) or for younger respondents who may find these tools particularly demanding. Yet, to our knowledge, no instrument exists that makes use of a non-verbal format to facilitate screening within these populations. The above gaps need to be addressed so as to

provide a potential alternative to currently available tools, particularly in instances where such instruments may be unsuitable due to their high verbal demands.

1.7. The current thesis

In the current thesis we present four empirical studies that address each of the research questions outlined above. All of the studies presented draw on an extensive dataset collected from a community sample of over two hundred high-risk youth aged 16 to 24 years, who had experienced varying levels of maltreatment ranging from minimal to extreme. Half of the sample was recruited from Kids Company, a charity that provides services and support to vulnerable, inner-city youth who have often suffered from pervasive and co-occurring forms of developmetnal adversity. The other half of the sample was recruited from a number of external channels, including secondary schools and internet websites. A large battery of well-validated instruments was administered to measure: (i) childhood experience of abuse and neglect; (ii) presence of additional forms of developmental adversity within the domestic and community environment; and (iii) current psychological, affective, behavioural, and interpersonal functioning (multi-rater assessment). As a result, this sample is optimally suited to address the outstanding research questions aforementioned.

In **Chapter 2**, we describe a study examining the unique, additive and interactive effects of childhood maltreatment and community violence exposure (CVE) on mental health outcomes making use of multivariate regressions and moderation analyses. Outcomes examined included internalizing and externalizing difficulties as well as trauma-related symptomatology. We predicted that more severe maltreatment would be associated with greater psychological maladjustment and trauma-related symptomatology. We also hypothesised that CVE would independently predict these outcomes and that once CVE was taken into account the strength of associations between maltreatment and mental health symptoms would diminish. Interactive effects were examined on an exploratory basis.

In **Chapter 3**, we present a study investigating the unique associations between distinct forms of maltreatment and mental health outcomes. We included the same outcomes as Chapter 2. All analyses were adjusted for a wide range of socio-demographic variables as well as CVE exposure. In order to disentangle unique from shared effects, we compared two different statistical approaches, first examining each

maltreatment type individually and then modelling all maltreatment types together. We predicted that all maltreatment types would be significantly interrelated, so that shared variance between them would play an important role in explaining associations between maltreatment and mental health outcomes. We further predicted that there would be evidence of some unique associations between maltreatment types and outcomes, particularly in relation to physical abuse and externalizing difficulties.

In **Chapter 4**, we present a study where we contrasted individuals with primary and secondary callous-unemotional (CU) traits in relation to history of maltreatment and broad markers of individual functioning, including psychiatric symptoms, behavioural risk, affective functioning and attachment style. We employed a median split approach to compare four groups: (i) 'Primary CU' (i.e. high CU, low anxiety); (ii) 'Secondary CU' (i.e. high CU, high anxiety); 'Anxious' only (i.e. low CU, high anxiety); and a 'Low' group (i.e. low CU, low anxiety). We explored group differences using a number of regression models, the type of which varied depending on data distribution. We predicted that, compared to the primary CU group, the secondary CU group would be characterised by more severe experiences of childhood maltreatment and greater levels of psychiatric symptomatology and behavioural risk, but not differ in relation to externalising problems. We further predicted that (low) levels of psychological distress associated with primary CU would be similar to those reported by the Low comparison group, while (elevated) symptoms associated with secondary CU would be comparable to those reported by the Anxious group. No a priori hypotheses were made regarding affective functioning or attachment style.

In **Chapter 5**, we describe a study on the initial development and validation of a novel non-verbal measure of family aggression: the Family Aggression Screening Tool (FAST). To our knowledge, this is the first available self-report tool to make use of pictorial representations to assess experiences of family aggression, including direct victimization and exposure to intimate partner violence (IPV). We examined four psychometric properties of the FAST. First, we assessed reliability by examining internal consistency and inter-correlations between the FAST subscales. Second, we tested convergent and discriminant validity by observing associations between the FAST and the Childhood Trauma Questionnaire (CTQ), a well-validated self-report measure of childhood maltreatment. Third, we assessed concurrent validity by examining associations between the FAST and measures of psychiatric symptomatology. Finally, we examined the diagnostic accuracy of the FAST using the

CTQ as the validity criterion. We expected that the FAST subscales would show good internal consistency, and that convergent validity would be supported by significant and discriminative associations with corresponding scales on the CTQ. Furthermore, we expected that the FAST would be positively associated with measures of psychiatric symptoms, indicating good concurrent validity. When using the CTQ as a validity criterion, we expected that the FAST would show at least adequate sensitivity and specificity.

Finally, in **Chapter 6**, we summarise the findings from these four empirical studies and discuss their potential implications as well as possible avenues for future research.

CHAPTER 2: The impact of childhood maltreatment and community violence exposure on adolescent mental health

Childhood maltreatment is a key risk factor for maladjustment and psychopathology. Although maltreatment is associated with community violence exposure (CVE), these two forms of developmental adversity are generally examined separately. Consequently, little is known about how they may combine to affect mental health outcomes. The present chapter describes the first behavioural study to date to comprehensively investigate the unique, additive and interactive effects of maltreatment and community violence exposure on mental health. Latent Profile Analysis (LPA) was applied to data from 204 high-risk youth from the community in order to categorize groups of participants with similar patterns of childhood maltreatment exposure. Associations between childhood maltreatment, CVE and mental health outcomes were then explored using multivariate regression and moderation analyses. LPA identified three groups of individuals with low, moderate, and severe levels of childhood maltreatment. Maltreatment was associated with more internalizing, externalizing, and trauma related symptom, following a dose-response gradient. In contrast, CVE showed independent associations with only externalizing and trauma-related symptoms. Typically, childhood maltreatment and CVE exerted additive effects; however, these forms of adversity interacted to predict levels of anger. It was concluded that exposure to maltreatment and community violence is associated with increased levels of psychiatric symptoms. However, while maltreatment is associated with increased symptoms across a broad range of mental health domains, the impact of community violence is more constrained, suggesting that these environmental risk factors differentially impact mental health functioning.

2.1. Introduction

As seen in the introduction of this thesis, childhood maltreatment is global phenomenon and a major public health concern (Radford et al., 2011). Children who experience maltreatment are more likely to suffer from a wide range of enduring psychosocial, emotional and behavioural difficulties, including post-traumatic stress disorder, depression, anxiety and antisocial behaviour (Cicchetti & Toth, 2005). Maltreatment also poses a significant financial burden on judicial and social welfare services and decreases economic productivity in the longer term (Currie & Widom, 2010). Consequently, maltreatment is regarded as a salient developmental risk factor and an important target for prevention and intervention efforts (Gilbert et al., 2009b).

While a considerable body of research has investigated direct associations between childhood maltreatment and mental health outcomes, little is known about factors that may moderate such associations (Zielinski & Bradshaw, 2006). Influences within different levels of a child's ecology may interact with one another to potentiate or diffuse the effects of maltreatment (Lynch & Cicchetti, 1998). The importance of specific influences likely varies with developmental stage; the immediate family environment may be particularly salient for younger children, while community-level factors may gain importance with age (Margolin & Gordis, 2000). Although a number of studies have investigated how family factors can moderate mental health outcomes in maltreated youth, the role of the wider community context remains a relatively under-researched area (Zielinski & Bradshaw, 2006).

A particularly salient contextual risk factor for adolescents and young adults is community violence exposure (CVE; Cooley-Strickland et al., 2009). A recent meta-analysis found that at least half of youth in urban areas had witnessed or directly experienced violence within their community (Fowler et al., 2009). CVE has been found to correlate significantly with experience of maltreatment (Overstreet & Braun, 2000). Furthermore, both maltreatment and CVE are associated with poor psychosocial outcomes (Fowler et al., 2009; Lynch & Cicchetti, 1998). Despite this, CVE is generally overlooked within the maltreatment literature (Aisenberg & Mennen, 2000). Given that a considerable proportion of research is carried out with adolescents or young adults using retrospective reports of maltreatment, failure to assess current levels of CVE may result in the overestimation of maltreatment effects (Aisenberg & Herrenkohl, 2008). That is, effects associated with more temporally proximal CVE may be misattributed to

childhood history of maltreatment. Similarly, failing to account for maltreatment exposure may lead to an overestimation of the effects of CVE. Although independent effects of CVE on global trauma symptomatology, controlling for maltreatment history, have been previously reported (e.g. Garrido, Culhane, Raviv, & Taussig, 2010), we are not aware of any studies that have investigated whether childhood maltreatment and current CVE independently affect common or distinct areas of individual functioning using a broader range of mental health outcomes.

Recent CVE may also serve to moderate the association between childhood maltreatment and adolescent outcomes (Cicchetti & Lynch, 1993). It has been previously reported that family-level factors such as parental attachment moderate the association between CVE and mental health outcomes (e.g. Salzinger, Feldman, Rosario, & Ng-Mak, 2011). Yet, little is known about the existence of interactive effects between current CVE and childhood history of maltreatment. Interactions with maltreatment may occur in a number of ways. Exposure to community violence may have an exponential effect on maltreated youth; for example, hypervigilant responses to threat and dissociative symptoms associated with maltreatment exposure may be further reinforced by CVE. On the other hand, it is possible that CVE does not exacerbate established vulnerabilities in maltreated youth but rather has more pronounced effects on individuals who have *not* experienced childhood maltreatment. Such non-maltreated youth may have developed fewer coping resources and thus be more traumatised by violence in the community (Buka et al., 2001). It is also possible that instead of acting as a moderator, CVE serves to increase risk for negative outcomes regardless of maltreatment history. In fact, maltreatment and CVE may exert additive rather than interactive effects on negative outcomes. It has already been shown more generally that the experience of polyvictimization is associated with poorer outcomes compared to the experience of isolated forms of adversity (e.g. Finkelhor et al., 2007a), and that the number of adversities experienced linearly increases risk for negative developmental outcomes (Anda et al., 2006; Arata et al., 2007; Edwards et al., 2003). However, whether childhood maltreatment and current CVE additively combine to affect a range of mental health outcomes is currently unclear.

2.1.1. The current study

To our knowledge, no study to date has comprehensively investigated unique, additive and interactive effects between past history of maltreatment and current levels of CVE. The aims of the present study were three-fold. First, we wished to examine the effects of maltreatment on maladjustment and trauma-related symptomatology in a sample of high-risk youth. We used Latent Profile Analysis (LPA; Lanza, Flaherty, & Collins, 2003) to identify groups of individuals with different maltreatment profiles and then examined associations between each of these groups and mental health symptoms. Second, we aimed to investigate the impact of CVE. Specifically, whether maltreatment and CVE independently predicted psychiatric symptoms and whether the strength of associations between maltreatment and psychiatric symptoms would decrease after accounting for current CVE. Third, we wished to explore interactive effects between childhood maltreatment and current levels of CVE to investigate whether individuals with distinct maltreatment profiles are differentially affected by CVE. By controlling for socio-demographic characteristics and neighbourhood deprivation we exclude the contribution of these possible confounds. Based on previous studies, we predicted that more severe maltreatment would be associated with greater psychological maladjustment and trauma-related symptomatology. We also hypothesised that CVE would independently predict these outcomes and that once CVE was taken into account the strength of associations between maltreatment and mental health symptoms would diminish. Interactive effects were examined on an exploratory basis.

2.2. Methods

2.2.1. Participants

The sample comprised of 204 inner-city adolescents and young adults aged 16 to 24 years (M = 18.85). Multiple recruitment channels were used in order to include individuals with varying levels of maltreatment. Of the total sample, 48% (N = 98) were recruited and assessed at Kids Company, a charity that provides services to vulnerable, high-risk youth (typically via self-referral) who have experienced severe developmental adversity. The other 52% (N = 106) were recruited via London-based secondary schools (N = 78) and websites (N= 28). Of the total sample, 53% were girls (N = 108). The sample was ethnically diverse, with 44% Caucasian, 41% Black, 10% Mixed, and 5% Asian participants.

2.2.2. Procedure

All procedures were approved by the University College London Research Ethics Committee (ID No: 2462/001). Participants from Kids Company were introduced to the research by a member of staff, after which interested participants met with one of the research team who provided additional information about the study. After the testing session, a key worker from the charity who knew each participant well completed a short questionnaire booklet. Participants from schools received information about the research during a brief presentation and students interested in the research were provided with additional information. After the testing session, a teacher who knew each participant well completed the questionnaire booklet. Several websites, including Gumtree, Experimatch, and the UCL subject pool were also used to recruit participants. Interested individuals were asked to fill in a brief screening form and to select a time slot for the testing session. Participants who described themselves as students also provided the details of a teacher who knew them well, so that the questionnaire booklet could be completed. All participants provided informed consent prior to participation. Testing took place in a quiet room within Kids Company, the young person's school or at UCL depending on recruitment source. Participants from Kids Company and from the websites were compensated for their time individually; however students recruited from school settings received group compensation for school equipment or a final year party in line with head-teacher preferences. Of all external ratings, 53.6% were provided by key workers and 46.4% were provided by teachers.

2.2.3. Measures

Descriptive statistics for the whole sample and by recruitment site are displayed in Table 2.1. Intercorrelations across the study variables are shown in Table 2.2.

2.2.3.1. Socio-demographic covariates

Individual-level data on age, sex, ethnicity and IQ were collected from all participants. Cognitive ability was assessed using the two-subtest version of the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999). None of the participants in the sample scored below 70 or above 125 on the WASI. Higher values indicate female gender, non-white ethnicity, older age and higher cognitive ability.

Area-level data was acquired using participant postcode information. Postcodes were matched to administrative Lower Super Output Areas (LSOAs) that represent area-weighted geographical units for which population census data are available. From each LSOA an Index of Multiple Deprivation (IMD, 2011) score was obtained. The IMD is an aggregate measure of multiple indicators of neighbourhood deprivation, spanning: (i) income; (ii) employment; (iii) health and disability; (iv) education skills and training;(v) barriers to housing and services; (vi) crime; and (vii) living environment (Noble, Wright, Smith, & Dibben, 2006). Higher values indicate greater deprivation.

All of the above individual- and area-level variables were controlled for in the present analyses, so as to remove any potentially confounding influences on associations between different forms of developmental adversity and psychopathological outcomes. Neighbourhood deprivation, for example, has been previously linked to maltreatment and CVE, as well as being shown to increase risk for mental health difficulties (Butchart et al., 2006). As such, it is important to establish whether maltreatment and CVE associate with psychiatric symptoms over and above any effects attributable to these potential confounds.

2.2.3.2. Childhood maltreatment

Childhood maltreatment was assessed using the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998). The CTQ is a 28-item self-report measure screening for experiences of maltreatment "while growing up". Items are rated on a 5-point scale from '*never true*' to '*very often true*' (e.g. 'people in my family hit me so hard that it left me with bruises or marks'). The CTQ comprises of 5 subscales measuring emotional abuse, physical abuse, sexual abuse, emotional neglect and physical neglect. The scales show high internal consistency in our sample (α = .70 – .97) and good overall convergent and discriminant validity (Bernstein, Ahluvalia, Pogge, & Handelsman, 1997). By including 'I currently feel unsafe at home' as an additional yes/no item we were able to ascertain that none of the participants included in the study were currently vulnerable to violence in the domestic environment (e.g. by family or partner).

2.2.3.3. Community violence exposure

Exposure to community violence over the past year was assessed using items from the Children's Report of Exposure to Violence (CREV; Cooley, Turner, & Beidel, 1995). The CREV is a validated self-report measure that records frequency of exposure to different forms of violence, including being beaten up, robbed, chased, shot and killed. Three subscales were used in the present study: hearing about, witnessing, and directly experiencing (i.e. victimization) community violence. Participants were asked to rate how often in the past year they had been exposed to each type of violence from 0 = '*never*' to 4 = *'every day*'. Chronbach's alpha for the scales varied from .79 to .89. A composite measure of Community Violence Exposure was derived by averaging scores across the three subscales.

2.2.3.4. Psychiatric symptoms

Psychiatric symptoms were assessed making use of both external report and self-report measures.

Teachers or key workers completed four subscales from the Adolescent Symptom Inventory (ASI; Gadow & Sprafkin, 2002) to assess symptoms of generalised anxiety disorder (GAD; e.g "has difficulty controlling worries"), major depressive disorder (MDD; e.g. "is depressed most of the day"), oppositional defiant disorder (ODD; e.g. "loses temper") and conduct disorder (CD; e.g. "starts physical fights"). Each scale contained between 7 and 9 items (α = .89 – .94). Items were rated on a 4-point scale from *'never true*' to '*very often true*'. Two composite measures were created from the ASI subscales. First, an Internalizing Problems scale was created by averaging responses across the GAD and MDD subscales. Second, scores from the ODD and CD subscales were averaged to form the Externalizing Problems scale (Loney, Butler, Lima, Counts, & Eckel, 2006).

Participants completed the Trauma Symptom Checklist for Children (TSCC-A; Briere, 1996) to measure internalizing problems and trauma symptoms. The TSCC-A is a 44-item self-report inventory that includes 5 clinical scales (anxiety, depression, post-traumatic stress, anger and dissociation) and 2 validity scales (under- and hyper-response). Each item is rated on a 4-point scale from '*never*' to '*almost all of the time*'

and includes statements such as ‘bad dreams or nightmares’ and ‘remembering things I don’t want to remember’. Chronbach’s alpha for the scales varied from .84 to .87. Construct, convergent and discriminant validity have been well-established using child and adolescent samples (Briere, 1996; Sadowski & Friedrich, 2000). A composite measure of internalizing problems was derived by averaging the scores from the anxiety and depression subscales, so that results could be compared to external reports. Post-traumatic stress, anger and dissociation were kept separate and represented trauma-related symptoms.

Table 2.1 Descriptive statistics by recruitment source

Variables		**Recruitment Source**	
	Full Sample (N = 204)	Kids Company (N = 98)	Non Kids Company (N = 106)
	Mean (SD) or %	Mean (SD) or %	Mean (SD) or %
Violence Exposure			
Maltreatment (total)	41.13 (16.12)	48.39 (18.93)	34.41 (8.78)
CVE	17.54 (13.07)	24.78 (14.08)	11.10 (7.65)
Socio-Demographic Variables			
Ethnicity			
White	44.1%	20.4%	66.0%
Black	40.7%	68.4%	15.1%
Mixed	9.8%	10.2%	9.4%
Asian	5.4%	1.0%	9.4%
Sex (Female)	52.9%	54.1%	51.9%
Age	18.86 (2.30)	19.58 (2.15)	17.05 (.682)
IQ	101.30 (11.85)	97.72 (12.20)	104.47 (10.63)
IMD	28.41 (11.08)	34.01 (9.63)	23.37 (9.39)
Clinical Symptoms			
Other-rated			
Internalizing Problems	3.65 (3.88)	5.22 (4.20)	1.81 (2.42)
Externalizing Problems	2.34 (3.60)	3.61 (4.20)	.84 (1.86)
Self-report			
Internalizing Problems	6.48 (4.49)	7.91 (5.17)	5.16 (3.28)
Anger	7.15 (5.64)	9.18 (6.04)	5.26 (4.50)
PTSD	9.58 (6.52)	12.31 (6.98)	7.05 (4.87)
Dissociation	9.12 (6.03)	11.20 (6.67)	7.19 (4.60)

Abbreviations = CVE, past year Community Violence Exposure; IMD, Index of Multiple Deprivation; PTSD, Post-Traumatic Stress Disorder.

Table 2.2. Intercorrelations across study variables

	1	2	3	4	5	6	7	8	9	10
Violence exposure										
1. Maltreatment (total)	-									
2. CVE	.39***	-								
Socio-demographics										
3. Age	.253***	.17*	-							
4. IQ	-.06	-.23***	.13	-						
5. IMD	.121	.26***	.39***	-.11	-					
Clinical symptoms: Other-rated										
6. Internalizing Problems	.47***	.28***	.13	-.19	.21**	-				
7. Externalizing Problems	.40***	.34***	.07	-.26***	.13	.66***	-			
Clinical symptoms: Self-report										
8. Internalizing Problems	.47***	.25***	.11	-.13	.13	.40***	.23**	-		
9. Anger	.34***	.40***	-.04	-.15*	.18**	.41***	.39***	.59***	-	
10. PTSD	.51***	.40***	.11	-.18**	.20**	.44***	.30***	.81***	.64***	-
11. Dissociation	.41***	.40***	.01	-.11	.15*	.37***	.27***	.71***	.67***	.80***

Abbreviations = CVE, past year Community Violence Exposure; IMD, Index of Multiple Deprivation; PTSD, Post-Traumatic Stress Disorder.

2.3. Statistical analyses

All analyses were performed using Mplus version 6.1.1. (Muthén & Muthén, 2011). A Latent Profile Analysis (LPA) was first conducted to identify groups of individuals differing in maltreatment profile across the five CTQ subscales. LPA uses the latent structure of maltreatment experience to derive a person-centered categorical variable whereby each individual is assigned to a mutually exclusive maltreatment class (i.e. profile). We estimated five different LPAs, starting with a 1-group model and ending with a 5-group model. All models had random starting values. The physical abuse, physical neglect and sexual abuse CTQ subscales were censored due to non-normality of the score distribution. Best fit was determined using the adjusted Bayesian Information Criteria (BIC), the Lo-Mendell-Rubin likelihood ratio test (LMR), and entropy, where values greater than 0.80 indicate higher classification accuracy.

Fit statistics indicated that the 2- and 3-class solutions had the highest entropy values (0.91 and 0.87, respectively). The 2-class solution differentiated only a small 'severe maltreatment' group from the rest of participants despite marked variation in maltreatment scores. As a result, the 3-class solution was adopted to increase descriptive power. As shown in Figure 2.1, the 3-class solution identified a gradient of maltreatment exposure, whereby 122 (58%) participants were assigned to a 'Low Maltreatment' (Low MT) group, 57 (30%) to a 'Moderate MT' group and 25 (12%)

participants to a 'Severe MT' group. Full model fit indices for the 1- to 5-class solutions are shown in Table 2.3.

Figure 2.1 Mean maltreatment scores across Latent Profile Analysis classes

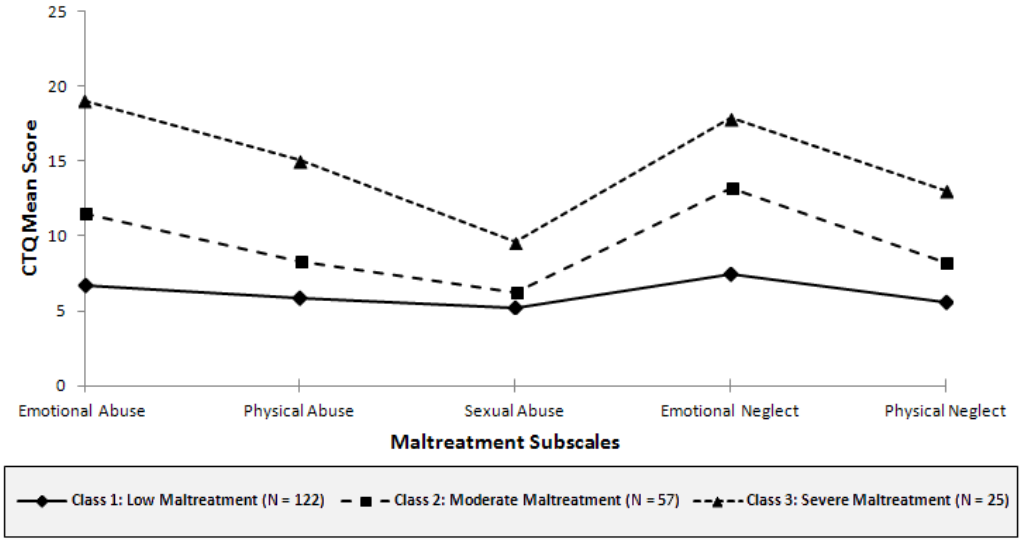


Table 2.3 Latent Profile Analysis (LPA) model fit indices

	1 Class	*2 Classes*	*3 Classes*	*4 Classes*	*5 Classes*
Adj BIC	4470.90	4124.557	4032.26	4015.585	3991.548
Entropy	*NA*	.907	.873	.863	.856
LMR	*NA*	2 *v* 1	3 *v* 2	4 *v* 3	5 *v* 4
		Value = -2224	*Value* = -2045	*Value* = -1992	*Value* = -1977
		p = .000	*p* = .052	*p* = .28	*p* = .54
N for each class	***C*=204**	*C1*=155(76%) *C2*=49 (24%)	*C1*=122(58%) *C2*=57 (30%) *C3*=25 (12%)	*C1*=105(52%) *C2*=64 (31%) *C3*=16 (8%) *C4*=19 (9%)	*C1*=97(48%) *C2*=45 (22%) *C3*=17 (8%) *C4*=26 (13%) *C5*=19 (9%)

Abbreviations = Adj BIC, adjusted Bayesian information criterion; LMRL, Lo-Mendell-Rubin likelihood ration test.

Abbreviations = Adj BIC, adjusted Bayesian information criterion; LMRL, Lo-Mendell-Rubin likelihood ration test.

Mean maltreatment scores across the three LPA classes are presented in Table 2.4. In order to validate the 3-class solution, a series of One-Way Analysis of Variance (ANOVA) tests and Pair-wise Post-hoc Comparisons were conducted; these confirmed that the three groups differed significantly from one another across all CTQ subscales ($p<.001$). Classes were further validated by comparing CTQ subscale means for each group with the maltreatment thresholds specified in the CTQ Manual (Bernstein & Fink, 1998). As expected, across all five CTQ subscales, means for the 'Low MT' group fell within the 'None-Minimal' range of scores specified in the CTQ Manual. Means for the 'Moderate MT' group fell within the 'Low-Moderate' range. For the 'Severe MT' group, means for all CTQ subscales fell within the 'Severe-Extreme' range except for the Sexual Abuse mean, which instead fell within the 'Moderate-Severe' range. This was likely due to the wide variation in experience of sexual abuse within this group, as reflected by the larger standard deviation.

Table 2.4 Mean differences in maltreatment severity across LPA classes

Variable	*Overall Item Means M (SD)*	*LPA Three Class Solution* C1: Low MT [a] *M (SD)*	C2: Moderate MT [b] *M (SD)*	C3: Severe MT [c] *M (SD)*	ANOVA *F*	Pairwise Post-hoc Comparisons
Emotional Abuse	9.66 (4.72)	6.76 (1.75)	11.71 (2.87)	19.08 (4.72)	F (2, 203) = 334.97, P < .001	C3 > C2 > C1
Physical Abuse	7.72 (4.42)	5.89 (1.83)	8.30 (3.68)	15.40 (6.13)	F (2, 203) = 92.53, P < .001	C3 > C2 > C1
Sexual Abuse	6.04 (3.38)	5.20 (1.34)	6.25 (3.24)	9.68 (6.76)	F (2, 203) = 22.13, P < .001	C3 > C2 & C1
Emotional Neglect	10.42 (4.70)	7.46 (2.41)	13.51 (3.08)	17.80 (3.39)	F (2, 203) = 198.46, P < .001	C3 > C2 > C1
Physical Neglect	7.28 (3.21)	5.59 (1.03)	8.35 (2.62)	13.12 (3.59)	F (2, 203) = 154.99, P < .001	C3 > C2 > C1

Note. ANOVA P-values Bonferroni corrected for 5 comparisons (p < .01). *Abbreviations* = MT; Maltreatment.

Two separate multivariate regression models were then conducted: one model was used to predict other-rated outcomes (i.e. teacher/key worker ratings on ASI subscales) and the other to predict self-report outcomes (TSCC subscales). Within each of these regression models, outcomes were modelled together to account for correlations in error terms. Missing values were handled through maximum likelihood estimation with robust standard errors (MLR). To provide robustness to non-normality and adjust for small sample size bias, regression analyses were bootstrapped 10,000 times from which we obtained bias-corrected 95% confidence intervals. As a result, information about the significance of effects is established via the examination of bias-corrected confidence intervals, while a measure of effect size is obtained by looking at standardized estimates.

For each of the two models, the main regression analysis followed three steps. First, LPA classes were entered as dummy coded variables, after controlling for age, sex, ethnicity, IQ and neighbourhood IMD in order to examine the effect of LPA maltreatment classes on the outcome measures. Second, community violence exposure was added as a predictor in order to examine: (i) whether both LPA classes and CVE independently predicted the outcomes (i.e. unique effect of one form of adversity on outcomes, controlling for the other); (ii) whether the associations between LPA classes and outcomes remained significant after accounting for current levels of CVE; and (iii) whether the addition of CVE significantly improved model fit, tested by running a 1-degree of freedom chi-square difference test. In the third step, we added as a predictor the multiplicative term of the categorical LPA variable by CVE to test possible interaction effects on the outcome measures. In order to run the above analyses and obtain comparable standardized estimates across the different regression steps, only participants who had complete data on both maltreatment and CVE were included. This resulted in a total sample of N = 148 for the model predicting other-rated outcomes, and N = 189 for the model predicting self-report outcomes. The difference in sample size between other-rated and self-rated outcomes resulted from the fact that it was not possible to obtain teacher or key worker (i.e. for Kids Company) ratings for all participants in the study. The reduced samples did not differ from the full sample (N = 204) on any of the study variables.

2.4. Results

Descriptives and bivariate correlations across the study variables are presented in Table 2.5. The categorical LPA maltreatment variable was moderately and positively correlated with current CVE. Both the LPA variable and CVE were significantly correlated with all outcome measures. Although we report findings for internalizing problems (i.e. using a composite measure of anxiety and depression), it is important to note that analyses were also run separately for anxiety and depression (both other-rated and self-report). Patterns of results for both outcomes were consistent in terms of the magnitude and direction of associations with maltreatment and CVE.

Step 1: Dose-response effect of maltreatment

The regression model predicting other-rated outcomes is shown in Table 2.6 - Model A. After controlling for demographic and neighbourhood characteristics, history of childhood maltreatment significantly predicted developmental maladjustment. The 'Low MT' group experienced significantly less internalizing and externalizing problems compared to the 'Severe MT' group, and this contrast had a large effect size. The 'Low MT' group also experienced lower externalizing difficulties compared to the 'Moderate MT' group, but these two groups did not differ in levels of internalizing difficulties. The 'Moderate MT' group only differed significantly from the 'Severe MT' group on internalizing difficulties (i.e. lower scores).

Results from the model predicting self-report outcomes are shown in Table 2.6 - Model B. Consistent with Model A, individuals in the 'Low MT' group reported experiencing significantly lower internalizing problems and trauma symptomatology than the 'Severe MT' group, with large effect sizes across outcomes. For all negative outcomes, except Anger, there was a dose-response effect of maltreatment (Low MT< Moderate MT<Severe MT). For Anger, the 'Low MT' group reported experiencing significantly lower symptoms than both the 'Moderate MT' and 'Severe MT' groups; however, the 'Moderate MT' and 'Severe MT' groups did not differ from one another in anger levels.

Table 2.5 Descriptive statistics and intercorrlations with LPA classes and CVE

Variables	LPA Classes	CVE	Mean (SD) or %
Violence Exposure			
LPA Classes	–	.37***	–
CVE	.37***	–	17.60 (13.08)
Socio-Demographic Variables			
Ethnicity [a]			
White	- .20**	- .33***	44.1%
Black	.23***	.37***	40.7%
Mixed	- .08	.01	9.8%
Asian	.04	- .10	5.4%
Sex (Female)	.02	- .08	53%
Age	.25***	.16*	18.85 (2.27)
IQ	- .02	- .23**	–
IMD	.13	.26***	28.55 (10.73)
Clinical Symptoms			
External rater [b]			
Internalizing Problems	.41***	.28***	3.65 (3.88)
Externalizing Problems	.34***	.38***	2.34 (3.60)
Self-report [c]			
Internalizing Problems	.49***	.24***	6.55 (4.56)
Anger	.33***	.39***	7.15 (5.64)
PTSD	.52***	.40***	9.58 (6.52)
Dissociation	.42***	.40***	9.12 (6.02)

Note. *** = $p < .001$; ** = $p < .01$; * = $p < .05$. *Abbreviations* = LPA Classes, Latent Profile Analysis maltreatment classes (0 = 'Low MT', 1 = 'Moderate MT', 2 = 'Severe MT'); CVE, past year Community Violence Exposure; IMD, Index of Multiple Deprivation; PTSD, Post-Traumatic Stress Disorder.

[a] Ethnicity = White (yes = 1; no = 0); Black (yes = 1; no = 0); Mixed (yes = 1; no = 0); Asian (yes = 1; no = 0).

[b] *N = 148*; [c] *N = 189*.

Step 2: Independent effects of maltreatment and CVE

In the second step of the analysis we re-ran the regression models adding CVE as a predictor. For other- rated outcomes (Model A, Table 2.6), the associations between LPA classes and internalizing and externalizing problems remained significant even after accounting for CVE. Current levels of CVE independently predicted externalizing problems, but not internalizing problems. Consistent with this, the 1-degree of freedom Chi-Square difference test showed that the addition of CVE significantly improved model fit only for externalizing problems ($\Delta\chi^2(1) = 11.60,\ p < .001$).

For self-report outcomes (Model B, Table 2.6), the associations between LPA classes and psychiatric symptoms remained significant even after accounting for CVE. CVE did not independently predict internalizing problems and did not significantly increase model fit for this outcome. However, CVE did independently predict trauma-related symptomatology, reducing the predictive strength of maltreatment and significantly improving model fit for anger ($\Delta\chi^2(1) = 13.83,\ p < .001$), PTSD ($\Delta\chi^2(1) = 9.572,\ p < .001$) and dissociation symptoms ($\Delta\chi^2(1) = 15.12,\ p < .001$).

In summary, maltreatment exerted a moderate-to-large effect across all psychiatric outcomes examined. Effects remained significant after controlling for CVE but decreased in size. CVE independently predicted externalizing problems and trauma symptoms, but not internalizing problems.

Table 2.6 Multivariate regression predicting other- and self-report psychiatric symptoms

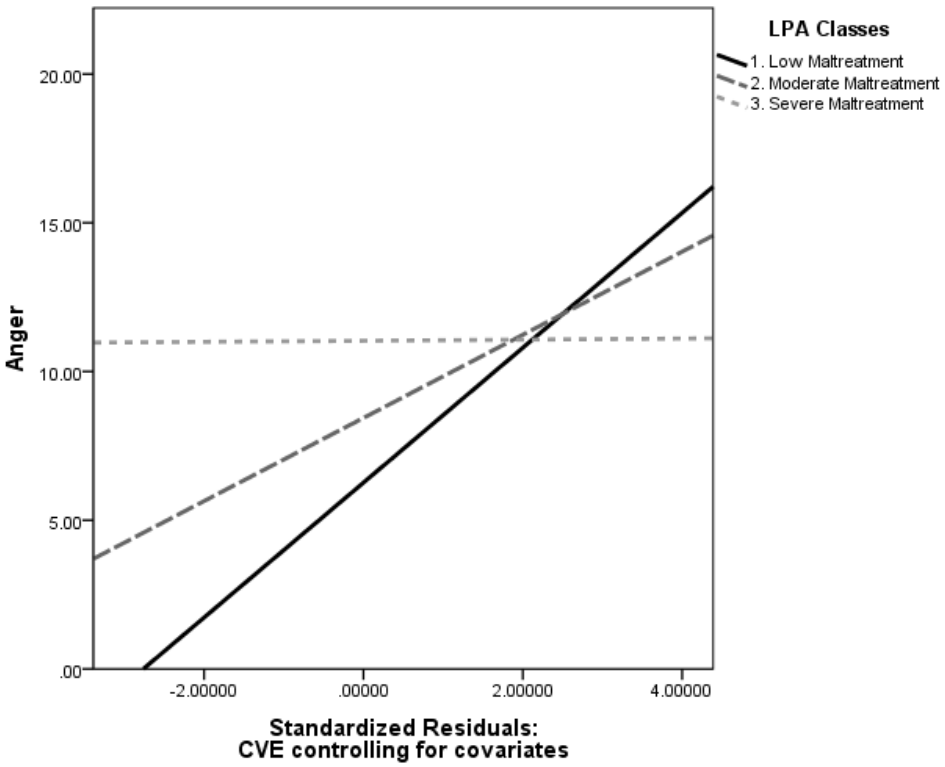
	Model A: Other-Report Outcomes[a]								Model B: Self-Report Outcomes[b]											
	Internalizing Problems				Externalizing Problems				Internalizing Problems				Anger				PTSD				Dissociation			
	B	(Std. *B*)	95% CI UL	95% CI LL	*B*	(Std. *B*)	95% CI UL	95% CI LL	*B*	(Std. *B*)	95% CI UL	95% CI LL	*B*	(Std. *B*)	95% CI UL	95% CI LL	*B*	(Std. *B*)	95% CI UL	95% CI LL	*B*	(Std. *B*)	95% CI UL	95% CI LL
Step 1: Main Effects [c]																								
LPA Classes																								
Low MT (vs severe)	-3.46*	(-.47)	-5.11	-1.65	-2.74*	(-.39)	-4.51	-1.08	-6.14*	(-.66)	-8.01	-4.22	-4.54*	(-.40)	-6.79	-2.24	-9.11*	(-.68)	-11.39	-6.09	-7.08*	(-.58)	-9.37	-4.21
Low MT (vs moderate)	-.77	(-.11)	-1.90	.38	-1.41*	(-.21)	-2.51	-.45	-2.13*	(-.23)	-3.35	-.86	-2.93*	(-.26)	-4.27	-1.44	-3.22*	(-.24)	-4.91	-1.38	-2.35*	(-.19)	-3.94	-.72
Severe MT (vs moderate)	3.18*	(.31)	1.22	5.08	1.61	(.17)	-.20	3.60	4.49*	(.31)	2.52	6.65	2.13	(.12)	-.07	4.63	2.13*	(.33)	4.03	9.37	5.34*	(.29)	2.62	8.03
R^2	**.29**				**.23**				**.25**				**.15**				**.31**				**.20**			
Step 2: Main Effects [c, d]																								
LPA Classes																								
Low MT (vs severe)	-3.46*	(-.47)	-5.24	-1.66	-2.05*	(-.30)	-3.08	-.40	-5.93*	(-.64)	-7.90	-3.86	-2.94*	(-.26)	-5.49	-.32	-7.82*	(-.58)	-10.4	-4.44	-5.46*	(-.45)	-7.94	-2.38
Low MT (vs moderate)	-.75	(-.10)	-1.91	.43	-1.21*	(-.18)	-2.35	-.24	-2.08*	(-.22)	-3.32	-.78	-2.49*	(-.22)	-3.81	-.95	-2.87*	(-.21)	-4.55	-1.04	-1.90	(-.15)	-4.55	-1.04
Severe MT (vs moderate)	3.12*	(.31)	1.15	5.11	1.00	(.10)	-.76	2.95	4.36*	(.30)	2.35	6.56	.96	(.05)	-1.33	3.61	5.82*	(.28)	2.89	8.71	4.20*	(.22)	2.89	8.71
CVE	.01	(.03)	-.03	.05	.07*	(.27)	.04	.11	.01	(.04)	-.21	.56	.12*	(.28)	.07	.18	.10*	(.19)	.04	.17	.12*	(26)	.04	.19
R^2	**.29**				**.29†**				**.25**				**.21†**				**.33†**				**.26†**			

Note. Population effect sizes are interpreted using standardized estimates (Std. B) following Cohen's guidelines: an effect of .10 is small effect, an effect of .24 is a medium effect, and an effect of .37 is a large effect. *Abbreviations* = PTSD, Post-Traumatic Stress Disorder; CI = bootstrapped confidence interval; LL = lower limit of the 95% CI; UL = upper limit of the 95% CI. [a] N = 148; [b] N = 189; [c] Main effects shown control for age, sex, ethnicity, IQ, and index of multiple deprivation; [d] Chi-squared difference test significant at † = $p < .001$. * Bootstrapped CI for standardized coefficient does not cross zero; i.e. significant effect size.

Step 3: Moderation analyses

In the third step of the analysis, the interaction term of the categorical LPA class variable by CVE was included in Model A and Model B. One interaction, predicting self-report anger levels, was significant (*B*= -.35, *SE*= .04, *p*=.03). This interaction is shown in Figure 2.2. The 'Low MT' group showed the steepest increase in anger levels as exposure to community violence increased, followed by the 'Moderate MT' group. By contrast, self-reported anger symptoms in the 'Severe MT' group were similar regardless of CVE levels. With regard to the other outcome measures, the absence of significant interactions suggests that maltreatment and CVE exert additive effects on externalizing problems, PTSD and dissociation symptoms, whereas internalizing problems appear affected by maltreatment exposure only.

Figure 2.2 Interaction between maltreatment and community violence exposure in predicting self-report anger levels



2.5. Discussion

To our knowledge, the present study was the first to comprehensively investigate independent, additive and interactive influences of childhood maltreatment and community violence on mental health. Using Latent Profile Analysis, we identified three groups differing in maltreatment severity. Severity of maltreatment exposure exerted a dose dependent effect on levels of externalizing, internalizing and trauma-related symptoms. These effects attenuated but remained significant after accounting for current levels of CVE, suggesting that failing to account for CVE may lead to an overestimation of maltreatment effects. While childhood maltreatment had an impact across the spectrum of mental health symptoms assessed, CVE independently predicted only externalizing and trauma-related symptoms. Our results therefore suggest that these environmental risk factors differentially impact mental health functioning. Moderation analyses showed that while maltreatment and CVE typically exert additive effects (in relation to externalizing problems, PTSD and dissociation symptoms), they interact with one another to predict anger levels.

Childhood maltreatment impacts mental health following a dose-response gradient

In the current study maltreatment profiles were identified using LPA, a person-centred approach that offers substantial methodological advantages over other commonly used methods. Past studies have often examined maltreatment types individually, even though these have been shown to co-occur widely (Finkelhor et al., 2007a). When multiple types of maltreatment have been included, these have typically been explored dimensionally by creating count variables or categorically by using subjective cut-off scores (Hazen, Connelly, Roesch, Hough, & Landsverk, 2009). Empirically-driven approaches, on the other hand, have rarely been used (Roesch, Villodas, & Villodas, 2010). By modelling multiple maltreatment types concurrently, the use of LPA enabled us to account for the complexity and comorbidity of maltreatment experiences, thus addressing a major challenge in the field.

When relating LPA groups to mental health outcomes, maltreatment severity predicted psychiatric symptoms following a dose-response gradient (Low <Moderate<Severe). Effects were robust even after controlling for demographic characteristics, neighbourhood deprivation and CVE. These findings reflect the enduring consequences of child abuse and neglect on psychological and emotional

functioning. Results using this stringent approach are also consistent with epidemiological and neurobiological studies documenting the profound and cumulative effect of maltreatment on multiple domains of individual functioning (Anda et al., 2006; McCrory, De Brito, & Viding, 2011).

Failure to account for CVE leads to the overestimation of maltreatment effects

In the present study, controlling for current levels of CVE considerably reduced the strength of associations between childhood maltreatment, externalizing problems and trauma symptomatology. For some outcomes, such as anger levels, the inclusion of CVE caused the effect size of maltreatment to go from large to only moderate. Such results highlight the importance of accounting for multiple forms of developmental adversity in order to systematically isolate the unique effects of maltreatment on mental health outcomes. This is particularly relevant for studies measuring maltreatment based on retrospective reports in older youth, as these same youths may be particularly likely to experience current CVE. Future studies would benefit from including additional factors associated with both maltreatment and community violence (e.g. intimate partner violence, peer victimization) in order to gain a more ecologically valid and transactional understanding of the impact of developmental adversity on individual mental health.

Community violence exposure is a risk factor for maladjustment and trauma symptoms

Current levels of CVE independently predicted externalizing problems and trauma symptomatology beyond the effects of childhood maltreatment. These findings are in line with previous studies that point to CVE as an important risk factor for mental health and well-being (Fowler et al., 2009). Although little empirical evidence is currently available to shed light on specific underlying mechanisms, a number of possibilities have been suggested. First, community violence may potentiate hostile attribution biases and hypervigilance to threat, which in turn may increase reactive aggression (Fowler et al., 2009). Second, repeated witnessing of violent acts may model violent responses as a socially acceptable and effective way of resolving conflict or achieving desired goals (Cooley-Strickland et al., 2009). Third, the perceived and actual threat of CVE may maintain a state of physiological and emotional hyper-arousal that could contribute to

the development of post-traumatic stress and feelings of anger. Dissociative responses may also develop as a coping strategy to distance oneself from emotionally aversive and threatening situations (Buka et al., 2001). Given that the experience of maltreatment and community violence share a number of common features (Foster & Brooks-Gunn, 2009) these mechanisms may also be of relevance in characterising the impact of childhood maltreatment (Margolin & Gordis, 2000). In the present study, CVE did not significantly predict other-rated or self-reported internalizing difficulties. These findings contrast with those reported by a meta-analysis, which found a small positive effect of CVE on internalizing difficulties (Fowler et al., 2009). However, because the meta-analysis did not take into account maltreatment exposure we propose that such an association may have been secondary to the effects of maltreatment.

The additive and interactive effects of maltreatment and community violence

Moderation analyses showed that the effects of maltreatment and community violence combine in outcome-specific ways. Internalizing problems were uniquely predicted by childhood maltreatment. Additive effects were found in relation to externalizing problems, post-traumatic stress and dissociation symptoms, indicating that maltreatment and CVE both independently augment symptoms in these domains. However, in relation to one domain – anger –we observed an interaction between childhood maltreatment and CVE. While the low maltreatment group showed the lowest levels of anger when not exposed to community violence, anger levels linearly increased with CVE until they exceeded even those reported by the severe maltreatment group. It is possible that youth in the low maltreatment group are emotionally and physiologically unprepared for high levels of violence in the community. Consistent with this hypothesis, a recent meta-analysis exploring predictors of anger in adolescence found that stress and exposure to violence were among the strongest predictors, exerting a moderate-to-substantial effect size (Mahon, Yarcheski, Yarcheski, & Hanks, 2010). On the other hand, stable anger levels observed in the severe maltreatment group may reflect a 'plateau state' whereby severely maltreated youth develop chronically heightened anger levels irrespective of the amount of violence they are currently exposed to. Given the correlational nature of the study, however, these are inevitably speculative hypotheses. Longitudinal data will be needed to clarify processes underlying this interactive effect.

Limitations

The present findings should be interpreted in light of a number of limitations. First, our measure of maltreatment was based on self-report. Although it is possible that retrospective biases and unwillingness to disclose were present, a recent study found that associations between maltreatment and psychopathology were comparable when making use of retrospective versus prospective reports (Scott, McLaughlin, Smith, & Ellis, 2012). Moreover, the use of official data has been found to considerably underestimate the true extent of maltreatment experienced, casting doubt on the reliability of this method (Cicchetti & Toth, 2005). Second, the fact that maltreatment, CVE and a proportion of outcome measures were reported by youth themselves raises the possibility of shared method variance. In their meta-analysis, Fowler and colleagues (2009) found that studies using the same reporter for both community violence and outcomes resulted in a larger effect size. We assessed internalizing difficulties via self and other ratings. Importantly, results across reporters were highly consistent regarding the lack of a unique effect of CVE on internalizing difficulties. Third, because of sample size limitations we were unable to explore whether the degree of proximity to CVE moderates the association between childhood maltreatment and mental health outcomes. It would be informative in future to examine whether hearing about, witnessing or directly experiencing community violence may interact differently with childhood maltreatment to exacerbate levels of maladjustment and trauma symptomatology. Finally, our findings suggest a causal effect of childhood maltreatment and community violence exposure on mental health; however, the cross-sectional nature of the study meant that we were unable to establish the directionality of effects found. For example, it is possible that instead of CVE increasing risk for externalizing difficulties, having externalizing difficulties in the first place increases risk for CVE. More research is needed to explore longitudinal bidirectional associations between CVE exposure and mental health functioning, with a particular focus on behavioural difficulties.

Implications and future directions

Childhood maltreatment emerged as a powerful predictor of mental health symptoms above and beyond the impact of CVE. Maltreatment exerted a generic and detrimental effect on all domains of functioning examined, underscoring the importance of

preventive efforts and early intervention strategies. Nevertheless, the effect of maltreatment was reduced after controlling for CVE suggesting that future research examining the sequelae of child abuse and neglect should account for CVE as to not overestimate the impact of maltreatment. CVE uniquely predicted levels of externalizing problems and trauma symptomatology over and above the effects of childhood maltreatment. Severe CVE was particularly associated with elevated symptoms of anger. Given the high prevalence of CVE in urban areas, our findings highlight the importance of addressing CVE in adolescent populations (Cooley-Strickland et al., 2009). At present, preventive measures and intervention solutions targeting youth exposed to CVE are limited and lack systematic evaluation (Fowler et al., 2009). Tailored programmes that focus on the development of healthy coping strategies and the provision of counselling services may be particularly effective in reducing aggressive or traumatic responses to violence exposure, particularly if these are made easily accessible within school settings or youth centres. It remains unclear whether treatment approaches should be tailored for individuals presenting with common psychiatric symptoms, but with different kinds of prior risk experiences. Finally, these findings highlight the need for clinicians to more routinely assess CVE in young people as a potential risk factor for trauma related symptomatology and externalizing problems.

2.6. Conclusions

The present chapter describes the first study to date to have comprehensively examined the unique, additive and interactive effects of childhood maltreatment and community violence exposure on mental health outcomes. While maltreatment was found to be associated with increased symptoms across a broad range of mental health domains, the impact of community violence is more constrained, suggesting that these environmental risk factors differentially impact mental health functioning. Typically, childhood maltreatment and CVE exerted additive effects; however, these forms of adversity interacted to predict levels of anger. Findings of common and distinct effects of maltreatment and CVE exposure have implications for the development of prevention and intervention strategies.

CHAPTER 3: Unique associations between maltreatment types and mental health outcomes

At present, little is known regarding the presence of shared versus unique effects of maltreatment types on individual outcomes. Further, no study to date has examined whether unique effects attributed to different forms of maltreatment may be observed when controlling for a range of potentially confounding variables, including socio-demographic characteristics and current levels of community violence exposure (CVE). In the current chapter, we address these outstanding questions in the literature. We included the same mental health outcomes detailed in Chapter 2 (i.e. internalizing, externalizing difficulties and trauma-related symptomatology). We began by examining the degree of overlap between types of maltreatment as well as the prevalence rates for single and multi-type maltreatment. We then made use of regression models to address whether effects attributed to distinct forms of maltreatment vary when these are entered as individual predictors versus simultaneously (i.e. unique effects). Maltreatment types were found to be highly interrelated. Experience of multi-type maltreatment (i.e. two or more forms of maltreatment concurrently) was found to be more common than the experience of any single form of maltreatment in isolation. While most forms of maltreatment were significantly associated with outcomes when examined individually, few unique effects were observed when modelling all maltreatment types simultaneously. Emotional abuse emerged as the sole unique predictor of mental health functioning, above and beyond the effect of socio-demographic variables, current CVE and variance shared with all other maltreatment types.

3.1. Introduction

In recent decades, the deleterious effects of maltreatment on child development and wellbeing have been well documented (Cicchetti & Toth, 1995, 2005; Currie & Widom, 2010; McCrory, De Brito, & Viding, 2011). Nevertheless, heterogeneity in individuals' responses to maltreatment continues to represent a challenge for researchers and practitioners alike (Afifi & MacMillan, 2011; Herrman et al., 2011). One factor that may contribute to such individual heterogeneity is the type of maltreatment experienced. More specifically, it has been suggested that distinct forms of abuse and neglect may differentially impact areas of mental health functioning (Higgins & McCabe, 2000). However, the empirical literature to date has been largely inconsistent. While some studies have provided support for the existence of differential effects (Litrownik et al., 2005; McGee, Wolfe, & Wilson, 1997; Petrenko et al., 2012; Taussig, 2002), others have reported more generic, non-specific associations between types of maltreatment and individual outcomes (Mullen, Martin, Anderson, Romans, & Herbison, 1996; Silverman, Reinherz, & Giaconia, 1996; Torchalla et al., 2012). As a result, it remains unclear whether distinct forms of maltreatment exert unique or shared effects on individual functioning. Further research is needed to clarify the association between maltreatment types and the sequelae of maltreatment, as the presence of differential effects may carry important implications for risk assessment, individualized treatment formulation and the development of more targeted prevention strategies.

Much of what is known regarding differences between maltreatment types has come from studies that have examined one form of maltreatment at a time. It is being increasingly recognized, however, that such an approach may be inadequate as it assumes that different forms of maltreatment occur independently from one another (Fallon et al., 2010; Herrenkohl & Herrenkohl, 2009; Higgins & McCabe, 2001). Although the degree of overlap between maltreatment types is seldom reported, a number of recent studies have found that maltreatment types are significantly correlated, so that experience of one form of maltreatment increases the likelihood of other ones occurring (Arata et al., 2007; Herrenkohl & Herrenkohl, 2009; Higgins & McCabe, 2003). Consistent with this, studies that have examined the prevalence of maltreatment types have reported that, across maltreated individuals, between 33-95% have experienced more than one form of maltreatment, depending on the sample and methodology used (see Herrenkhol & Herrenkhol, 2009, for a review). Together, the

limited data that is available suggests that maltreatment types are largely interrelated and often co-occur with one another (Dong et al., 2004; Finkelhor et al., 2007a; Higgins & McCabe, 2000; Nishina & Juvonen, 2005; Saunders, 2003). As a result, examining single forms of maltreatment without adjusting for presence of other maltreatment types may be potentially misleading and result in the overestimation of effects attributed to specific forms of maltreatment (Finkelhor et al., 2007a; Higgins & McCabe, 2001; Lau et al., 2005).

In order to address these limitations, a number of studies have begun to examine multiple forms of maltreatment concurrently (Lau et al., 2005; Litrownik et al., 2005; Petrenko et al., 2012; Taussig, 2002; Torchalla et al., 2012). While some consistent findings have emerged, particularly with regards to the unique effect of physical abuse on externalizing difficulties (Litrownik et al., 2005; McGee et al., 1997; Petrenko et al., 2012; Taussig, 2002), evidence of other unique effects has been more equivocal. Mixed findings in the literature may stem from considerable variations across studies in factors such as (i) the number of maltreatment types assessed, (ii) the analytical strategy employed, and (iii) the type of covariates included (Arata et al., 2007; Higgins & McCabe, 2001; Petrenko et al., 2012).

Firstly, studies examining multiple forms of maltreatment concurrently have often varied in the number of maltreatment types assessed. While physical and sexual abuse have featured predominantly within these studies, the inclusion of other maltreatment types has been more inconsistent. In particular, studies have differed with regards to whether emotional abuse is included as a maltreatment type of interest. In some cases, emotional abuse has been excluded on the basis that it may be inherent to all other forms of maltreatment and may not represent a unitary construct (e.g. Garbarino, Guttmann, & Seeley, 1986; Petrenko et al., 2012). In other cases, emotional abuse has been examined separately and has been found to be a significant independent contributor to mental health difficulties (Arata et al., 2007; McGee et al., 1997; Sullivan, Fehon, Andres-Hyman, Lipschitz, & Grilo, 2006). It is important to clarify the nature and scope of effects associated with emotional abuse, particularly as it is a highly prevalent yet often overlooked form of maltreatment within both research and clinical practice (Rees, 2010; Teicher, Samson, Polcari, & McGreenery, 2006; Wekerle, 2011).

Secondly, studies have varied in the methodology used to examine differential effects associated with distinct forms of maltreatment. A common approach in the literature has been to assign individuals to discrete categories that index different

combinations of maltreatment types, and to then compare these groups so as to identify presence of differential effects (Arata et al., 2007; Higgins & McCabe, 2001; Lau et al., 2005). However, this approach has the disadvantage of relying extensively on subjective decisions about what cut-offs to use and how many combinations to include, both of which may contribute to differences in findings across studies. Furthermore, with the use of discrete categories it is not possible to statistically partition variance so as to establish whether maltreatment effects are driven by unique or shared variance between maltreatment types. In contrast, regression approaches can be used to isolate the effects of individual maltreatment types, over and above all other forms of maltreatment. To date, however, very few studies have made use of this approach to identify differential effects while including all maltreatment types concurrently (Arata et al., 2007; McGee et al., 1997; Torchalla et al., 2012).

Thirdly, existing studies have varied in the number and type of covariates included. While most studies have not included any additional variables as potential confounds (see Higgins & McCabe, 2001, for a review), some have controlled for differences in demographic characteristics, such as participant age and sex (e.g. Sullivan et al., 2006; Taussig, 2002). Very few studies have adjusted for socio-economic disadvantage, even though maltreatment is known to cluster in geographical areas characterized by increased poverty and deprivation, both of which are associated with poorer mental health outcomes (Higgins & McCabe, 2001). Finally, no study to our knowledge has examined the effects of different form of maltreatment while controlling for presence of additional risk factors, such as exposure to community violence (Petrenko et al., 2012). Community violence exposure (CVE) may be a particularly important confound in the examination of effects attributed to childhood maltreatment types for two reasons. First, maltreatment and CVE have been found to co-occur with one another. Second, both forms of adversity have been shown to increase risk of negative mental health outcomes, including post-traumatic stress and externalizing difficulties (Lynch & Cicchetti, 1998; Margolin & Gordis, 2000; Overstreet & Braun, 2000). Given that differential associations between maltreatment types and these mental health outcomes have been reported by a number of studies (e.g. Petrenko et al., 2012; Sullivan et al., 2006), it is of interest to establish whether such effects may be observed when adjusting for current levels of CVE.

3.1.1. The current study

The purpose of the present study was to investigate unique associations between different forms of maltreatment and mental health outcomes in a community sample of high-risk youth. Outcomes examined included internalizing and externalizing difficulties as well as trauma-related symptomatology. The aim of the present study was two-fold. First, in line with recent recommendations by Herrenkhol and Herrenkhol (2009), we aimed to assess the degree of overlap between maltreatment types and calculate prevalence rates of maltreatment, so as to facilitate comparability with other studies. Second, we aimed to differentiate unique from shared effects of maltreatment types on mental health outcomes by examining (i) whether each maltreatment type is associated with individual outcomes when examined independently; and (ii) whether each maltreatment type is uniquely associated with individual outcomes, above and beyond all other forms of maltreatment. By controlling for demographic characteristics, neighbourhood deprivation and current levels of community violence exposure we excluded the contribution of these possible confounds in all analyses. We predicted that (i) distinct forms of maltreatment would be significantly interrelated and frequently co-occurring; and (ii) each form of maltreatment would be associated with outcomes when examined individually, but few differential effects would be evident when all maltreatment types were examined simultaneously. Based on previous studies, we predicted that physical abuse would be uniquely associated with externalizing difficulties.

3.2. Methods

3.2.1. Participants

The present sample comprised of 204 inner-city adolescents and young adults aged 16 to 24 years (M = 18.85). Of the total sample, 48% (N = 98) were recruited and assessed at Kids Company. The other 52% (N = 106) were recruited via London-based secondary schools and internet websites, including Gumtree, Experimatch and the UCL subject pool. Of the total sample, 53% were girls (N = 108). The sample was ethnically diverse, with 44% Caucasian, 41% Black, 10% Mixed, and 5% Asian participants. Please refer to Chapter 2 for more in depth information regarding the sample of the study.

3.2.2. Procedure

All procedures were approved by the University College London Research Ethics Committee (ID No: 2462/001). Full details of the study procedures are provided in Chapter 2.

3.2.3. Measures

3.2.3.1. Covariates (control variables)

Data on age, sex, ethnicity and IQ were collected from all participants. Cognitive ability was assessed using the two-subtest version of the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999). Neighbourhood deprivation was measured using the census-derived Index of Multiple Deprivation (IMD, 2011) obtained from participant postcode information (see Chapter 2). Higher values indicate female gender, non-white ethnicity, older age, higher cognitive ability and greater neighbourhood deprivation. Exposure to community violence over the past year was assessed using items from the validated, self-report Children's Report of Exposure to Violence (CREV; Cooley, Turner, & Beidel, 1995). Three subscales were used in the present study: hearing about, witnessing, and directly experiencing (i.e. being a victim of) community violence (α = .79 – .89). A composite measure of CVE was derived by averaging scores across the three subscales.

3.2.3.2. Childhood maltreatment

Childhood maltreatment was assessed using the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998). The CTQ is a 28-item self-report measure screening for experiences of maltreatment "while growing up". The CTQ comprises of 5 subscales measuring emotional abuse (e.g. "people in my family said hurtful or insulting things to me"), physical abuse (e.g. "I got hit or beaten so hardly that it was noticed by someone like a teacher, neighbor or doctor"), sexual abuse (e.g. "someone tried to make me do sexual things or watch sexual things"), emotional neglect (e.g. "I felt loved", reversed) and physical neglect ("my parents were too drunk or high to take care of the family"). The scales show high internal consistency in our sample (α = .70 – .97). By including 'I currently feel unsafe at home' as an additional yes/no item we were able to ascertain that none of the participants included in the study were currently vulnerable to violence in the domestic environment (e.g. by family or partner).

3.2.3.3. Psychiatric symptoms

Psychiatric symptoms were assessed making use of both other- and self-report measures. Teachers or key workers completed four subscales from the Adolescent Symptom Inventory (ASI; Gadow & Sprafkin, 2002) to assess symptoms of generalised anxiety disorder (GAD), major depressive disorder (MDD), oppositional defiant disorder (ODD) and conduct disorder (CD). Each scale contained between 7 and 9 items (α = .89 – .94). Two composite measures were created from the ASI subscales. First, an Internalizing Problems scale was created by averaging responses across the GAD and MDD subscales. Second, scores from the ODD and CD subscales were averaged to form the Externalizing Problems scale.

Participants completed the Trauma Symptom Checklist for Children (TSCC-A; Briere, 1996) to measure internalizing problems and trauma symptoms. The TSCC-A is a 44-item self-report inventory that includes 5 clinical scales (anxiety, depression, post-traumatic stress, anger and dissociation) and 2 validity scales. Chronbach's alpha for the scales varied from .84 to .87. A composite measure of internalizing problems was derived by averaging the scores from the anxiety and depression subscales, so that results could be compared to external reports. Post-traumatic stress, anger and dissociation were kept separate and represented trauma-related symptoms.

3.3. Statistical analyses

Correlation matrices were used to examine associations between maltreatment types and the study covariates (i.e. socio-demographic characteristics and CVE), as well as interrelationships between maltreatment types. To calculate prevalence rates, we used the maltreatment thresholds specified by the CTQ manual (i.e. None, Low, Moderate and Severe; Bernstein & Fink, 1998) to examine frequency rates for each maltreatment type individually, regardless of whether it co-occurred with other maltreatment types. We then examined the proportion of maltreated youth who experienced multi-type maltreatment (i.e. two or more forms of maltreatment). Maltreated youth were defined as youth who had experienced at least one form of maltreatment at or above the Low maltreatment severity threshold specified by the CTQ manual (Arata, Langhinrichsen-Rohling, Bowers, & O'Farrill-Swails, 2005). Two different sets of multivariate regressions were then conducted, both of which controlled for age, sex, IQ, ethnicity,

index of multiple deprivation (IMD) and CVE. In the first set of regressions, each maltreatment type was included separately as an independent predictor, to examine its effect above and beyond socio-demographic covariates and CVE (individual models). In the second set of regressions, all maltreatment types were entered simultaneously as predictor variables to assess whether any maltreatment type was uniquely associated with the outcomes, above and beyond the effect of covariates as well as all other maltreatment types (simultaneous models). Contrasting individual and simultaneous models allowed the partition of unique versus shared effects of maltreatment types on mental health outcomes. In the current study, level of significance was established by examining bias-corrected confidence intervals (95% CI) of the unstandardized estimates and associated *p* values, while standardized estimates were used as a measure of effect size. Analyses were performed on SPSS package v. 21 (IBM Corp., 2012).

3.4. Results

Associations between maltreatment types and covariates

Descriptive statistics and correlations between maltreatment types, socio-demographic characteristics and CVE are presented in Table 3.1. Physical abuse, emotional neglect and physical neglect were negatively associated with white ethnicity and positively associated with black ethnicity. All maltreatment types except physical abuse were positively associated with participant age. This positive correlation may possibly be driven by the participants recruited from Kids Company, as they were slightly older than other participants and also more likely to have experienced the most severe levels of maltreatment. Physical abuse was associated with lower IQ. Importantly, all types of childhood maltreatment were significantly associated with higher levels of CVE during the past year. Associations with CVE were weak for sexual abuse, but moderate across all other forms of maltreatment (r = .30 – .37). Maltreatment types were not significantly associated with participant sex or level of neighbourhood deprivation (IMD), possibly reflecting the fact that all participants came from deprived neighbourhoods.

Table 3.1 Descriptives and correlations with socio-demographic characteristics.

		Ethnicity[a]								
Maltreatment type	M *(SD)*	White	Black	Mixed	Asian	Sex	Age	IQ	IMD	CVE
Emotional abuse	9.66 *(4.72)*	-.12	.12	-.04	.70	.03	.24***	.04	.08	.33***
Physical abuse	7.72 *(4.42)*	-.19**	.26***	-.08	-.05	.03	.13	-.16*	.05	.34***
Sexual abuse	6.04 *(3.38)*	-.07	.10	-.01	-.05	.08	.14*	-.04	.13	.19**
Emotional neglect	10.42 *(4.70)*	-.24***	.23***	-.07	.10	.02	.25***	-.02	.12	.30***
Physical neglect	7.28 *(3.21)*	-.19**	.23***	-.06	.02	.00	.21***	-.09	.10	.37***
Maltreatment total	8.22 *(3.22)*	-.16**	.25***	-.07	.03	.04	.25***	-.06	.12	.39***

N.B. Bivariate correlations significant at: *p <.05, **p < .01, ***p < .001. IMD, Index of multiple deprivation; CVE, Community violence exposure. [a] Ethnicity: White (yes = 1; no = 0); Black (yes = 1; no = 0); Mixed (yes = 1; no = 0); Asian (yes = 1; no = 0).

Interrelationships between maltreatment types

Intercorrelations between maltreatment types are presented in Table 3.2. All maltreatment types were significantly correlated with one another ($p < .001$). Correlation coefficients ranged from .29 to .70. Sexual abuse was the maltreatment type most weakly associated with other maltreatment types. The strongest correlations were found between emotional abuse and emotional neglect, as well as between emotional neglect and physical neglect.

Table 3.2 Intercorrelations between maltreatment types

Maltreatment type	1	2	3	4
1. Emotional abuse	–			
2. Physical abuse	.61	–		
3. Sexual abuse	.38	.29	–	
4. Emotional neglect	.70	.52	.34	–
5. Physical neglect	.65	.59	.35	.70

N.B. all correlations, p < .001.

Prevalence rates

Table 3.3 displays the frequency of each type of maltreatment based on the thresholds specified by the CTQ manual. Emotional abuse and emotional neglect were the most common types, with approximately half of participants reporting at least low levels of

maltreatment in these domains. Physical abuse and physical neglect were reported by over one third of participants (i.e. 'Low' threshold or higher). Sexual abuse was the least common form of maltreatment and was reported by approximately 15% of participants. Of those youth who had experienced maltreatment, most were classified within the 'Low' maltreatment range, followed by the 'Moderate' range. 'Severe' maltreatment occurred in between 7.8% and 13.7% of participants across the different maltreatment types examined.

Rates of multi-type maltreatment (i.e. of poly-victimization) are also shown in Table 3.3. Out of the full sample, 139 youth reported experiencing at least one form of maltreatment at or above the Low CTQ maltreatment severity threshold. Of these maltreated youth, 28.1% reported experiencing one form of maltreatment, while the remaining 71.9% reported experiencing multiple types of maltreatment while growing up. As such, multi-type maltreatment occurred more frequently than the experience of single forms of maltreatment in isolation.

Table 3.3 Prevalence of individual maltreatment types and multi-type maltreatment

	CTQ threshold			
Maltreatment type [a]	None	Low	Moderate	Severe
	% *(N)*	% *(N)*	% *(N)*	% *(N)*
Emotional abuse	52.0 *(106)*	24.5 *(50)*	9.8 *(20)*	13.7 *(28)*
Physical abuse	65.7 *(134)*	13.7 *(28)*	8.8 *(18)*	11.8 *(24)*
Sexual abuse	84.8 *(173)*	4.9 *(10)*	4.9 *(10)*	5.4 *(11)*
Emotional neglect	50.5 *(103)*	29.4 *(60)*	11.3 *(23)*	8.8 *(18)*
Physical neglect	68.6 *(140)*	12.3 (*25)*	11.3 *(23)*	7.8 *(16)*
Number of types [b]				Maltreated youth
1				28.1 *(39)*
2				23.7 *(33)*
3				17.3 *(24*)
4				20.1 *(28*)
5				10.8 *(15)*

[a] Proportion of youth who are classified as having experienced None, Low, Moderate or Severe maltreatment based on CTQ thresholds. N = 204.

[b] Proportion of maltreated youth who have experienced 1 to 5 forms of maltreatment at or above Low maltreatment threshold. N = 139.

Regression analyses

Individual models. Associations between maltreatment types and psychiatric symptoms are displayed in Table 3.4. Individual models show estimates for each maltreatment type when entered as a sole predictor, without controlling for the presence of other maltreatment types. From this model, it is clear that across outcomes, the majority of maltreatment types were significantly and positively associated with psychiatric symptom severity based on other- and self-report ratings, above and beyond the effect of socio-demographic covariates and CVE. There were, however, a number of exceptions. Sexual abuse was least consistently associated with psychiatric symptoms, only predicting other-report externalizing difficulties and self-report PTSD symptoms. Physical neglect and emotional neglect were not associated with other-report externalizing symptoms, and physical neglect was also not associated with self-report anger levels. In contrast, emotional abuse and physical abuse were significantly associated with all outcomes explored. It is particularly note-worthy that findings were consistent across both other- and self-report ratings in the relative contribution of different maltreatment types to internalizing difficulties. Overall, standardized estimates were strongest for emotional abuse, and weakest for sexual abuse.

Simultaneous models. Simultaneous models were then conducted by entering all maltreatment types as predictors concurrently. As such, simultaneous models explore the unique associations between each form of maltreatment and psychiatric symptoms, above and beyond the contribution of socio-demographic variables, CVE and other maltreatment types (see Table 3.4). Across all outcomes except other-report externalizing difficulties, emotional abuse was found to be the sole unique contributor to psychiatric symptoms. Results were consistent across both other- and self-reports of internalizing difficulties. Effect sizes were moderate for anger levels, and large for internalizing difficulties, PTSD and dissociation. None of the maltreatment types were uniquely associated with externalizing difficulties. Therefore, our hypothesis of a unique association between physical abuse and externalizing difficulties was not supported. As a post-hoc analysis we examined whether this finding was due to the fact that we adjusted for past year CVE. Indeed, physical abuse was uniquely associated with externalizing difficulties when CVE was not controlled for ($St.\ B = .29$, $p < .01$).

Table 3.4 Associations between maltreatment types and psychiatric symptoms

	Regression models							
	Individual				Simultaneous			
	B	*(Std B)*	95% CI		*B*	*(Std B)*	95% CI	
Psychiatric symptoms			LL	UL			LL	UL
Other-report								
Internalizing								
Emotional abuse	.27***	(.38)	.16	.38	.29***	(.40)	.12	.46
Physical abuse	.18**	(.23)	.05	.30	.03	(.04)	-.12	.18
Sexual abuse	.14	(.13)	-.03	.32	.04	(.03)	-.14	.21
Emotional neglect	.16**	(.21)	.04	.29	-.10	(-.12)	-.28	.09
Physical neglect	.24**	(.23)	.07	.43	.05	(.05)	-.19	.30
Externalizing								
Emotional abuse	.14*	(.21)	.03	.26	.10	(.15)	-.07	.27
Physical abuse	.15*	(.20)	.03	.27	.11	(.14)	-.04	.26
Sexual abuse	.19*	(.18)	.02	.35	.15	(.14)	-.03	.32
Emotional neglect	.10	(.06)	-.02	.22	-.03	(-.04)	-.22	.16
Physical neglect	.12	(.11)	-.05	.29	-.06	(-.05)	-.30	.19
Self-report								
Internalizing								
Emotional abuse	.47***	(.48)	.34	.60	.51***	(.52)	.31	.71
Physical abuse	.22**	(.20)	.06	.38	-.10	(-.10)	-.28	.08
Sexual abuse	.18	(.14)	-.01	.38	-.00	(-.00)	-.18	.18
Emotional neglect	.31***	(.31)	.17	.45	-.04	(-.04)	-.24	.16
Physical neglect	.44***	(.29)	.22	.65	.10	(.07)	-.18	.35
Anger								
Emotional abuse	.35***	(.29)	.17	.52	.34**	(.28)	.08	.60
Physical abuse	.26**	(.20)	.07	.46	.10	(.08)	-.13	.34
Sexual abuse	.03	(.17)	-.21	.27	-.11	(-.07)	-.35	.13
Emotional neglect	.25**	(.20)	.07	.43	.06	(.05)	-.20	.33
Physical neglect	.24	(.14)	-.04	.51	-.16	(-.09)	-.54	.21
PTSD								
Emotional abuse	.69***	(.49)	.51	.87	.76***	(.54)	.49	1.03
Physical abuse	.37***	(.24)	.15	.59	-.06	(-.04)	-.31	.19
Sexual abuse	.33*	(.17)	.06	.60	.08	(.04)	-.17	.33
Emotional neglect	.42***	(.29)	.22	.62	-.11	(-.08)	-.38	.17
Physical neglect	.59***	(.27)	.29	.90	.06	(.03)	-.33	.44
Dissociation								
Emotional abuse	.52***	(.41)	.35	.70	.67***	(.52)	.41	.93
Physical abuse	.24*	(.17)	.03	.45	-.05	(.04)	-.29	.18
Sexual abuse	.10	(.13)	-.15	.35	-.09	(-.05)	-.34	.15
Emotional neglect	.27**	(.22)	.10	.47	-.06	(-.05)	-.33	.21
Physical neglect	.30*	(.15)	.01	.59	-.16	(-.08)	-.54	.22

N.B. All models control for sex, ethnicity, age, IQ and IMD. Adjusted estimates additionally control for past year community violence exposure (CVE). †p <.05, **p < .01, ***p < .001.

3.5. Discussion

The present study is the first, to our knowledge, to examine unique associations between different forms of childhood maltreatment and psychiatric symptoms, over and above the contribution of socio-demographic characteristics, neighbourhood deprivation and current levels of community violence exposure. We found that all forms of childhood maltreatment were positively associated with exposure to violence in the community. Maltreatment types were highly interrelated and frequently co-occurred with one another. With few exceptions, when examined separately (individual models), all maltreatment types were significantly associated with the mental health outcomes explored. However, the majority of associations failed to reach significance when maltreatment types were examined concurrently (simultaneous models). Contrary to our prediction, no unique association was found between physical abuse and externalizing difficulties. Emotional abuse emerged as the sole unique contributor to internalizing difficulties and trauma-related symptomatology.

Interrelationships and co-occurrence of maltreatment types

In line with recent recommendations by Herrenkohl and Herrenkhol (2009), a number of descriptive statistics were reported so as to facilitate comparability between our findings and those of other studies examining maltreatment types. These were: (i) the strength of correlations between maltreatment types; and (ii) frequency rates for each maltreatment type as well as the frequency of multi-type maltreatment. Maltreatment types were found to be positively and significantly correlated with one another. The magnitude of associations was very similar to that reported by a small set of existing studies reviewed by Herrenkhol and Herrenkohl (2009). In line with a previous review of the literature, sexual abuse was found to be most weakly associated with other forms of maltreatment (see Higgins & McCabe, 2001, for a review), while other maltreatment types were strongly interrelated. The present findings add to the growing body of literature documenting the large degree of overlap between maltreatment types, and consequently the importance of measuring multiple forms of maltreatment concurrently.

When we examined prevalence rates for each maltreatment type (i.e. regardless of whether or not it co-occurred with other forms of maltreatment), we found that emotional abuse and emotional neglect were the most frequently experienced forms of maltreatment, followed by physical abuse, physical neglect and sexual abuse. These

findings are consistent with a number of studies showing that emotional abuse is a particularly prevalent form of developmental adversity, even though it continues to be underreported compared to other maltreatment types due to difficulties with its definition and operationalization (Chamberland, Fallon, Black, & Trocmé, 2011; Schneider, Ross, Graham, & Zielinski, 2005; Trickett, Mennen, Kim, & Sang, 2009). Second, we examined prevalence rates of single- and multi-type maltreatment by calculating the frequency of maltreated youth who reported experiencing 1-5 types of maltreatment while growing up. We found that, amongst maltreated youth, approximately one in four experienced only one form of maltreatment alone. As such, experience of multi-type maltreatment occurred more frequently than the experience of single forms of maltreatment. These findings are in line with studies indicating that, amongst maltreated individuals, multi-type maltreatment may often be the norm, rather than the exception (Finkelhor et al., 2007a; Herrenkohl & Herrenkohl, 2009).

Shared versus unique effects of maltreatment types

In the present study we compared the effects of maltreatment types making use of two different approaches. First, we examined associations between maltreatment types and outcomes by entering each form of maltreatment separately as an independent predictor (individual approach). Second, we examined unique associations between maltreatment types and outcomes by entering all forms of maltreatment concurrently, so as to control for shared variance between them (simultaneous approach). With few exceptions, examining maltreatment types individually resulted in significant associations between each form of maltreatment and mental health outcomes. Emotional and physical abuse were found to be consistently associated with elevated symptoms across all outcomes explored. In contrast, associations between sexual abuse and outcomes were generally weaker and significant only for externalizing difficulties and PTSD symptoms.

The majority of associations found in the individual models failed to reach significance once all maltreatment types were examined concurrently (i.e. simultaneous models). These results suggest that the significant associations found in the individual models may have been driven by intercorrelations between different forms of maltreatment. The findings also clearly demonstrate that failure to account for multiple forms of maltreatment can result in the overestimation of unique effects attributed to specific maltreatment types. Although this limitation has been noted conceptually

within the literature (Herrenkhol & Herrenkhol, 2009; Higgins & McCabe, 2001), very few studies have explicitly documented this change in associations making use of both individual and simultaneous approaches (e.g. Torchalla et al., 2012). Previous studies have generally examined distinct forms of maltreatment individually. Even when multiple maltreatment types have been examined concurrently, studies have varied in the number of maltreatment types assessed. As evidenced by the current findings, such differences across studies may in part explain why generic, non-specific associations between maltreatment types and outcomes have sometimes been reported, while other times differential and unique associations have been found. For example, based on our individual models, internalizing difficulties were found to be significantly associated with all maltreatment types, thus supporting a more 'generic' model of maltreatment effects on mental health functioning. In contrast, simultaneous models showed that only one type of maltreatment, emotional abuse, was uniquely predictive of internalizing difficulties, thereby also supporting a 'differential' role for this type of maltreatment in predicting internalizing difficulties. It is important for future studies to consider how the use of different analytical strategies may impact findings when investigating the effects of maltreatment types.

Physical abuse and externalizing difficulties

Against expectations, we found no evidence of a unique association between physical abuse and externalizing difficulties in our simultaneous model. This finding contrasts a robust body of literature documenting an independent effect of physical abuse on externalizing outcomes, including conduct problems and delinquency (Litrownik et al., 2005; McGee et al., 1997; Petrenko et al., 2012; Taussig, 2002). However, the present study differed from others in one key respect, by adjusting for current levels of CVE. In fact, when we conducted a post-hoc analysis and repeated the model without controlling for CVE, a unique association between physical abuse and externalizing difficulties was indeed found. These findings indicate that it is important to measure current exposure to violence when examining the association between physical abuse and externalizing difficulties. Findings also suggest that researchers should be mindful of the processes that may link physical abuse, CVE and externalizing difficulties. On the one hand, CVE may mediate the association between physical abuse and later externalizing problems. For example, it is possible that physical abuse may increase vulnerability to CVE (e.g.

via lack of parental supervision, school absence, substance use, affiliation with delinquent peers), which in turn increases risk for externalizing difficulties (Cicchetti & Toth, 2005; Maas et al., 2008). On the other hand, it is also possible that physically abused youth may be more vulnerable to CVE *because* they have greater externalizing difficulties. A clearer understanding of longitudinal bidirectional associations between physical abuse and CVE is needed so as to refine prevention and intervention targets aimed at reducing externalizing difficulties amongst physically abused youth.

Emotional abuse as a sole independent contributor to mental health outcomes

In the present study, emotional abuse emerged as the sole unique contributor to internalizing difficulties and trauma related symptomatology, including anger, post-traumatic stress and dissociation.

Although available data is sparse, our findings of a unique association between emotional abuse and internalizing difficulties are consistent with those reported by a small number of studies (Arata et al., 2007; McGee et al., 1997). Interestingly, a study by Edwards and colleagues (2003) reported that, in addition to independently predicting symptoms of anxiety and depression, emotional abuse also served to heighten the effect of other maltreatment types. It has been suggested that emotional abuse may be a particularly important risk factor for internalizing problems because it negatively impacts the development of the self-system (McGee et al., 1997). For example, prolonged experience of denigration may cause a child to internalize parental criticisms, which may contribute to low self-esteem and negative perceptions of the self (Briere & Runtz, 1990). Moreover, experiencing intense negative affect by parents may impair the child's own capacity to self-regulate, which may further increase risk for internalizing difficulties (McGee et al., 1997). In their study, Kent, Waller, and Dagnan (1999) also suggested that the uncertainty surrounding emotionally abusive experiences may give rise to feelings of anxiety. More specifically, they posited that, compared to physical and sexual abuse, emotional abuse may be characterized by more ambiguous and unpredictable precipitants, thereby increasing arousal and exacerbating the child's perception of vulnerability.

Second, we found that emotional abuse was uniquely associated with anger levels. We are aware of only one study to date that has explored the effects of multiple

maltreatment types on anger levels. Hoglund and Nicholas (1995) found that adults who had experienced emotional abuse were more likely to engage in both forms of overt and covert anger as well as displaying greater levels of hostility. The authors concluded that emotional abuse represented a major contributing factor to anger difficulties, especially when combined with physical abuse. Potential mechanisms underlying this association, however, were not considered. It is possible that difficulties in emotional arousal and affect regulation that increase risk for depression and anxiety amongst emotionally maltreated individuals may also contribute to difficulties in managing feelings of anger. However, more research will be needed to clarify processes underlying the association between emotional abuse and anger.

Third, we found that emotional abuse was independently associated with PTSD symptoms. These findings are particularly puzzling. Given that a diagnosis of PTSD requires the presence of acute and potentially life-threatening stressors, it would seem counter-intuitive that emotional abuse, rather than physical or sexual abuse, would uniquely predict PTSD symptoms. Although most of the extant literature on PTSD has focussed on the impact of physical and sexual abuse, a small number of studies that have assessed emotional abuse have reported similar findings to ours. Spertus, Yehuda, Wong, Halligan, and Seremetis (2003) found that emotional abuse independently predicted PTSD symptomatology, over and above the effects of other forms of maltreatment. Furthermore, a study by Sullivan and colleagues (2006), found that emotional abuse was the only maltreatment type to be uniquely associated with severity of PTSD symptom clusters (arousal, avoidance and numbing) as well as overall levels of posttraumatic stress. Reasons for such an association are unclear. On the one hand, it is possible that emotional abuse, particularly when it involves the use of coercive and threatening behaviours, may directly trigger PTSD symptoms by instilling fear in the child. For example, threatening behaviour may cause a child to fear retribution, re-victimization or the infliction of harm to others. Alternatively, it is possible that emotional abuse may increase risk for post-traumatic stress via a more indirect route. For example, it has been proposed that emotional abuse may be inversely related to social support, which has been found to act as a protective factor against PTSD symptomatology (e.g. Brewin & Holmes, 2003). Another possibility is that emotional abuse may indirectly cause posttraumatic stress by increasing risk of lifetime exposure to traumatic events (Spertus et al., 2003). Future studies are needed to explore the possible processes that may underlie such an association, as these may carry important

implications for diagnostic evaluation, risk assessment, and treatment formulation in relation to youth experiencing post-traumatic stress.

Finally, the present study found that emotional abuse uniquely contributed to dissociative symptoms. Dissociation involves the disruption of processes essential for the integration of consciousness, memory, perception and identity (Simeon, Guralnik, Schmeidler, Sirof, & Knutelska, 2001). As with PTSD research, the literature on dissociation has focussed principally on the impact of physical and sexual abuse. However, a small number of studies have reported that emotional abuse uniquely impacts levels of dissociation (Şar, Akyüz, Kundakçi, Kiziltan, & Doğan, 2004; Simeon et al., 2001). Furthermore, Kent and colleagues (1997) found that the emotional abuse was the only maltreatment type to uniquely predict disordered eating behaviours, and that this association was fully mediated by levels of anxiety and dissociation. It is possible that by causing disruptions to the development of the self-system, emotional abuse leads to a more fragmented sense of self. Alternatively, it is possible that youth who have experienced more chronic or severe emotional abuse may have begun to dissociate as an adaptive coping strategy in response to an emotionally harmful environment. As with the other outcomes outlined above, future research will be needed to elucidate processes underlying the association between emotional abuse and dissociation.

Why emotional abuse?

Together, findings from our study as well as others point to emotional abuse as a particularly detrimental form of maltreatment and as a robust predictor of mental health difficulties. These findings raise the question as to why emotional abuse in particular would impact individual functioning, over and above the effect of other maltreatment types. Beyond the specific reasons outlined above, there is a need to understand more generally what makes emotional abuse 'distinctive' compared to other maltreatment types. One major issue that needs to be addressed is whether emotional abuse uniquely predicts negative outcomes because it is simply more harmful than other maltreatment types, or whether other mechanisms may be at play. On the one hand, it is possible that emotional abuse alone may carry more profound effects than other maltreatment types. One line of argument would hold that in addition to being characterized by low levels of

parental warmth and support (Nicholas & Bieber, 1996), the experience of emotional abuse may also serve to decrease the availability of emotional scaffolding and social support necessary for coping with co-occurring forms of maltreatment. In fact, it has been previously found that physically abused individuals who rated caregivers as being more emotionally supportive were less likely to develop internalizing difficulties in adulthood compared to individuals who reported experiencing low parental warmth (Wind & Silvern, 1994). An alternative line of argument could contend that the reason emotional abuse is so strongly associated with mental health outcomes is because it indexes something that lies at the core of all maltreatment types (Hart & Brassard, 1987; Navarre, 1987). For example, physical abuse, sexual abuse and neglect are all likely to instil in the child a belief that they are worthless or unloved, both of which meet definitional criteria for emotional abuse (UK Department for Education, 2013). If this were to be the case, then it would be unsurprising that effects attributed to different forms of maltreatment would fail to reach significance once the variance they share with emotional abuse is controlled for. Importantly, this explanation would also indicate that it is the experience of feeling worthless or unloved that is potentially the most toxic outcome of any maltreatment type. Further research is required to try to disambiguate these possible explanations.

Currently available instruments significantly limit our ability to tease out what is driving the effects of emotional abuse in the current study. While the Childhood Trauma Questionnaire (CTQ) is a widely used and well-validated measure of childhood maltreatment, it includes only five items related to emotional abuse. Of these, two describe behaviourally specific acts of emotional abuse (calling names, saying hurtful things), two describe feelings that may not only index emotional abuse but may also be secondary to other maltreatment types (feeling hated, thinking that parents wished they were never born), and the last item measures subjective appraisals of the abuse ('I believe I was emotionally abused'). This combination of items is problematic for two reasons. First, it makes it difficult to disentangle whether effects observed may result from items that are specific to emotional abuse or from those that may apply more generally to all forms of maltreatment. Second, it makes it difficult to discern whether the effects of emotional abuse may be driven by objective behaviours as opposed to more subjective appraisals of the abuse. Both of these limitations need to be addressed in future in order to clarify the processes by which emotional abuse exerts a unique effect on mental health.

Limitations

The present findings should be interpreted in light of a number of limitations. First, our measure of maltreatment was based on self-reports, which are particularly susceptible to retrospective biases. Although these may have been present, a recent study found that the use of retrospective versus prospective reports of maltreatment resulted in comparable associations with psychopathological outcomes (Scott et al., 2012). Second, the fact that maltreatment, CVE and a proportion of outcomes were reported by youth themselves raises the possibility of shared method variance. It is note-worthy, however, that results across reporters were highly consistent regarding the relative contribution of different maltreatment types to internalizing difficulties, both within individual and simultaneous models. Third, because of the instrument of maltreatment used in the current study, we were unable to clarify which aspects of emotional abuse drive the unique associations with psychiatric symptoms observed. Fourth, the study was based on a community sample of high-risk youth; as such, findings may not generalize to the wider population. Finally, our data supports a causal role of emotional abuse on mental health difficulties; however, the cross-sectional nature of our study precluded the possibility of establishing the directionality of effects observed.

Implications and future directions

Despite these limitations, the findings from the present study have a number of implications. First, evidence of a strong interrelationship between maltreatment types underscores the importance of recognizing the large degree of overlap between different forms of maltreatment. In a research context, it is critical for empirical studies wishing to examine unique effects to assess all maltreatment types concurrently so as to account for the shared variance between them. In a clinical context, practitioners should be particularly aware that experiencing one form of maltreatment increases the likelihood of other ones occurring, and that multi-type maltreatment may be more common amongst maltreated individuals than the experience of single forms of maltreatment. Consideration of these factors may be especially relevant for risk assessment, the identification of more comprehensive maltreatment profiles, and the development of strategies designed to reduce risk for re-victimization amongst maltreated individuals.

Second, the recent findings point to the need to consider current levels of community violence exposure when investigating the effects of childhood maltreatment. In our study, associations between history of physical abuse and externalizing difficulties were no longer significant after adjusting for current exposure to community violence. Such results highlight the importance of accounting for multiple forms of developmental adversity in order to shed light into the complex interplay of environmental risk factors on mental health outcomes. This is particularly relevant for studies measuring maltreatment based on retrospective reports in older youth, as these same youths may be particularly vulnerable to experiencing CVE. Future studies would also benefit from including additional environmental risk factors (e.g. intimate partner violence, peer victimization) in order to examine whether these influence the effects of maltreatment types on mental health outcomes. Longitudinal research will also be needed to clarify bidirectional associations between physical abuse and CVE in the development of externalizing difficulties.

Finally, the fact that emotional abuse was found to be the sole independent contributor to psychiatric symptoms highlights the fundamentally damaging impact of emotional abuse on individual functioning. Findings from the present study are particularly disconcerting given that emotional abuse is highly prevalent yet often overlooked within research, policy and clinical circles (Rees, 2010; Simeon et al., 2001). Emotional abuse may be under-recognized for a number of reasons. Compared to other forms of maltreatment, the definition, operationalization and measurement of emotional abuse continues to pose particular challenges (Rees, 2010). Definitions have varied not only across research, clinical and legal contexts, but also across countries and jurisdictions, hampering efforts to gauge the scope of the problem. The use of different terms to describe emotional abuse in the empirical literature has also limited comparability of findings across studies (Sullivan et al., 2001). In terms of measurement, it has been difficult to identify specific behaviours that comprehensively capture the construct of emotional abuse (Tonmyr et al., 2011). Furthermore, compared to physical and sexual abuse, it has been particularly challenging to craft appropriate thresholds parameters around emotional abuse; that is, to establish where normative parenting ends and maltreatment begins (Wekerle, 2011). Another reason for lack of awareness of emotional abuse, however, stems from misconceptions about the severity and impact of this form of maltreatment on developmental outcomes (Rees, 2010). This may be due to the fact that, compared to other maltreatment types, the signs of

emotional abuse may not be as overtly visible and may not strictly constitute an imminent danger to the child (Chamberland et al., 2011).

Despite this, the present findings are consistent with an emerging body of literature pointing to emotional abuse as a highly detrimental form of maltreatment that necessitates greater attention in research, policy and clinical practice. More research is needed to clarify how emotional abuse relates to other forms of maltreatment. For example, it is important to establish whether emotional abuse represents a separate entity or whether it truly lies at the core of all forms of abuse and neglect. Furthermore, it is important to identify what features of emotional abuse drive the observed effects on mental health functioning. This will require the use of measures that enable to (i) disentangle features that are unique to emotional abuse, versus those that may be secondary to all maltreatment types (e.g. feeling unloved or unwanted), and (ii) separate the effects of objective versus subjective appraisals of the abuse (e.g. behavioural acts such as shouting vs. subjective beliefs about being abused). Such distinctions are essential for elucidating the role of emotional abuse both within other maltreatment types as well as in the sequelae of maltreatment.

Undoubtedly, results underscore the need for greater investment in evidence-based prevention strategies that act to reduce prevalence of emotional abuse, thereby decreasing risk for later mental health difficulties. In terms of risk assessment, clinicians should be aware of the key role of emotional abuse in the manifestation of a broad range of negative outcomes, including internalizing difficulties and trauma-related symptomatology. The implementation of initiatives designed to foster parental warmth, parenting skills and positive parent-child interactions may be particularly effective in counteracting the consequences of emotional abuse and preventing future experience of victimization (Iwaniec et al., 2007). Given that emotional abuse may impact individual functioning primarily by disrupting the developing self-system, tailored programmes that help to build children's self-esteem and self-image may also be instrumental in reducing risk for mental health problems, particularly internalizing difficulties (Briere & Runtz, 1990; Doyle, 1997, 2003).

3.6. Conclusions

In the present chapter we described the first study, to our knowledge, to examine unique associations between different forms of childhood maltreatment and psychiatric symptoms, over and above the contribution of socio-demographic characteristics, neighbourhood deprivation and current levels of community violence exposure. Maltreatment types were found to be highly interrelated and often co-occurred with one another. Amongst maltreated youth, experience of multi-type was found to occur more frequently than the experience of single forms of maltreatment. While most maltreatment types were significantly associated with psychiatric symptoms when examined individually, few unique effects were observed when modelling all maltreatment types simultaneously. Contrary to expectations, physical abuse was not uniquely associated with externalizing difficulties, when accounting for current exposure to community violence. Emotional abuse emerged as the sole unique predictor of internalizing difficulties and trauma-related symptomatology, including levels of anger, post-traumatic stress and dissociation. These findings indicate that emotional abuse may represent a key risk factor for poor mental health functioning. Greater awareness of the impact of emotional abuse is needed, as it represents a highly prevalent yet often overlooked form of maltreatment within research, policy and clinical practice.

CHAPTER 4: Associations between variants of callous-unemotional traits, childhood maltreatment and markers of individual functioning

Childhood maltreatment has been associated with a broad range of psychopathological outcomes. More recently, the experience of maltreatment has been implicated in the development of callous-unemotional (CU) traits in youth; however, the literature remains largely mixed. Inconsistencies may be partially attributable to the fact that youth with high CU traits are typically examined as a single aetiological entity, yet newly emerging data suggest that the origin of these traits may vary in different youth. In line with the adult literature on psychopathy, it has been proposed that two variants of CU traits exist: Primary (without co-occurring anxiety) and Secondary (with co-occurring anxiety). These variants are thought to underlie different aetiological processes, with the primary variant reflecting primarily constitutional and genetic influences, while the secondary variant reflecting principally environmental influences. However, little empirical data is currently available regarding associations between variants of CU traits and childhood history of abuse and neglect. Moreover, evidence is limited regarding potential differences between variants across a wide range of functional domains. Finally, it is unclear how youth with high CU and high anxiety (i.e. Secondary CU) may differ from youth who only present with high anxiety. In the present chapter, we describe a study where we examined differential associations between CU variants, history of childhood maltreatment and broad markers of individual functioning. Because of the high prevalence of maltreatment, the sample used was optimally suited for the aim of the study. Making use of generalized linear models, we found that secondary, but not primary CU was associated with elevated experiences of childhood maltreatment, increased psychopathology, attachment insecurity, affective dysregulation and behavioural risk markers. Variants did not differ in levels of externalizing difficulties. Overall, maltreatment history and profile of individual functioning were comparable between youth with secondary CU and youth presenting with high anxiety, but low CU traits. Findings suggest that (i) childhood maltreatment is a key factor in the discrimination of primary and secondary CU variants, and (ii) differences in individual functioning associated with each variant point to the need for more tailored clinical assessment tools and intervention strategies.

4.1. Introduction

Psychopathy is a personality disorder characterized by a constellation of affective, interpersonal and behavioural features (e.g. lack of empathy and remorse, deceptiveness, and irresponsibility) (Cleckley, 1941; Lilienfeld, 1998). Psychopathy has received considerable attention in research, legal and clinical settings as a robust risk factor for persistent antisocial behaviour (Hare, 1998). A central debate relates to whether psychopathy represents a unitary or multifarious construct. Although psychopathic individuals are often regarded as emotionally stable and low in anxiety, a number of studies have shown them to vary in their levels of trait anxiety (Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003). It has been proposed that two variants of psychopathy underlie such group heterogeneity. *Primary* psychopathy is defined by low anxiety and stress resilience (Cleckley, 1976), while *secondary* psychopathy is characterised by high levels of negative emotionality and psychological distress (Karpman, 1941). Importantly, these two variants are hypothesized to reflect distinct aetiological processes, the first being primarily shaped by heritable and constitutional factors while the second is thought to be principally influenced by environmental factors, in particular childhood maltreatment (Karpman, 1948; Porter, 1996). Several studies have validated the distinction of psychopathy variants in adults based on levels of anxiety (Poythress et al., 2010; Skeem, Johansson, Andershed, Kerr, & Louden, 2007; Swogger & Kosson, 2007). Such studies have established that secondary, but not primary psychopathy is associated with childhood trauma as well as a number of comorbid difficulties, including increased anger, substance use, impulsivity, suicidal ideation and vulnerability to psychopathology (Skeem et al., 2003). It is important to highlight that these primary and secondary variants have not been found to differ in their levels of psychopathic traits or antisocial behaviour (e.g. Hicks, Markon, Patrick, Krueger, & Newman, 2004). It therefore appears that although these variants represent 'behavioural phenocopies' in terms of psychopathic traits and antisocial behaviour, they may be characterised by different causal pathways and patterns of comorbid difficulties. Given that a psychopathy 'diagnosis' can be used to inform risk assessment, treatment options and legal decisions, both in clinical and criminal settings, the existence of variants may carry important implications for policy and practice and requires further attention (Skeem, Polaschek, Patrick, & Lilienfeld, 2011).

Assessment of psychopathic traits has in recent years been extended to child and adolescent populations. The research and clinical interest in these traits in youth stems from findings that adults with psychopathy often show a pattern of behavioural and affective maladjustment that can be traced back to childhood (Patrick, 2007). Callous-unemotional (CU) traits (e.g. lack of guilt and empathy) are believed to distinguish a particularly problematic and severe sub-group of youth with conduct disorder at greater risk of developing adult psychopathy (Frick & Viding, 2009). CU traits parallel the distinct affective features of adult psychopathy (Frick, 2009) and are considered more stable and less 'normative' in youth, compared to other traits associated with adult psychopathy (e.g. irresponsibility) (Herpers, Rommelse, Bons, Buitelaar, & Scheepers, 2012). An emerging body of research has provided support for a distinction between primary and secondary variants of CU traits in youth and children (e.g. Humayun & viding, In press; Kahn, Frick, et al., 2013; Kimonis, Frick, Cauffman, Goldweber, & Skeem, 2012; Vaughn et al., 2009). Consistent with the adult literature, these studies have found that the secondary variant is characterised by more severe trauma history and clinical symptomatology. However, a number of important gaps have yet to be addressed in the study of variants of CU traits in youth. First, the majority of youth studies have been based on forensic populations (e.g. incarcerated juvenile offenders). It is not clear whether these findings generalize to community samples. Second, variants have generally been identified based on self-report measures; it is unclear whether comparable findings emerge when CU traits are estimated on the basis of external report. Third, studies that have examined associations between childhood maltreatment and psychopathic trait variants have generally relied on global measures of childhood adversity that lack descriptive power (e.g. yes/no items; maltreatment measured together with other traumatic experiences). Whether specific forms of maltreatment (e.g. abuse versus neglect) may be differentially related to variants of CU traits is therefore unclear. Finally, both adult and youth studies have typically made used of a generic 'non-psychopathic' reference group (i.e. not disaggregated by level of anxiety), which has limited the ability to provide meaningful comparisons between variants and youth low in psychopathic traits. Importantly, little is known regarding potential differences between variants across a wide range of functional domains that may be clinically relevant for informing risk assessment and intervention strategies.

4.1.1. The current study

We studied a community sample of high-risk youth and young adults. We exclusively examined CU traits as they are most closely related to the distinct affective features of adult psychopathy. In order to establish the validity and clinical utility of CU variants, we investigated differences in relation to history of childhood maltreatment and broad markers of individual functioning, including psychological distress and psychiatric symptoms, behavioural risk, affective functioning and attachment style. To allow for more valid contrasts we compared the two groups of youth with high CU traits (Primary CU group: high CU/non-anxious; Secondary CU group: high CU/anxious) with two clinically relevant reference groups (Low group: low CU/non-anxious; Anxious group: low CU/anxious). We predicted that, compared to the primary CU group, the secondary CU group would: (i) be characterised by more severe experiences of childhood maltreatment; (ii) present with greater levels of psychological distress and psychiatric symptomatology but not differ in relation to externalising problems; (iii) present with significantly elevated behavioural markers of clinical risk. No a priori hypotheses were made regarding affective functioning or attachment style.

4.2. Methods

4.2.1. Participants

The current sample draws from a larger study (n = 204) examining the effects of developmental adversity on individual functioning amongst socially deprived youth and young adults aged 16 to 24 years. In the present study, only participants for whom information was available for both CU traits and anxiety were included (n = 155). Out of the 155 participants included, 54% (n = 84) were recruited at Kids Company charity. The other 46% (n = 71) of participants were recruited via a number of London-based secondary schools. Of the total sample, 80% of participants were under the age of 20 years (M = 18) and 54% were females (N = 84). The sample was ethnically diverse, with 51% Caucasian, 42% Black, 7% 'Other' participants. Please refer to Chapter 2 for in depth details of the sample. Youth with complete information on CU (i.e. reduced sample) were significantly younger and had on average lower IQ than youth without CU information.

4.2.2. Procedure

All procedures were approved by University College London's (UCL) Research Ethics Committee (ID No: 2462/001). Testing took place in a quiet room within Kids Company, or the young person's school depending on recruitment source (see Chapter 2 for full details).

4.2.3. Measures

4.2.3.1. Socio-demographic covariates

Individual-level data on age, sex, ethnicity and IQ were collected from all participants. Cognitive ability was assessed using the two-subtest version of the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999). None of the participants in the sample scored below 70 or above 125 on the WASI. An Index of Multiple Deprivation (IMD) was obtained using post-code information as an indicator of neighbourhood deprivation (see Chapter 2). Higher values indicate female gender, non-white ethnicity, older age, higher cognitive ability and greater neighbourhood deprivation.

4.2.3.2. Indicator variables

Callous-Unemotional Traits

Teachers or key workers completed the Inventory of Callous Unemotional traits (ICU; Frick, 2004), which measures callous, uncaring and unemotional traits using 24 items rated on a 4-point likert scale ranging from '*not at all*' to '*definitely true*' (e.g. "seems very cold and uncaring"). The scale shows good construct and predictive validity (Kahn, Byrd, & Pardini, 2013). Consistent with other studies (e.g. Kimonis, Frick, Munoz, & Aucoin, 2008), item 2 and 10 were removed due to low corrected inter-total correlations. The remaining 22 items were summed to form a total scale, showing good internal consistency in this sample (α = .90).

Trait Anxiety

Participants completed the *Anxiety* scale from the Trauma Symptom Checklist for Children (TSCC-A; Briere, 1996). The TSCC-A is a 44-item self-report inventory that includes 5 clinical scales (anxiety, depression, post-traumatic stress, anger and dissociation) and 2 validity scales (under- and hyper-response). Each item is rated on a 4-point scale from '*never*' to '*almost all of the time*'. Construct, convergent and discriminant validity have been well-established using child and adolescent samples (Briere, 1996; Sadowski & Friedrich, 2000). The Anxiety scale contains 9 items and includes statements such as "worrying about things" (α = .86).

4.2.3.3. External correlates

Childhood maltreatment

Childhood maltreatment was assessed using the Childhood Trauma Questionnaire – Short Form (CTQ; Bernstein & Fink, 1998). The CTQ is a 28-item self-report measure screening for experiences of maltreatment "while growing up". Items are rated on a 5-point scale from 'never true' to 'very often true' (e.g. "people in my family hit me so hard that it left me with bruises or marks"). The CTQ comprises 5 subscales measuring emotional abuse, physical abuse, sexual abuse, emotional neglect and physical neglect. The scales show high internal consistency in our sample (α = .70 – .97) and good overall convergent and discriminant validity (Bernstein et al., 2003). Higher scores represent more severe experience of childhood maltreatment.

Psychiatric symptoms

Psychiatric symptoms were measured using both self-report and externally reported instruments. Symptoms of depression, anger, post-traumatic stress and dissociation were assessed using the self-report clinical scales from the Trauma Symptom Checklist for Children, as described above (TSCC-A; α =.84 –.87). Statements included "feeling sad or unhappy" (depression), "wanting to yell or break things" (anger), "remembering things I don't want to remember" (post-traumatic stress), and "my mind going empty or blank" (dissociation).

In addition, teachers or key workers completed the Strength and Difficulties Questionnaire (SDQ; Goodman, 1997). The SDQ comprises of 25 items organized into 5 subscales: conduct problems (e.g. "often fights with others or bullies them"; α =.77), hyperactivity (e.g., "sees tasks through to the end, good attention span"; α =.85), peer problems (e.g., "has at least one good friend"; α =.57), emotional problems (e.g., "often unhappy, down-hearted or tearful"; α =.82), and prosocial behaivour (e.g., "helpful if someone is hurt, upset or feeling ill"; α =.76). Each item is rated on a 3-point scale from *'not true'* to *'certainly true'*. The SDQ is a widely used screening instrument in the UK with demonstrated reliability and validity (Goodman, 2001). Higher scores on both instruments indicate greater psychiatric symptomatology.

Behavioural risk-taking

Behavioural risk-taking was measured making use of a number of self-report instruments and single items. First, substance use was assessed via the Alcohol Use Disorders Identification Test (AUDIT; Babor, De la Fuente, Saunders, & Grant, 1989) and the Drug Use Disorders Identification Test (DUDIT; Berman, Bergman, Palmstierna, & Schlyter, 2007). The AUDIT and DUDIT include 10 and 11 items respectively, measuring substance use (e.g. frequency and quantity), harmful use (e.g. sustaining injury) and symptoms of dependence (e.g. impaired control over use). The first items are rated on a 5-point scale ranging from 'never' to 'daily or almost daily'. The last two items from each scale are rated on a 3-point scale and are coded as 0 ('no'), 2 ('yes, but not during the last year') or 4 ('yes, during the last year'). Chronbach's alphas for the AUDIT and DUDIT were .82 and .90, respectively. Both measures have been shown to have good concurrent validity (Durbeej et al., 2010).

In addition, participants were administered three yes/no items from the Youth Risk Behaviour Survey (YRBS; Eaton et al., 2008). The first two items asked about suicidal ideation ("during the past 12 months, did you ever seriously consider attempting suicide?") and planning ("during the past 12 months, did you make a plan about how you would attempt suicide?"). The third item asked about sexual safety ("the last time you had sexual intercourse, did you or your partner use a condom?"). Participants who reported not having had sexual intercourse were excluded from analysis of this item (n = 42).

Affective functioning

Affective functioning was measured via self-report ratings of irritability and alexithymia. The Affective Reactivity Index (ARI; Stringaris et al., 2012) includes six items and measures irritability, including statements such as "easily annoyed by others" and "often lose temper". Participants are asked to use a 3-point Likert scale ('not true' to 'certainly true') to rate how well each statement applies to them during the past six month period, and compared to others of the same age. The scale has been validated using child and adolescent samples both in the US and in the UK (Stringaris et al., 2012). Items were summed to form a total score, with adequate internal consistency (α = .88). Higher scores indicate greater irritability.

The fist factor from the Toronto Alexithymia Scale (TAS-F1; Bagby, Parker, & Taylor, 1994) was used to assess difficulty in the ability to identify one's own feelings and to distinguish them from bodily sensations signalling emotional arousal. The scale comprises of 7 items rated on a 5-point scale from 'I strongly disagree' to 'I strongly agree' (α = .89). Statements include "I am often confused about what emotion I am feeling" and "when I am upset, I don't know if I am sad, frightened, or angry". The scale has shown good construct validity using a large community sample (Parker, Taylor, & Bagby, 2003). Higher scores indicate greater difficulty in identifying feelings.

Attachment style

The Experiences in Close Relationships Inventory (ECR; Brennan, Clark, & Shaver, 1998) was used as a self-report measure of attachment insecurity to close others. The ECR was developed from a factor analysis of multiple attachment questionnaires, and comprises of two 18-item scales, Anxiety (e.g. "I worry about being abandoned"; α = .92) and Avoidance (e.g. "I try to avoid getting to close to others"; α = .91). Because we were particularly interested in disorganized attachment (i.e. high anxiey and high avoidance), we analysed categorical scores derived using a median split approach, consistent with Bartholomew and Horowitz's model (Bartholomew & Horowitz, 1991; Welch & Houser, 2010). More specifically, participants were defined as (i) Secure, if scoring below midpoint on both scales (30% of total sample), (ii) Anxious, if above midpoint on the Anxiety scale only (16%), (iii) Avoidant, if scoring above midpoint on the Avoidant scale only (26%), and (iv) Disorganized, if scoring above midpoint on

both scales (28%). The ECR has been widely used in adolescent and adult samples, showing good reliability and validity (e.g. Sibley, Fischer, & Liu, 2005).

4.3. Statistical analyses

A number of studies using model-based cluster analysis have reliably shown that adults and youth high on affective-interpersonal/callous-unemotional traits can be distinguished on the basis of co-occurring anxiety, without differing on levels of psychopathic traits per se (e.g. Kimonis et al., 2012). In the present study, we disaggregated variants using a median split approach, which resulted in four categorical groups: (i) 'Low', if scoring below midpoint on both measures of CU and anxiety (23%, n = 36); (ii) 'Anxious', if scoring above midpoint on anxiety only (25%, n = 45); (iii) 'Primary CU', if scoring above midpoint on CU only (23%, n = 36); and (iv) 'Secondary CU' if scoring above midpoint on both measures of CU and Anxiety (29%, n = 45). In contrast to past studies, this method enabled us to compare variants with two different reference groups (i.e. 'Low anxious / Low CU' group and 'Anxious' group). This approach also parallels methods used in clinical assessments, which often rely on cut-offs rather than categories derived from data-driven analyses. It is important to note that CU and anxiety measures did not correlate significantly in the present sample when examined globally (r = .03).

Group comparisons on socio-demographic variables and external correlates were examined using a number of Generalized Linear Models, which differed depending on data distribution. Linear regressions were used for normally distributed data (age, IMD, IQ, psychiatric symptoms and affective functioning). Maltreatment scores, conduct problems and substance use variables were analysed making use of negative binomial regressions due to over-dispersion of the data (i.e. variance greater than mean). Chi-square and logistic regressions were used for categorical data (sex, ethnicity, attachment style, suicidal ideation and planning, unsafe sex). For each analysis, we first report main effect statistics from the Omnibus test (i.e F statistic for linear regressions; X^2 statistic for negative binomial regressions and categorical data). Pair-wise comparisons are then reported for all significant main effects. Further, a measure of effect size is reported for significant pair-wise contrasts (Cohen's d for linear regressions and Odds Ratio for negative binomial regressions and categorical data). To

correct for inflated alphas resulting from multiple comparisons we set the alpha threshold at $p < .01$. Analyses were performed using SPSS package v. 21 (2012).

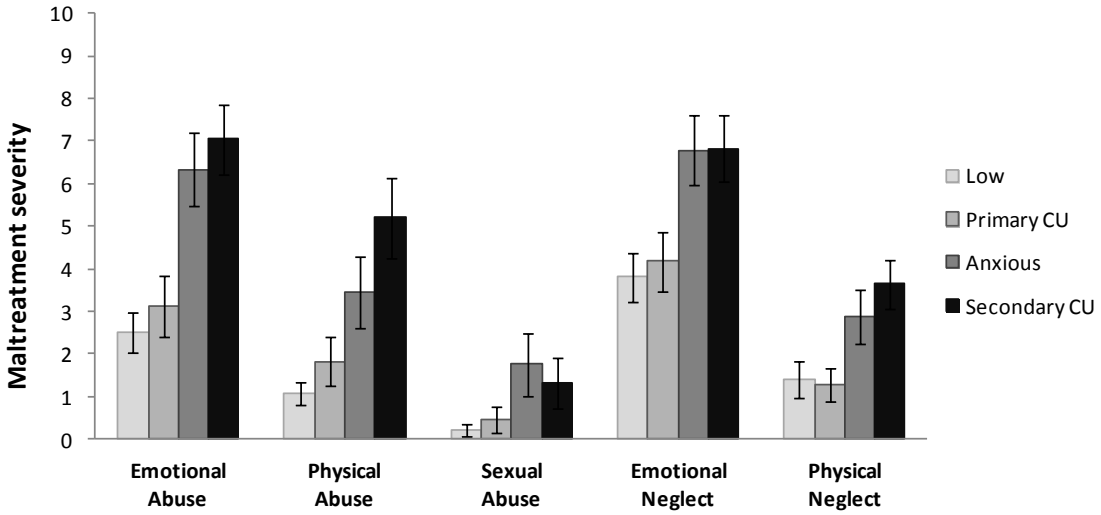
4.4. Results

Descriptive statistics for socio-demographic variables are presented in Table 4.1. Groups did not differ across age, ethnicity, IQ and IMD. The ratio of males to females differed across groups, X^2 (3, 155) = 16.24, $p < .001$. Over half of youth in the secondary CU group were females compared to one third in the primary CU group. Number of females differed most markedly between primary CU and Anxiety groups (30.1% vs. 76.3% females). As a result, we ran analyses both with and without sex as a covariate. Results were comparable using both approaches; nevertheless, all analyses presented here control for sex.

Maltreatment history

Mean levels of maltreatment across groups are shown in Figure 4.1. The secondary CU group and the Anxious group reported significantly higher levels of maltreatment compared to the primary CU and Low groups who reported much lower levels of maltreatment (Table 4.1). For example, maltreatment severity was two to three times greater in the secondary CU group compared to the primary CU group on measures of emotional, physical and sexual abuse as well as physical neglect ($p < .001$). Differences in emotional neglect were marginal ($p < .05$). Similarly, the secondary CU group reported higher levels of maltreatment compared to the Low group ($p < .001$; emotional neglect $p < .05$). By contrast, the primary CU group reported comparable (low) levels of maltreatment as those in the Low group ($p > .05$).

Figure 4.1 Mean levels of childhood maltreatment severity across groups



Individual functioning

Differences in individual functioning are presented in Table 4.2. At a mean level, the secondary CU group showed greater psychiatric symptoms, more severe behavioural risk markers and poorer affective functioning than any other group.

Psychiatric symptoms

The secondary CU group reported significantly higher symptoms of depression ($p < .001$, $d = 1.38$), anger ($p < .001$, $d = 1.31$), post-traumatic stress disorder (PTSD; $p < .001$, $d = 1.63$), and dissociation ($p < .001$, $d = 1.66$) compared to the primary CU group (See Figure 4.2). As predicted, the two variants did not differ from one-another in externalizing behaviours, showing similar levels of conduct problems, hyperactivity, peer problems and (low) prosocial behaviour ($p>.05$). Both CU groups scored significantly higher on externalizing problems compared to either the Anxious or Low reference groups ($p < .001$). The secondary CU group reported significantly greater anger than the Anxious group ($p < .01$, $d = .75$), but both showed similarly high levels of psychiatric symptomatology in other domains. Again, the primary CU group and the Low group were similar: levels of psychiatric symptomatology in relation to depression, anger, PTSD and dissociation, did not differ significantly between these groups.

Table 4.1 Group comparisons on socio-demographic variables and maltreatment history

	Low CU		High CU		Omnibus test	Pair-wise Contrasts	
	Low (n = 36)	Anxious (n = 38)	Primary CU (n = 36)	Secondary CU (n = 45)		Secondary vs. Primary CU	Secondary vs. Anxious CU
Socio-demographic characteristics							
Sex (% Female)	52.8	76.3	30.6	55.6	X^2 (3, 155) = 16.24, $p < .001^a$	† *OR* = 2.84 [1.13, 7.14]	† *OR* = .39 [.15, 1.00]
Ethnicity	27:8:1	19:16:3	17:17:2	17:24:4	X^2 (9, 155) = 13.97, *ns*	-	-
Age *M SD*	18.03 (2.16)	18.92 (2.27)	18.67 (2.03)	18.33 (1.97)	*F* (3, 155) = 1.28, *ns*	-	-
IMD *M SD*	25.01 (10.10)	28.31 (11.86)	29.31 (10.55)	29.92 (11.13)	*F* (3, 155) = 1.64, *ns*	-	-
IQ *M SD*	100.66 (9.70)	99.24 (11.97)	101.06 (9.14)	97.42 (12.28)	*F* (3, 155) = .89, *ns*	-	-
Group-dependent variables							
Callous-unemotional traits *M SD*	14.69 (4.73)	15.53 (5.02)	32.53 (6.11)	31.98 (7.25)	-	-	-
Anxiety *M SD*	2.42 (1.48)	10.47 (4.48)	2.72 (1.47)	10.24 (4.76)	-	-	-
Maltreatment history							
Emotional Abuse *M SD*	2.50 (2.83)	6.34 (5.32)	3.11 (4.31)	7.04 (5.62)	X^2 (4, 155) = 23.97, $p < .001^{a,b}$	** *OR* = 2.30 [1.41, 3.77]	-
Physical Abuse *M SD*	1.08 (1.64)	3.45 (5.11)	1.83 (3.41)	5.20 (6.37)	X^2 (4, 155) = 37.61, $p < .001^b$	*** *OR* = 2.92 [1.73, 4.94]	-
Sexual Abuse *M SD*	.22 (.90)	1.76 (4.58)	.47 (1.83)	1.31 (3.95)	X^2 (4, 155) = 39.32, $p < .001^{a,b}$	** *OR* = 2.51 [1.24, 5.09]	-
Emotional Neglect *M SD*	3.80 (3.54)	6.79 (5.04)	4.17 (4.18)	6.82 (5.21)	X^2 (4, 155) = 9.30, †	† *OR* = 1.65 [1.02, 2.67]	-
Physical Neglect M SD	1.39 (2.57)	2.89 (3.90)	1.28 (2.34)	3.64 (3.94)	X^2 (4, 155) = 22.04, $p < .001^{a,b}$	*** *OR* = 2.93 [1.69, 5.08]	-
Total Maltreatment M SD	9.00 (8.99)	21.24 (19.22)	10.86 (12.65)	24.02 (19.67)	X^2 (4, 155) = 24.75, $p < .001^{a,b}$	*** *OR* = 2.23 [1.23, 3.23]	-

Note. Analyses control for sex. Ethnicity = White:Black:Other. Maltreatment history analysed using negative binomial regression. CU vs. Low groups do not differ in level of maltreatment. For the sake of clarity, tables presented only provide in-depth statistics for the contrasts of greatest interest ('Secondary CU' vs. 'Primary CU' and 'Secondary CU' vs. 'Anxious'). More detailed information about the other contrasts is available upon request.

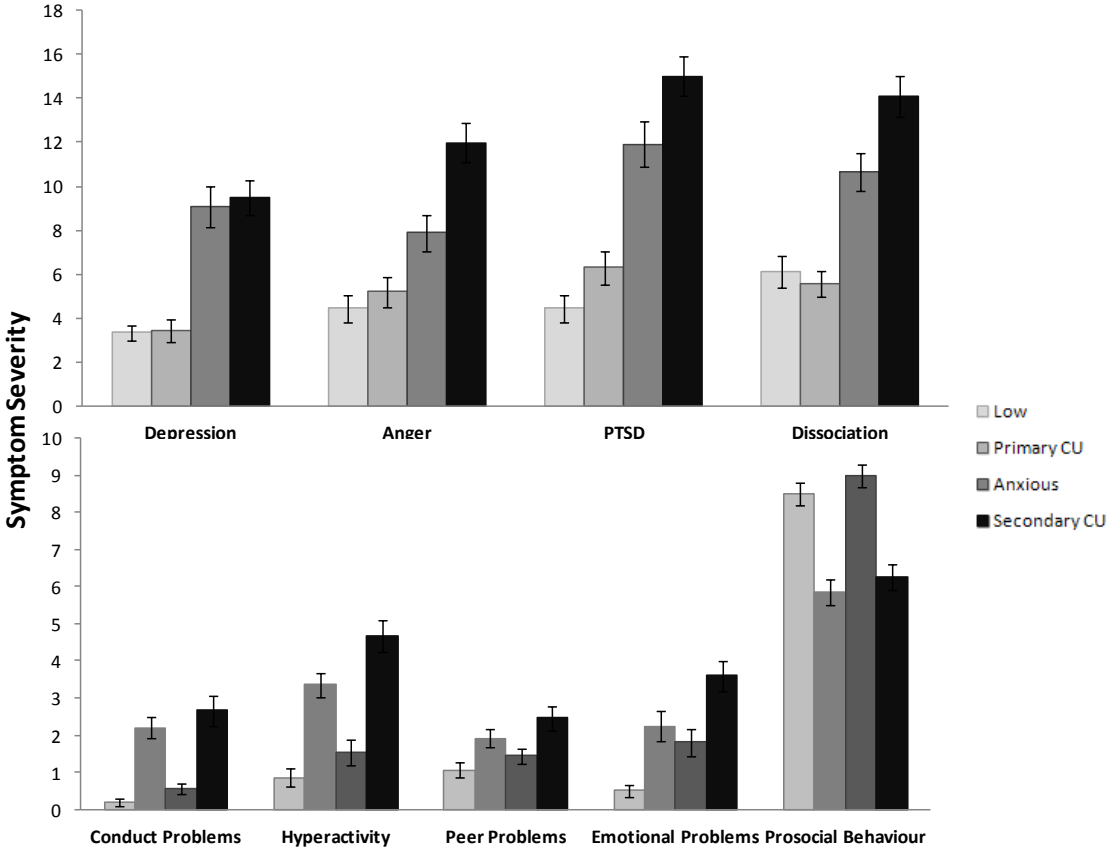
† p < .05, ** p < .01, *** p < .001. [a] Primary CU vs Anxious contrast significant at least at p < .0; [b] Secondary CU vs Low contrast significant at least at p < .01.

Table 4.2 Group comparisons on markers of individual functioning

	Low CU		High CU		Omnibus test	Pair-wise Contrasts					
	Low (n = 36)	Anxious (n = 38)	Primary CU (n = 36)	Secondary CU (n = 45)		Secondary vs. Primary CU			Secondary vs. Anxious CU		
Psychiatric Symptoms											
Self-report											
Depression *M SD*	3.33 (1.98)	9.05 (4.55)	3.42 (2.93)	9.51 (5.40)	F (4, 155) = 22.32, $p < .001$[a,b]	***	d = 1.38	[.42, 2.34]	-		
Anger *M SD*	4.44 (3.79)	7.87 (5.02)	5.19 (4.24)	11.98 (8.92)	F (4, 155) = 15.15, $p < .001$[a,b]	***	d = 1.31	[.18, 2.44]	**	d = .75	[- .42, 1.93]
PTSD *M SD*	4.44 (3.78)	11.92 (6.32)	6.30 (4.56)	15.00 (5.99)	F (4, 155) = 25.60, $p < .001$[a,b]	***	d = 1.63	[.47, 2.79]	-		
Dissociation *M SD*	6.11 (4.37)	10.66 (5.25)	5.55 (3.62)	14.09 (6.17)	F (4, 155) = 19.91, $p < .001$[a,b]	***	d = 1.66	[.54, 2.78]	†	d = .60	[- .62, 1.83]
External-rated											
Conduct Problems *M SD*	.19 (.52)	.55 (.86)	2.20 (1.71)	2.66 (2.69)	X^2 (4, 155) = 60.49, $p < .001$[a,b,c]	-			***	OR = 4.86	[2.54, 9.28]
Hyperactivity *M SD*	.86 (1.38)	1.53 (2.19)	3.35 (1.98)	4.69 (2.88)	F (4, 153) = 19.32, $p < .001$[a,b,c]	-			***	d = 1.24	[.54, 2.78]
Peer Problems *M SD*	1.06 (1.24)	1.45 (1.24)	1.91 (1.45)	2.46 (2.19)	F (4, 153) = 4.33, $p < .01$[b]	-			-		
Emotional Problems *M SD*	.50 (1.03)	1.81 (2.31)	2.23 (2.44)	3.59 (2.73)	F (4, 154) = 9.85, $p < .001$[b,c]	-			**	d = .71	
Prosocial Behaviour *M SD*	8.51 (1.89)	8.10 (1.94)	5.84 (1.98)	6.27 (2.31)	F (4, 151) = 12.47, $p < .001$[a,b,c]	-			***	d = .86	
Behavioural risk markers											
Alcohol use *M SD*	5.14 (4.65)	4.55 (4.74)	4.34 (4.20)	5.83 (7.03)	X^2 (4, 150) = 1.83, *ns*	-			-		
Drug use *M SD*	1.89 (4.86)	2.76 (5.94)	3.48 (6.42)	5.58 (9.08)	X^2 (4, 150) = 31.07, $p < .001$[b]	***	OR = 2.03	[1.20, 3.43]	**	OR = 1.97	[1.19, 3.26]
Suicidal ideation (%)	0	10.8	14.3	31.8	X^2 (4, 152) = 21.64, $p < .001$[b]	-			***	OR = 4.85	[1.37, 17.16]
Suicide plan (%)	0	5.4	2.9	18.2	X^2 (4, 152) = 13.73, $p < .01$[b]	†	OR = 6.49	[.75, 56.26]	†	OR = 4.78	[.91, 24.88]
Unsafe sex (%)	12.8	15.4	25.6	46.2	X^2 (4, 147) = 13.77, $p < .01$[b]	-			***	OR = 5.33	[1.56, 18.28]
Affective functioning											
Irritability *M SD*	2.51 (2.67)	4.38 (3.98)	2.82 (2.54)	6.09 (4.06)	F (4, 151) = 6.80, $p < .001$[b]	***	d = .95	[.20, 1.71]	-		
Alexithymia *M SD*	10.39 (3.42)	16.94 (6.59)	12.88 (5.13)	17.54 (6.75)	F (4, 152) = 10.36, $p < .001$[b]	**	d = .78	[-.55, 2.10]	-		

N.B. Analyses control for sex. Conduct problems, alcohol use and drug use analysed using negative binomial regression. Cohen's *d* guidelines for effect size: *d* of .2 = small, .5 = medium, .8 = large. † p < .05, ** p < .01, *** p < .001. [a] Primary CU vs Anxious contrast significant at least at p < .01; [b] Secondary CU vs Low contrast significant at least at p < .01; [c] Primary CU vs Low significant at least at p < .01.

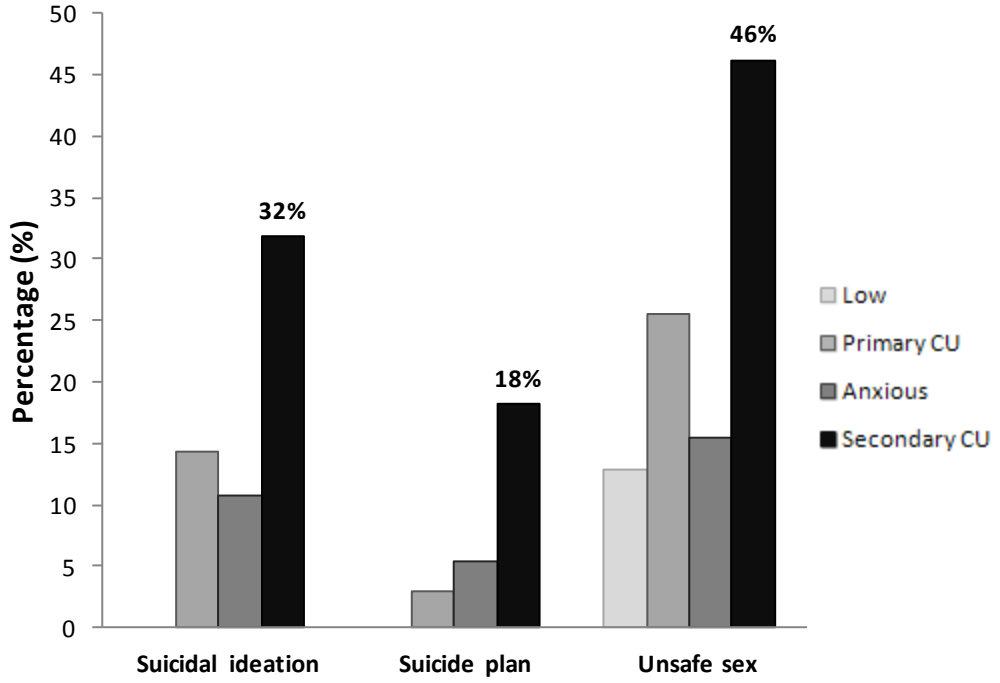
Figure 4.2 Psychiatric symptom severity across groups



Behavioural markers of clinical risk

There was no significant main effect of Group on alcohol use. In relation to drug use, the secondary CU group reported higher use than both the primary CU group ($p < .001$, $OR = 2.03$) and Anxious group ($p < .01$, $OR = 1.97$). Endorsement of behavioural risk items across groups related to suicidality and unsafe sex are graphically presented in Figure 4.3. Significant main effects were found for suicidal ideation (X^2 (4, 152) = 21.64, $p< .001$), planning (X^2 (4, 152) = 13.73, $p< .01$) and unsafe sex (X^2 (4, 147) = 13.77, $p< .01$). In the secondary group, 31.8% of participants reported having thought of committing suicide in the past year and 18.2% made a suicide plan, compared to 14.3% ideation and 2.9% planning in the primary CU group. Rates of suicidal ideation and planning within the secondary CU group were also considerably higher than within the Anxious and Low groups. In addition, of those who had sexual intercourse, almost half (46.2%) of participants in the secondary CU group reported not using a condom or other contraceptive during their last sexual encounter, compared to 25.6% in the primary CU group, 15.4% in the Anxious group and 12.8% in the Low group.

Figure 4.3 Endorsement of behavioural risk markers across groups



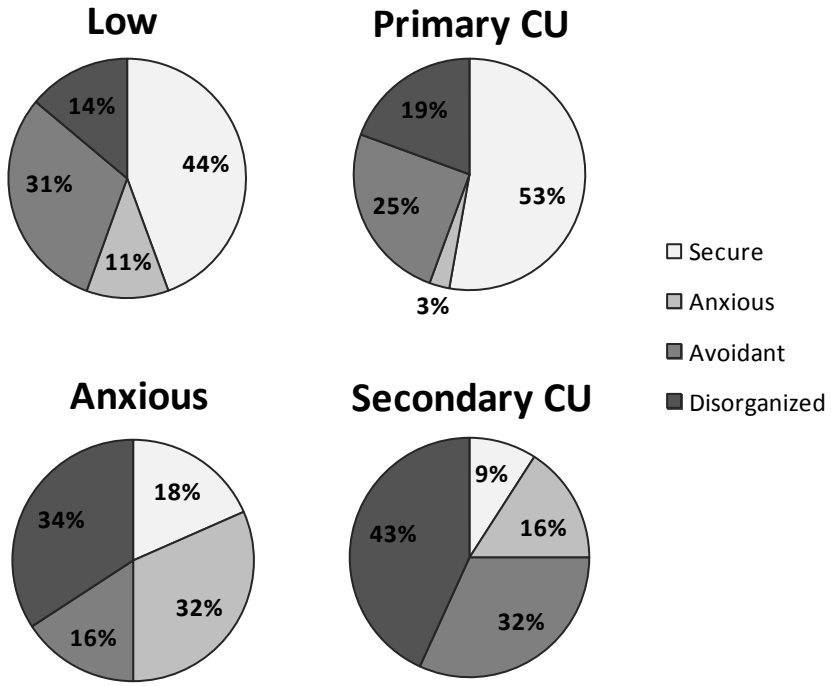
Affective functioning

The two CU variants differed significantly in both measures of affective functioning, with the secondary CU group showing higher levels of irritability ($p < .001$, $d = .95$) and alexithymia ($p < .001$, $d = .78$). In contrast, the secondary CU group did not differ from the Anxious group on either measure of affective functioning. As with measures of psychological distress, the primary CU group showed a profile of affective functioning similar to that of the Low group.

Attachment style

Attachment style differed significantly across groups, X^2 (9, 154) = 37.28, $p < .001$. As can be seen in Figure 4.4, the most striking difference relates to the proportions of secure vs disorganized attachment across groups. The secondary CU group were predominantly characterised by high levels of disorganized attachment (43%) and avoidant attachment (32%) styles, with only 9% showing secure attachment, the lowest proportion relative to any other group. The Anxious group were predominantly characterised by high levels of disorganized attachment (34%) and anxious attachment (32%) styles, with 18% showing secure attachment. By contrast the 53% and 44% of the primary CU and Low groups respectively were classified as securely attached.

Figure 4.4 Current attachment style across groups



4.5. Discussion

The present study sought to explore individual heterogeneity across youth high in CU traits. We examined whether CU variants could be identified in a community sample of high-risk youth using external ratings of CU traits. We further examined whether variants show differential associations with trauma history and individual functioning, making use of a detailed assessment of childhood maltreatment, psychiatric symptoms and other markers of clinical risk. Three principal findings emerged from the present study. First, youth with secondary CU were characterised by more severe history of childhood abuse and neglect compared to the primary CU group. Second, the secondary CU group presented with significantly elevated levels of psychiatric symptoms in relation to depression, anger, dissociation and PTSD compared to their primary CU peers. Third, the secondary CU group presented with significantly elevated behavioural risk markers, being more likely to use drugs, contemplate and plan suicide, and engage in unsafe sex. Our exploratory analyses indicated differences in affective functioning and attachment style across the primary and secondary CU groups. Importantly, the two variants were not found to differ on measures of externalizing difficulties, suggesting that in terms of conduct problems they are likely to present in a similar fashion.

Childhood maltreatment as a key discriminating factor between variants

In line with previous studies, childhood maltreatment emerged as a key factor discriminating primary and secondary CU groups (Kimonis et al., 2012; Vaughn et al., 2009). Importantly, the present study is the first, to our knowledge, to demonstrate an association between secondary CU and elevated maltreatment scores across the full range of childhood abuse and neglect experiences. It is also the first to compare variants with both a low-anxiety and a high-anxiety control group on history of maltreatment. While the maltreatment profile of youth with secondary CU was comparable to that of youth presenting with high anxiety and low CU (i.e. the Anxious group), the primary CU group did not differ in levels of childhood abuse or neglect from those showing low CU/ low anxiety (i.e. Low reference group). These findings are inconsistent with a recent study showing increased neglect in the primary CU group (Kimonis et al., 2013), but that study was based on an incarcerated sample of males with lower mean maltreatment scores that we report here and did not contrast variants against a high- and low-anxious reference group.

Secondary CU indicates a particularly vulnerable group of individuals

Youth with secondary CU presented with the highest level of psychological distress and psychiatric symptomatology across all domains examined, in line with adult secondary psychopathy data (e.g. Karpman, 1948; Porter, 1996). Additionally, the secondary CU group was characterized by significantly elevated behavioural markers of clinical risk, including increased drug use, feelings of suicidality and engagement in unsafe sexual practices. One third of youth in the secondary CU group reported having seriously considered committing suicide in the past year, and almost one fifth reported making a suicide plan. These rates are alarmingly high and suggest that clinicians would benefit from an increased awareness of the elevated risk of suicidal ideation and planning among youth with secondary CU. Rates of unsafe sex were also considerably higher in the secondary CU group compared to any other group, with almost half of secondary CU youth reporting not using a condom or other contraceptive during the last sexual intercourse. These figures are disturbing given the known associations between unsafe sexual behaviours and adverse health outcomes, including increased risk of sexually-

transmitted diseases (e.g. HIV infections) and unintended pregnancies (Coyle et al., 2001).

Our exploratory measures delineated additional differences across CU variants in areas of affective functioning and attachment to close others. Elevated levels of irritability and anger found in the secondary CU group are consistent with the notion that the secondary variant of psychopathic traits features increased emotional expression and reactivity (Skeem et al., 2003). Compared to primary CU, the secondary variant was also associated with increased alexithymia. This is of interest, given that a number of past studies have found negative or non-significant associations between the core affective features of psychopathy and alexithymia (e.g. Louth, Hare, & Linden, 1998). Although both are thought to involve deficits in emotional processing, the present findings indicate that alexithymia is only associated with CU traits when anxiety is also present. This may suggest that difficulties in identifying feelings and distinguishing them from bodily sensations are more driven by anxiety than CU traits. In support of this, a recent study found that psychopathy and anxiety interacted to predict levels of alexithymia, so that individuals with both high psychopathy and high anxiety presented with the highest levels of alexithymia (Lander, Lutz-Zois, Rye, & Goodnight, 2012). Given that both youth with anxiety and those with secondary CU reported more severe histories of maltreatment, it is possible that elevated alexithymia across these groups reflects the developmental impact of childhood maltreatment on emotional arousal and functioning. Attachment disorganization, another established sequelae of childhood maltreatment (Cyr et al., 2010), was also found to be most common in youth with secondary CU, while primary CU featured predominantly a secure attachment style. To our knowledge, this is the first study to have examined current patterns of attachment styles in primary and secondary CU variants separately.

Research and clinical implications

The present findings highlight the need to differentiate youths with primary vs secondary CU variants. Supplementing measures of psychopathic traits with an assessment of anxiety can offer important information for both clinicians and researchers. Clinically, failure to acknowledge wide variations in levels of anxiety among youth with high CU traits may obscure the diverse constellations of needs and

risk factors associated with subgroups of individuals presenting with elevated CU traits. Equally, findings point to the importance of assessing experiences of childhood maltreatment as it is shown to markedly discriminate between CU variants. In research, clinical and legal settings, developmental adversity is not always assessed concurrently with psychopathic traits in youth (Tatar II, Cauffman, Kimonis, & Skeem, 2012). An increased awareness of maltreatment as a possible risk factor for secondary CU may be helpful in informing risk assessment and suitable intervention strategies. On the other hand, findings that CU variants presented with similar levels of externalising behaviours suggests that an assessment of externalizing difficulties, such as conduct problem severity, may not be as informative in the discrimination of CU variants.

Individuals with high CU traits and anxiety – the secondary CU group – represent a high-risk clinical group. Such individuals are more likely to be characterised by developmental trauma, concurrent psychiatric symptomatology (including equally high levels of conduct problems than are seen in primary CU group) and suicide risk. For these individuals, therapeutic approaches that are centred on experience of trauma, such as trauma-focussed CBT may be warranted to address PTSD-related symptomatology. High rates of disorganized attachment in youth with secondary CU also suggests that current attachment status may be an important target for interventions aimed at improving interpersonal functioning and promoting the development of healthy relationships within this group of youth. Interventions addressing conduct problems in youth with secondary CU are also likely to need embedding in a wider therapeutic intervention to address poor psychiatric functioning, particularly in relation to anxiety and depression. Finally, risk assessments will need to pay particular attention to engagement in risky behaviours (e.g. drug use, unsafe sex) and increased risk of suicidality as these are strongly associated with secondary CU.

The clinical implications of the present findings for youth with primary CU are less clear. Based on prior research, intervention strategies that support positive parenting practices aimed at fostering empathic concern and affective perspective-taking have shown promise in reducing CU traits over time (Waller, Gardner, & Hyde, 2013). For older youth, particularly those showing high levels of conduct problems, multi-systemic therapy (MST) and reward-focused therapeutic approaches may prove most effective in reducing problem behaviours associated with CU (Vaughn et al., 2009). It is important to note, however, that the effectiveness of such interventions has

not been investigated across CU variants, so that the extent to which they may benefit youth with primary vs. secondary CU is presently unclear.

We found evidence of group differences in the ratio of males to females across CU variants in this community sample. While the group of youth with primary CU contained disproportionately more boys, the secondary CU group had a more balanced male to female ratio (slightly greater number of girls). Interestingly, previous research has reported that psychopathic personality traits are associated with a history of trauma in young female offenders (Odgers, Reppucci, & Moretti, 2005) and that high levels of psychopathic personality traits are driven more by environmental (rather than genetic) influences in girls (Fontaine, Rijsdijk, McCrory, & Viding, 2010). Future studies are required to ascertain whether the difference in sex ratio is a reliable finding and whether the experience of trauma may represent a particularly potent risk factor for secondary CU in girls.

An important clinical and research question that emerges from the present data relates to why some youth with a history of trauma present both high levels of CU and anxiety (i.e. secondary CU) while others only present with high anxiety (i.e. Anxious group). In order to address this question, it is necessary to understand whether the experience of trauma represents a *causal* factor in the development of secondary CU traits or whether CU traits manifest independently of childhood maltreatment (i.e. whether both CU variants share the same aetiological basis). In the first case, it is possible that qualitative differences in the timing, duration or characteristics of the traumatic experiences may drive differential development of secondary CU vs. anxiety only. On the other hand, if CU traits develop in genetically-at risk individuals regardless of maltreatment experiences, the key difference between secondary CU and Anxious youth may involve presence or absence of genetic vulnerability to CU. Interestingly, the only twin study to date did not find differences in the heritability of psychopathic traits across primary and secondary variants (Humayun & Viding, In press). Finally, it is possible that, given the heritability of both CU and anxiety, youth who develop secondary CU have a genetic predisposition to both, which is manifested in response to an environmental trigger (e.g. maltreatment). More research is needed to establish the causal processes involved in the development of CU traits that co-occur with anxiety, with a particular focus on the role of maltreatment.

Future directions

First, longitudinal research is needed to gain a more mechanistic understanding of processes underlying variants of CU traits in youth. Longitudinal studies may also help determine whether variants are predictive of different developmental trajectories and outcomes over time, particularly in relation to frequency and nature of antisocial behaviour, suicidality, and mental health problems. Second, examining the timing of maltreatment experiences may be important for understanding how secondary CU develops. If it is true that maltreatment is associated with increased risk of elevated CU traits by disrupting the normative development of a 'moral compass' and associated feelings (e.g. guilt, remorse) in genetically at risk individuals, it would be particularly important to determine whether developmental windows exist where the effect of maltreatment is more pronounced. Third, although CU variants appear to represent 'behavioural phenocopies' of one-another it remains to be established whether they can be discriminated on measures of psychobiological, cognitive and affective functioning. Based on prior research in psychopathy, particular areas that warrant further investigation include emotional regulation, physiological arousal, punishment and reward sensitivity, avoidance learning and prosocial reasoning (Skeem et al., 2003).

A number of recent studies have begun to examine neurocognitive profiles across variants. Using a dot-probe task, Kimonis and colleagues (Kimonis et al., 2012) found that variants differed in emotional processing, where youth with the secondary variant showed higher attentional engagement to emotionally distressing stimuli compared to youth with the primary variant, who instead showed lower engagement. Another study found that the secondary CU variant was associated with an overreactive behavioural activation, while the primary variant featured low behavioural inhibition (Kahn, Frick, et al., 2013). Further research is needed to establish whether differences found across variants are uniquely associated with CU traits per se or rather reflect presence of elevated anxiety in the secondary variant. Addressing this question will require the use of tasks that are capable of isolating the effects of CU across variants, independently of the effects of anxiety. In this respect, tasks of emotional reactivity that use threat-related paradigms may not be optimal in that they are often sensitive to anxiety-related emotional reactivity. In contrast, low anxiety paradigms, such as experimental empathy-related or reinforcement learning tasks, may enable assessment of whether secondary CU is associated with a similar or different pattern of

neurocognitive functioning than primary CU. Aside from behavioural performance, it is possible that variants may be found to differ at a neural level. No study to our knowledge has compared brain activity (e.g. in response to learning paradigms) within youth with primary vs secondary CU variants. In light of past imaging studies of psychopathy, particular regions of interest include amygdala, fronto-temporal regions and their functional connectivity. Finally, research is needed to inform the development of more tailored interventions as well as to evaluate whether the application of differing strategies may be more effective than a 'one size fits all' approach. This is especially important given the dearth of programmes specifically validated on youth with CU traits (Skeem et al., 2011).

Limitations

The findings of present study should be interpreted in light of several limitations. First, callous-unemotional traits are a dimensional construct, not a taxon. Because we wished to identify and compare variants of CU traits, a categorical approach provided an effective means of communication. However, it important to clarify that variants do not represent mutually exclusive categories and that future studies may benefit from using dimensional information to supplement categorical approaches. Second, the inclusion of a measure of childhood maltreatment provided a temporal proxy for the effect of developmental adversity on secondary CU. However, the cross-sectional nature of the study meant that we were unable to establish the directionality of effects found. Moreover, although findings seem to suggest that secondary CU may be more environmentally driven than primary CU, it was not possible to remove possible confounding factors from our design (e.g. youth high in CU may be more likely to have parents high in psychopathic traits, who are also more likely to maltreat them). Genetically informative designs may be particularly effective in accounting for such potential confounds. Third, because of sample size limitations we were only able to enter sex as a free-standing covariate. It may be interesting in future to examine whether sex moderates associations between CU variants and markers of individual functioning. Finally, even though sampled from the community, youth in our study came predominantly from high-risk, multi-problem families. As a result, findings may not generalize to the wider population. Furthermore, the fact that youth included in the

present study (i.e. reduced sample) differed on age and IQ from those excluded due to missingness of CU is likely to reflect our recruitment strategy (e.g. CU information could not be obtained for youth who were not currently in education, and these same youth tended to be older than the rest of the sample). Future studies addressing these limitations may help further our understanding of the nature and significance of CU variants among youth.

4.6. Conclusions

In the present chapter, we examined whether primary and secondary variants of CU traits were differentially associated with history of childhood maltreatment and broad markers of individual functioning. We found that, compared to primary CU, secondary CU was characterized by elevated experiences of childhood maltreatment, increased psychopathology, atypical patterns of affective functioning and disorganized attachment as well as greater behavioural and suicide risk. These findings highlight the importance of differentiating between variants of CU across both research and clinical settings. Particularly, results underscore the importance of maltreatment as a key discriminating factor across variants. Furthermore, differences in individual functioning associated with variants point to the need for more tailored clinical assessment tools and intervention strategies. Clinicians should be especially alert as to the combination of high CU and high anxiety, as it indexes a particularly vulnerable group of youth.

CHAPTER 5: Initial validation of the Family Aggression Screening Tool (FAST) as a brief non-verbal measure of family aggression

In recent years, novel screening tools have been developed to facilitate detection of family aggression, including maltreatment and exposure to intimate partner violence (IPV). However, a number of methodological issues have yet to be addressed in order to improve rapid, comprehensive and valid screening of family aggression. First, there is a lack of tools that enable recording of both experiences of maltreatment and IPV exposure, which is problematic given that both forms of family aggression have been shown to co-occur. Second, currently available screening tools rarely enable the recording of specific characteristics of family aggression that may be relevant for informing risk assessment and treatment formulation, such as the identity of perpetrator and victim, as well as the directionality of aggression between family members. Finally, currently available self-report instruments all tend to rely heavily on the respondent's ability to read and comprehend the questions presented, which may limit their applicability to a range of populations, such as individuals with reading difficulties, those whose first language is not English, as well as younger respondents. In the current chapter, we present a study where we tested the initial psychometric properties of the newly developed Family Aggression Screening Tool (FAST), a brief, self-report tool that makes use of pictorial representations to assess experiences of family aggression, including direct victimization and exposure to IPV. Initial psychometric properties of the FAST were tested in the same sample of high-risk youth presented in previous chapters. For validation purposes, the FAST was compared to (i) the Childhood Trauma Questionnaire (CTQ), a well-validated instrument of childhood maltreatment, and (ii) multi-informant reports of current psychiatric symptomatology. Internal consistency of the FAST was good. Convergent validity was supported by strong and discriminative associations between corresponding subscales on the FAST and CTQ. The FAST also showed good concurrent validity, correlating significantly with multi-informant reports of psychiatric symptomatology. When the CTQ was used as the validity criterion, corresponding scales on the FAST exhibited acceptable sensitivity and excellent specificity. Initial findings provide support for the reliability and validity of the FAST as a brief, non-verbal screening tool of family aggression.

5.1. Introduction

Family aggression, including child maltreatment and exposure to intimate partner violence (IPV), represents a global phenomenon and a major public health concern (Gilbert, Widom, et al., 2009). In the United Kingdom, it is estimated that as many as 5% to 15% of youth have experienced severe acts of family aggression while growing up, although the true prevalence is likely to be even greater (Radford et al., 2011). Children who are exposed to family aggression are more likely to suffer from a wide range of psychosocial, emotional and behavioural difficulties, including post-traumatic stress, depression, anxiety, and conduct problems (Cicchetti & Toth, 2005; Holt, Buckley, & Whelan, 2008). The effects of family aggression can be enduring and pervasive, increasing risk for psychiatric and medical disorders in adult life (Afifi, 2012; Anda et al., 2006; Currie & Widom, 2010). As such, family aggression is recognized as a key developmental risk factor and as an important target for prevention and intervention efforts (Gilbert, Widom, et al., 2009). In recent years, new screening tools have been developed to facilitate detection of family aggression (Ohan et al., 2002; Rabin et al., 2009; Tonmyr et al., 2011). Self-report instruments, in particular, have gained popularity as they are generally briefer, more cost-effective, easier to complete, and less invasive, compared to alternative methods (e.g. interview protocols). Despite these advantages, there are a number of methodological issues that still need to be fully addressed in order to ensure more rapid, comprehensive and valid screening of family aggression.

First, the vast majority of existing instruments do not distinguish between experiences of child maltreatment and exposure to IPV (Gottlieb & Schrager, 2012). This is problematic, given that these two forms of family aggression have been shown to co-occur regularly. In particular IPV exposure has been found to be a risk factor of childhood maltreatment (Herrenkohl et al., 2008; Stith et al., 2009). In a recent nationally representative study, youth who had experienced severe maltreatment by a caregiver were found to be almost three times more likely to experience IPV exposure compared to youth who were not severely maltreated (Radford et al., 2011). Another study found that more than half of those who had been exposed to IPV had also been maltreated (Hamby et al., 2010). Several other studies have also documented a substantial overlap between child maltreatment and IPV exposure (Brandon et al., 2008; Butchart et al., 2006; Herrenkohl et al., 2008; Moylan et al., 2009). Consequently, using

screening tools that measure exclusively maltreatment or IPV exposure can hinder efforts to identify interrelationships between these two forms of family aggression. In a research context, screening for either maltreatment or IPV exposure can lead to the overestimation of effects found, as it is not possible to isolate the unique effects of one form of family aggression, controlling for the other. Furthermore, screening for either maltreatment or IPV limits the ability to examine cumulative and interactive effects that may arise from the experience of multiple forms of family aggression (Herrenkhol et al., 2008; Moylan et al., 2009). Although it is entirely possible to address these limitations by using two separate measures of maltreatment and IPV exposure, the use of a single combined instrument may result in more efficient screening across both research and clinical settings.

Second, there is a lack of screening tools that enable the recording of specific characteristics of family aggression, such as perpetrator identity, number of perpetrators and directionality of aggression between family members. These characteristics can vary widely across families where aggression occurs, and may potentially influence the impact of family aggression on developmental outcomes (Appel & Holden, 1998; Holden, 2003). For example, incidents of IPV may involve either one partner as the sole perpetrator toward the other partner (i.e., the victim), or both partners engaging in mutual combat. Similarly, child maltreatment may occur at the hands of either one or both caregivers. Co-occurring patterns of maltreatment and IPV may also vary considerably. In some cases, one caregiver may aggress against both partner and child. Other times, aggression may occur sequentially, with one caregiver aggressing against the partner, and, in turn, the partner aggressing against the child. Screening for patterns of family aggression such as these may enable researchers and clinicians to identify subgroups of children who are at increased risk of developing more severe or long-term difficulties. Indeed, in clinical settings, the ability to rapidly screen for patterns of family aggression may be particularly useful for informing risk assessment and treatment planning.

The third methodological issue relates to the fact that currently available assessment tools, when self-administered, tend to rely heavily on respondents possessing the necessary verbal skills to understand the questions presented, which may limit their applicability to a range of different populations. For example, the use of verbal screening tools may not be suitable for youth with reading difficulties. Evidence suggests that such difficulties may be particularly prevalent among youth who have

experienced family aggression. Maltreatment and IPV are more likely to occur in deprived neighbourhoods characterized by higher levels of poverty and unemployment, poorer quality of schooling and lower educational attainment (Butchart et al., 2006; Coulton et al., 1995; Stith et al., 2009). Furthermore, numerous studies have shown that maltreatment and IPV are associated with cognitive deficits, lower verbal ability, poorer literacy and difficulties in reading comprehension (Huth-Bocks et al., 2001; Koenen et al., 2003; Thompson & Whimper, 2010). Yet, to our knowledge, no instrument exists that makes use of a non-verbal format to facilitate screening of maltreatment and IPV within this population. Although it is often possible to administer questions by having them read aloud, this may feel uncomfortable for the recipient, eliciting feelings of shame, perceived stigma and socially desirable responding associated with non-disclosure (Meston, Heiman, Trapnell, & Paulhus, 1998). Reliance on verbal screening tools may also be inadequate for immigrants or those individuals whose first language is not English. Finally, the use of verbal screening tools may be particularly inappropriate for use with younger respondents. Although non-verbal instruments have successfully been developed to assess constructs such as post-traumatic stress in younger respondents (e.g. Richters, Martinez, & Valla, 1990), we are not aware of any non-verbal instrument specifically designed to measure experiences of family aggression.

The present report describes the initial psychometric properties of the Family Aggression Screening Tool (FAST), a novel, self-report instrument that utilizes pictorial representations to assess multiple forms of family aggression. The FAST is designed to be easily understood, quick to complete and widely accessible. It is freely available upon request and time of administration is of around five minutes. The FAST is characterised by three main features. First, unlike most available screening tools, the FAST records both experiences of direct victimization and exposure to IPV. As such, the FAST enables to identify interrelationships between both forms of family aggression, as well as to examine unique, additive and interactive effects on developmental outcomes (Herrenkohl et al., 2008). Second, the FAST provides information about specific characteristics of family aggression, including the identity of perpetrator and victim, the number of perpetrators and the directionality of aggression between family members. As such, the FAST enables to detect more complex family patterns and gain insight into dynamics of family aggression. The FAST also assesses whether each form of aggression is still on-going, which is important for informing evaluation of a person's current risk status. Lastly, within the domain of family

aggression, the FAST is the first instrument to make use of simple pictorial representations to assess experiences of direct victimization and IPV exposure, making it a potential alternative to currently existing tools, particularly in instances where such instruments may be unsuitable due to their high verbal demands. The FAST produces continuous severity scores, which have been shown to be more statistically powerful and qualitatively rich compared to frequently used dichotomous items. In summary, the FAST is the first instrument to have been developed with the aim of providing rapid and comprehensive screening of family aggression using non-verbal pictorial representations.

5.1.1. The current study

In order to be useful, the FAST must provide a valid and reliable way to assess an individual's experience of family aggression. In the present study, we examined four psychometric properties of the FAST. First, we assessed reliability by examining internal consistency and inter-correlations between the FAST subscales. Second, we tested convergent and discriminant validity by examining associations between the FAST and the Childhood Trauma Questionnaire (CTQ, Bernstein & Fink, 1998), a widely used and well-validated self-report measure of childhood maltreatment. We expected that the FAST and CTQ subscales would be positively related, with the strongest associations found between corresponding subscales (i.e. scales related to emotional and physical victimization). Third, we assessed concurrent validity by examining associations between the FAST and measures of psychiatric symptomatology, both self- and other-report. In line with previous studies, we expected that the FAST would be positively and significantly associated with severity of psychiatric symptoms. Finally, we examined the diagnostic accuracy of the FAST using the CTQ as the validity criterion. We expected that corresponding subscales on the FAST would show at least adequate sensitivity (i.e. ability to correctly detect individuals with experience of family aggression) and specificity (i.e. ability to correctly detect individuals with no experience of family aggression).

5.2. Methods

5.2.1. Participants

The current sample is drawn from a larger study (*N* = 204) examining the effects of developmental adversity on individual functioning. The present sample includes only participants for whom data on the Family Aggression Screening Tool is available (*n* = 168). Forty-four percent of participants (*n* = 74) were recruited at Kids Company. The other fifty-six percent of participants (*n* = 94) were recruited via a number of London-based inner-city secondary schools and websites. The majority (80%) of participants were under the age of 21 years (M = 18; range = 16-24) and 49% were females (*n* = 83). The sample was ethnically diverse with 47% self-identifying as Caucasian, 37% self-identifying as Black, and 11% Mixed, and 5% Asian. Please refer to Chapter 2 for more detailed information regarding the sample.

5.2.2. Procedure

All procedures were approved by the University College London Research Ethics Committee (ID No: 2462/001). Testing took place in a quiet room within Kids Company, the young person's school or at UCL depending on recruitment source (see Chapter 2 for more information on the procedures used).

5.2.3. Measures

5.2.3.1. Family Aggression Screening Tool (FAST)

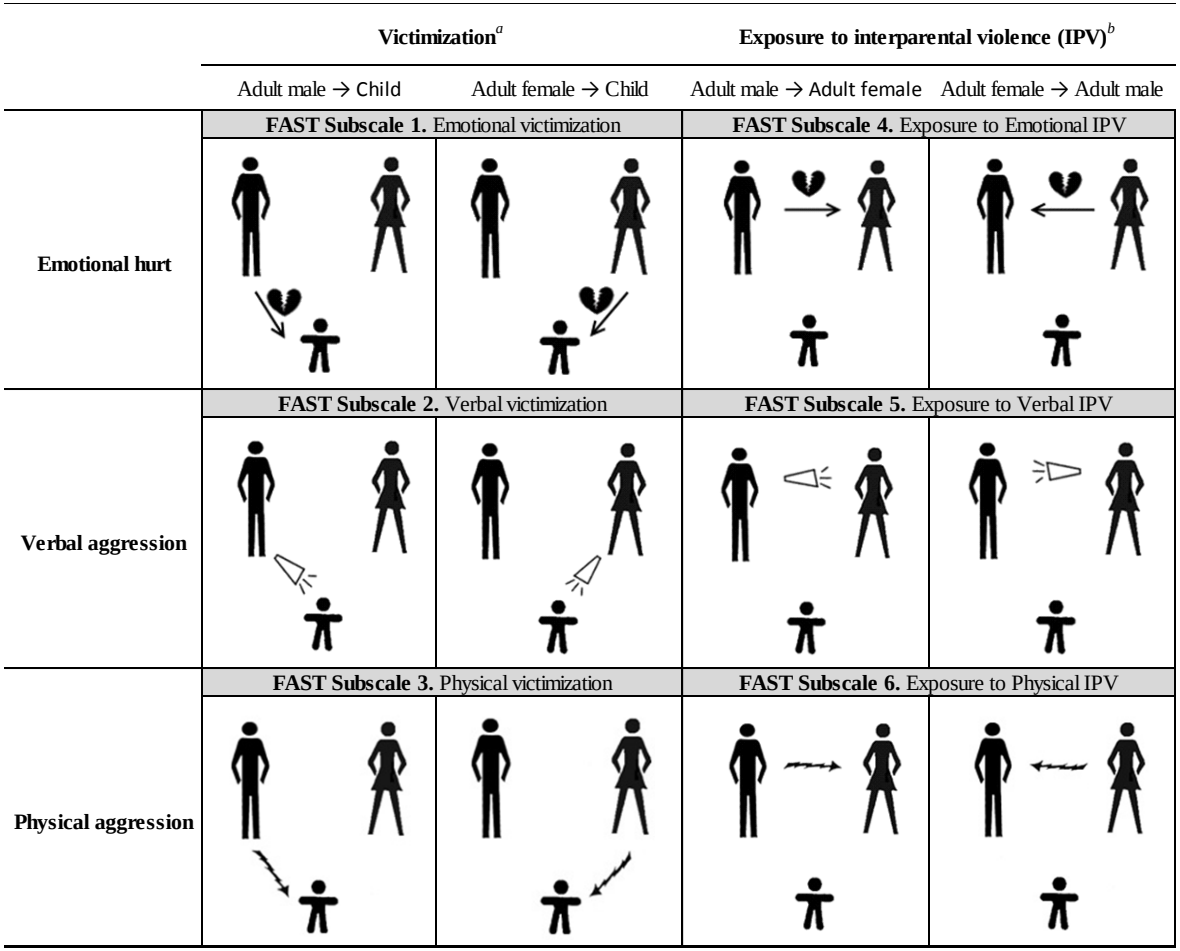
The FAST consists of 12 pictorial representations that assess experience of different forms of direct victimization and exposure to IPV that may have occurred in the young person's house "while growing up" (see Figure 5.1). Each pictorial representation depicts three characters, an adult male (father), an adult female (mother) and a child. Depending on the form of aggression measured, each representation also includes one of three symbols: (i) a broken heart, to depict emotional hurt (e.g., doing or saying mean things, hurt feelings); (ii) a megaphone, to depict verbal aggression (e.g., shouting, threatening, swearing); and (iii) a jagged arrow, to depict physical aggression (e.g., slapping, hitting or anything worse). The direction of the symbols indicates who the perpetrator is (i.e., adult male or female) and who the victim is (i.e., adult male or female, or child). As a result, half of the 12 representations assess experience of direct

victimization (i.e., emotional, verbal or physical victimization from adult male to child, or adult female to child), while the other six representations assess exposure to IPV (i.e. exposure to emotional, verbal or physical IPV from adult male to adult female, or from adult female to adult male).

The FAST was presented on computer, using Psytools software (Delosis Limited). Young people completing the FAST were first presented with a brief set of instructions. The instructions described the purpose of the measure and the meaning of each symbol, along with an example (see Figure 5.2). Upon seeing each representation, participants were asked three consecutive questions. First, participants were asked *"Did this ever happen to you?*" with the possibility of answering yes or no (i.e., binary item). If participants answered "no" they were automatically directed to the next representation. If participants answered "yes" to the first question, participants were asked the second question "*Has it ended?"* (yes/no). Third, participants were asked to rate *"How often did it happen?*" on a continuous sliding scale ranging from "never" (0) to "sometimes" (5) to "a lot" (10) (0.1 decimal increments).

Scores derived from the 12 pictorial representations (i.e. in response to the question *"how often did it happen?*") were summed to form six separate subscales, three indexing direct victimization, and the other three indexing IPV exposure (see Figure 5.1). For victimization items, scores indicating aggression from adult male to child, and from adult female to child were summed together to form three subscales (emotional, verbal, and physical victimization; range = 0 – 20). For the IPV exposure items, scores indicating aggression from adult male to adult female, and from adult female to adult male were summed to form the other three subscales (exposure to emotional, verbal, and physical IPV; range = 0 – 20). Additionally, the six subscales were summed to create a FAST total score, to provide an indicator of overall family aggression (range = 0 – 120). Psychometric properties were examined using the 6 FAST subscales as well as the FAST total score. It is important to note here that the 12 individual representations can be used by researchers and clinicians to assess both individual characteristics and co-occurring patterns of family aggression; however, this was beyond the scope of the present study due to sample size limitations.

Figure 5.1 Layout of pictorial representations included in the Family Aggression screening tool (FAST) and corresponding subscales



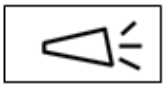
[a] Victimization subscales are created by summing the 'Adult male → Child' and 'Adult female → Child' items for each form of aggression.

[b] IPV exposure subscales are created by summing the 'Adult male → Adult female' and Adult female → Adult male' items for each form of aggression.

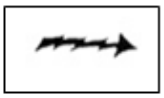
Figure 5.2 Family Aggression Screening Tool (FAST) instructions

These drawings show different types of aggression that can happen in homes.
We would like to know whether any of these happened between you and the adults in your household when you were growing up.
In the drawings below you will see:

A **heart** - this means that there were hurt feelings in the house (such as saying or doing mean things)

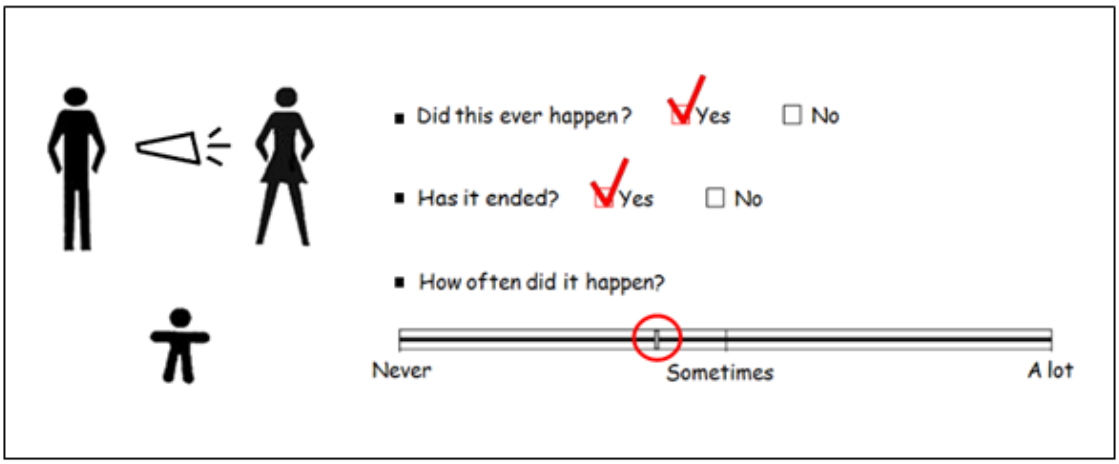


A **megaphone** - this means that there was verbal aggression in the house (such as shouting, threatening, swearing)



An **arrow** - this means that there was physical aggression in the house (such as slapping, hitting, or anything worse)

Here is an example - This drawing shows a father (or adult male) being verbally aggressive to a mother (or adult female). The person completing this questionnaire remembered this happening when they were growing up, so they checked the box that says YES. The person was then asked whether this type of aggression has ended, and they checked the box that says YES, because it does not happen anymore. The person was then asked to select a point anywhere along the line that best describes how often this type of aggression happened in the past, from never to a lot.



Now have a look at each of the drawings that come after this example. Look at the direction the hearts, megaphones and arrows are pointing and see if you remember this kind of aggression happening in your house when you were growing up. If you have no memory of this happening, you can check the box NO and move on to the next picture.

5.2.3.2. Childhood Trauma Questionnaire (CTQ)

The Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998) is a self-report instrument that measures experiences of maltreatment "while growing up." The CTQ originally included 70 items and was subsequently reduced to a 28-item instrument via exploratory and confirmatory factor analysis (Bernstein et al., 2003). The CTQ comprises five subscales measuring emotional abuse, physical abuse, sexual abuse, emotional neglect and physical neglect, in addition to three items measuring minimization/denial. Items are rated on a 5-point Likert scale ranging from '*never true*' to '*very often true*' (e.g. 'people in my family hit me so hard that it left me with bruises or marks'). From the CTQ it is either possible to derive continuous scores (i.e., higher scores represent greater severity of maltreatment) or create dichotomous classifications based on one of four possible thresholds (None, Low, Moderate, Severe; Bernstein & Fink, 1998).

The psychometric properties of the CTQ have been well-documented. With regards to reliability, the CTQ subscales have shown adequate-to-excellent internal consistency (α = .72 – .96), test-retest reliability and measurement invariance across multiple validation samples of clinical and non-referred adolescents and adults (Bernstein & Fink, 1998). Overall, psychiatrically referred groups have been found to score higher on CTQ subscales than nonreferred groups. CTQ subscale scores have been compared to a number of external validation measures, including the Childhood Trauma Interview (CTI; Fink et al., 1995) in a sample of substance abusing adults, and therapist ratings in a sample of adolescent psychiatric inpatients (Bernstein et al., 1997). In both cases, convergent and discriminant validity were demonstrated via positive correlations that were stronger between corresponding scales than non-corresponding scales. Moderate to strong correlations with corresponding scales were found for all CTQ subscales, including the CTQ emotional abuse subscale (CTI: r = .42; therapist ratings: r = .48) and the CTQ physical abuse subscale (CTI: r = .48; therapist ratings: r = .59). Finally, concurrent validity of the CTQ has been shown via significant low-to-moderate positive correlations between the CTQ subscales and measures of trauma-related symptomatology, including depression, PTSD and dissociation (r = .13 – .38) (Bernstein & Fink, 1998). Within our sample, alpha coefficients for the CTQ subscales ranged between α = .70 and .97.

5.2.3.3. Psychiatric symptomatology

Psychiatric symptoms were assessed using both self- and other-report measures. Participants completed the Trauma Symptom Checklist for Children (TSCC-A; Briere, 1996) to measure trauma-related symptoms. The TSCC-A is a 44-item self-report inventory that includes 5 clinical scales (anxiety, depression, post-traumatic stress, anger and dissociation) and 2 validity scales (under- and hyper-response). Items are rated on a 4-point scale from '*never*' to '*almost all of the time*'. Cronbach's alpha for the scales varied from .84 to .87 in our sample. Convergent, discriminant and predictive validity of the TSCC-A have been documented using child and adolescent samples (Briere, 1996; Sadowski & Friedrich, 2000).

Teachers or key workers completed five subscales from the DSM-IV-referenced Adolescent Symptom Inventory (ASI; Gadow & Sprafkin, 2002) to assess symptoms of generalised anxiety disorder (GAD), major depressive disorder (MDD), attention-deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD) and conduct disorder (CD). Each scale contains between 7 and 18 items and is rated on a 4-point scale from '*never*' to '*very often*' (α = .89 – .94).

5.2.3.4. Socio-demographic covariates

Data on age, sex, ethnicity and IQ were collected from all participants. Cognitive ability was assessed using the two-subtest version of the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999). All participants scored between 70 and 125 on the WASI. Participant postcode information was used to obtain an Index of Multiple Deprivation (IMD, 2011) score which is derived from population census data and encompasses multiple indicators of neighbourhood deprivation. Higher values indicate female gender, non-white ethnicity, older age, higher cognitive ability and greater neighbourhood deprivation.

5.3. Statistical analyses

The reliability of the FAST (Aim 1) was tested in two ways. First, we calculated Cronbach's alpha to measure internal consistency of the FAST total scale, whereby values ≥ .90 are considered excellent, ≥.80 as good, and ≥.70 as adequate (Kline, 1993). Second, we examined how the FAST subscales were associated with one another (inter-

item correlations) as well as with the total score (corrected item-total correlations) using Pearson correlation coefficients, where coefficients ≥ .50 are considered strong, ≥ .30 as moderate, and ≥ .10 as weak (Cohen, 1988).

Convergent and discriminant validity (Aim 2) were assessed by running Pearson correlations between subscales of the FAST and CTQ. Because FAST subscales were significantly associated with age and ethnicity, we also computed partial correlations controlling for these demographic variables. The scales were not significantly associated with participant sex, IQ or neighbourhood deprivation (IMD) (see Table 5.1). In order to examine unique associations between the subscales of the FAST and CTQ, we additionally ran a series of step-wise multivariate regressions to predict CTQ maltreatment scores, where (i) age and ethnicity were entered as covariates in the first step, and (ii) all FAST subscales were entered simultaneously as independent variables in the second step of the regression. It is important to note that out of the 6 FAST subscales, two (emotional and physical victimization) directly corresponded with CTQ subscales (emotional and physical abuse).

Concurrent validity (Aim 3) was tested by examining associations between the FAST subscales and (self- and other-report) psychiatric symptomatology using both zero-order Pearson correlations, as well as partial correlations controlling for age and ethnicity.

Our final aim (Aim 4) was to examine the diagnostic accuracy of the FAST using the CTQ as a validity criterion. Two of the FAST subscales directly corresponded with CTQ subscales. As such, we were able to examine diagnostic accuracy exclusively for these two subscales (i.e. FAST: emotional and physical victimization; CTQ: emotional and physical abuse), making use of Receiver Operating Characteristic (ROC) analysis (Vida, 1993). ROC utilizes of a dichotomous criterion variable (i.e. the 'gold standard' of measurement) to calculate sensitivity and specificity values for each possible score of the continuous scale that is being validated (i.e. 'test variable'). First, ROC analysis enables to establish the overall diagnostic accuracy of the continuous 'test' scale by providing an Area under the Curve (AUC) statistic based on the gold standard, which ranges from 0.5 (chance accuracy) to 1.0 (perfect accuracy), with values above .70 considered acceptable (Swets, 1988). Second, because ROC analysis provides sensitivity and specificity values for every possible score of the measure being validated, it enables to select an optimal score (i.e. cut-off) that provides the best trade-off between false positive and false negative errors, as defined by the gold standard

criterion variable. An ideal cut-off enables correct classification of both those individuals who have experienced family aggression (i.e. true positives) as well as those who have little or no experience of it (i.e. true negatives).

Although no 'gold standard' exists for the detection of family aggression, the CTQ has been widely used as a criterion variable to validate a considerable number of maltreatment instruments (e.g. DiLillo et al., 2010; Lobbestael, Arntz, Harkema-Schouten, & Bernstein, 2009). In order to use the CTQ emotional and physical abuse subscales as criterion variables in our study, we dichotomized them into binary yes/no items based on the CTQ Moderate classification threshold guidelines (≥ 13 and ≥ 10, respectively, Bernstein & Fink, 1998). For validation purposes, we judged that the Moderate CTQ threshold was an optimal classifier against which to validate the FAST, compared to the Low (overly inclusive) and Severe (overly conservative) CTQ thresholds. We then examined the following diagnostic indices for the selected cut-offs: (i) Sensitivity, the test's ability to correctly identify youth who have experienced victimization (i.e. true positive rate); (ii) Specificity, the test's ability to correctly identify youth who have had little or no history of victimization (i.e. true negative rate); (iii) Positive Predictive Value (PPV), the probability that victimization is present when the test is positive (i.e. above the FAST cut-off); (iv) Negative Predictive Value (NPV), the probability that victimization is not present when the test is negative (i.e. below the FAST cut-off); and (v) Consistent classification, the proportion of youth who were classified with the same status by both the FAST and CTQ, as analysed by the cross-tabulation function and associated chi-square statistic. Together, these diagnostic indices enabled to assess of the performance of the FAST as a valid 'red flag' tool for detecting experiences of emotional and physical victimization, as compared to the widely used and psychometrically validated CTQ. Analyses were performed on SPSS package v. 21 (2012).

5.4. Results

Descriptive statistics and correlations between the FAST subscales and socio-demographic characteristics are presented in Table 5.1. As is common with maltreatment instruments, FAST scores were skewed towards the lower end of the scale, with a high proportion of 0 scores (i.e. reporting no family aggression). However, 89% of sample reported occurrence of some form of family aggression on the FAST

total score (i.e. score > 0), and between 20% and 66% of sample reported occurrence of specific forms of family aggression on the individual FAST subscales, with verbal victimization being most common, and exposure to physical IPV the least common. The FAST subscales were significantly correlated with age and ethnicity, but not with participant sex, IQ or level of neighbourhood deprivation (i.e. IMD).

Table 5.1 Descriptives and correlations with socio-demographic characteristics

		Ethnicity[a]							
FAST subscales	M *(SD)*	White	Black	Mixed	Asian	Sex	Age	IQ	IMD
Victimization									
Emotional	3.33 *(4.47)*	-.18*	.15*	.06	.00	.06	.07	-.08	.05
Verbal	5.13 *(5.32)*	-.21**	.16*	.08	.01	-.09	.18*	.10	.10
Physical	2.48 *(4.20)*	-.23**	.20**	-.01	.09	.12	.24**	.07	.11
IPV Exposure									
Emotional	3.33 *(4.19)*	-.17*	.11	.12	-.04	.12	.19*	-.04	.12
Verbal	4.44 *(5.40)*	-.10	.02	.09	.06	.05	.21**	.00	.05
Physical	1.53 *(3.77)*	-.16*	.20**	.02	-.10	.08	.15†	-.11	.11
FAST Total	20.28 *(20.09)*	-.24**	.18*	.09	.01	.07	.25***	.00	.14

N.B. Bivariate correlations significant at: † p < .06, *p <.05, **p < .01, ***p < .001

[a] Ethnicity: White (yes = 1; no = 0); Black (yes = 1; no = 0); Mixed (yes = 1; no = 0); Asian (yes = 1; no = 0).

Reliability

Internal consistency and intercorrelations between FAST subscales (aim 1).

Internal consistency of the FAST was good (α = .82), indicating that it reliably measured overall family aggression. Inter-item and item-total correlations between the FAST subscales are presented in Table 5.2. Correlations between subscales were significant and ranged from low to strong (r = .26 – .63). The strongest associations were found between the verbal and physical aggression subscales (victimization dimension: r = .63; exposure to IPV dimension: r = .59). Corrected item-total correlations were strong across all subscales (r = .50 – .66), indicating that each subscale reliably measured the same construct as the total score and that none of the subscales warranted removal.

Table 5.2 Inter-item and item-total correlations among the FAST subscales

FAST subscales	1	2	3	4	5	**Item-Total**
Victimization						
1. Emotional	–					.50
2. Verbal	.45	–				.65
3. Physical	.48	.63	–			.64
IPV Exposure						
4. Emotional	.41	.30	.26	–		.51
5. Verbal	.29	.58	.43	.50	–	.66
6. Physical	.29	.36	.53	.47	.59	.60

N.B. all correlations, $p < .001$.

Validity

Convergent and discriminant validity (aim 2).

Associations between the FAST and CTQ are presented in Table 5.3. The FAST total score was strongly correlated with the CTQ total score ($r = .70$). Zero-order bivariate Pearson correlations across the subscales ranged from low to strong ($r = .17 – .64$), with the strongest correlations found between corresponding subscales. For example, the FAST emotional victimization subscale was significantly correlated with the CTQ emotional abuse subscale ($r = .58$). Similarly, the FAST physical victimization subscale was strongly associated with the CTQ physical abuse scale ($r = .64$). Correlations between non-corresponding scales on the FAST and CTQ ranged from .17 to .55. Controlling for age and ethnicity did not change the overall pattern of results (see Table 5.3).

Results from the step-wise multivariate regression analyses show that the associations between corresponding subscales on the FAST and CTQ were unique (i.e. controlling for the other significantly correlated subscales), supporting their respective convergent and discriminant validity (see Table 5.3). When entering all FAST subscales simultaneously as predictors of the CTQ subscales, emotional victimization was the only significant predictor of CTQ emotional abuse (*Std. B* = .39, $p < .001$) and physical victimization was the strongest predictor of CTQ physical abuse (*Std. B* = .47, $p < .001$). A number of non-corresponding FAST subscales were also predictive of the CTQ (see Table 5.3).

Table 5.3 Associations between FAST subscales and CTQ subscales

FAST subscales	CTQ Subscales														
	Emotional Abuse			Physical Abuse			Sexual Abuse			Emotional Neglect			Physical Neglect		
	r^a	partial r^b	Std.B^c	r^a	partial r^b	Std.B^c	r^a	partial r^b	Std.B^c	r^a	partial r^b	Std.B^c	r^a	partial r^b	Std.B^c
Victimization															
Emotional	.58***	.58***	.39***	.55***	.55***	.33***	.28***	.28***	.09	.48***	.49***	.30***	.53***	.53***	.35***
Verbal	.48***	.46***	.13	.35***	.34***	-.16*	.26***	.25***	.07	.42***	.38***	-.04	.37***	.34***	-.18*
Physical	.51***	.48***	.15	.64***	.63***	.47***	.35***	.34***	.23*	.53***	.51***	.37***	.58***	.56***	.38***
IPV Exposure															
Emotional	.36***	.33***	.05	.34***	.32***	.05	.26***	.24**	.16	.26***	.24**	.02	.33***	.30***	-.00
Verbal	.38***	.35***	.04	.32***	.30***	-.07	.17*	.15†	-.15	.34***	.31***	.10	.41***	.38***	.16
Physical	.37***	.35***	.07	.53***	.52***	.26***	.27***	.26***	.11	.32***	.30***	-.02	.47***	.45***	.13

NB. † p < .06, *p <.05, **p < .01, ***p < .001. Underlined coefficients represent associations between corresponding subscales across the FAST and CTQ.

[a] Zero-order bivariate correlations (*N* = 166).

[b] Partial correlations controlling for age and ethnicity (*N* = 162).

[c] Step-wise multivariate regression analyses controlling for age and ethnicity. Standardized estimates are presented as a measure of effect size (N = 162).

Concurrent validity (aim 3).

Correlations between the FAST subscales and measures of psychiatric symptomatology are presented in Table 5.4. The FAST total score was moderately associated with both self-report (r = .36) and other-report (r = .37) total symptomatology, supporting the concurrent validity of the FAST. Associations between the individual FAST subscales and the psychiatric symptom subscales ranged from .07 to .40. Emotional victimization was moderately associated with all self- and other-report psychiatric symptom subscales, the strongest associations being with self-report anxiety, depression and PTSD symptoms. Exposure to emotional and physical IPV was also significantly associated with psychiatric symptoms across subscales. The remaining FAST subscales were significantly associated with some, but not all psychiatric symptom subscales. The overall pattern of results was consistent when controlling for age and ethnicity (see Table 5.4).

Sensitivity and Specificity (aim 4).

Diagnostic accuracy was evaluated for the two FAST subscales that directly corresponded with the CTQ subscales (i.e. emotional and physical victimization). Based on the CTQ classification, the prevalence of emotional and physical victimization was 22% and 20%, respectively. Results from the ROC analysis are presented in Table 5.5. The area under the ROC curve was significant for both the FAST emotional victimization (AUC = .82, SE = .05, $p < .001$), and physical victimization (AUC = .84, SE = .05, $p < .001$) subscales, indicating good overall level of accuracy (i.e. values exceed .70). This means that, based on the CTQ Moderate abuse classification criterion, the likelihood of detecting emotional and physical victimization using these FAST subscales was significantly higher than that expected by chance.

Table 5.4 Associations between FAST subscales and measures of psychiatric symptomatology

FAST subscales	Self-report (TSCC)										Other-report (ASI)									
	Anxiety		Depression		Anger		PTSD		Dissociation		GAD		MDD		ADHD		ODD		CD	
	r^a	*partial* r^b	r^a	*partial* r^b	r^a	*partial* r^b	r^a	*partial* r^b	r^a	*partial* r^b	r^a	*partial* r^b	r^a	*partial* r^b	r^a	*partial* r^b	r^a	*partial* r^b	r^a	*partial* r^b
Victimization																				
Emotional	.40***	.39***	.36***	.26***	.28***	.29***	.38***	.37***	.28***	.29***	.36***	.31***	.30***	.25**	.30***	.27**	.31***	.28**	.23**	.19*
Verbal	.12	.11	.16*	.14	.28***	.30***	.28***	.27***	.24***	.25***	.17	.11	.19*	.13	.09	.04	.17†	.14	.14	.09
Physical	.12	.11	.15*	.13	.11	.13	.24***	.22**	.14	.15*	.29***	.23*	.29***	.23**	.19*	.14	.22*	.18*	.14	.07
IPV Exposure																				
Emotional	.25***	.24**	.24**	.22**	.23**	.25***	.26***	.25***	.17*	.17*	.28**	.24**	.23**	.20*	.26**	.24**	.33***	.31***	.35***	.31***
Verbal	.07	.06	.19*	.17*	.21**	.24**	.21**	.19*	.21**	.22**	.25**	.22*	.25**	.23**	.20*	.18*	.26**	.24**	.20*	.17†
Physical	.15†	.14	.24**	.23**	.24**	.26***	.26***	.25***	.21**	.23**	.38***	.35***	.36***	.33***	.30***	.27**	.36***	.35***	.31***	.28**
FAST Total	.24***	.24**	.30***	.28***	.31***	.34***	.37***	.35***	.29***	.31***	.37***	.32***	.35***	.30***	.29***	.25**	.36***	.33***	.29***	.25**

N.B. † p < .06, *p <.05, **p < .01, ***p < .001. PTSD = post-traumatic stress disorder; GAD = generalized anxiety disorder; MDD = major depressive disorder; ADHD = attention-deficity/hyperactivity disorder; ODD = oppositional defiant disorder; CD = conduct disorder.

[a] Zero-order bivariate correlations (self-report N = 164; other-report N = 120).

[b] Partial correlations controlling for age and ethnicity (self-report N = 162; other-report N = 118).

The selection of an optimal cut-off score for the emotional and physical victimization subscales was based on a number of diagnostic indices (see Table 5.5). Cut-off scores of 7 for emotional victimization, and 6 for physical victimization were selected as they yielded similar diagnostic accuracy, as well as providing the best balance of sensitivity and specificity. When using these cut-offs, the scales correctly classified 70% of participants who had experienced victimization, based on the CTQ Moderate thresholds, and 93% of participants with low or no experience of victimization. Thus, the cut-offs provided adequate sensitivity and excellent specificity (Florkowski, 2008). The predictive values further indicated that scoring above the selected FAST cut-offs resulted in the likelihood of accurately detecting close to 3 out of 4 true positives (PPV), while scoring below the cut-off resulted in the likelihood of correctly identifying 9 out of 10 true negatives (NPV). The proportion of cases identified by the selected FAST cut-offs as compared to the CTQ Moderate classification threshold is shown in Table 5.6. Overall, classifications made by the two measures were consistent in 88.1% of cases for emotional victimization, and 88.7% of cases for physical victimization. Chi-square analysis further supported this by demonstrating a highly statistically significant association between the FAST and CTQ binary classification systems (emotional victimization: X^2 (1) = 65.85, p <.001; physical victimization: X^2 (1) = 68.32 p <.001).

Table 5.5 Sensitivity and specificity of FAST emotional and physical victimization subscales.

	Cut-off Scores					
FAST subscales	5	6	7	8	9	10
Emotional victimization[a]						
Sensitivity (%)	73	70	**70** (.57 - .80)	57	51	46
Specificity (%)	76	90	**93** (.89 - .96)	95	95	96
PPV (%)	46	67	**74** (.60 - .85)	72	76	76
NPV (%)	91	91	**92** (.88 - .94)	89	87	85
AUC (95% CI)			.82 (.73 - .91)***			
Physical victimization[b]						
Sensitivity (%)	70	**70** (.55 - .81)	67	61	58	36
Specificity (%)	88	**93** (.90 - .96)	96	99	99	99
PPV (%)	59	**72** (.57 - .83)	79	91	95	92
NPV (%)	92	**93** (.89 - .95)	92	91	91	86
AUC (95% CI)			.84 (.75 - .94)***			

N.B. Range of scores = 0 - 20; PPV = Positive Predictive Value; NPV = Negative Predictive Value; AUC = area under the Receiver Operating Characteristic (ROC) curve; 95% CI = (5% confidence interval of AUC. Bolded values represent diagnostic results for optimal cut-off scores. *N* = 168.

[a] True positives = 37; true negatives = 131; prevalence = 22%. The criterion variable is the dichotomous CTQ emotional abuse subscale based on 'moderate' abuse classification threshold. For the optimal cut-off (7/20) 95% confidence intervals are presented in brakets across diagnostic indices.

[b] True positives = 33; true negatives = 135; prevalence = 20%. The criterion variable is the dichotomous CTQ physical abuse subscale based on 'moderate' abuse classification threshold. For the optimal cut-off (6/20) 95% confidence intervals are presented in brakets across diagnostic indices.

Table 5.6 Proportion of cases identified by the FAST vs CTQ

	CTQ Moderate threshold	
FAST	No	Yes
Emotional victimization (Cutoff = 7/20) [a]		
No	122	11
Yes	9	26
Physical victimization (Cutoff = 6/20) [b]		
No	126	10
Yes	9	23

[a] Correspondence between the FAST and CTQ = 88.1%, X2 (1) = 65.85, p <.001

[b] Correspondence between the FAST and CTQ = 88.7%, X2 (1) = 68.32 p <.001

5.5. Discussion

The purpose of the current study was to evaluate the reliability and validity of the FAST, a brief non-verbal screening tool of family aggression. Internal consistency of the FAST was found to be good. The six FAST subscales (i.e. emotional, verbal, and physical victimization; exposure to emotional, verbal and physical IPV) were all strongly associated with the FAST total score. Inter-correlations between the FAST subscales were moderate-to-strong, indicating that forms of aggression measured by the FAST were distinct from one another but also related. This is consistent with previous studies showing that (i) maltreatment types co-occur (Herrenkohl & Herrenkohl, 2009), and (ii) maltreatment is closely associated with exposure to IPV (Hamby et al., 2010; Holt et al., 2008).

In order to test convergent validity, we examined associations between the FAST and the CTQ, a widely used and extensively validated measure of childhood maltreatment. Total scores on the FAST and CTQ were highly associated. This is noteworthy, given the limited number of corresponding scales between these two instruments and the use of markedly different approaches to assess childhood experiences. While the FAST makes use of visual symbols to depict forms of aggression, the CTQ uses multiple verbal items that generally describe behaviourally specific events. Yet, despite these differences, the current results indicate that both instruments are measuring largely overlapping constructs.

In line with expectations, associations between corresponding scales on the FAST and CTQ were stronger than those found between non-corresponding scales, supporting the ability of the FAST to discriminate between forms of family aggression. Importantly, the magnitude of correlations between corresponding scales was equivalent to that reported in previous studies comparing the CTQ against other measures of maltreatment, including the Childhood Trauma Interview (Fink et al., 1995), therapist ratings (Bernstein et al., 2003), as well as a number of recently developed verbal self-report instruments (e.g. DiLillo et al., 2010; Lobbestael et al., 2009). Furthermore, subscales on the FAST were found to uniquely predict corresponding scales on the CTQ, providing additional support for the discriminant validity of the FAST.

Concurrent validity of the FAST was demonstrated by significant associations with psychiatric symptoms, both self- and other- report. The strength of these associations was comparable to that reported by previous studies examining correlations

between the CTQ and similar indices of psychopathology (e.g. Bernstein & Fink, 1998; Goldstein et al., 2011). Emotional victimization was the strongest correlate of symptom severity across the majority of psychiatric domains. These findings are consistent with mounting evidence pointing to emotional maltreatment as an important risk factor for developmental maladjustment (Schneider et al., 2005; Wekerle, 2011). In contrast, verbal victimization was associated with a smaller subset of psychiatric domains. The findings raise the question as to whether emotional hurt may exert stronger or broader effects than the experience of verbal aggression alone. This is of interest given that emotional and verbal abuse are seldom examined separately in the maltreatment literature; the extent to which they may overlap with one another, or uniquely affect outcomes is therefore unclear.

Physical victimization was weakly associated with externalizing problems, which is somewhat inconsistent with studies linking physical abuse to conduct problems and antisocial behaviour (e.g. Litrownik et al., 2005; Taussig, 2002). One possibility is that, in addition to measuring physical abuse (as indicated by the strong correlation with the CTQ physical abuse scale), the physical victimization subscale may also capture more 'normative' parental behaviours (e.g. corporal punishment as a means of obtaining discipline), thereby resulting in weaker associations with psychiatric symptoms. This will need to be further explored in future studies.

Diagnostic accuracy of the emotional and physical victimization FAST subscales was examined using the CTQ as the validity criterion. The area under the curve statistic was employed to assess the likelihood of detecting victimization using the FAST compared to that expected by chance alone. The area under the curve demonstrated a highly significant support for the scales' ability to detect experiences of emotional and physical victimization (i.e. good overall diagnostic accuracy). Using ROC procedures, we then identified optimal cut-off scores for the scales that provided the best balance between sensitivity and specificity (emotional victimization = 7; physical victimization = 6). Both cut-offs demonstrated adequate sensitivity in correctly classifying youth who had experienced aggression (i.e. true positives detected when scoring above cut-off), and excellent specificity in correctly identifying those who had little or no experience of it (i.e. true negatives detected when scoring below cut-off). The ability of the FAST cut-off scores to correctly identify true negative cases contrasts with the typically low specificity of existing screening tools, which tend to increase the risk of false positives (Gottlieb & Schrager, 2012). Consequently, using the FAST can

allow researchers and clinicians to more confidently screen out individuals with little or no experience of family aggression.

Finally, we found that classifications based on the FAST and CTQ cut-offs were highly consistent with one another (>88% correspondence). Despite this, there were instances in which both measures led to discrepant classifications. These may be explained by differences in the methodology used to screen for experiences of victimization (i.e. verbal vs non-verbal). The use of visual symbols on the FAST is more likely to rely on the participant's broader subjective experience of victimization (e.g. broken heart to represent emotional hurt). In contrast, the CTQ principally relies on the occurrence of specific and objective behavioural acts that have been defined as abusive. Consequently, it is possible that youth who were classified as victimized only by the FAST could have experienced events or feelings that were not measured directly by the CTQ items. Reasons for a positive classification only on the CTQ are less clear and will need to be further explored. It is important to note, however, that because no 'gold standard' exists for the detection of child victimization, the CTQ classification threshold used may have also resulted in a number of erroneous classifications.

Limitations and future directions

In summary, these preliminary findings indicate that the FAST is a valid and reliable non-verbal measure of family aggression. Nevertheless, the FAST is characterised by a number of limitations. First, the use of generic visual symbols is designed to provide an initial 'snapshot' into patterns of family aggression, and as such is unable to provide specific detail of the young person's experience of victimization and IPV exposure. Because of its non-verbal nature, the FAST also relies on subjective conceptualizations to a greater extent than do other verbal measures of family aggression, which may lead to differences in measurement. Nevertheless, strong associations between the FAST and CTQ indicate that these two instruments are measuring largely overlapping constructs. This is further supported by the fact that associations between the FAST and CTQ were comparable to those reported using other verbal instruments of maltreatment (e.g. DiLillo et al., 2010; Lobbestael et al., 2009). Furthermore, subjective appraisals of maltreatment experiences have been found to be a powerful predictor of poor mental health functioning (e.g. McGee et al., 1997). The use of a non-verbal format may

actually be advantageous for detecting emotional maltreatment, as it is notably more challenging to operationalize than other forms of victimization, such as physical abuse (Tonmyr et al., 2011). Second, the FAST does not incorporate sexual abuse or neglect as a result of difficulties in representing these forms of maltreatment visually. Interestingly, however, emotional victimization on the FAST uniquely predicted scores across CTQ subscales, including sexual abuse, emotional neglect and physical neglect. This suggests that emotional hurt on the FAST may be reported by youth who have experienced either acts of commission (i.e. abuse) or omission (i.e. neglect). As a result, the FAST may be helpful in initially detecting possible experience of emotional hurt, which can then be further explored using a more in-depth assessment tool or interview protocol. Third, while the FAST assesses whether the individual is currently experiencing each form of family aggression, it does not provide details regarding timing or duration of exposure. It is important to note, however, that estimations of age of onset and duration of family aggression may be particularly unreliable in self-report instruments, due to recall biases and inability to accurately report exposure to aggression that may have occurred during early childhood (Fallon et al., 2010).

Aside from the limitations of the FAST outlined above, there are a number of methodological limitations in the present study that will need to be addressed in future. The use of the CTQ as a validity criterion meant that we were unable to establish convergence and diagnostic accuracy of all FAST subscales, except emotional and physical victimization (i.e. corresponding scales). In order to establish the full psychometric properties of the FAST subscales, it will need to be compared to other validated measures that include an assessment of verbal aggression as well as exposure to IPV. The CTQ was chosen as a validity criterion due to its known psychometric properties. However, like all self-report instruments it is potentially susceptible to recall biases and non-disclosure, and as such does not represent a 'gold standard' against which to validate the FAST. The comparison of the FAST to different measures of maltreatment and IPV exposure (both self- and other-report, e.g. therapist ratings, case files) will ultimately provide further information regarding the validity of the FAST. Furthermore, findings regarding the psychometric properties of the FAST were based on a relatively small community sample of high-risk youth. As a result, it will be important to establish to what extent reliability, validity and diagnostic accuracy of the FAST may vary across adolescent populations (e.g. psychiatric inpatients vs low-risk community). In particular, it will be important to validate the applicability of the FAST to youth with

reading difficulties, non-native English speakers and younger respondents. Finally, due to sample size limitations we were unable to examine each pictorial representation separately so as to explore associations between family aggression characteristics (i.e. identity of victim and perpetrator; directionality of aggression between family members) and psychiatric symptomatology. Future studies will be needed to examine whether these characteristics, as recorded by the FAST, moderate the impact of family aggression on mental health outcomes. It will also be important to establish whether these characteristics may be clinically useful for informing risk assessment and treatment formulation.

5.6. Conclusions

The present chapter described a study where we tested the initial psychometric properties of the FAST. The FAST is the first instrument, to our knowledge, to use pictorial representations to screen for experiences of family aggression. It is brief, easy to use, minimally invasive and freely available upon request. Findings provide initial support for its validity, reliability and diagnostic accuracy in detecting multiple forms of family aggression. As a result, the FAST has the potential to be widely applicable in both research and clinical settings. By recording both forms of victimization and IPV exposure, the FAST may be used to conduct research into the unique, additive and interactive effects of individual forms of family aggression on developmental outcomes. As a screening tool, the FAST can be used to obtain a 'snapshot' of family aggression patterns, and inform the need of more comprehensive follow-up assessments. The use of pictorial representations may also provide a means for clinicians to initiate a dialogue regarding the young person's history of exposure in a way that is potentially less invasive than verbal screening tools. Finally, the FAST may prove particularly useful in facilitating screening with youth who experience reading difficulties or poor literacy, non-native English speakers, as well as younger respondents. Taken together, findings indicate that the FAST shows promise as a non-verbal tool for the rapid detection of family aggression.

CHAPTER 6: General Discussion

6.1. Overview

Childhood maltreatment continues to represent a global phenomenon and a major public health concern (Gilbert, Widom, et al., 2009). The effects of maltreatment can be profound and pervasive, disrupting normative developmental trajectories and increasing long-term vulnerability to psychopathology. In childhood, maltreatment has been shown to compromise emotional, psychosocial, neurocognitive and behavioural development, elevating risk for a wide range of mental health and adjustment difficulties (Cicchetti & Toth, 2005). The effects of maltreatment can be enduring, extending well into the adult years. Adults who have experienced maltreatment while growing up are also more likely to present with psychiatric and medical disorders. More broadly, maltreatment has been associated with decreased life opportunities, including lower levels of educational attainment, future earnings, and employment prospects (Currie & Widom, 2010). At a societal level, maltreatment poses a significant financial burden on healthcare, judicial and welfare services, increasing costs associated with physical injury and disability, mental health problems, substance dependence, criminality, and unemployment (Gilbert, Widom, et al., 2009). Consequently, maltreatment is recognized as a salient developmental risk factor and as an important target for prevention and intervention efforts.

Despite major advances in our understanding of maltreatment over the past decades, a number of areas necessitate increased research attention. One such area relates to the issue of poly-victimisation or *co-occurrence*. Maltreatment has been shown to co-occur with other forms of developmental adversity, such as exposure to violence within the home and wider community. While clinicians typically aim to identify presence of multiple past and present risk factors in a child's environment, consideration of this co-occurrence is largely lacking within research settings. Progress in this area is necessary to better understand how different forms of adversity relate to one another, and to estimate more precisely the unique, additive and interactive effects of adverse experiences on child development. Another area that needs to be further explored is the marked *individual heterogeneity* in response to maltreatment. While some individuals develop mental health difficulties, others do not. Even those that do develop problems as a result of maltreatment can differ considerably in the type and severity of difficulties experienced. As such, heterogeneity in response to maltreatment continues to represent a considerable challenge for researchers and practitioners alike.

Understanding factors that underlie such heterogeneity is imperative for facilitating the development of more effective prevention and intervention strategies, as well as enabling the identification of maltreated children who may be at greater risk of experiencing more severe or long-term impairments in individual functioning. Lastly, an outstanding challenge is to tackle the widespread tendency for maltreatment to be *underreported* (Fallon et al., 2010). Greater investment is needed in the development of effective screening tools to ensure more rapid, comprehensive and valid detection of childhood adversity. Further, there is a need for tools that can facilitate screening with traditionally 'hard-to-screen' populations, such as individuals with reading difficulties, non-English speakers and younger respondents. Developments in this area would contribute to more efficient detection of maltreatment as well as informing risk assessment and service provision within a wide range of settings.

The current thesis set out to advance knowledge in the above areas using behavioural data drawn from a community sample of over two hundred high-risk youth. All youth came from socially deprived neighbourhoods, but varied considerably in the extent of maltreatment experienced, ranging from minimal to extreme. Extensive data was collected to inform a detailed characterization of (i) experiences of childhood maltreatment (using both validated and novel instruments); (ii) the presence of additional adversity within the domestic and community environment; and (iii) a profile of psychosocial, emotional and behavioural functioning (multi-rater assessments). As a result, the sample was well suited for examining maltreatment *co-occurrence, individual heterogeneity,* and *screening*.

6.2. Research questions

In the current thesis we endeavoured to empirically address four outstanding research questions:

1) Does childhood maltreatment and community violence exposure exert common or distinct effects on mental health outcomes?

2) Are individual maltreatment types uniquely associated with different mental health outcomes?

3) Do variants of callous-unemotional traits differ in history of childhood maltreatment and profile of individual functioning?

4) Can we develop a more effective and widely accessible screening tool for family aggression?

Findings and implications pertaining to each of these questions are considered sequentially in the sections below.

6.2.1. Do childhood maltreatment and community violence exposure exert common or distinct effects on mental health outcomes?

In **Chapter 2**, we described a study where we examined the unique, additive and interactive effects of childhood maltreatment and community violence exposure (CVE) on mental health outcomes. Overall, our findings indicate presence of both common and distinct effects of maltreatment and CVE on adolescent mental health. While history of childhood maltreatment was associated with increased symptoms across a broad range of mental health domains, the impact of community violence was more constrained. Typically, maltreatment and CVE exerted additive effects on mental health; however, these two forms of developmental adversity interacted to predict anger levels.

First, we found that severity of maltreatment predicted levels of internalizing, externalizing and trauma-related symptoms (i.e. anger, PTSD and dissociation) following a dose-response gradient. These results are consistent with existing epidemiological and neurobiological studies documenting the profound and cumulative effect of maltreatment on multiple domains of individual functioning (McCrory, De Brito & Viding, 2011). The fact that maltreatment exerted generic and detrimental effects on all domains examined emphasizes the importance of investing in early preventive strategies, which are likely to be considerably more effective and economic than the implementation of remedial interventions later on (Cicchetti & Toth, 2005). Effects attributed to maltreatment remained significant but diminished in strength after adjusting for CVE. Hence, results suggest that researchers examining associations between maltreatment and mental health outcomes should account for current levels of CVE so as not to overestimate the effects of maltreatment. This may be especially relevant for studies measuring maltreatment based on retrospective reports in older youth, as these same youths may be particularly likely to experience CVE.

Second, we found that CVE predicted externalizing difficulties and trauma-related symptoms, over and above the effects of maltreatment. Thus, CVE was identified as an independent risk factor for negative mental health outcomes. Given the high prevalence of community violence in urban areas, these findings emphasize the need to address CVE in adolescent populations (Margolin & Gordis, 2000). At present, preventive measures and intervention solutions targeting youth exposed to CVE are limited and lack systematic evaluation (Fowler et al., 2009). Preventive solutions need to be developed and implemented in order to reduce exposure to community violence. Furthermore, tailored programmes that provide counselling services and promote healthy coping strategies amongst affected youth should be made available, so as to reduce the impact of CVE on mental health. It is noteworthy that CVE was not found to independently predict levels of internalizing difficulties (across multi-rater assessments). Future studies are needed to examine whether such a lack of effect may stem from a process of desensitization or pathological adaptation to violence exposure or whether other mechanisms may be at play.

Finally, we found that the effects of childhood maltreatment and CVE combined in outcome-specific ways. Additive effects were found in relation to externalizing problems, post-traumatic stress and dissociation. This pattern of additive effects indicates that within these domains experiencing either form of adversity was harmful, but experiencing both results in the greatest levels of maladjustment and trauma symptoms. As a result, clinicians conducting risk assessments should be aware that exposure to CVE may exacerbate symptom severity in maltreated youth, and vice versa.

With regards to levels of anger, maltreatment and CVE were found to interact with one another. On the one hand, youth who had experienced severe maltreatment presented with the highest levels of anger, but such anger levels did not augment as a function of CVE. On the other hand, youth who had experienced little or no maltreatment showed the steepest increase in anger levels as a result of increasing levels of CVE. Results may reflect chronically heightened levels of anger within severely maltreated youth, whilst also reflecting a dose dependent relationship following CVE in those exposed to little or no maltreatment but who were exposed to high levels of community violence. Longitudinal studies are needed to clarify how responses to CVE over time may differ across youth who have experienced varying levels of maltreatment.

Taken together, the findings described in **Chapter 2** advance understanding of how different forms of developmental adversity combine to affect multiple domains of mental health functioning. Findings indicate that both maltreatment and CVE act as potent independent risk factors for psychopathology. Furthermore, whilst maltreatment may act as a more proximal risk factor, CVE may serve to modify associations between maltreatment and certain psychiatric symptoms. The observed pattern of common and distinct effects of maltreatment and CVE on mental health also has implications for the development of prevention and intervention strategies.

6.2.2. Are individual maltreatment types uniquely associated with different mental health outcomes?

In **Chapter 3** we presented a study examining the unique associations between distinct forms of maltreatment and mental health outcomes, adjusting for socio-demographic characteristics and CVE. Overall, we found that maltreatment types were highly interrelated and frequently co-occurred with one another. When examined separately, most maltreatment types predicted mental health outcomes, over and above the contribution of socio-demographic variables and current levels of CVE. However, few effects remained significant once all maltreatment types were examined concurrently, so as to account for shared variance between them. These findings therefore indicate the existence of both shared and unique effects of maltreatment types on mental health outcomes. Emotional abuse emerged as the sole unique contributor to internalizing difficulties and trauma related symptomatology.

In line with previous studies, we found that maltreatment types were largely overlapping, as evidenced by strong correlations between them (Herrenkhol & Herrenkhol, 2009). Furthermore, maltreatment types frequently co-occurred with one-another. In fact, maltreated youth reported experiencing two or more types of maltreatment more frequently than the experience of single forms of maltreatment. Despite evidence of relatedness between maltreatment types, forms of abuse and neglect are often treated as independent entities within research practice (Finkelhor et al., 2007a; Higgins & McCabe, 2001). A paradigm shift is needed wherein researchers begin to acknowledge and appropriately address interrelationships between different

forms of maltreatment. Such an approach will help shed light on specific effects associated with different types of maltreatment.

The study attempted to partition unique and shared effects of maltreatment types on mental health outcomes. We found that in general effects were driven by intercorrelations between maltreatment types (i.e. shared variance). That is, the majority of significant associations observed when examining maltreatment types individually failed to reach significance once maltreatment types were examined simultaneously. In contrast to previous studies (e.g. Litrownik et al., 2005; Petrenko et al., 2012; Taussig, 2002), physical abuse was not found to uniquely contribute to externalizing difficulties. Post-hoc analyses indicated that this was due to the fact that we had adjusted for current levels of CVE in our analyses. Consistent with **Chapter 2**, these findings emphasize the importance of measuring and accounting for current levels of CVE within maltreatment research. More generally, future studies should aim to identify processes linking maltreatment, CVE and mental health outcomes. Particularly, longitudinal data is needed to examine the bidirectional associations between physical abuse and CVE in the development of externalizing difficulties, so as to clarify the directionality of effects observed.

Of all maltreatment types, emotional abuse was found to be the sole unique contributor to internalizing difficulties and trauma-related symptoms, over and above the effects of socio-demographic characteristics, CVE and other maltreatment types. Together with a small number of existing studies, this finding points to emotional abuse as a particularly detrimental form of maltreatment and as a robust predictor of mental health difficulties. These findings underscore the need for increased awareness of emotional abuse, as it remains often overlooked within research, policy and clinical practice (Rees, 2010; Simeon et al., 2001). The next step for research will be to identify what makes emotional abuse so 'distinctive' compared to other maltreatment types. Unfortunately, available measures of emotional abuse currently limit the ability to tease apart distinct aspects of emotional abuse that may be differentially driving the effects observed. Current instruments often use a combination of items indexing (i) behavioural acts that are specific to emotional abuse (e.g. belittling, shouting), (ii) feelings that index emotional abuse but that may also be secondary to all forms of maltreatment (e.g. feeling unloved, worthless, unwanted), as well as (iii) subjective appraisals of the abuse (e.g. 'I believe that I was emotionally abused'). Disambiguating these different aspects of emotional abuse may help researchers understand why this

form of maltreatment emerges as the sole unique contributor to mental health functioning.

In summary, the study presented in **Chapter 3** supports the existence of both shared and unique effects of maltreatment types on mental health outcomes. Most importantly, the study highlights the role of emotional abuse in increasing vulnerability to poor mental health outcomes. The unique effects observed for emotional abuse emphasise the need to ensure such experiences are an integral part of routine risk assessment as well individualised treatment formulation. It also highlights the need for the development of more targeted intervention strategies in relation to this form of abuse. Strategies designed to foster parental warmth, parenting skills and positive parent-child interactions may be particularly effective in counteracting the consequences of emotional abuse and preventing future experience of victimization (Iwaniec, Larkin, & McSherry, 2007). Furthermore, tailored programmes that help to build children's self-esteem and self-image may also be instrumental in reducing risk for mental health problems following experience of emotional abuse (Briere & Runtz, 1990; Doyle, 2003).

6.2.3. Do variants of callous-unemotional traits differ in history of childhood maltreatment and profile of individual functioning?

In **Chapter 4**, we presented a study where we examined differential associations between variants of callous-unemotional (CU), history of maltreatment and profile of individual functioning. We found that secondary CU (i.e. high CU and high anxiety), but not primary CU (i.e. high CU and low anxiety), was associated with elevated experiences of childhood maltreatment, increased psychopathology, attachment insecurity, affective dysregulation, and behavioural risk. Variants, however, did not differ in levels of externalizing difficulties. To allow for more valid contrasts, we also compared variants of CU traits with two clinically relevant reference groups (*Low group*: low CU/low anxiety; *Anxious group*: low CU/ high anxiety). We found that maltreatment history and profile of individual functioning in the secondary CU group were generally comparable to that of the Anxious group, while the primary CU group presented similarly to the Low group. Together, these findings point to heterogeneity in

the developmental risk factors associated with primary and secondary CU, but also heterogeneity in levels of clinical risk.

First, we found that maltreatment history was a key discriminating factor between variants of CU traits. Secondary CU, but not primary CU, was associated with elevated maltreatment scores across all forms of abuse and neglect examined. As such, information about maltreatment history may help clinicians identify subgroups of youth with high CU, as well as informing risk assessment and suitable intervention strategies. Particularly, results suggest that youth with secondary CU may benefit to a greater extent from intervention strategies that focus around the experience of childhood trauma. Future research will be needed to evaluate whether the application of differing strategies for youth with primary and secondary CU may be more effective than a 'one size fits all' approach. On a conceptual level, findings are in line with previous studies that have suggested that secondary CU may be primarily driven by environmental risk factors, while primary CU may result principally from genetic and constitutional factors (Kimonis et al., 2013; Vaughn et al., 2009). However, it is noteworthy that youth with secondary CU did not differ in their maltreatment history compared to youth who presented only with high anxiety (but low CU traits). This finding thus raises the question as to why experience of childhood maltreatment is associated with secondary CU in some cases, but only anxiety in others. In order to address this question, it will be necessary to employ longitudinal and genetically-sensitive designs to clarify processes involved in the development of CU traits that co-occur with anxiety.

Second, we found that individuals with secondary CU presented with the highest levels of difficulties across all domains of individual functioning explored. Particularly, compared to primary CU, secondary CU was associated with elevated psychiatric symptoms of depression, anger, posttraumatic stress and dissociation. Secondary CU also presented with atypical patterns of affective functioning (greater irritability and alexythimia) as well as greater attachment disorganization. Furthermore, youth with secondary CU were more likely to use drugs, contemplate and plan suicide, and engage in unsafe sex. Together, these findings suggest that clinicians should be alert to the combination of high CU and high anxiety, as it appears to index a particularly vulnerable group of youth. It is important to note that primary and secondary variants of CU traits did not differ in levels of externalizing difficulties. This suggests that an assessment of externalizing difficulties, such as conduct problem severity, may not be as informative in the discrimination of CU variants, as they are likely to present in a

similar fashion. In future, it will be necessary to move beyond the examination of behavioural differences in order to establish whether variants may also be discriminated at a psychobiological and neural level.

Together, the findings described in **Chapter 4** highlight the need to differentiate youth with primary versus secondary variants of CU. Clinically, failure to acknowledge wide variations in levels of anxiety among youth with high CU traits may obscure the diverse constellations of needs and risk factors associated with groups of individuals presenting with high CU traits. Results also underscore the importance of maltreatment as a key factor that appears to discriminate across variants as well as pointing to the need to broaden clinical assessment tools and tailor intervention strategies to reflect the observed heterogeneity in those presenting with high levels of CU traits.

6.2.4. Can we develop a more effective and widely accessible screening tool for family aggression?

In **Chapter 5** we described a study where we developed and validated a novel screening tool of family aggression – in other words, exposure to physical abuse, emotional abuse and intimate partner violence (IPV). The Family Aggression Screening Tool (FAST) features three key advantages. First, it enables to detect both experiences of direct victimization and exposure to IPV. Second, it records information about the characteristics of family aggression, including the identity of perpetrator and victim, as well as the directionality of aggression between family members. Third, the FAST is the first instrument, to our knowledge, to screen for experiences of family aggression making use of non-verbal pictorial representations, making it easily understood and widely accessible to a range of populations. In addition, the FAST is freely available and quick to complete. In order to establish its utility as a screening tool, we examined four psychometric properties. Overall, findings from this study provided initial support for the reliability, validity and diagnostic accuracy of the FAST in detecting multiple forms of family aggression.

With regards to reliability, we found that the FAST showed good internal consistency. Correlations indicated that the FAST subscales were distinct from one another but also related. These findings are consistent previous evidence documenting

the considerable overlap between experiences of direct victimization and IPV exposure (Hamby et al., 2010; Holt et al., 2008). We then examined associations between the FAST and the Childhood Trauma Questionnaire (CTQ, Bernstein & Fink, 1998), in order to establish convergent validity. We found that the FAST and CTQ were highly associated, suggesting that they measure largely overlapping constructs. This was particularly noteworthy, given the limited number of corresponding scales between these two instruments and the use of markedly different approaches to assess childhood experiences (i.e. verbal versus pictorial). In line with expectations, associations between corresponding scales on the FAST and CTQ were stronger than those found between non-corresponding scales, supporting the ability of the FAST to discriminate between forms of family aggression. Importantly, the strength of associations observed was comparable to that reported in studies validating other self-report verbal instruments of maltreatment using the CTQ (e.g. DiLillo et al., 2010; Lobbestael et al., 2009).

Concurrent validity of the FAST was supported by significant associations with multi-informant reports of psychiatric symptomatology. More specifically, the FAST subscales were positively associated with increased psychiatric symptoms across domains of internalizing, externalizing difficulties and trauma-related symptomatology. Interestingly, we found that emotional victimization was the strongest correlate of symptom severity across the majority of psychiatric domains, both self- and other-report. These findings are consistent with those reported in **Chapter 3**, where emotional abuse (as measured by the CTQ) emerged as the most powerful predictor of mental health outcomes. Together, findings point to the need for increased recognition of emotional abuse within research, legal and clinical settings.

Finally, we examined diagnostic accuracy of the emotional and physical victimization FAST subscales using the CTQ as the validity criterion. Other subscales of the FAST could not be tested for diagnostic accuracy, as they did not directly correspond with the CTQ. Using the area under the curve (AUC) statistic, we found a highly significant support for the scales' ability to detect experiences of emotional and physical victimization (i.e. good overall diagnostic accuracy). We then selected cut-offs for each scale that provided the best trade-off between sensitivity and specificity. These cut-offs demonstrated adequate sensitivity in correctly classifying youth who had experienced aggression, and excellent specificity in correctly identifying those who had little or no experience of it. Classifications based on the FAST and CTQ cut-offs were highly concordant (i.e. high agreement between classification systems).

Together, preliminary findings indicate that the FAST is a valid and reliable non-verbal measure of family aggression. As such, the FAST has the potential to be widely applicable in both research and clinical settings. By recording both experience of direct victimization and IPV exposure, the FAST may be used in research to investigate how different forms of family aggression affect developmental outcomes, individually and in combination. As a screening tool, the FAST can be used to obtain a 'snapshot' of family aggression patterns, and inform the need of more comprehensive follow-up assessments. Due to sample size limitations, it was unfortunately not possible to examine the specific characteristics of family aggression recorded by the FAST. Future studies will be needed to test whether these characteristics may be clinically useful for informing risk assessment and treatment formulation. Finally, because of its non-verbal format, the FAST may be particularly accessible to traditionally 'difficult-to-screen' populations, including individuals with reading difficulties, non-English speakers and younger respondents. In future, it will be important to validate the applicability of the FAST with these populations. The use of pictorial representations may also provide a means for clinicians to initiate a dialogue about experiences of family aggression in a way that is potentially less invasive than verbal screening tools.

In summary, the findings described in **Chapter 5** provide initial support for the reliability, validity and diagnostic accuracy of the FAST in detecting multiple forms of family aggression. Although future studies will be needed to establish the full psychometric properties of the FAST using a range of different validation measures as well as examining its application to different populations, this measure shows promise as a non-verbal tool for the rapid detection of family aggression.

6.3. Limitations and future directions

Findings from the current thesis contribute to a greater understanding of processes underlying associations between childhood maltreatment and mental health outcomes. Nevertheless, these findings should be interpreted in light of a number of limitations. Below we discuss these limitations and propose future research directions that would help overcome them.

First, assessments of childhood maltreatment were based on self-report measures across all empirical chapters of this thesis. Self-report measures may be particularly susceptible to retrospective biases and unwillingness to disclose. However, previous evidence suggests that associations between maltreatment and psychopathology may be comparable when making use of retrospective versus prospective reports (Scott et al., 2012). Furthermore, use of self-report assessments in youth samples has been found to minimize issues of retrospective reporting compared to use in adult samples (Arata et al., 2007). Although official data may provide a more objective assessment of maltreatment, it has been found to considerably underestimate the true extent of maltreatment experienced, casting doubt on the reliability of this method (Cicchetti & Toth, 2005). Ideally, the findings from the current thesis should be replicated making use of multiple reports of maltreatment history (e.g. self-report, case files, therapist ratings).

Second, the fact that maltreatment, community violence exposure and a proportion of outcome measures were reported by youth themselves raises the possibility of shared method variance (**Chapter 2 and 3**). Although this is possible, it is important to note that when multi-rater assessments were available, results were found to be highly consistent (e.g. results regarding associations between maltreatment, CVE and internalizing difficulties). Future studies examining the relationship between multiple forms of developmental adversity and mental health outcomes should aim to use multiple informants, so as to obtain more accurate and reliable findings.

Third, we were unable to examine whether the specific characteristics of youth's adverse experiences moderated associations between the forms of developmental adversity and mental health outcomes examined. For example, the measure of maltreatment used in **Chapters 2, 3 and 4** (CTQ) did not enable to record information regarding the timing and duration of maltreatment experienced. As a result, we were unable to tease apart whether poly-victimized youth experienced different forms of maltreatment concurrently or sequentially. Furthermore, it was not possible to establish whether consequences of maltreatment varied depending on developmental stage and the chronicity of maltreatment experienced. Information about timing of maltreatment would have been particularly useful for examining how secondary CU develops (**Chapter 4**). However, timing of maltreatment is difficult to assess reliably. Youth reporting on their own experiences of maltreatment may not recall incidents occurring during early childhood. Data drawn from case files is dependent on incidents being

detected, recorded and investigated by statutory agencies (Cichetti & Toth, 2005). Furthermore, even though parent reports may provide more accurate information regarding timing of maltreatment, these are also susceptible to recall biases and unwillingness to disclose. With regards to community violence exposure (**Chapter 2 and 3**) specific information about the proximity of exposure was indeed available. Due to sample size limitations, however, we were unable to examine these individually, using instead a composite measure of overall CVE. It would be informative in future to examine whether hearing about, witnessing or directly experiencing community violence differentially affect externalizing difficulties and trauma-related symptoms. It would also be interesting to explore whether the degree of CVE proximity moderates the effect of childhood maltreatment on mental health functioning. Our sample size also precluded an examination of the specific characteristics of family aggression recorded by the FAST (**Chapter 5**). In future, it would be important to determine whether the effects of family aggression on psychiatric symptomatology depend on factors such as identity of perpetrator and victim, as well as the directionality of aggression between family members.

Fourth, data from our study was obtained using a cross-sectional design. Although our findings are generally consistent with a robust body of literature documenting the detrimental impact of childhood maltreatment on individual functioning and wellbeing, the use of a cross-sectional design precluded the possibility of establishing the directionality of effects observed (**Chapter 2, 3, 4 and 5**). Ideally, findings should be replicated making use of longitudinal data, so as to ensure that the effects observed are indeed attributable to childhood maltreatment. Issues of directionality are also relevant within **Chapters 2 and 3**, where we examined the impact of current levels of CVE on mental health. Here, it becomes even more challenging to disentangle the direction of effects observed. While we interpreted findings as supporting the negative impact of current CVE on mental health, alternative explanations are also possible. For example, it is possible that instead of CVE increasing risk for externalizing difficulties, having externalizing difficulties in the first place increases risk for CVE. Furthermore, the use of a cross-sectional design limits the ability to identify potential mechanisms underlying the co-occurrence of maltreatment and CVE over time. Particularly, it is difficult to establish whether exposure to one causally increases risk of exposure to the other, or whether both forms of adversity may result from a common set of risk factors (e.g. poverty). More research is needed to explore bidirectional associations between

maltreatment, CVE and mental health functioning over time, with a particular focus on behavioural difficulties. The use of a rural maltreated vs. non-maltreated comparison sample may also help to further disentangle the effects of community violence and maltreatment on mental health outcomes. With regards to the findings from **Chapter 4**, longitudinal research will be needed to gain a more mechanistic understanding of processes underlying variants of CU traits in youth. Longitudinal studies may also help determine whether variants are predictive of different developmental trajectories and outcomes over time, particularly in relation to antisocial behaviour, suicide risk, and mental health problems.

Fifth, the data from our study were not genetically informative. Past studies have found that environmental stressors such as maltreatment can interact with specific gene variants to increase or decrease biological vulnerability to stress (e.g. Caspi et al., 2002). Furthermore, emerging evidence suggests that environmental influences such as maltreatment can cause long-lasting changes to neuroendocrine and physiological function via the alteration of gene expression (i.e. epigenetics; Champagne, 2010; McGowan et al., 2009). It would be of interest to investigate whether the effects of maltreatment observed in the current thesis may be mediated by epigenetic changes (**Chapter 2 and 3**). In future, maltreatment studies should incorporate epigenetic analyses so as to (i) identify underlying processes by which childhood maltreatment impacts development at a molecular level, (ii) clarify whether co-occurring impairments resulting from the experience of maltreatment involve common or distinct biological etiologic mechanisms and (iii) improve understanding of how the detrimental effects of maltreatment are sustained over time. Further knowledge of these areas will be invaluable for informing public policy and assisting in the development of effective prevention and intervention strategies. Access to genetically informative data will also be important for identifying aetiological processes underlying variants of CU traits in youth (**Chapter 4**).

In future, studies should investigate whether the effects observed may also be found at a psychobiological level. In relation to **Chapter 2**, it would be interesting to examine whether childhood maltreatment and CVE exert independent and additive effects on neural structure and function, and if so, whether such effects may account for the increased levels of psychiatric symptomatology observed. Although past studies examining neural correlates of maltreatment have reported presence of structural and functional changes (McCrory, De Brito & Viding, 2011), little is known about the effect

of CVE on the brain. For example, studies should examine whether youth exposed to violence in the community but not at home may present with similar neural correlates as maltreated youth, and whether exposure to both forms of developmental adversity may exacerbate observed differences in brain structure and function (e.g. heightened amygdala reactivity). With regards to **Chapter 3**, it would be important to examine the neural correlates of distinct forms of maltreatment. While a small number of studies have begun to investigate the effects of different forms of maltreatment on the brain, evidence is currently mixed (McCrory, De Brito & Viding, 2011). In particular, it would be informative to establish whether distinct forms of abuse and neglect exert generic or specific effects on brain development and function. Furthermore, it would be interesting to elucidate whether the unique effects of emotional abuse observed in the current thesis may be found at a neural level. This, however, will need to be preceded by developments in the definition, operationalization and measurement of emotional abuse. As highlighted in **Chapter 4**, CU variants appeared to represent 'behavioural phenocopies' of one-another. However, it remains to be established whether variants may be discriminated using experimental measures of psychobiological, cognitive and affective functioning. Addressing this question will require the use of tasks that are capable of isolating the effects of CU across variants, independently of the effects of anxiety. Studies should also address whether differences across variants may be found at a neural level. Based on the previous literature on adult psychopathy, regions of interest include amygdala, fronto-temporal regions and their functional connectivity. Furthermore, given the strong association between secondary CU and history of childhood maltreatment, it would be of interest to examine whether youth with high CU and high anxiety share similar neural correlates to maltreated youth. Such evidence may be important for furthering understanding of the link between secondary CU and childhood trauma.

Finally, it is important to acknowledge that the effects of maltreatment may depend on complex patterns of interactions between risk and protective factors present at multiple levels of the child's environment (Cicchetti & Lynch, 1993). In the current thesis we did not specifically record information regarding presence or absence of protective factors at the individual, family or community level. In future, it would be important to examine whether protective factors, such as availability of social support or secure attachment with a caregiver, may moderate the effect of maltreatment and community violence exposure on mental health outcomes. Furthermore, although we

included a number of socio-demographic and individual factors as potential confounds in our analyses, it is possible that some of these variables may act to mediate (e.g. IQ) or moderate (e.g. sex) associations between developmental adversity and psychopathological outcomes. In future, it would be ideal to perform a more detailed investigation of moderating and mediating influences on maltreatment effects using a larger sample, as we were underpowered to carry out such analyses due to sample size limitations. It is also important to note that all of the findings reported were based on a community sample of high-risk youth. As a result, it is unclear how much results generalize to the wider population. Research addressing the limitations and future directions outlined above may significantly contribute to our understanding of maltreatment and associated sequelae.

6.4. Conclusions

The present thesis set out to investigate the impact of childhood maltreatment in a community sample of over two hundred high-risk youth. Our findings demonstrate that childhood maltreatment negatively impacts mental health outcomes following a dose-response gradient. While maltreatment was found to increase symptoms across a broad range of mental health domains, the impact of community violence exposure was more constrained. Findings also indicated that failure to account for current levels of community violence exposure can result in the overestimation of maltreatment effects. Both forms of adversity were found to typically exert additive effects, although they interacted to predict anger levels. Together, these findings significantly advance understanding of how different forms of developmental adversity combine to affect multiple domains of mental health functioning. Furthermore, evidence of common and distinct effects of maltreatment and community violence exposure bears implications for the development of prevention and intervention strategies. When examining associations between distinct forms of maltreatment, we found that maltreatment types are highly interrelated. Maltreated youth were more likely to report experiencing multiple forms of maltreatment, rather than single types in isolation. These findings underscore the importance of considering the full range of maltreatment experiences within research and clinical practice, as these are likely to co-occur. In the current thesis, we found evidence of both shared and unique effects of maltreatment types on

mental health outcomes. In particular, emotional abuse emerged as the sole unique contributor to mental health difficulties. These findings highlight the need for increased recognition of emotional abuse as a potent risk factor for maladjustment, particularly as it continues to be a highly prevalent yet often overlooked form of childhood maltreatment. When examining individual heterogeneity in youth presenting with high CU traits, we found that maltreatment history was a key discriminating factor between variants of CU traits. In contrast to primary CU, secondary CU was associated with elevated experiences of maltreatment across all forms of child abuse and neglect. Furthermore, youth with secondary CU presented with increased levels of psychopathology, affective dysregulation, attachment insecurity and behavioural risk compared to their primary CU peers. These findings emphasize the need to differentiate youth with primary versus secondary variants of CU, as they are associated with markedly different needs and risk factors. Furthermore, differences in maltreatment history and individual functioning across variants point to the need for more tailored clinical assessment tools and intervention strategies. Finally, the current thesis described the initial validation of the Family Aggression Screening Tool (FAST). The FAST is the first measure to be developed with the aim of providing rapid and comprehensive screening of family aggression making use of non-verbal pictorial representations. It is briefly administered, easy to use, minimally invasive and freely available upon request. Findings from the current thesis provide initial support for its reliability, validity and diagnostic accuracy in detecting multiple forms of family aggression, including direct victimization and exposure to intimate partner violence. As a result, the FAST has the potential to be widely applicable in both research and clinical settings. Particularly, the non-verbal format of the FAST may prove useful in facilitating detection within 'difficult-to-screen' populations, including individuals with reading difficulties, non-native English speakers and younger respondents. In conclusion, findings from the current thesis significantly advance knowledge of the processes by which interrelated forms of developmental adversity combine to affect mental health, as well as elucidating factors associated with individual heterogeneity to maltreatment responses. These data contribute to a growing evidence base, which mandates increased investment in community resources to prevent maltreatment experience and reduce exposure to community violence. Findings also point to the need for further work in refining intervention targets for youth who have been exposed to different forms of developmental adversity.

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