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*Childhood adversities and
psychopathological outcomes*

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Statement on authorship

I have undertaken all the statistical analyses described in this thesis, with guidance and direction from Associate Professor Michael Kaess. I have also been responsible for the interpretation and write up of all of the results. The three studies presented in this thesis have been accepted (status “in press”) or are currently under review in peer-reviewed journals. In particular, *Study 1* was accepted for publication in the *Journal of Personality Disorders*; *Study 2* has been submitted for publication in *Psychopathology*; and *Study 3* has been submitted for publication in *Clinical Psychology Review*.

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Introduction

Maltreatment of children by their parents or other caregivers is widely spread, and can cause serious injury and severe long-term consequences. Child maltreatment encompasses any acts of commission or omission by a parent or other caregiver that result in harm, potential for harm, or threat of harm to a child or adolescent (usually interpreted as up to 18 years of age), even if harm is not the intended result (Gilbert et al., 2009). In the past two decades, four forms of maltreatment have been increasingly recognised: physical abuse; sexual abuse; psychological abuse, sometimes referred to as emotional abuse; and neglect.

Research from high-income countries revealed that 4–16% of children experienced severe parental violence, 15–30% of girls and 5–15% of boys experienced sexual abuse, and one in ten children was neglected (Gilbert et al., 2009). Self-report studies from the UK and the US showed that 8–9% of women and about 4% of men reported exposure to severe psychological abuse during childhood (Edwards, Holden, Felitti, & Anda, 2003; May-Chahal & Cawson, 2005).

Childhood maltreatment has unique and important implications since it can exert negative influences on sensitive developmental periods for emotional, behavioural, cognitive, and social domains; thereby, interrupt healthy development and lead to an increased risk for the development of psychopathology (Nanni, Uher, & Danese, 2012). Indeed, there is a large body of evidence that exposure to childhood maltreatment is a robust predictor of later psychiatric disorder, including mood disorders, anxiety disorders, eating disorders, substance use disorders, posttraumatic stress disorder (PTSD), and personality disorders (Afifi et al., 2011; Chu, Williams, Harris, Bryant, & Gatt, 2013; Green et al., 2010; Kendler et al., 2000; Kessler, Davis, & Kendler, 1997; MacMillan et al., 2001). Thus, there is increasing interest in deepen the understanding

on how and under which circumstances childhood adversity leads to psychiatric disorders; and in identifying different factors that may be associated with specific forms of mental suffering.

At least two broad pathways have been hypothesized to explain the impact of adversity on later psychiatric outcomes: the biological and genetic pathway and the psychodynamic developmental model.

Biological and genetic influence

Children who have been subjected to ongoing abuse and neglect in the context of their primary relationships, and whose family environments have lacked adequate support have been found to differ in their neurological and neurobiological development from children who have not been abused or neglected. Maltreated children have a variety of neurobiological abnormalities that affects their long-term psychological and physiological functioning (Fonagy, Luyten, & Strathearn, 2011; van der Kolk, 2003). As a result, many traumatized children have problems regulating their emotions, knowing what they feel, and verbalizing their experiences and feelings.

Indeed, research documented that exposure to early adversity may become “biologically embedded”, altering the development of key physiological systems (e.g., the hypothalamic–pituitary–adrenal axis, HPA axis) (Miller, Chen, & Parker, 2011). Some types of early life adversity have been shown to negatively impact on HPA axis responsiveness and regulation. Studies have shown that children raised in an environment of attentive care giving show lower stress induced cortisol release (Abercrombie, et al., 2011). By contrast, abused children show hallmarks of an altered HPA axis that may already have adapted to a trauma (King, et al., 2001). Indeed, adults with a history of early maltreatment exhibit altered HPA axis functioning, including

flattened diurnal variability, lower early morning cortisol secretion, increased adrenocorticotropin (ACTH) release, and lower cortisol responses (Gerritsen et al., 2010). HPA axis adaptations to a chronically adverse environment or ongoing traumatic events may have short-term survival advantages for living in such dangerous environments but also carry the risk of long-term effects on cognition and emotion as well as subsequent risk for psychiatric disorders later in life (Gershon, Sudheimer, Tirouvanziam, Williams, & O'Hara, 2013). Furthermore, diverse types of maltreatment (e.g., sexual abuse, parental verbal abuse, or harsh corporal punishment) have been found to be associated with numerous structural and functional alterations in the brain and neuroendocrine systems (Frodl, Reinhold, Koutsouleris, Reiser, & Meisenzahl, 2010; Vythilingam, et al., 2002). Maltreated children have been found to have volumetric reductions in the corpus callosum left neocortex, hippocampus, and amygdala (Teicher et al., 2003). Similarly, neuroendocrine changes have been documented in the aftermath of childhood maltreatment (Bevans et al., 2008).

Additionally, genetic markers may moderate the effects of early adversity on later psychopathology. As one example, a functional insertion/deletion polymorphism in the serotonin gene linked promoter region (5-HTTLPR) has repeatedly been found to moderate the influence of early adversity and stressful events on the development of psychopathology (Caspi, et al, 2010). Altogether, recent research suggests that several different pathways and mechanisms may subserve the interaction of early adversity and neurocognitive and neuropsychiatric outcomes in late life. Indeed, although biological and genetic findings have not always been consistent, they do indicate a possible broad array of disruptions in the development of neuroanatomical structures and functions following maltreatment.

The psychodynamic model

Second, exposure to early adversity may be related to psychodynamic model of attachment (Bowlby, 1988). The basic premise of attachment theory is that a child's relationship with a primary caregiver during infancy is critically important to its later development, and serves as a prototype for the child's relationships throughout the lifespan (Bowlby, 1983). Attachment theory states that either secure or insecure bonds may form between infant and caregivers in the early months of the infant's life for the purposes of safety and security. The bond formed between infant and caregivers influences the quality of the relationships a child has throughout his or her life. Secure attachments help children to develop an internal model of self-competence; insecure attachments, however, promote feelings of threat, rejection, and personal unworthiness (Tarabulsky, Pascuzzo, Moss, St-Laurent, Bernier, & Cyr, 2008).

From a developmental perspective, disruptions in relations with primary caretakers are thought to be an important factor in the genesis of mental disorders. Attachment researchers, drawing from the work of John Bowlby (1988) and his followers, have highlighted the significance of non-responsive or abusive caregivers and other disruptions in attachment within the family. When children are hurt or in danger, parents and other caregivers are able to help them restore a sense of safety and control under most conditions. However, when caregivers are emotionally absent, inconsistent, demeaning, violent, intrusive, or neglectful, they cannot serve as this important source of security for their offspring; thus, their children are liable to become intolerably distressed and to develop a sense that the environment is intrinsically unsafe (Bowlby, 1988). Even more, if children are exposed to unmanageable stress, and if caregivers are unable to help them modulate their arousal, they are unable to organize themselves physiologically and fail to categorize experiences in a coherent fashion (Bowlby, 1983).

To date, theories on neurobiological consequences of childhood maltreatment and attachment theory should not be regarded as competitive explanatory models, but rather as synergistic parts of the same model. Studies from neurosciences have reported findings consistent with those from the field of attachment research. Insecure attachment is expected to create a risk for problematic relationship, including emotion-regulation difficulties and poor social skills (Kerns & Richardson, 2005) via its influence on brain functioning and neuroendocrinological systems probably moderated by genes but also other environmental factors.

Specific types of childhood adversity, the concomitant environment, and the development of specific mental disorders

Theoretical models have posited that specific types of childhood adversity, such as physical abuse, sexual abuse or psychological abuse, may be uniquely related to specific psychiatric outcomes. Unfortunately, studies among youth (McMahon, et al., 2003) and adult samples (Kessler, et al., 2010; McLaughlin, et al., 2010) suggest that, while exposure to early adversity is associated with increased risk for psychiatric disorder, the influence of specific types of childhood maltreatment on different mental disorder outcomes remains controversial. Likely the contradictory data in this field may be reflective of the diversity of definitions and measures of childhood adversity that is likely to undermine the success of the field. Hence, the global use of more exhaustive and deeper “gold-standard” measures of childhood adversity are needed to overcome this limitation.

Despite the increased risk associated with exposure to traumatic childhood experiences (Gilbert et al., 2009), a growing body of evidence has shown that many people are able to adapt to pernicious experiences they have encountered with minimal

negative impact (Collishaw, Pickles, Messer, Rutter, Shearer, & Maughan, 2007; McGloin, & Widom, 2001). Relatively little is known about these resilient individuals, but numerous evidence highlighted the importance of considering not only the single episodes of abuse or neglect, but rather the broader environment in which children develop (Sperry & Widom, 2013). Indeed, for one hand, maltreated children often experience additional stressors, including separation from their parents, economic hardship, multiple forms of revictimization over the course of their lives; for the other hand, they can experience potential source of resilience that might mitigate the negative influence of early maltreatment (Jonson-Reid, Chung, Way & Jolley, 2010; Widom, Czaja, & Dutton, 2008). Characteristics of the family or of the social environment may affect, in either a positive or negative way, outcomes for maltreated children. Despite these theories, relatively few studies have examined whether the presence of negative environment factor play a role in the development of subsequent problems for maltreated children.

Objectives

The aim of present thesis was a deep examination of the potential psychopathological outcomes related to childhood adversities. In particular, the specific role of different kinds of childhood maltreatment (e.g., physical, sexual, and emotional abuse) and of familial or social factors (e.g., parental bonding, family functioning, social support) on different mental disorders (e.g. borderline personality disorders, depression, etc.) was examined.

For this purpose, the present work is articulated in three separate studies, each of which has analyzed specific aspects of the main topic. In particular, *Study 1* has focused on the specific associations of childhood maltreatment, parental bonding and family

functioning in female adolescents with borderline personality disorder (BPD) compared with female adolescents with others psychiatric conditions. *Study 2* sought to investigate the specific effect of environmental factors on mental health outcomes of early-maltreated adults, by comparing a group of mixed clinical participants (CG) with childhood experiences of abuse and neglect with a healthy group (HG) with similar patterns of experiences. Finally, *Study 3* used a meta-analytic approach to assess the specific influence of different types of maltreatment on depression outcome in adults and adolescents.

In addition to the general topic, the recurrent theme of the three studies was the specific assessment measure that was used to detect and classify early experiences of childhood adversity: the Childhood Experiences of Care and Abuse (CECA), interview or questionnaire version (Bifulco, Bernazzani, Moran, & Jacobs, 2005; Bifulco, Brown, & Harris, 1994). This measure is considered the current ‘gold standard’ for the assessment of adverse childhood experiences in the international research field (Thabrew, de Sylva, & Romans, 2012).

The Childhood Experiences of Care and Abuse (CECA)

The CECA is a measure of childhood experiences of neglect and abuse, developed and used over a 20-year period. It takes the form of a semi-structured interview, which aims to reflect objective features of early life experience with probing questions to ascertain details of context and time-sequence of experience. Indeed, it is unique in its emphasis on investigator-based measurement in a semi-structured interview format where the investigator rather than the respondent decides whether experience meets criteria for inclusion. From such accounts, the investigator is able to decide whether experiences meet criteria for neglect or abuse (with predefined thresholds) irrespective

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of how the respondent defines them. The aim is to increase accuracy and to help combat bias from reporting style or emotional response. The CECA focuses on material, which is objective (concerning behaviour) rather than subjective (concerning feelings).

The CECA measure of childhood adversity covers a wide range of childhood and adolescent experience up to the end of the 16th year of age. The length of the interview varies according to the complexity of childhood arrangements, but usually takes at least an hour. Although feelings about childhood are also recorded, the scales only use "objective" ratings since the primary aim of the CECA is to reflect childhood and adolescent environment as accurately as possible. Interviewers ask about each family arrangement prior to the age of 17, characterised by parents (or parent substitutes) present in the home for periods of one year or more.

Specifically, the interview assesses neglect, antipathy, physical abuse, sexual abuse and psychological abuse, all of which are shown to relate to adolescent and adult mental disorder. Additional scales, which can be utilized optional, assess loss of parent, family arrangements, discord in the home, violence between parents, supervision and control of children, role reversal and childhood helplessness. Additional positive scales assess social support, closeness to parents, coping and being the parents' favourite child. A brief measure reflecting circumstances of leaving home is also included. Demographic measures such as parental social class, sibling position and details of parental loss are assessed at the beginning of the interview.

Most of the scales are 4-point: "1: marked", "2: moderate", "3: some", "4: little/none". Full description of CECA scales is given elsewhere (Bifulco & Moran, 1998), but brief definitions of the scales on lack of care and abuse are given below.

Antipathy: parental hostility, coldness or rejection shown toward the child, including scapegoating in relation to siblings.

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Neglect: the failure of parents to provide for the child's basic material needs (food, clothing, shelter, protection) and developmental needs (interest in school, friends, child's happiness, health and wellbeing).

Physical Abuse: violence directed towards the child by a household member (including parents, surrogate parents, siblings or relative in the household); inclusion criteria involves hits on head or hard around the body with the hands/fists, being hit with an implement, kicked, bitten, or burned, or threats or use of gun or knife, with severity determined by the intensity of the attack and its frequency.

Sexual Abuse: age-inappropriate sexual contact by any adult or older peer related or not, acquainted or not. Sexual abuse includes a range of sexual contact including intercourse, violation or penetration with an object, oral sex, touching of breasts/genitals, as well as requiring the child to watch sexual activity or pornography, and verbal solicitations for sex or age-inappropriate verbal content. Severity is determined by extent of sexual contact as well as relationship to perpetrator with higher ratings given for family members and trusted authority figures or family friends.

Psychological abuse: episodes of humiliation, terrorization, cognitive disorientation, exploitation or corruption of the child, or intentional deprivation of needs or valued objects, from parents usually in the context of a parental high controlling and domineering relationship with the child. Severity determined by the range of such experiences and their frequency.

The CECA is a reliable measure of childhood experience in adults as well as in adolescents. CECA interviewers received extensive training (see www.cecainterview.com) and ratings have been demonstrated to have excellent psychometric properties, with satisfactory inter-rater reliability and convergent validity between siblings (Bifulco et al., 2002; Bifulco, Brown, Lillie, & Jarvis, 1997).

A brief self-report version has been validated against the interview (CECA.Q). This assesses loss of parents, neglect, antipathy from main carers and physical and sexual abuse. Support in childhood is also included. The measure shows acceptable sensitivity and specificity against the interview measure (Bifulco, et al., 2005). The CECA.Q showed good internal consistency and re-test reliability, as well as overall significant correlations with the CECA interview. The measure is significantly associated with both the Parental Bonding Instrument and the Childhood Trauma Questionnaire, but has wider coverage of maltreatment, shows a dose-response effect in relation to lifetime clinical depression and has improved prediction of disorder. Thus, also can be considered a very good assessment tools of childhood maltreatment.

Study 1. The specific role of childhood abuse, parental bonding, and family functioning in female adolescents with borderline personality disorder

Previous studies have shown that experiences of severe maltreatment and the family environment in which they can occur may be significant factors in the development of BPD (Haugaard, 2004; Zanarini & Frankenburg, 1997). BPD is characterized by a pervasive pattern of impulsivity, emotional instability, interpersonal dysfunction and disturbed self-image (American Psychiatric Association [APA], 2014). At the core of the diagnosis, there is emotional dysfunction characterized by excessive sensitivity and intense reactions to emotional stimuli, and strong complex emotions that are often difficult to identify and regulate (Ebner-Priemer, Welch, Grossman, Reisch, Linehan, & Bohus, 2007).

The disorder usually emerges during adolescence and continues into adulthood. It is nowadays regarded as both a dimensional construct and a disorder, and has recently been confirmed as a diagnosis for adolescents in the new DSM-5 (Kaess, Brunner, &

Chanen, 2014). Despite growing evidence on risk factors of BPD in adults, there is a paucity of research on such specific characteristics of BPD in youth, and studies on adolescence BPD in clinical setting are still rare (Kaess, Brunner, & Chanen, 2014).

Furthermore, whereas a variety of different adverse childhood experiences have been identified as important antecedents of adult BPD, rarely these experiences were investigated together in the same study. In addition to the relevance of maltreatment experiences in the development of BPD, it appears important to consider the broader family context in which the traumatic events take place. However, previous studies reported contradictory results (Allen, et al., 2005; Gunderson, & Lyoo, 1997; Belsky, Caspi, Arseneault, Bleidorn, Fonagy, Goodman, Houts, & Moffitt, 2012; Carlson, 2009; Guttamn & La Porte, 2000). Taken together, the precise role of childhood adversity in the etiology of BPD is still controversial (Bradley, Jenei, & Westen, 2005) and there is still only little knowledge about the specific role of various types of childhood adversities in adolescent BPD compared to other clinical controls.

Study 1 aimed to investigate childhood maltreatment, parental bonding and family functioning in a sample of female adolescent inpatients with BPD (N=44), and to compare them with a clinical control (N=47) group with mixed psychiatric diagnoses. It was hypothesized that different dimensions of childhood adversity (maltreatment, parental bonding, and family functioning) would independently contribute to the development of BPD in adolescence.

Findings from this study showed that a history of childhood abuse and maltreatment was significantly ($p < .001$) more common in patients with BPD compared to their clinical controls. Using univariate regression, significant associations were found for all adverse childhood experiences including poor parental bonding and a negative family environment, except for physical abuse from mother. In the stepwise logistic regression

model ($p < .001$), experiences of sexual abuse, problematic general family functioning, and low care from mother remained in the best predictive model of BPD.

Our results demonstrated a strong association between adolescent BPD and a history of childhood maltreatment. In particular, the highest associations were found for specific types of emotional abuse (parental antipathy and neglect) and for sexual abuse. According to Fonagy & Bateman (2008), an invalidating and rejecting caregiving environment marked by parental criticism likely impairs a child's reflective capacities and sense of self. Fonagy et al. (2011) proposed that a reflective function deficit (defined as an impairment of affect regulation, impulse control, self-monitoring, and the experience of self-agency) may combine to bring about some characteristics of severe BPD. Thus, the high percentage of emotional abuse and, in particular, of paternal antipathy found in this study for BPD adolescents may be related to a deficit in reflective capacities. Our result showed also that in adolescent BPD sexual abuse might play quite an important role even if adjusting for all other adverse childhood experiences.

Regression analysis showed that maladaptive family functioning was associated with BPD, in line with a previous study reporting that borderline adolescents perceive their family functioning as more dysfunctional than the depressive and nonclinical sample. Borderline patients in this study reported low levels of care from both mother and father, and significant associations between BPD and critical care and overprotection from both mother and father were found. The role of parenting or caregiver responses to the child as well as the overall quality of the family environment have been linked to problems with impulse control and emotion dysregulation, consistent with Fonagy's (2008) mentalizing theory.

The present study builds upon the very limited research that currently addresses adolescent BPD. This finding suggests that qualitatively distinct dimensions of childhood adversity (sexual abuse, low care from mother, and negative general family functioning) may all independently contribute to BPD development. The findings of this study emphasize the importance of considering familial variables and a broad variety of adverse childhood experience in the etiology of BPD in adolescence and have important implications for family involvement in the treatment of adolescent BPD.

Study 2. Environmental factors that distinguish between clinical and healthy samples with childhood experiences of abuse and neglect

Childhood maltreatment is known to be associated with a wide range of psychosocial, emotional, and behavioral problems in adulthood (Briere & Elliott, 2003; Cicchetti & Toth, 2005; Fergusson, Boden, & Horwood, 2008; Scott, McLaughlin, Smith, & Ellis, 2012). However, despite the increased risk associated with exposure to traumatic childhood experiences, a growing body of evidence has consistently shown that many people are able to adapt to pernicious experiences they have encountered with minimal negative impact (Alim et al., 2008; Collishaw et al., 2007; McGloin & Widom, 2001). Relatively little is known about these resilient individuals, but gaining a better understanding of the factors involved in either positive or negative adaptation to early maltreatment experiences might increase our knowledge of the pathways by which mental disorders develop and thus help promote good mental health.

Complex theoretical models in the field of child maltreatment have highlighted the importance of considering the broader environment in which children develop (Belsky, 1981; Sperry & Widom, 2013). These approaches assumed that abuse and neglect do not occur in isolation, but rather that characteristics of the family or of the social

environment may affect, in either a positive or negative way, outcomes for maltreated children. Unfortunately, previous studies reported highly contradictory findings and the role played by environmental factors such as lack of social support, parental psychiatric disorders, financial hardship, and separation from parents in influencing psychopathological outcomes in traumatized children is still not known.

In addition, while a considerable body of research has investigated direct associations between childhood maltreatment and mental health outcomes in clinical samples, little is known about the link between childhood maltreatment and positive or normal mental health development. Indeed, previous research lacks comparisons between maltreated groups that become healthy adults and maltreated groups that develop mental illness.

Therefore, the present study attempts to overcome these limitations by examining the role of environmental factors in two groups of individuals with well-documented histories of severe child abuse and neglect (assessed with the *Childhood Experience of Care and Abuse* interview) but with different mental health outcomes.

The findings of the current study indicated that psychopathological outcome was associated with a greater presence of negative environmental factors. In particular, lack of social support seemed to be the most important predictor for adverse mental health outcomes of individuals with a history of early maltreatment. In our study, an extensive definition of social involvement was applied, which includes the child's social environment outside the household, comprising organized social activities outside the home (youth clubs, sports activities, etc.), friendships, and the presence of a support figure in whom the child could confide about abuse or neglect in the home or could talk to about everyday matters (Bifulco & Moran, 1998).

Social support as defined in this study may be considered as potential sources of resilience, which refers to the ability to cope adaptively with adversity or trauma (Luthar, Cicchetti, & Becker, 2000). Resilience characteristics from social support are likely to mitigate risks of developing psychopathological disorders, probably through effective emotional regulation, tolerance of negative affect, or the presence of supportive and nurturing relationships (Feder, Nestler, & Charney, 2009; Luthar et al., 2000).

The findings highlight the need for clinicians to more routinely assess whether social support is lacking in maltreated individuals as a potential risk factor for trauma-related psychopathology. Furthermore, the efforts to gain a better understanding of the developmental mental health trajectories in maltreated individuals should encourage further researchers to delve into this subject more deeply using prospective and more extensive approaches.

Study 3. Associations between depression and specific childhood experiences of abuse and neglect: a meta-analysis

Substantial evidence from both cross-sectional and prospective studies indicates that childhood neglect and abuse are strongly associated with the development of clinical depression in both adolescence and adulthood (Abela & Skitch, 2007; Bifulco, Brown, Moran, Ball, & Campbell, 1998; Gibb, Alloy, & Abramson, 2001; MacMillan et al., 2001; Widom, DuMont, & Czaja, 2007).

Several authors have argued that emotional abuse in childhood, which typically includes experiences of being rejected, degraded, terrorized, isolated, or teased, might be more strongly related to internalizing symptoms and the development of depression than physical abuse or sexual abuse (Alloy et al., 2006; Gibb, Butler, & Beck, 2003;

Lumley & Harkness, 2007; Shapero et al., 2014). Unfortunately, high levels of heterogeneity can be observed across the published studies, which limits the comparability of previous research.

Currently, no review or meta-analysis has attempted to elucidate the association between a broad variety of specific childhood experiences of abuse and neglect and depression among the scientific publications in this field. Thus, the present meta-analysis aimed to estimate the specific association between depression (recurrent or persistent) and different types of childhood maltreatment (antipathy, neglect, physical abuse, sexual abuse, and psychological abuse) assessed with the same measure. Specifically, we chose the *Childhood Experience of Care and Abuse* (CECA; Bifulco, Brown, & Harris, 1994) interview, a measure with a 20-year standing and the ‘gold standard’ in this area of international research (Thabrew, de Sylva, & Romans, 2012).

A systematic search in scientific databases included use of the CECA interview and strict clinical assessment for major depression (recurrent or persistent) as criteria. Our meta-analysis utilized Cohen’s d and relied on a random-effects model. The search yielded 12 primary studies (reduced from 42), with a total of 4372 participants (2918 women and 1454 men) and 34 coefficients. After separating the meta-analyses for each type of maltreatment we found that psychological abuse, neglect, and physical abuse were strongly associated with an outcome of depression. Sexual abuse and the composite index, although significant, were less strongly related.

The findings highlighted psychological abuse, followed by neglect as being most strongly associated with depression. Both types of emotional abuse (neglect and psychological abuse) may result in a child’s feeling of powerlessness and reduced self-esteem, which may easily foster depression in later life. According to attachment theory (Bowlby, 1983), attachment figures help develop representational models of the

relational world. Thus, those who have lived with neglect and/or psychological abuse may be at risk of developing a more negative self-model, becoming prone to internalizing symptoms (Shapero et al., 2014).

Overall, the results of this meta-analysis point to the importance of considering several types of maltreatment experiences as risk factors for an outcome of depression as well as the use of complete and exhaustive measures for assessing adverse childhood experiences. Clinicians may consider that a routine inquiry concerning childhood maltreatment could add important prognostic information to their assessment. These results also suggest that a history of psychological maltreatment may be an important marker in targeting depression prevention efforts in populations.

Conclusion

Childhood maltreatment is a pervasive problem affecting millions of individuals throughout the world. Many different environmental, developmental, and psychological factors may influence the mental health outcomes of abuse and neglect. The findings of the present three studies revealed interesting insights allowing better understanding of the specific influence of different types of childhood adversity on specific mental health outcomes.

The results from *Study 1* and *3* clearly showed that the more “silent” forms of maltreatment such as psychological abuse, antipathy and neglect might have a decisive role on development of psychopathological outcomes. Given that a broad range of experiences is subsumed under the term “adversity,” future research and clinical assessment needs to be comprehensive and assess a large range of early maltreatment forms. Exhaustive, complex, and reliable assessment tools that are able to detect the large variety of negative experiences and include key dimensions of these experiences

such as type, severity, chronicity, and timing should support these assessments. Finally, those identified with a history of early adversity may be candidates for more intensive psychiatric and psychotherapeutic treatments. As our understanding of the differential effects of adversity develops, treatments may be individually tailored to the type and timing of exposure.

As demonstrated in *Study 2*, psychological resilience derived from positive social support to those who were able to survive early life adversity without psychopathological development. In case of a critical family environment, support from outside may thus potentially attenuate the effect of adversity exposure on the subsequent risk for psychiatric disorder. Community-based preventive interventions that improve either the quality of children's family life or alternatively the support of their respective neighbourhood environments may have substantial long-term benefits by reducing the incidence of psychiatric disorders in the general population.

Some periods of vulnerability have also been highlighted in this research. Indeed, results from *Study 3* showed that adolescents were more affected by childhood maltreatment than adults in terms of their risk for major depressive disorder. Theorists have argued that exposure to adversity during the critical developmental periods of late childhood and early adolescence may confer high vulnerability to particular forms of psychiatric disorders, perhaps owing to the rapid brain development that occurs during these ages (Kaplow, et al., 2005; Rudolph, & Flynn, 2007). Thus, the transition to puberty may be a critical developmental period, which carries increased risk for particular forms of psychiatric disorders in case of a disturbing and non-supportive environment. Further research is needed to identify the precise critical periods and the forms of adversity most damaging at each period. Longitudinal designs might offer significant advantages for examining differential effects of early adversity by age of

exposure, and thus for identifying critical periods in human development that confer heightened risk for psychiatric disorders in later life (Thompson, Hallmayer, & O'Hara, 2011).

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STUDY 1

The specific role of childhood abuse, parental bonding, and family functioning in female adolescents with borderline personality disorder

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Abstract

This study examined a broad variety of adverse childhood experiences in a consecutive sample of female adolescent inpatients with borderline personality disorder (BPD; n=44) compared with a clinical control (CC; n=47) group with mixed psychiatric diagnoses. BPD was diagnosed using a structured clinical interview; different dimensions of childhood adversity were assessed using the Childhood Experiences of Care and Abuse Questionnaire, the Parental Bonding Instrument, and the Family Assessment Device. A history of childhood adversity was significantly more common in patients with BPD than in the CC group. Using a multivariate model, sexual abuse (OR=13.8), general family functioning (OR=8.9), and low maternal care (OR=7.6) were specific and independent predictors of adolescent BPD. The results increase our knowledge of the specific role of different dimensions of childhood adversity in adolescent BPD. They have important implications for prevention and early intervention as they highlight the need for specific strategies for involving the family.

Introduction

Borderline Personality Disorder (BPD) is characterized by a consistent pattern of intense, unpredictable, and unstable interpersonal relationships, thought contents and processes, affects, and self-perceptions (American Psychiatric Association [APA], 2013). A significant body of evidence suggests that the diagnostic stability, reliability, and validity of BPD in adolescents is similar to that in adults (Chanen et al., 2004; Chanen, Jovev, Djaja et al., 2008; Miller, Muehlenkamp, & Jacobson, 2008). Furthermore, the new DSM-5, as well as the proposed ICD-11 personality disorder classification, support an adolescent BPD diagnosis (APA, 2013; Tyrer, Crawford, &

Mulder, 2011). Despite this progress, research on adolescent BPD is still premature, only few studies having investigated this disorder among youths (Kaess, Brunner, & Chanen, 2014) and even fewer studies using clinical samples (Chanen, Jovey, McCutcheon et al., 2008; Glenn & Klonsky, 2013; Kaess, Resch, et al., 2013; Kaess, von Ceumern-Lindenstjerna, et al., 2013; Ludolph, Westen, Misle, Jackson, Wixom, & Wiss, 1990).

Previous studies have shown that experiences of severe abuse and the family environment in which they can occur may be significant factors in the development of BPD (Bleiberg, 1994; Haugaard, 2004; Paris, 2000; Stepp, Olino, Klein, Seeley, & Lewinsohn, 2013; Wilkins & Warner, 2001; Zanarini & Frankenburg, 1997). Retrospective investigations among adults with BPD consistently demonstrate the presence of early traumatic experiences such as traumatic separations (Bandelow, Krause, Wedekind, Broocks, Hajak, & Ruther, 2005; Zanarini, Gunderson, Marino, Schwartz, & Frankenburg, 1989), physical abuse (Links, Steiner, Offord, & Eppel, 1988; Paris, Zweig-Frank, & Guzder, 1994; Zanarini, et al, 1989; Zanarini, Williams, Lewis, Reich, Vera, Marino, & Frankenburg, 1997), emotional neglect (Paris & Frank, 1989; Zweig-Frank & Paris, 1991), low care and overprotection, especially from mother (Byrne, Velamoor, Cernovsky, Cortese, & Losztyn, 1990; Nickell, Waudby, & Trull, 2002; Torgerson & Alneaes, 1992) and sexual abuse (Elzy, 2011; Ferraz et al., 2013; Shearer, Peters, Quaytman, & Ogden, 1990; Zanarini, et al., 2002). Paris et al. (1994) considered childhood sexual abuse a substantial risk factor for the development of BPD; indeed, numerous studies suggest that sexual abuse occurs more frequently in the childhood histories of adult BPD patients than in many other psychiatric disorders (Ogata, Silk, & Goodrich, 1990; Paris et al. 1994; Zanarini et al., 1997). However, sexual abuse rarely occurs in isolation, but rather in the context of other types of abuse

and multiple forms of dysfunctional parental behavior (such as emotional withdrawal, physical neglect, and failure to provide protection) (Zanarini et al., 1997). Therefore, the specific association between BPD and sexual abuse remains controversial (Fossati, Madeddu, & Maffei, 1999).

In addition to the relevance of maltreatment experiences in the development of BPD, it appears important to consider the broader family context in which the traumatic events take place. Findings from cross-sectional studies reported low empathy and conflicting family relationships (Allen, et al., 2005; Gunderson, & Lyoo, 1997), contradictory family communication patterns (Guttamn & La Porte, 2000), and lack of perceived protection by mothers (Lyons-Ruth, Choi-Kain, Pechtel, Bertha, & Gunderson, 2011) in families of adults with BPD when compared to both normative and clinical controls.

Longitudinal data from community samples of adolescents indicated that exposure to harsh treatment in the family environment during the childrearing years may be associated with risk for offspring personality disorders, in particular BPD (Belsky, Caspi, Arseneault, Bleidorn, Fonagy, Goodman, Houts, & Moffitt, 2012; Carlson, 2009; Johnson, Cohen, Chen, Kasen, & Brook, 2006; Winsper, Zanarini, & Wolke, 2012). More specifically, childhood neglect (Jovev, McKenzie, Whittle, Simmons, Allen, & Chanen, 2013) and early separations from mother (Crawford, Cohen, Chen, Anglin, & Ehrensaft, 2009) were reported as significant predictors of an increase in BPD symptoms; and maternal inconsistency combined with a high maternal overinvolvement has been shown to predict both emergence and persistence of BPD (Bezirgianian, Cohen, & Brook, 1993)

Taken together, the precise role of childhood adversity in the etiology of BPD is still controversial (Bradley, Jenei, & Westen, 2005) because putative risk factors, such as

childhood maltreatment, parental bonding difficulties, and adverse familial environment, might all contribute to the development of BPD (Ludolph, et al., 1990) and are often highly intercorrelated.

The following gaps in research on childhood adversity and adolescent BPD have been identified: (1) whereas a variety of different adverse childhood experiences have been identified as important antecedents of adult BPD, rarely these experiences were investigated together in the same study; (2) there are questions concerning the specificity of childhood adversity as a risk factor of BPD since most studies on BPD have used healthy controls as a comparison, and significant associations with retrospectively reported childhood adversity have been documented for the majority of adult psychiatric disorders (Teicher & Samson, 2013); (3) despite the increasing body of literature on antecedents of BPD in adults, there is a paucity of research on specific characteristics of BPD in youth, and particularly findings from clinical samples are rare. In summary, there is still only little knowledge about the specific role of various types of childhood adversities in adolescent BPD compared to other clinical controls.

Given the current state of knowledge, the aim of this study was to investigate a broad variety of adverse childhood experiences in a sample of adolescent patients with BPD and to compare them with a clinical control (CC) group with mixed psychiatric diagnoses. It was hypothesized that adolescents with BPD would present with a significantly higher rate of childhood maltreatment, negative parental bonding experiences and impaired family functioning. Furthermore, it was hypothesized that different dimensions of childhood adversities (maltreatment, parental bonding, and family functioning) independently contribute to the development of BPD in adolescence.

Methods

Procedure and participants

The study protocol was approved by the ethics committee of the Medical Faculty, University of Heidelberg. Informed and written consent was obtained from patients and their parents/caregivers. Diagnosis of BPD was verified by experienced clinical staff using structured interviews. Participants were included in the BPD group if they fulfilled at least five diagnostic criteria of BPD according to the DSM-IV (APA, 1993). For the assessment of childhood adversity, participants were given an appointment to privately complete a booklet of self-report questionnaires. These were subsequently given to an independent study manager and anonymized.

One hundred and sixty-six female adolescents were consecutively approached at inpatient units of the Clinic of Child and Adolescent Psychiatry at the University Hospital of Heidelberg, Germany. Of these, 35 patients were excluded due to the presence of acute psychotic symptoms (N=3), insufficient knowledge of the German language (N=2), IQ lower than 75 (N=2), or admission due to an acute crisis for no longer than three days (N=28). Thus, 131 inpatients were asked to participate in the study. Among them, 16 patients refused to participate, 36 patients did not receive parental consent, and one patient decided not to continue. In the first step, consecutive recruitment of 78 young inpatients resulted in 39.7% females who met the DSM-IV criteria for BPD and 60.3 % who did not. In order to increase the size of the BPD group, a second round included consecutive recruitment of BPD inpatients only. Thus, another 16 inpatients with BPD were asked to participate in the study; of these, 3 refused. A total sample of 91 female adolescent patients with a mean age of 15.57 years (SD=1.35) completed the full assessment. Forty-seven patients (51.6%) did not meet DSM-IV criteria for BPD (CC group), whereas 44 patients (48.4%) met BPD criteria (BPD

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group). Sociodemographic characteristics of the study sample including group differences are presented in *Table 1*. There were no significant group differences between any of the sociodemographic characteristics reported. Clinical characteristics of both groups are shown in *Table 2*. The mean number of comorbid diagnoses in the BPD group was significantly higher than in the CC group, which confirms previous research on adolescent BPD (Kaess, von Ceumern-Lindenstjerna, et al., 2013; Venta, Kenkel-Mikelonis, & Sharp, 2012).

Table 1. Sociodemographic variables for the whole sample and the CC and BPD group, respectively.

Sociodemographic category	BPD group (n = 44)		CC group (n = 47)		Total (n = 91)		Group differences <i>p</i> -value
	M	SD	M	SD	M	SD	
Age	15.63	1.38	15.51	1.34	15.57	1.35	.693
Household Composition	N	%	N	%	N	%	<i>p</i> -value
With biological mother	34	77.3	43	91.5	77	84.6	.169
With other mother figure	3	6.8	1	2.1	4	4.4	
With no mother/mother figure	7	15.9	3	6.4	10	11	
With biological father	20	45.5	26	55.4	46	50.5	.624
With other father figure	5	11.3	5	10.6	10	11	
With no father/father figure	19	43.2	16	34	35	38.5	
Siblings	N	%	N	%	N	%	<i>p</i> -value
0	10	23.3	8	17.4	18	20.2	.62
1	13	30.2	20	43.5	33	37.1	
2	13	30.2	11	23.9	24	27	
> 3	7	16.3	7	15.2	14	15.7	
School type ^a	N	%	N	%	N	%	<i>p</i> -value
Hauptschule	8	18.2	8	17	16	17.6	.463
Realschule	18	40.9	13	27.7	31	34.1	
Berufsschule	2	4.5	3	6.4	5	5.5	
Gymnasium	15	34.1	23	48.9	38	41.8	
Unknown	1	2.3	0	0	1	1.1	

^a Hauptschule: nine years of elementary school; Realschule: six years of school after four years of elementary school, terminating with a secondary school level-I certificate; Berufsschule: 2 to 3 years of vocational training school after Hauptschule or Realschule; Gymnasium: eight years of school after four years of elementary school, terminating with the general qualification for university entrance.

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Table 2. BPD diagnostic criteria (DSM-IV) and clinical diagnoses (ICD-10) for the whole sample and the CC and BPD group, respectively.

Diagnoses	BPD group		CC group		Total		Group differences
	(n = 44)		(n = 47)		(n=91)		
BPD Diagnostic Criteria	N	%	N	%	N	%	<i>p</i> -value
Fear of abandonment	29	65.9	5	10.6	34	37.4	<.001**
Unstable relationships	36	81.8	5	10.6	41	45.1	<.001**
Identity disturbances	25	56.8	8	17	33	36.3	<.001**
Impulsivity	37	84.1	6	12.8	43	47.3	<.001**
Self-harm / Suicidality	41	93.2	11	23.4	52	57.1	<.001**
Affective instability	42	95.5	11	23.4	53	58.2	<.001**
Inner emptiness	29	69.5	10	21.3	39	43.8	<.001**
Inappropriate anger	31	70.5	9	19.1	40	44	<.001**
Paranoia / Dissociation	24	57.1	14	29.8	38	42.7	.009*
Clinical diagnoses (ICD-10) ^b	N	%	N	%	N	%	<i>p</i> -value
Mean number of diagnoses per patient	2.023		1.468		1.763		<.001**
F0 (Organic, including symptomatic, mental disorders)	0	0	1	2.1	1	1.1	.331
F1 (Mental and behavioral disorders due to psychoactive substance use)	3	6.8	0	0	3	3.3	.069
F2 (Schizophrenia, schizotypal and delusional disorders)	0	0	2	4.3	2	2.2	.166
F3 (Mood [affective] disorders)	9	20.5	16	34	25	27.5	.147
F4 (Neurotic, stress-related and somatoform disorders)	11	25	24	51.1	35	38.5	.011*
F5 (Behavioral syndromes associated with physiological disturbances and physical factors)	4	9.1	10	21.3	14	15.4	.107
F6 (Disorders of adult personality and behavior)	44	100	0	0	44	48.4	/
F8 (Disorders of psychological development)	1	2.3	1	2.1	2	2.2	.962
F9 (Behavioral and emotional disorders with onset usually occurring in childhood and adolescence)	12	27.3	10	21.3	22	24.2	.504

b. Multiple diagnoses per subject possible * $p < .05$; ** $p < .001$

Measures

Assessment of BPD was performed using the German version (Fydrich, Renneberg, Schmitz, & Wittchen, 1997) of the Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II; First, Spitzer, Gibbon, & Williams, 1996). The assessment was performed by experienced clinicians in the field of adolescent BPD. In addition, our group ensures rigorous training of assessors and has previously demonstrated excellent inter-rater reliability of Cohen's kappa of 1.00 (Kaess, Resch, et al., 2013). Other clinical diagnoses according to the ICD-10 diagnostic criteria were established by a well-established procedure of consensus between two child psychiatrists.

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The German version (Kaess et al., 2011) of the Childhood Experience of Care and Abuse Questionnaire (CECA Q; Bifulco, Bernazzani, Moran, & Jacobs, 2005) was used to assess experiences of parental antipathy, neglect, and abuse before the age of 17. Within the CECA.Q, neglect is defined in terms of a parent's disinterest in material care (feeding and clothing), health, school work, and friendships. Antipathy is defined as hostility, coldness, or rejection shown to the child by parents or surrogate parents, including 'scapegoating' behavior. Physical abuse is defined in terms of hitting by parents or other caregivers, and sexual abuse involves physical contact or approach of a sexual nature by any adult to the child (Bifulco et al., 2005). The German version of the CECA.Q showed good internal consistency (Cronbach's alpha from 0.86 to 0.93 in this study). A previous study revealed adequate re-test reliability (Cohen's k from 0.78 to 0.93), as well as overall significant correlations with the CECA interview (Kaess et al., 2011).

The German version (Richter-Appelt, Schimmelmann, & Tiefensee, 2004) of the Parental Bonding Instruments (PBI; Parker, Tupling, & Brown, 1979) was used to retrospectively assess the behaviors and attitudes of each parent toward the child from birth to 16 years of age for both the main mother and father figure. Each version comprises 12 questions on "care" and 13 questions on "protection" from the respective parental figure. The care subscale ranges from rejection or coldness to warmth and affection, while the protection subscale ranges from allowance of autonomy to overprotection and controlling behaviors. In this study, the PBI scales showed good internal consistency (Cronbach's Alpha 0.86-0.96).

The German version (Cierpka, 1998) of the Family Assessment Device (Epstein, Baldwin, & Bishop, 1983) was used to assess participants' views of their family functioning. This self-report measure is divided into seven subscales: Problem Solving

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(FAD-PS), Communication (FAD-Comm), Roles (FAD-R), Affective Responsiveness (FAD-AR), Affective Involvement (FAD-AI), Behavior Control (FAD-BC), and General Functioning (FAD-GF). The FAD has been validated in several ways. Scores from families with a member that is suffering from mental or physical health problems are consistently higher than those where the members are all in a good state of health (Epstein, et al., 1983; Sawyer & Sarris, 1988). There is little correlation with ratings of social desirability and test--re-test reliability is acceptable (Miller, Epstein, Bishop, & Keitner, 1985); internal consistency in this study ranged from 0.61 to 0.93 (Cronbach's Alpha).

Data Analysis

Descriptive statistics were calculated for both groups. Age differences between groups were tested by an independent sample t-test; categorical variables were analyzed using chi-squared tests. Univariate and multivariate logistic regressions were tested for the three different measures (CECA Q, FAD, and PBI). In each regression BPD diagnoses was used as dependent variable and the single subscales of each measure were entered as independent variables. Finally, a combined multivariate model with the significant independent predictors from the different regression models was tested. The associations between adverse childhood experiences and BPD were reported as odds ratios (OR) together with their 95% confidence intervals (CI). In order to prevent estimation bias as a result of excluding participants with missing values in one of the variables, missing values were replaced with imputed values, using the multivariate imputation by chained equations algorithm. The regression was then calculated for 30 imputed datasets and the results were combined. There was a small amount of missing data in 13.2% of the total sample, mainly with one (3.3%) to four (5.5%) items missing.

The Fisher exact test showed that missingness was not related to BPD status (Fisher's exact = 0.824).

Results

Adverse childhood experiences and BPD

Forty-one patients (93.2%) of the BPD group reported at least one type of childhood maltreatment. This number was significantly higher than for 23 patients (48.9%) from the CC group ($\chi^2=21.32$; $p = <.001$). All types of maltreatment (except physical abuse from mother) were reported significantly more often among adolescents with BPD than in the CC group. The most common types of maltreatment reported in the BPD group were paternal antipathy and sexual abuse. 97.7% of the BPD group participants reported scores above the *cut-off* in at least two scales of the FAD, whereas 63.0% of the CC group presented scores above the *cut-off* in at least two of the scales. Group differences were significant for all scales. As regards parental bonding, results suggested that 95.5% of the BPD patients showed scores in the clinical range on the care subscale for either mother or father or both, whereas the score of overprotection was in the clinical range for 68.2% of BPD participants. In contrast, 48.8% and 34.0% from the CC group reported scores in the clinical range for care and overprotection, respectively.

Univariate and Multivariate Regression Analysis

Table 3 shows the associations between adverse childhood experiences and BPD. Using univariate regression, significant associations (ranging from OR=3.46 to as high as OR=9.87) were found for all types of childhood maltreatment, except for physical abuse from mother. The highest odds ratios were found for sexual abuse (OR=9.87), followed by antipathy from mother (OR=6.48) and antipathy from father (OR=5.93). Univariate regression analyses also showed significant associations (ranging from

OR=3.62 to as high as OR=12.36) for all subscales of the FAD. In particular, critical scores in general functioning showed the highest associations (OR=12.36), followed by communication (OR=8.86) and affective involvement (OR=7.47). Finally, univariate analyses showed also significant associations (ranging from OR=3.14 to as high as OR=14.68) for all subscales of PBI. In particular, care from mother showed the highest associations (OR=14.68), followed by care from father (OR=5.87).

Table 3 also shows the results of a multivariate regression model. This model was calculated in order to account for the high intercorrelation of adverse childhood experiences. In the first step we calculated the multivariate regression separately for the three measures (CECA, FAD and PBI). Furthermore, we tested if entering the number of comorbid Axis I disorders as additional covariate could affect the results. The findings showed that the number of diagnoses was not a significant predictor in the final combined multivariate model (OR=1.91, 95%CI=0.72–5.07, $p=.192$), and did not change the significance of any of the childhood adversity predictors. Therefore, we reported the analyses without this covariate.

As regards childhood maltreatment, although the multivariate regression model was highly significant ($p<.001$), only sexual abuse ($p<.001$) and antipathy from father ($p=.046$) reached independent statistical significance. Multivariate regression for the FAD scales was statistically significant ($p=.002$), but none of the subscales showed an independent association with BPD. Despite the model's overall significance ($p<.001$) for parental bonding, only low care from mother reached independent statistical significance ($p<.001$).

Subsequently, our analyses were tested for potential multicollinearity that could occur due to the high inter-correlation of our predictors in the three measures used (see supplement tables for detailed information).

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As regard CECA Q. scales, large correlation between the coefficients for antipathy and neglect from mother ($r = -.66$) as well as antipathy and neglect from father ($r = -.65$) were found, indicating a potential effect of collinearity in the CECA.Q model. Since antipathy showed higher effect sizes compared to neglect, we decided to maintain the coefficients for antipathy. Removing neglect from the multivariate model resulted in significant estimates for antipathy from both mother and father. However, antipathy did not remain as a significant predictor in the final combined model.

As regard FAD scales, a large correlation between the coefficients for problem solving and general functioning ($r = -.46$) was found. To avoid potential multicollinearity effects, the coefficient for problem solving, which showed a lower effect size than general functioning, was removed from the multivariate model. The new model without this coefficient resulted in significant estimate for general functioning, which showed a significant prediction also in the final combined model.

For the PBI scales, although there was a high inter-correlation among coefficients for care and overprotection from father ($r = -.41$), removing one of these two variables from the multivariate model did not change the results: only the coefficient for care from mother maintained an independent association with BPD.

Finally, combining the significant predictors from the multivariate regression of each domain into a common model ($p < .001$), experiences of sexual abuse showed the highest odds ratio (OR=13.84, 95%CI=3.16–60.57, $p < .001$), followed by critical general family functioning (OR=8.90, 95%CI=2.11–37.48, $p = .003$), and low care from mother (OR=7.56, 95%CI=1.94–29.48, $p = .004$).

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Table 3. Associations of adverse childhood experiences with BPD in both univariate and multivariate regression models are presented as odds ratios including their confidence interval.

Explaining variables (BPD %; CC%) ^c	Associations with BPD								
	Univariate analyses			Multivariate analyses			Reduced multivariate analyses ^d		
	OR	95% - CI	p-value	OR	95% - CI	p-value	OR	95% - CI	p-value
Adverse childhood experiences									
Antipathy mother/mother figure (51.2%; 13.0%)	6.48	2.31 - 18.19	<.001**	3.81	.67 - 21.56	.131	4.11	1.12 - 15.03	.033*
Antipathy father/father figure (61%; 20.0%)	5.93	2.31 - 15.26	<.001**	4.72	1.03 - 21.68	.046*	3.78	1.19 - 11.93	.023*
Neglect mother/mother figure (30.2%; 8.7%)	4.36	1.30 - 14.59	.017*	1.13	.14 - 9.18	.909	--	--	--
Neglect father/father figure (48.8%; 22.2%)	3.46	1.38 - 8.74	.008*	.70	.13 - 3.62	.667	--	--	--
Physical abuse mother/mother figure (27.3%; 12.8%)	2.56	.87 - 7.57	.089	1.44	.34 - 6.18	.623	1.46	.35 - 6.11	.601
Physical abuse father/father figure (31.8%; 10.6%)	3.92	1.27 - 12.06	.017*	1.77	.37 - 8.44	.471	1.82	.39 - 8.56	.449
Sexual abuse (59.1%; 12.8%)	9.87	3.47 - 28.11	<.001**	11.41	3.3 - 39.4	<.001**	10.66	3.25 - 34.97	<.001**
Family Assessment									
FAD PS - Problem Solving (72.7%; 28.3%)	6.55	2.61 - 16.46	<.001**	2.39	.58 - 9.90	.23	--	--	--
FAD CM - Communication (86.4%; 41.4%)	8.86	3.12 - 25.10	<.001**	1.72	.35 - 8.55	.507	1.73	.35 - 8.60	.500
FAD RL - Roles (56.8%; 26.1%)	3.62	1.49 - 8.79	.004*	1.92	.57 - 6.42	.293	2.16	.67 - 6.96	.195
FAD AR - Affective Responsiveness (77.3%; 39.1%)	5.27	2.10 - 13.24	<.001**	.51	.10 - 2.68	.424	.63	.13 - 3.17	.578
FAD AI - Affective Involvement (86.4%; 58.7%)	7.47	2.92 - 19.16	<.001**	2.36	.62 - 9.00	.206	1.99	.55 - 7.22	.293
FAD BC - Behavior Control (95.2%; 71.7%)	6.78	1.46 - 31.34	.014*	4.04	.60 - 27.11	.151	3.69	.56 - 24.34	.175
FAD GF - General Functioning (83.7%; 28.3%)	12.36	4.42 - 34.55	<.001**	3.42	.68 - 17.24	.137	5.56	1.4 - 23.07	.018*
Parental Bonding									
Care mother (86.4%; 30.4%)	14.68	5.06 - 42.62	<.001**	9.57	3.04 - 30.15	<.001**	9.38	3.02 - 29.07	<.001**
Overprotection mother (52.3%; 21.3%)	4.05	1.62 - 10.12	.003*	2.06	.65 - 6.46	.216	2.31	.74 - 7.21	.149
Care father (80.0%; 40.0%)	5.87	2.29 - 15.07	<.001**	2.47	.71 - 8.64	.154	1.98	.65 - 5.99	.228
Overprotection father (52.5%; 26.7%)	3.14	1.29 - 7.69	.012*	.84	.23 - 2.98	.785	--	--	--

c. Frequencies expressed in percentage of adverse childhood experiences in both the BPD and CC group respectively

d. For each pair of collinear predictors (correlation of the estimates > .4) the one with the lower effect size was excluded

* p <.05; **p <.001

Discussion

To our knowledge, this is the first study to examine the specific and combined role of childhood maltreatment, parental bonding experiences, and family functioning in female

adolescents with BPD. Our findings indicate that a variety of specific types of childhood adversities may contribute to the development of BPD.

BPD and childhood maltreatment

Our results demonstrated a strong association between adolescent BPD and a history of childhood maltreatment. In particular, the highest associations were found for specific types of emotional abuse (parental antipathy and neglect) and for sexual abuse. This is in line with previous research findings (Haugaard, 2004; Huang, et al., 2012; Paris, 2000; Venta, et al., 2012; Zanarini & Frankenburg, 1997; Zanarini et al., 1997; Zweig-Frank & Paris, 1991).

However, whereas the role of the mother is often highlighted in the etiology of psychiatric disorders, our study showed that antipathy from father was the most frequent type of emotional abuse in the BPD group (61%). When discussing the issue of father's versus mother's antipathy and neglect, it may be important to note that our sample included only females; thus, does not allow exploring the potential importance of caregiver antipathy from cross-gender parent child roles. However, the role of father's care has not yet been explored in depth within BPD research; therefore, this finding may pave the way for new areas of research that need to be studied in better detail.

On the basis of Bifulco et al.'s (2005) definition used in this study, antipathy may be very similar to Linehan's term of invalidation, which is thought to play a major role in the development of BPD (Linehan, 1993). According to Fonagy and Bateman (2008), an invalidating and rejecting caregiving environment marked by parental criticism likely impairs a child's reflective capacities and sense of self which may in turn lead to BPD development (Fonagy et al., 2011). However, despite the high occurrence of antipathy from fathers in the BPD sample, this variable did not predict BPD symptoms

in the final model over and above the influence of sexual abuse, family functioning and low maternal care.

Another type of abuse strongly present in the BPD group was a history of sexual abuse, in line with the few previous studies on clinical adolescent BPD (Horesh, Ratner, Laor, & Toren, 2008; Venta, et al. 2012). Our finding that sexual abuse predicted BPD in adolescent patients within multivariate analysis was rather surprising, given that Fossati et al. (1999) reported a meta-analytically derived, modest overall effect size ($r = 0.28$) of childhood sexual abuse in adult BPD. Our result showed that in adolescent BPD sexual abuse might play quite an important role even if adjusting for all other adverse childhood experiences.

Finally, it is important to underline that almost all BPD patients reported at least one type of childhood maltreatment. The National Child Traumatic Stress Network Workgroup on Diagnosis (Van der Kolk, 2005) proposed a new diagnosis that, in their view, provides a clear delineation of the enduring developmental effects of trauma and is helpful in conceptualizing the complex adaptations to trauma over the lifespan, such as developmental trauma disorder. The findings from this study may support BPD as a potential phenotype of complex developmental trauma disorder, showing the disruptive effect of chronic and cumulative abuse in early childhood.

BPD and family functioning

Family interaction has potential theoretical links to several of the core characteristics of BPD, such as emotional instability, identity disturbances, and problems in relationships. Consistent with previous empirical studies (Fruzzetti, Shenk & Hoffman, 2005; Stepp et al., 2013), our regression analysis showed that maladaptive family functioning was associated with BPD. Our finding revealed scores within a clinical

range for behavioral control, affective involvement, communication, and the general functioning scale for almost all patients with BPD. Dysfunctioning in these specific scales underscores how critical dimensions of family life, involving not only one caregiver but the whole family system, may well lay the groundwork for the development of BPD. Our findings are in line with a previous study reporting that borderline adolescents perceive their family functioning as more dysfunctional than the depressive and nonclinical sample (Valiente, 1995). The role of parenting or caregiver responses to the child as well as the overall quality of the family environment have been linked to problems with impulse control and emotion dysregulation, consistent with Fonagy's (2008) mentalizing theory.

BPD and parental bonding

Low care scores of the PBI are in line with previous findings in the adult BPD population. They show that borderline patients remember their parents mainly as emotionally neglectful (Byrne, et al., 1990; Guttman & Laporte, 2002; Paris & Frank, 1989). This failure of both parents in providing emotional care confirms the high presence of emotional abuse in the BPD group. Our findings also clarify earlier contradictions about whether neglect was perceived as coming from one parent (Frank & Paris, 1981) or both (Guttman & Laporte, 2002; Paris & Frank, 1989; Zweig-Frank & Paris, 1991). Furthermore, in the multivariate model, low maternal care still predicted BPD in adolescence. The lack of emotional involvement, support, and validation from the mother may actually potentiate the effects of other types of maltreatment and be related more generally to the development of BPD.

According to Parker et al. (1979), the parental style in BPD group can be defined as "affectionless control" for those who had experienced low care and high overprotection,

and as “neglectful parenting” when the participants reported low care and low overprotection. Previous studies have demonstrated that the parental style defined as “affectionless control” is most strongly associated with depressive syndromes (Lloyd & Miller, 1997; Parker, 1983). Our result may extend previous research, confirming this association for BPD in adolescence, too.

Multivariate model of childhood adversity in BPD

Sexual abuse, low care from mother, and negative general functioning remained as significant predictors in the reduced multivariate model. Interestingly, one predictor from each higher dimension of childhood adversity (maltreatment, bonding, and family functioning) remained in the final model. This finding suggests that qualitatively distinct dimensions of childhood adversity may all independently contribute to BPD development; thus, all need to be considered in the etiology of BPD.

Limitations and Strengths

Though this study addresses important questions in adolescent mental health, these findings are subject to some limitations. The first one concerns the fact that only females and only inpatients were included in this study. Future research should test whether results can be generalized to males and non-inpatient populations.

Additionally, all information about childhood adversities was obtained via self-report questionnaires; thus, our study is limited by its exclusive reliance on self-report data and hence by upwardly distorted correlations due to common method bias (Conway & Lance, 2010). Future research might provide important contributions by adopting additional methods and collecting information on childhood adversity from multiple sources. Another limitation may be the fact that an adult measure for BPD diagnosis

was used to distinguish the sample. Nevertheless, several studies suggested that adult criteria can be used to distinguish borderline adolescents from psychiatric comparison subjects (Kaess, Brunner, Chanen, 2014). The lack of inter-rater reliability (BPD assessment) and the clinical assessment of traditional axis I disorders are potential limitations as well but these may be alleviated by both highly experienced raters and well-established procedures as described in the methods section. Finally, it is important to underline that the current study had a cross-sectional design; thus, the results reflect associations rather than prospective risk factors. Longitudinal studies are needed to confirm these findings.

The strengths of the study include the assessment of adolescent inpatients with full-syndrome BPD using structured clinical interviews. Furthermore, the self-report measures used cover a great number of both childhood and family experiences and have demonstrated good psychometric properties in international research. Importantly, by comparing the BPD group to other psychiatric inpatients, we could identify the contribution of certain kinds of adverse childhood experiences specifically on BPD.

Clinical and Research Implications

The findings from this study have important implications for clinical practice and research. As regards clinical practice, the strong association between lifetime interpersonal childhood adversities and BPD draws attention to the importance of screening for BPD pathology in primary care patients who report interpersonal trauma experiences. Furthermore, our findings suggest the crucial role that the whole family system may play in the development of BPD. Thus, clinicians should take into account the family interaction dimensions in order to put more efficient interventions in place.

The present study builds upon the very limited research that currently addresses adolescent BPD. It highlights the importance of considering several dimensions of childhood adversity as well as the role of the father as an area of future research in the field. Prospective studies are needed to confirm a possible causal relationship but also factors of resilience since a high number of individuals exposed to adverse experiences in childhood do not develop BPD at a symptom or even disorder level.

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STUDY 2

Environmental factors that distinguish between clinical and healthy samples with childhood experiences of abuse and neglect

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Abstract

Background: Childhood maltreatment is known to be associated with a wide range of psychosocial, emotional, and behavioral problems in adulthood but these children often also become healthy adults. Theoretical models have highlighted the importance of considering the broader environment in which children develop and assumed that environmental factors (either positive or negative) influence mental health outcomes in maltreated children. The present study sought to investigate the effect of additional environmental factors by comparing a group of mixed clinical participants (CG) with experiences of abuse and neglect with a healthy group (HG) with similar patterns of

experiences. Variables selected as potential environmental factors were: separation from parents, financial hardships, parental psychiatric disorders, and low social involvement.

Sampling and Method: The study included 55 mixed clinical participants (mean age $M=34.9$; $SD=9.2$), and 23 healthy participants (mean age $M=32.7$; $SD=10.6$). All participants were investigated using the Childhood Experience of Care and Abuse (CECA) interview. The two groups were specifically matched with regards to patterns of severe childhood maltreatment.

Results: The findings of the current study indicated that psychopathological outcome was associated with a greater presence of negative environmental factors ($p<.001$). In particular, lack of social support seemed to be the most important predictor ($OR=24.25$).

Conclusion: The findings from this study highlight the crucial influence of social support on maltreatment-related mental health outcome. This study is the first to investigate the influence of specific environmental factors in two groups with similar, severe childhood experiences of abuse and neglect but different mental health outcomes. Our results should encourage further in-depth research in this field using complex and extensive approaches. Further, these findings encourage the efforts that should be undertaken to incorporate both familial and external sources of social support in promoting mental health for maltreated children.

Key words: childhood maltreatment, environmental factors, mental health, CECA interview, social support

Introduction

Child maltreatment by parents or other caregivers is widespread in the population. Research from high-income countries estimated that 4–16% of children have experienced severe parental violence, 15–30% of girls and 5–15% of boys have been sexually abused, and one in ten neglected or psychologically abused (Gilbert et al., 2009). Considering these high rates, several studies have consistently demonstrated the detrimental consequences of childhood exposure to abuse and neglect (Molnar, Buka, & Kessler, 2001). In fact, children who experience maltreatment are more likely to suffer from a wide range of enduring psychosocial, emotional, and behavioral problems, including posttraumatic stress disorder, depression, substance abuse, anxiety, and antisocial behavior (Briere & Elliott, 2003; Cicchetti & Toth, 2005; Fergusson, Boden, & Horwood, 2008; Scott, McLaughlin, Smith, & Ellis, 2012).

However, despite the increased risk associated with exposure to traumatic childhood experiences, a growing body of evidence has consistently shown that many people are able to adapt to pernicious experiences they have encountered with minimal negative impact (Alim et al., 2008; Collishaw et al., 2007; McGloin & Widom, 2001). Relatively little is known about these resilient individuals, but gaining a better understanding of the factors involved in either positive or negative adaptation to early maltreatment experiences might increase our knowledge of the pathways by which mental disorders develop and thus help promote good mental health.

Complex theoretical models in the field of child maltreatment have highlighted the importance of considering the broader environment in which children develop (Belsky, 1981; Sperry & Widom, 2013). These approaches assumed that abuse and neglect do not occur in isolation, but rather that characteristics of the family or of the social environment may affect, in either a positive or negative way, outcomes for maltreated

children. Researchers have documented the fact that, in addition to an increased risk for serious psychological and mental health consequences (Gilbert et al., 2009), abused and neglected children often experienced additional negative environmental factors, including low social support (the absence of persons such as family members, friends, reference figures, or gatekeepers able to provide emotional support and aid with child's needs), separation from parents, parents' psychiatric disorders, and low socioeconomic status (Felitti et al., 1998; Molnar et al., 2001; Sidebotham, Golding, & ALSPAC Study Team, 2001; Widom, Czaja, & Dutton, 2008) that may further influence psychosocial and health outcomes in life. In order to understand the implications of each of these types of specific environmental factors on subsequent mental disorders in maltreated children, it is important to distinguish the influence of one kind of childhood adversity from another.

Support from others has been hypothesized to be one of the protective factors that buffer children from the impact of early maltreatment experiences (Cohen & Wills, 1985; Heller, Larrieu, D'Imperio, & Boris, 1999). However, relatively few studies have examined whether the lack of social support plays a role in the development of subsequent problems for maltreated children and findings are highly heterogeneous and contradictory (Feldman, Conger, & Burzette, 2004; Pepin & Banyard, 2006; Schumm, Briggs-Phillips, & Hobfoll, 2006; Vranceanu, Hobfoll, & Johnson, 2007). Additionally, there is a strong link between child maltreatment and parental psychiatric problems, including specific findings related to depression and alcohol and drug abuse (Bifulco, Brown, Moran, Ball, & Campbell, 1998; Brewin, Andrews, & Valentine, 2000; Chaffin, Kelleher, & Hollenberg, 1996; Dube et al., 2003; Miranda, de la Osa, Granero, & Ezpeleta, 2013; Sachs-Ericsson et al., 2012). However, findings from the literature are again contradictory. Similarly, contradictory findings were found in those studies that

reported correlations between financial hardship and separation from parents and child maltreatment (Goodyer, Cooper, Vize, & Ashby, 1993; Hecht & Hansen, 2001; Miller, Chan, Tirella, & Perrin, 2009; Savage, 2014). These associations might be due to a reporting bias, though, in that lower-income or problematic families are more likely to come to the attention of the authorities. In sum, the role played by environmental factors such as lack of social support, parental psychiatric disorders, financial hardship, and separation from parents in influencing psychopathological outcomes in traumatized children is still not known.

In addition, while a considerable body of research has investigated direct associations between childhood maltreatment and mental health outcomes in clinical samples, little is known about the link between childhood maltreatment and positive or normal mental health development. Indeed, previous research lacks comparisons between maltreated groups that become healthy adults and maltreated groups that develop mental illness. Therefore, the present study attempts to overcome these limitations by examining the role of environmental factors in two groups of individuals with well-documented histories of severe child abuse and neglect but with different mental health outcomes.

Objective

The aim of this study was to compare a group of mixed clinical individuals (CG) who experienced abuse and neglect during childhood with a healthy group (HG) with similar experiences in order to find specific environmental factors as predictors of psychopathological outcome in the CG. In accordance with the literature, the variables selected as potential predictors of psychopathological outcomes were: separation from parents (> 12 months), financial hardships, parental psychiatric disorders, and low

social involvement. We hypothesized that the negative environmental factors identified would be found significantly more frequently in the CG than in the HG. Additionally, we assumed that specific environmental factors predict psychopathological outcome in the CG.

Methods

Procedure and participants

One hundred healthy participants were recruited to validate the Italian version of the Childhood Experience of Care and Abuse interview (CECA) (Bifulco, Brown, & Harris, 1994; Giannone, et al., 2011). Participants with any physical or mental diseases in the previous 5 years were excluded. The sample comprised 64 women and 36 men, age ranging from 19 to 50 years ($M=29.25$; $SD=9.58$). All participants were volunteers and informed and written consent was obtained. To assess childhood abuse and neglect, participants were given an appointment to privately complete the CECA interview.

For the present study, participants were selected if they reported at least one severe type of childhood maltreatment (antipathy, neglect, physical abuse, sexual abuse, and/or psychological abuse). Thus, the final healthy subgroup (HG) comprised 23 participants (mean age= 32.74 ; $SD=10.62$); 17 of them were female (73.9%). The percentages of maltreated individuals (23%) and the gender ratio are consistent with previous findings that showed a prevalence of abuse and neglect ranging from 3.7% to 30% in population-based samples and a higher prevalence of abuse in females (Gilbert et al., 2009).

Clinical subjects were recruited as part of an ongoing research project on the different psychopathological outcomes associated with a history of childhood maltreatment. The total sample comprised 124 participants (69.4% female), age ranging from 17 to 58 years ($M=32.41$; $SD=9.50$). Participants were recruited from five public mental care services in Italy. Clinical diagnoses were made by mental healthcare

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professionals according to the fourth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). The most frequent diagnosis was posttraumatic stress disorder (n=51; 41.1%), followed by substance abuse disorders (n=37; 29.8%) and eating disorders (n=36; 29.0%). All participants were volunteers and informed and written consent was obtained. From this total clinical sample, a subgroup (CG) was matched to the traumatized HG with regards to their patterns of abuse and neglect following the procedure described below.

Procedure for matching groups

Out of the clinical sample, 66.1% (n=82) reported experiences of maltreatment. Among those, 34.1% reported only one type of maltreatment, whereas 65.9% reported two or more types.

A subgroup with a history of childhood maltreatment comparable with the HG was selected by matching the two groups on the basis of patterns of maltreatment rather than simply according to the frequency of the different type of experiences. Consequently, we were able to select 55 participants who showed patterns comparable to those of the HG. As shown in *Table 1*, the two groups did not differ in terms of age, gender, marital status, and work. However, educational level differed significantly between the two groups, with a greater presence of high qualification in the HG than in the CG. As expected, HG and CG did not significantly differ in terms of pattern of abuse reported; only the presence of psychological abuse alone was significantly different between the two groups (see *Table 2*).

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Table 1. Socio-demographic characteristics in both clinical and healthy groups

Variables	CG		HG		<i>p</i>
	n=55		n=23		
	M	SD	M	SD	
Age	34.9	9.2	32.7	10.6	.493
	n	%	n	%	<i>p</i>
Gender female	38	69.1	17	73.9	.670
Marital status					
Single	30	54.5	14	60.9	.271
Married	14	25.5	9	39.1	
Divorced	11	20	0	0	
Work					
Student	7	12.7	11	47.8	.108
Unemployed	27	49.1	3	13.0	
Part-time work	5	9.1	5	21.7	
Full-time work	16	29.1	4	17.4	
Educational level					
Elementary	5	9.1	1	4.3	.034
Low School	24	43.6	3	13.0	
High School	17	30.9	11	47.8	
Master Degree	9	16.4	8	34.8	

Table 2. Pattern of maltreatment in both clinical and healthy groups

Childhood abuse and/or neglect	CG		HG		$\chi^2_{(1)}$	<i>p</i>
	n=55		n=23			
	n	%	n	%		
Antipathy only	10	18.2	6	26.1	.62	.430
Neglect only	8	14.5	3	13.0	.03	.862
Physical Abuse only	6	10.9	1	4.3	.86	.355
Sexual Abuse only	4	7.3	2	8.7	.05	.830
Psychological Abuse only	0	0	2	8.7	4.91	.027
Antipathy + Neglect	10	18.2	3	13.0	.31	.579
Antipathy + Sexual Abuse	2	3.6	1	4.3	.02	.882
Antipathy + Psychological Abuse	1	1.8	1	4.3	.42	.519
Antipathy + Sexual Abuse + Psychological Abuse	0	0	1	4.3	2.42	.120
Antipathy + Neglect + Psychological Abuse	6	10.9	1	4.3	.86	.355
Sexual Abuse + Psychological Abuse	1	1.8	1	4.3	.42	.519
Antipathy + Neglect + Physical Abuse + Psychological Abuse	7	12.7	1	4.3	1.24	.266

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Assessment measure

All participants (both healthy and clinical) completed the Childhood Experiences of Care Abuse interview (CECA) (A. Bifulco et al., 1994). The CECA is a retrospective, semi-structured instrument; it uses an investigator-based approach to rating, and behavioral indicators instead of the subject's own feelings or reports of severity are taken into account for the rating. For statistical analyses, CECA scales were dichotomized between 'severe' (marked or moderate) and 'nonsevere' (mild or little-no) negative experiences (A. Bifulco et al., 2002; Antonia Bifulco & Moran, 1998). All the interviews were audiotaped and were rated by two interviewers according to predetermined criteria and manually established threshold examples; very good interrater agreement was found for all CECA subscales ($70 \leq K \leq 1,00$). A full description of CECA scales is given elsewhere (Antonia Bifulco & Moran, 1998), but brief definitions of the scales on lack of care and abuse and of environmental factors during childhood utilized in this study are provided below. The CECA interview has recently been judged as the "gold-standard" for the assessment of childhood abuse and neglect (Thabrew, de Sylva, & Romans, 2012).

Maltreatment

- Antipathy: includes parental hostility, rejection, and coldness shown toward the child, and scapegoating in relation to siblings. This is taken to equate with parental emotional neglect as described in the literature.
- Neglect: mainly refers to material and physical neglect, involving parental lack of interest in relation to material care (e.g., feeding, clothing, and household routines), friendships, school work, or career prospects.
- Physical abuse: violence directed towards the child by a household member; inclusion criteria involve hits on the head or being hit hard around the body with the

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hands/fists, being hit with an implement, kicked, bitten, or burned, or threats or use of a gun or knife, with severity determined by the intensity of the attack and its frequency.

- Psychological abuse: includes coercive and sadistic treatment of the child involving incidents of humiliation, terrorization, cognitive disorientation, exploitation, and corruption of the child or intentional deprivation of needs or valued objects.
- Sexual abuse: includes any age-inappropriate sexual contact, with severity of the abuse taking into account the degree and intrusiveness of sexual contact, the relationship of trust with the perpetrator, and the frequency and duration of the abuse.

Environmental factors:

- Separation from parents: includes every kind of parental loss (divorce, death, work reason, wartime evacuations,...) for more than 12 months;
- Financial hardships: takes into account the extent to which the family had to do without essentials in terms of food, new clothing, furniture, and holiday trips, etc., and also the extent to which there was debt, bankruptcy, or evictions due to not paying rent, etc.
- Parental psychiatric disorders: includes any parental psychiatric disorder (depression, eating disorder, drug addiction, ...) in the first few years of a child's life;
- Low social involvement: reflects the child's social environment outside the household. The scales involve organized social activities outside the home (youth clubs, etc.), social involvement (friendships), and presence of a support figure. For the presence of a support figure, there should be some evidence of their supportive role in terms of some actual confiding or approaches for help. Includes those to whom child confided about abuse or neglect in the home or could talk to about everyday matters.

Data Analysis

Descriptive statistics were calculated for both groups. Age differences between groups were tested by an independent sample t-test; categorical variables were analyzed by using chi-squared tests. Multivariate logistic regressions were tested for the selected risk factors. Clinical outcome was taken as a dependent variable and the single risk factors were entered as independent variables. The associations between adverse childhood experiences and CG were reported as odds ratios (OR) together with their 95% confidence intervals (CI).

Results

In agreement with our hypothesis, we found significant differences between the two groups with regards to the presence of negative environmental factors. In particular, participants of the CG group were exposed to a greater number of negative environmental factors during childhood (see *Table 3*). More specifically, CG participants reported lower social involvement, with 66.7% of subjects showing low social involvement compared to 8.7% in the HG (OR= 21.00; $\chi^2=21.69$; $p<.001$). Moreover, the CG reported a significantly higher frequency of parental figures suffering from psychiatric disorders (41.5% compared with 13.3% in the HG, OR=4.73, $\chi^2 =5.89$, $p=.02$).

Table 3. Frequency and group differences of environmental factors in both CG and HG

Environmental factors	CG		HG		OR	$\chi^2_{(1)}$	p
	n=55		n=23				
	n	%	n	%			
Separation from parents	23	41.8	6	26.1	2.04	1.71	.19
Financial hardship	9	16.7	4	17.4	.95	.01	.94
Parent psychiatric disorders	22	41.5	3	13.3	4.73	5.89	.02
Low social involvement	36	66.7	2	8.7	21.00	21.69	<.001

Table 4 shows the associations of environmental factors with the CG. The ORs can be interpreted as a measurement of increase/decline of the odds of having a mental disorder in the presence of the environmental factors. The multivariate logistic regression model predicting psychopathological outcome with environmental factors as independent variables, adjusting for sex, age, and educational level, was highly significant ($p < .001$). As hypothesized, lower social involvement scores predicted a higher likelihood of having negative mental illness (OR=24.25). Parental psychiatric disorder, separation from parents, and financial hardship did not seem to have an independent effect of predicting a mental disorder in these traumatized individuals.

Table 4. Associations of environmental factors with the CG in a multivariate regression model are presented as odds ratios including their confidence interval.

	Associations with CG		
	Multivariate analysis		
	OR	95% - CI	p-value
Age	1.01	.95 - 1.08	.81
Female gender	.70	.16 - 3.13	.64
Educational level	2.05	.89 - 4.71	.09
Environmental factors			
Separation from parents	2.08	.50 - 8.65	.31
Financial hardship	.17	.02 - 1.44	.11
Parent psychiatric disorders	3.98	.85 - 18.52	.08
Low social involvement	24.25	3.57 - 164.71	<.001

Discussion

To our knowledge, this study was the first to investigate the influence of specific environmental factors in two groups with similar patterns of childhood maltreatment but with different mental health outcomes. In fact, most previous studies analyzed the influence of risk factors by comparing maltreated with nonmaltreated samples (Walsh, MacMillan, & Jamieson, 2002; Widom et al., 2008). As hypothesized, the findings of the current study indicated that psychopathological outcome was associated with a

greater presence of negative environmental factors. In particular, lack of social support seemed to be the most important predictor.

Consistent with this finding, previous cross-sectional studies revealed that social support mediates the relationship between self-reported childhood maltreatment and adverse outcomes such as revictimization (Bender, Cook, & Kaslow, 2003), intimacy/trust (Pepin & Banyard, 2006), and posttraumatic stress disorder (PTSD) symptoms (Vranceanu et al., 2007). However, these findings were not confirmed in other studies (R. Bradley, Schwartz, & Kaslow, 2005; Hobfoll et al., 2002; Schumm et al., 2006). It is important to note that all studies used different definitions and measures of social support and childhood maltreatment as well as varying sampling procedures. In our study, an extensive definition of social involvement was applied, which includes the child's social environment outside the household, comprising organized social activities outside the home (youth clubs, sports activities, etc.), friendships, and the presence of a support figure in whom the child could confide about abuse or neglect in the home or could talk to about everyday matters (Antonia Bifulco & Moran, 1998).

Social support as defined in this study might be considered as potential sources of resilience, which refers to the ability to cope adaptively with adversity or trauma (Luthar, Cicchetti, & Becker, 2000). Resilience characteristics from social support are likely to mitigate risks of developing psychopathological disorders, probably through effective emotional regulation, tolerance of negative affect, or the presence of supportive and nurturing relationships (Feder, Nestler, & Charney, 2009; Luthar et al., 2000). Identifying opportunities to increase the availability of social support and improve abused children's abilities to effectively take advantage of these resources is a critical, but necessary endeavor to try and heal these early failings.

Furthermore, our findings of the role of parental psychiatric disorders were not completely consistent with previous findings (A. Bifulco et al., 1998; Chaffin et al., 1996; Chen et al., 2014; Miranda et al., 2013; Sachs-Ericsson et al., 2012). Previous studies (Chaffin et al., 1996; Kendler et al., 2000; Walsh et al., 2002) postulated that parental psychiatric disorders may increase the risk for childhood maltreatment due to the failure of a parent with mental illness to tend to a child's needs (Finkelhor, 1984; Fleming, Mullen, & Bammer, 1997) or because the parent-child relationship is impaired as a result of the parent's mental illness (E. J. Bradley & Peters, 1991; Sachs & Hall, 1991). Our findings suggest that parental mental illness was present significantly more frequently in CG than in HG; however, it does not predict that a psychopathological condition will develop in offspring beyond the severe childhood maltreatment. Likely, the pathway is more complex and parental psychopathology may reflect a genetic risk (Sachs-Ericsson et al., 2012) for developing a psychopathological condition.

Finally, our findings are somewhat contradictory to other studies that reported financial hardship and separation from parents as negative environmental factors for psychopathological outcomes in offspring (Chaffin et al., 1996). Our results indicate that low income and separation from parents were not particularly frequent in our samples (ranging from 16.7% to 41.8%); in addition, they did not seem to have a specific influence in predicting mental illness in traumatized samples.

Limitations and Strengths

Several limitations in our study should be noted. First, the sample size, although sufficient for the analysis, was relatively modest due to the selection of comparable samples among healthy and clinical individuals. Indeed, the purpose of comparing healthy and clinical, severely maltreated individuals and the use of an intensive

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interview for detecting the childhood experiences of abuse and neglect involved enormous recruitment efforts. Although reducing the sample size, the strict method we used to match the abuse and neglect experiences in both samples should guarantee a reliable comparison of the environmental factors in traumatized individuals, thus increasing the validity of our results.

Secondly, the validity of a retrospective self-report measure of childhood trauma in adults may be compromised by fallibility of memory and social desirability bias. However, using an intensive and standardized interview by particularly qualified interviewers may alleviate this limitation. Indeed, the CECA interview has previously proven to be robust in retrospective use, for example, when tested concerning independent sibling reports (A. Bifulco, Brown, Lillie, & Jarvis, 1997).

Clinical and research implications

The efforts to gain a better understanding of the developmental mental health trajectories in maltreated individuals should encourage further researchers to delve into this subject more deeply using prospective and more extensive approaches. Future research should investigate the types of family and peer support that can serve as resources for abused children. Likely, further inquiry into the qualitative dimensions of social support can improve our understanding of the specific aspects of social support that aid in trauma recovery (Dorian A Lamis, 2014). In addition, more specific genetic and epigenetic studies on the intergenerational transmission of mental illness among parents and children are warranted to better clarify the trajectory of this disadvantage over and above maltreatment experiences.

These findings have a number of clinical implications. They highlight the need for clinicians to more routinely assess whether social support is lacking in maltreated

individuals as a potential risk factor for trauma-related psychopathology. Finally, our results suggest that a thorough assessment of the availability of support is particularly important in maltreated children, and efforts should be undertaken to provide support figures to children exposed to abuse and neglect whenever possible.

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STUDY 3

Associations between depression and specific childhood experiences of abuse and neglect: a meta-analysis

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Abstract

Research documents a strong relationship between childhood maltreatment and depression. However, only few studies have examined the specific effects of various types of childhood abuse/neglect. This meta-analysis estimated the associations between depression and different types of childhood maltreatment (antipathy, neglect, physical abuse, sexual abuse, and psychological abuse) using the Childhood Experience of Care and Abuse (CECA) interview.

A systematic search in scientific databases included use of CECA interview and strict clinical assessment for major depression as criteria. Our meta-analysis utilized Cohen's d and relied on a random-effects model.

The search yielded 12 primary studies (reduced from 42), with a total of 4372 participants and 34 coefficients. Separate meta-analyses for each type of maltreatment revealed that psychological abuse and neglect were most strongly associated with an outcome of depression. Sexual abuse and the composite index, although significant, were less strongly related. Furthermore, the effects of specific types of childhood maltreatment differed across adult and adolescent samples.

This meta-analysis addressed the differential effects of type of childhood maltreatment on an outcome of depression, partially explaining between-study variance. The findings clearly highlight the potential impact of the more "silent" types childhood maltreatment (other than physical and sexual abuse) on the development of depression.

Key words: depression; CECA; abuse; neglect; maltreatment; meta-analysis

Introduction

The association between childhood adversity and the development of depression has been widely studied. Substantial evidence from both cross-sectional and prospective studies indicates that childhood neglect and abuse are strongly associated with the development of clinical depression in both adolescence and adulthood (Abela & Skitch, 2007; Bifulco, Brown, Moran, Ball, & Campbell, 1998; Gibb, Alloy, & Abramson, 2001; MacMillan et al., 2001; Widom, DuMont, & Czaja, 2007).

Most research so far focused on physical and sexual abuse (Cutajar et al., 2010; Dube et al., 2005; Fergusson, Boden, & Horwood, 2008; Kendler et al., 2000; Molnar, Buka, & Kessler, 2001); whereas fewer studies examined the effects of other types of abuse or neglect (Alloy, Abramson, Smith, Gibb, & Neeren, 2006; Bifulco, Moran, Baines, Bunn, & Stanford, 2002; Chen et al., 2014; Liu, Alloy, Abramson, Iacoviello, & Whitehouse, 2009; Musliner & Singer, 2014). Nonetheless, several authors have argued that emotional abuse in childhood, which typically includes experiences of being rejected, degraded, terrorized, isolated, or teased, might be more strongly related to internalizing symptoms and the development of depression than physical abuse or sexual abuse (Alloy et al., 2006; Gibb, Butler, & Beck, 2003; Lumley & Harkness, 2007; Shapero et al., 2014).

Unfortunately, high levels of heterogeneity can be observed across the published studies, which limits the comparability of previous research. This could be due to the use of different sampling procedures and methods of assessment. Indeed, different measurement methods (self-reports, interviews, hospital records, and official records) have been used to investigate childhood maltreatment and, more importantly, many different definitions of childhood adversity have been applied (Nanni, Uher, & Danese, 2012).

A recent meta-analysis has examined whether physical and sexual abuse in childhood were associated with depression and anxiety in later life (Lindert et al., 2014). Although the results of this analysis showed strong associations between sexual and physical abuse in childhood and depression, the measures used to assess both childhood abuse and depression varied greatly. Moreover, neither emotional abuse nor neglect was taken into account. Another recent meta-analysis showed that maltreated individuals were twice as likely as those without a history of childhood maltreatment to develop both recurrent and persistent depressive episodes (Nanni et al., 2012). Again, the available data did not permit an examination of the specific contribution of different maltreatment subtypes.

Indeed, although research has consistently documented a strong and significant relationship between childhood maltreatment, in general, and depression, studies that have examined the relationship between specific forms of adversity and depression development are sparse. Currently, no review or meta-analysis has attempted to elucidate the association between a broad variety of specific childhood experiences of abuse and neglect and depression among the scientific publications in this field.

Thus, the present meta-analysis aimed to estimate the specific association between depression (recurrent or persistent) and different types of childhood maltreatment (antipathy, neglect, physical abuse, sexual abuse, and psychological abuse) assessed with the same measure. Specifically, we chose the *Childhood Experience of Care and Abuse* (CECA; Bifulco, Brown, & Harris, 1994) interview, a measure with a 20-year standing and the ‘gold standard’ in this area of international research (Thabrew, de Sylva, & Romans, 2012).

According to findings from the literature, forms of maltreatment centering on themes of parents’ perception of failure, rejection, or unworthiness in the child seem to be

associated with a high vulnerability for developing depression (Gibb et al., 2003). Thus, we hypothesized that antipathy (involving parental criticism and hostility), neglect (withholding material care), and psychological abuse (coercive control) as defined by Bifulco and colleagues (Bifulco et al., 1994; Moran, Bifulco, Ball, Jacobs, & Benaim, 2002) would present a stronger association with depression than other forms of maltreatment (physical and sexual abuse).

Additionally, evidence has consistently demonstrated that adolescents with a history of childhood maltreatment have a greater vulnerability for becoming depressed or suicidal than individuals without such a history (Bifulco et al., 2014; Dunn, McLaughlin, Slopen, Rosand, & Smoller, 2013; Lumley & Harkness, 2007; Moretti & Craig, 2013; Ystgaard, Hestetun, Loeb, & Mehlum, 2004). Furthermore, the risk of depression and suicide attempts in maltreated individuals seem to be higher in adolescence than in adulthood (Brown, Cohen, Johnson, & Smailes, 1999; Dunn et al., 2013). Thus, this meta-analysis further aimed to find specific associations between childhood maltreatment types and depression, distinguishing among adult and adolescent samples.

Method

Search strategies

A systematic search strategy was used to identify relevant studies. A three-step literature search was conducted. First, a search of PubMed, PsycINFO, ISI Web of Knowledge, and Scopus (Elsevier) was performed to identify studies putatively reporting childhood maltreatment assessed with the *Childhood Experience of Care and Abuse* (CECA) interview. The search was conducted between 1 and 28 November 2013, specifying as start date of publication the year 1994 (the publication year of the CECA

interview). The following search terms were used: “CECA”, “childhood experience of care and abuse”, and “childhood abuse”, along with “depression”. Secondly, a database search was performed using the authors’ names of all articles that were identified within the first step. Thirdly, reference lists of articles included within the review were manually checked for any studies not retrieved by the computerized literature search.

Selection criteria

To achieve a high standard of reporting, the PRISMA guidelines were adopted (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009). Studies were selected for inclusion in the meta-analysis only when reported as an original research paper in a peer-reviewed journal. Studies were included independent of the language in which they were published; however, all proved to have been published in English.

As regard to depression assessment, only studies that assessed depression as a diagnostic category (rather than depressive symptoms) were included. In addition, the use of interview-based diagnoses was utilized as a selection criterion. We also included studies independent of the type of depression assessed (persistent or recurrent) or time of onset. Most studies had assessed major depressive disorder (MDD), recurrent or persistent; only one study had related childhood abuse with the first onset of depression.

As regards the measurement of childhood adversities, the gold standard criterion in this area of international research has previously been considered the CECA (Bifulco et al., 1994) interview. The CECA is a retrospective semi-structured interview that uses an investigator-based approach to rating. Behavioral indicators of parent/perpetrator actions instead of the subject's own feelings or reports of incident severity are taken into account. All scales have 4 points (marked, moderate, some, and little/none), with repeated incidents of abuse recorded and repeated neglect or antipathy in different

household arrangements, as determined by new parent figures. For certain analyses the scales are dichotomized, with ‘marked or moderate’ denoting severe abuse or neglect.

The core domains are defined as follows:

Antipathy: parental hostility, coldness or rejection shown toward the child, including scapegoating in relation to siblings.

Neglect: the failure of parents to provide for the child's basic material needs (food, clothing, shelter, and protection) and developmental needs (interest in school, friends, child's happiness, health, and well-being).

Physical Abuse: violence directed towards the child by a household member (including parents, surrogate parents, siblings, or relatives in the household); inclusion criteria involve hits on the head or being hit hard around the body with the hands/fists, being hit with an implement, kicked, bitten, or burned, or threats or use of a gun or knife, with severity determined by the intensity of the attack and its frequency.

Sexual Abuse: age-inappropriate sexual contact by any adult or older peer related or not, acquainted or not. Sexual abuse includes a range of sexual contact including intercourse, violation or penetration with an object, oral sex, touching of breasts/genitals, as well as requiring the child to watch sexual activity or pornography, and verbal solicitations for sex or age-inappropriate verbal content. Severity is determined by the extent of sexual contact as well as relationship to perpetrator, with higher ratings given for family members and trusted authority figures or family friends.

Psychological abuse: episodes of humiliation, terrorization, cognitive disorientation, exploitation, or corruption of the child or intentional deprivation of needs or valued objects, from parents usually in the context of a parental, highly controlling and domineering relationship with the child. Severity is determined by the range of such experiences and their frequency.

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The CECA is a reliable measure of childhood experience in both adults and adolescents. CECA interviewers receive extensive training (see www.cecainterview.com) and ratings have been demonstrated to have excellent psychometric properties, with satisfactory interrater reliability and convergent validity between siblings (Bifulco, Brown, Lillie, & Jarvis, 1997; Antonia Bifulco et al., 2002).

Coded variables

Variables for each article included in the meta-analysis were: rates of antipathy, neglect, physical abuse, sexual abuse, psychological abuse, and a composite index of childhood maltreatment (defined in most of the included studies as the presence of at least one type of maltreatment rated as ‘marked’ or ‘moderate’); year of publication; mean age of participants; gender (% of females); characteristics of sample (whether clinical or community based, adolescents or adults), and depression assessment.

Database

The literature search yielded a total of 42 potential studies. Of these, 14 were omitted because of complete or partial sample overlap; in these cases we included the study that offered the larger subsample or, alternatively, the full report of relevant information. Another 12 studies conducted the research only with a depressed sample; thus, they were excluded due to a lack of a comparison group. Finally, three studies were omitted because they did not use a depression assessment consistent with our selection criteria and one because it was only theoretical. In the end, our search resulted in 12 primary studies with 34 coefficients and a total of 4372 participants (2918 women and 1454 men) (see the PRISMA flow chart in Fig. 1).

Unfortunately, some of the proposed variables were not assessed or reported in various studies. All studies did provide information about the origin of sample,

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prevalence of female participants, mean age, procedure for depression assessment, and type of sample. However, concerning childhood experiences of abuse and neglect, most of the studies assessed different scales of the CECA interview; thus, different meta-analyses were conducted including different studies (see Table 1).

Table 1. Summary of studies and their characteristics

<i>Author(s) and publication year</i>	<i>Country</i>	<i>Sample</i>	<i>Type of sample</i>	<i>N</i>	<i>Mean Age or Range (Years)</i>	<i>% Female</i>	<i>Depression Measure</i>	<i>Type of childhood adversities assessed</i>
Brown & Moran, 1994	England	Adult	High-risk or clinical	404	18-50	100%	PSE	Composite index of childhood maltreatment**
Tousignant et al., 1999	Mixed	Adolescent	High-risk or clinical	203	15.7	51.7%	DISC	Physical abuse
Bifulco, Bernazzani, Moran, & Ball, 2000	England	Adult	High-risk or clinical	198	33.5	100%	PSE & SCAN	Composite index of childhood maltreatment
Webster & Palmer, 2000	England	Adult	High-risk or clinical	160	34	100%	Clinical assessment	Antipathy, Neglect, Physical and Sexual abuse, Composite index of childhood maltreatment
Hill et al., 2001	England	Adult	Population-based	198	30.8	100%	SADS	Neglect and Sexual abuse
Bifulco et al., 2002	England	Adolescent	High-risk or clinical	277	20	49.5%	PSE & SCID	Antipathy, Neglect, Physical and Sexual Abuse, Composite index of childhood maltreatment
Bifulco et al., 2002	England	Adult	High-risk or clinical	204	35	100%	PSE & SCAN	Antipathy, Neglect, Physical, Sexual, and Psychological abuse
Harkness, Bruce, & Lumley, 2006	Canada	Adolescent	Population-based	103	15.5	65%	K-SADS	Composite index of childhood maltreatment
Brown et al., 2007	England	Adult	Population-based	198	34	100%	SCAN	Composite index of childhood maltreatment
Lenze, Xiong, & Sheline, 2008	USA	Adult	High-risk or clinical	55	48.5	100%	DIGS	Antipathy, Neglect, Physical, Sexual, and Psychological abuse, Composite index of childhood maltreatment
Bifulco, Moran, Jacobs, & Bunn, 2009	England	Adolescent	High-risk or clinical	146	20.7	53.4	SCID	Antipathy, Neglect, Physical abuse, Composite index of childhood maltreatment
Pickles et al., 2010	England	Adult	Population-based	2226	44.6	50%	SADS	Sexual abuse and Composite index of childhood maltreatment

Note: PSE - Present State Examination (Wing et al, 1974); DISC – Diagnostic Interview Schedule for Children Version 2.25 (Breton et al., 1995); SCAN – Schedule for Clinical Assessment in Neuropsychiatry (Wing et al., 1990); SADS – Schedule for Affective Disorders and Schizophrenia (Spitzer & Endicott, 1975); SCID - Structured Clinical Interview for DSM-IV (First, Gibbon, Spitzer, & Williams, 1996); K-SADS - Schedule for Affective Disorders and Schizophrenia child and adolescent version (Kaufman, Birmaher, Brent, Rao, & Ryan, 1996); DIGS - Diagnostic Interview for Genetic Studies (Nurnberger et al., 1994).

*Severe neglect, or physical or sexual abuse.

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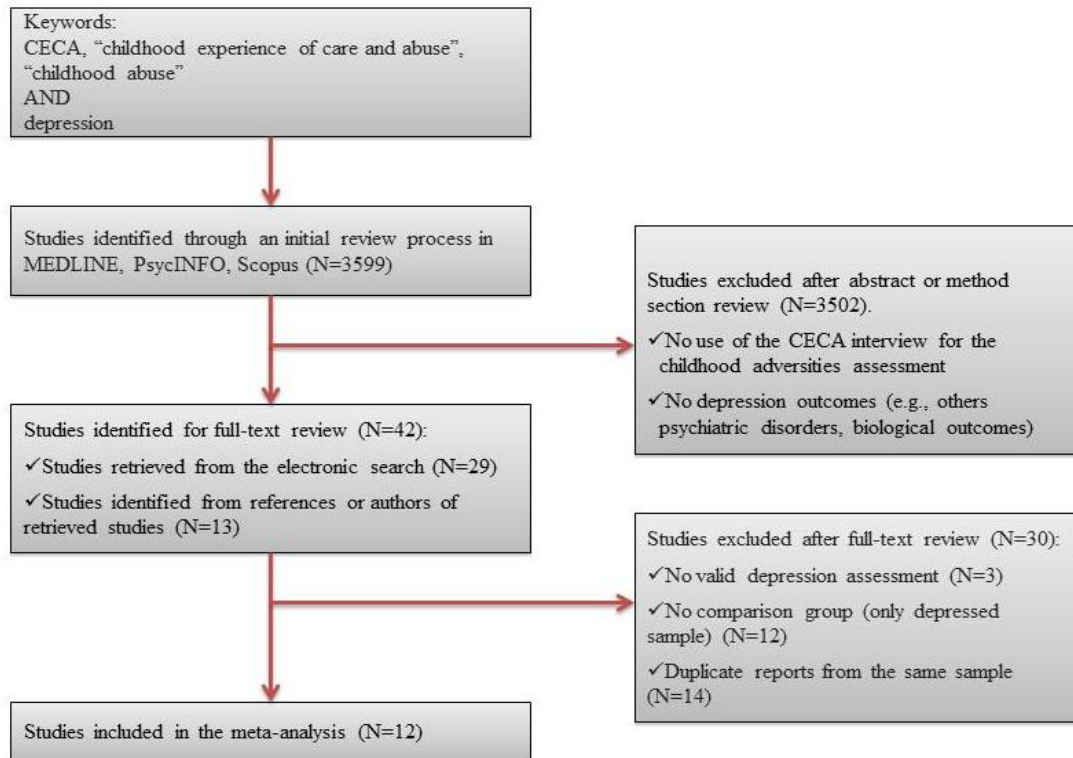


Figure 1. Study Selection Procedure

Coding of variables

All studies were coded by the first author. Moreover, a student assistant independently extracted data from the same eligible articles. Inconsistencies were resolved in consensus meetings and confirmed with the authors of the primary studies when necessary. The coding process was standardized by employing detailed coding rules. We coded (a) characteristics of publication (year of publication), (b) sample information (sample size; country of origin; percentage of females; mean age, adult or adolescent samples, and clinical or population-based samples), (c) effect sizes, and (d) the type of abuse. The interrater agreement ranged from 0.89 (for type and characteristics of the samples) to 1.00 (for most of the other variables).

Within the 12 studies included, nine of them used samples from the United Kingdom, one from Canada, one from the United States of America, and one a culturally mixed

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sample. Within the 12 studies included in this meta-analysis, eight studies were conducted with adult samples and four with adolescent samples. Additionally, eight studies used high-risk or clinical samples and four studies population-based samples.

Effect sizes were coded for different types of abuse and neglect assessed by the CECA or a composite index of childhood maltreatment. Specifically, nine studies reported information about the composite index, whereas eight studies reported specific information about the different CECA scales: five studies reported the effects size for antipathy, six for neglect, six for physical abuse, six for sexual abuse, and only two for psychological abuse. A detailed list of coded characteristics, percentage of missing data, and interrater agreement is shown in Tables 1 and 2.

Table 2. Coded Characteristics, Percentage of Missing Data and Interrater Agreement

<i>Variable</i>	<i>Coding Option</i>	<i>Missing data (%)</i>	<i>IA</i>
Year of publication	Metric	0.00	1.00
Country	1 = UK 2 = USA 3 = Canada 4 = mixed	0.00	1.00
Sample Size	Metric	0.00	.90
Percentage of females	Metric	0.00	1.00
Mean age	Metric	8.3	1.00
Sample	1 = Adult 2 = Adolescent	0.00	.89
Type of sample	1 = High-risk or clinical 2 = Population-based	0.00	.89
Depression measure	1 = PSE 2 = DISC 3 = SCAN 4 = SCID 5 = K-SADS 6 = DIGS 7 = Clinical	0.00	1.00
Childhood abuse	1 = Antipathy 2 = Neglect 3 = Physical abuse 4 = Sexual abuse 5 = Psychological abuse 6 = Composite index of childhood maltreatment	0.00	1.00
Effect-Size	Metric	0.00	1.00

Note: IA = Interrater agreement. Percentage of missing values was calculated in relation to the number of effect sizes included in the meta-analysis. Reported values of IA are coefficient kappa for categorical variables and intraclass correlations for coefficients of continuous variable.

Analytic strategy

The standardized mean difference (Cohen's d) effect size statistic was used in this meta-analysis, given it is particularly useful when comparing the effects of two nonexperimentally defined groups on an outcome that is not uniformly operationalized across studies (Cohen, 1988; Lipsey & Wilson, 2000). When a study reported a dichotomous outcome in terms of an odds ratio, the odds ratio was transformed using the appropriate calculations to make it directly comparable to the d statistic (Borenstein, Hedges, Higgins, & Rothstein, 2009). Mean effect size was estimated by the meta-analytic procedure, using the techniques outlined by Hunter and Schmidt (Hunter & Schmidt, 2004) and the associated software package (Schmidt & Lee, 2004).

Subgroups for different types of abuse and neglect and the composite index of maltreatment were created, therefore enabling us to examine the relationship between different types of maltreatment and depression. Separate analyses were conducted to determine the specific effects.

In addition to the number of studies included (k), the total sample size (n), and the mean effect sizes (Means d), the effect sizes' standard deviations (SDd) of the mean effect size and 80% credibility intervals (80%CV) were calculated to determine whether the mean effect size was significantly different from zero. We decided to report credibility intervals because they express the distribution of effect sizes in a random-effects model, indicating whether results can be generalized or should be further differentiated by investigating potential moderators (Hunter & Schmidt, 2004) (p. 205). We corrected for variance due to artifacts, specifically by sampling error, predictor, and criterion unreliability, and we reported the percentage of variance accounted for by artifacts (%Var). Finally, we reported the *fail-safe n* statistic that addressed the problem of publication and availability bias. It estimated the number of nonidentified studies

with null effects that would be necessary to reduce the effect size to a nonsignificant value, defined in this study as an effect size of .05 (Hunter & Schmidt, 2004) (p. 500).

Additionally, since Hunter and Schmidt have argued that if the percentage of variance is less than 75%, the search for moderators is recommended (2004; p. 401), we followed this guideline to determine whether moderator variables existed.

Results

A summary of estimated mean effect sizes and the related statistics is given in Table 3. For the relationship between the composite index of childhood maltreatment and depression ($k=9$; $n=3591$), the mean effect size across studies was $d= .431$ (80%CV=-.057-.919; %Var=6.62). This effect size indicates that there was a small-to-medium association between the composite index of childhood abuse and depression.

Table. 3 Meta-analytic results of the relations between childhood adversities and depression

<i>Variable</i>	<i>k</i>	<i>N</i>	<i>Mean d</i>	<i>SD d</i>	<i>80% CV</i>	<i>% Var</i>	<i>Nfs</i>
Composite index of childhood maltreatment *	9	3591	.431	.381	-.057 - .919	6.62	69
Antipathy	5	842	.515	.160	.311 - .720	49.07	47
Neglect	6	1040	.813	.104	.679 - .947	69.70	92
Physical abuse	6	1045	.810	.061	.732 - .887	87.08	91
Psychological abuse	2	259	.932	.000	.932 - .932	100.00	35
Sexual abuse	6	3120	.500	.141	.320 - .681	28.58	54

Note. k = number of samples; N = total sample size; Mean d = estimate of the true score effect sizes corrected for artifacts; SD d = Standard deviation of true score effect size; 80% CV = 80% credibility interval; % Var = percentage of variance due to artifacts; Nfs = fail-safe n (for the reduction of d to a trivial effect of .05).

*Severe neglect, or physical or sexual abuse.

When looking at individual experiences, the mean effect size for the association between antipathy and depression across studies ($k =5$; $n=842$) was $d=.513$

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(80%CV=.311-.920; %Var =49.07), indicating that there was a medium association between antipathy and depression. The mean effect sizes for a relationship between neglect ($k=6$; $n=1040$) and physical abuse ($k=6$; $n=1045$) and depression were large, respectively $d=.813$ (80%CV=.679 - .947; %Var = 69.70) and $d=.810$ (80%CV=.732 - .887; %Var =87.08). The mean effect sizes for the association of psychological abuse with depression were significantly stronger ($d=.932$; 80%CV=.932 - .932; %Var =100.00) than for the other kind of maltreatment and the composite index. For the relation between sexual abuse and depression ($k=6$, $n=3120$) the mean effect size across studies was $d=.500$ (80%CV=.320 - .681; %Var=28.58), indicating that there was a medium association between sexual abuse and depression.

Potential moderators

Table 4 presents the results of the analysis addressing whether the association between specific childhood adversities and depression outcome varied as a function of adult or adolescent samples. A total of 26 effect sizes were included in this analysis.

By utilizing the composite childhood abuse/neglect index, a stronger association with depression was found in adolescent samples ($d=.766$) than in adult samples ($d=.399$). In terms of individual experiences, antipathy was more strongly related to depression within adult samples ($d=.688$) than within adolescent samples ($d=.345$). No differences were found for the association between neglect and depression in adolescent or adult samples, in which d was large within both kinds of samples ($d=.868$ and $d=.732$ respectively). With the available data we could not conduct an analysis for sexual abuse (only one study analyzed sexual abuse in an adolescent sample) or psychological abuse.

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Table. 4 Meta-analytic results of specific adult or adolescent samples among studies of childhood adversities and depression

<i>Variable</i>	<i>k</i>	<i>N</i>	<i>Mean d</i>	<i>SD d</i>	<i>80% CV</i>	<i>% Var</i>	<i>Nfs</i>
<i>Composite index of childhood maltreatment*</i>							
Adolescent	3	526	.766	.076	.670 - .863	81.11	43
Adult	6	3241	.399	.388	-.097 - .896	4.79	42
<i>Antipathy</i>							
Adolescent	2	423	.345	.000	.345 - .345	100.00	12
Adult	3	419	.688	.104	.554 - .821	73.71	38
<i>Neglect</i>							
Adolescent	2	423	.732	.000	.732 - .732	100.00	27
Adult	4	617	.868	.156	.668 - 1.068	53.80	65
<i>Physical abuse</i>							
Adolescent	3	626	.871	-.311	.832 - .911	95.62	49
Adult	3	419	.717	.000	.717 - .717	100.00	40

Note. k = number of samples; N = total sample size; Mean d = estimate of the true score effect sizes corrected for artifacts; SD d = Standard deviation of true score effect size; 80% CV = 80% credibility interval; % Var = percentage of variance due to artifacts; Nfs = fail-safe n (for the reduction of d to a trivial effect of .05).

*Severe neglect, or physical or sexual abuse

Additionally, as shown in Table 5, we tested whether the type of sample (clinical vs nonclinical) might be a potential moderator of the relationship between childhood maltreatment and depression. The results showed that the mean effect size for the composite index of maltreatment in childhood was larger in clinical or high-risk samples ($d=.712$) than in population-based samples ($d=.322$).

Unfortunately, with the available data we could not test whether the type of sample (clinical vs nonclinical) moderates the relationships between the specific forms of maltreatment and depression. Similarly, gender could not be tested as potential moderator because data were lacking.

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Table. 5 Meta-Analytic results of clinical/high-risk or population-based samples among studies of childhood adversities and depression

Variable	k	N	Mean d	SD d	80% CV	% Var	Nfs
<i>Composite index of childhood maltreatment*</i>							
Clinical or high-risk samples	6	1240	.712	.249	.394 – 1.030	25.06	79
Population-based samples	3	2527	.322	.371	-.153 - .797	3.38	16

Note. k = number of samples; N = total sample size; Mean d = estimate of the true score effect sizes corrected for artifacts; SD d = Standard deviation of true score effect size; 80% CV = 80% credibility interval; % Var = percentage of variance due to artifacts; Nfs = fail-safe n (for the reduction of d to a trivial effect of .05).

*Severe neglect or physical or sexual abuse

Discussion

Experiences of abuse and neglect in childhood have been consistently associated with higher rates of depression. However, a full understanding of the relationship between childhood maltreatment and depression cannot be achieved until different types of abuse and neglect are differentiated or considered together. The present meta-analysis addressed the heterogeneity in the results of previous studies concerning a relationship between childhood maltreatment and depression and thereby allowed a differential investigation of different types of maltreatment experiences.

The association between a composite index of abuse/neglect was moderate and the result based on the composite index of childhood maltreatment is consistent with previous meta-analyses and studies reporting a significant association between abuse/neglect in childhood and negative outcomes in adulthood (Friedman et al., 2011; Matheson, Shepherd, Pinchbeck, Laurens, & Carr, 2013; Nanni et al., 2012; Wegman & Stetler, 2009). The composite index mean effect size of $d=.431$ reported here is nearly equal to the overall effect sizes reported in previous meta-analyses of child abuse and depression ($d=.45$) (Nanni et al., 2012) and also in a previous meta-analysis on

childhood abuse/neglect and physical health problems ($d=.42$) (Wegman & Stetler, 2009).

Our findings on specific types of childhood maltreatment revealed that some types were particularly strongly associated with depression outcome. In particular, and consistent with our hypothesis, psychological abuse presented a stronger association with depression than other forms of maltreatment. Psychological abuse as defined by Bifulco and colleagues (2002) is concerned with cruelty demonstrated by verbal and nonverbal acts from a close other in a position of power or responsibility for the child and it was associated with feelings of shame in childhood and depression in adulthood (Bifulco et al., 2002; Moran et al., 2002). This result confirms an emerging body of literature suggesting a significant relationship between emotional maltreatment and depression (e.g., Gibb et al., 2001; Kim & Cicchetti, 2006; Liu et al., 2009). Furthermore, findings from this meta-analysis extend the evidence of prior studies demonstrating the influence not only of psychological abuse but also of neglect on depressive disorders, here defined as the degree to which the caretaker does not provide for the child's basic emotional and material needs. We should highlight here that neglect and psychological abuse likely represent the two extreme polarities of maltreatment in a child. On the one hand, neglect is the most relevant form of maltreatment “by omission”, in which the child is deprived of basic responses to his or her needs of protection, care, and love from caregivers; on the other, psychological abuse is a perfect representative of maltreatment “by commission”, in which caretakers voluntarily degrade, humiliate, and terrorize their young in order to have power and control over them. In both instances this may result in a child's feeling of powerlessness and reduced self-esteem, which may easily foster depression in later life. According to attachment theory (Bowlby, 1983), attachment figures help develop representational models of the

relational world. Thus, those who have lived with neglect and/or psychological abuse may be at risk of developing a more negative self-model, becoming prone to internalizing symptoms (Shapero et al., 2014).

As regards physical and sexual abuse, findings from this meta-analysis may help to clarify the earlier debate about the specific influence of these forms of abuse on depression. In particular, the stronger association found between physical abuse and depression confirms the results of a recent meta-analysis, in which all studies of childhood physical abuse and depression found increased odd ratios of depression among those reporting physical abuse (Lindert et al., 2014). In contrast, the association between sexual abuse and depression was not as strong as that with others forms of maltreatment. This result, although not in contradiction to previous findings (Cutajar et al., 2010; Dube et al., 2005; Kendler et al., 2000; Molnar et al., 2001), highlights the importance of not focusing on one form of abuse alone, e.g. sexual abuse, but rather on a broad variety of adverse childhood experiences, which might better explain the potential early pathways that lead to depression later in life.

The effects of specific childhood maltreatments were not equally large across adult and adolescent samples. The types of samples (adult or adolescent) moderated the effect sizes between the composite index of maltreatment and depression (larger in adolescent samples) and between antipathy and depression (larger in adult samples). The effect of neglect and physical abuse was similarly large in both kinds of samples.

These findings of the composite index suggest that adolescence may be a sensitive developmental period during which several experiences of maltreatment need to be assessed, given the profound influences on the risk for depression (Lumley & Harkness, 2007). It also points to the greater recency of the experience of maltreatment for adolescents, in whom subsequent protective factors have not yet emerged as in adult

samples. One possible explanation for the stronger association between antipathy and depression observed in adult samples than in adolescents might be related to the nature of this maltreatment. Indeed, according to Bifulco and colleagues' definition (1994), antipathy reflects criticism, dislike, coldness, rejection, or hostility shown by a parent in the household towards the child; thus, it regards the daily parent-child interaction and not single or specific episodes of abuse. One could argue that during adolescence, in which the parent-child relationship is still ongoing, individuals struggle to adequately reflect on the idea of parental antipathy and have difficulties realizing the pernicious nature of this kind of experience. Another hypothesis could be that antipathy may be more prone to recall-bias than other types of maltreatment and therefore shows larger effects among adults. However, these data resulted from a small number of studies and the findings of the moderator analyses concerning sample characteristic need to be interpreted with caution.

Our meta-analysis revealed that the association between the composite index of maltreatment and depression was lower than all associations of specific experiences of maltreatment and depression. This might be caused by the greater heterogeneity (adolescent or adult, clinical or nonclinical) of the nine studies included in the analysis of the composite index. As discussed above, moderation analyses showed that associations with depression were higher in adolescent samples than in adults. Additionally, using a type of sample (clinical *vs* nonclinical) variable as moderator resulted in a higher association for clinical than for nonclinical samples. In addition, studies with weak effect sizes tended to only report the composite index, which may lead to a selective underestimation of this effect.

Limitations and Strengths

The results of this meta-analysis should be interpreted in the context of several potential limitations. First, assessing the type of abuse and neglect presents numerous problems. Several authors have suggested that multiple forms of abuse are likely to occur together (Finkelhor, Ormrod, & Turner, 2007; Wolfe & McGee, 1994). Since it was not known whether the studies included individuals who exclusively experienced one form of abuse or individuals who experienced multiple forms of abuse, conclusions about the unique contributions of each type of abuse from these results would be hasty.

Furthermore, some studies included in our meta-analysis did not report detailed data on important aspects of abuse, such as frequency, duration, or severity. However, the CECA's ranking rules take into account several characteristics of abuse (e.g., severity, frequency, duration, and people involved) to determine the rates, and the CECA is only used after prior training for reliability. Thus, we can suppose that the experiences of maltreatment reported in the studies included in the present meta-analysis should be comparable in regard to the severity of childhood adversity experienced by the participants. Indeed, although it limited the studies eligible for the present meta-analysis, our strict criteria for selecting the primary studies should guarantee a reliable comparison of childhood abuse and neglect among different studies, thus increasing the validity of our results.

Finally, the problem of small numbers of available studies restricted the analyses for various potential moderators. It is likely that the search for other potential moderators, such as clinical versus population-based samples or gender differences, might produce more detailed findings. Unfortunately, with the available data we could not examine the effect of other potential confounders. These results should therefore be interpreted as preliminary insights into what could be promising directions for future research.

Research and clinical implications

Overall, the results of this meta-analysis point to the importance of considering several types of maltreatment experiences as risk factors for an outcome of depression with a particular focus on the more “silent” forms of maltreatment such as psychological abuse and neglect. This meta-analysis adds information to the relationship between child maltreatment and depression, but it also highlights potential gaps in the literature that need to be addressed. Future research should focus on experiences of emotional or psychological abuse and neglect since the number of studies were still small for detailed analyses. Further research should also include a more representative sample of the population, including larger numbers of males and older adults. Additionally, more information on other potential moderators, such as age at time of maltreatment, duration of maltreatment, and severity of abuse/neglect, should be included. This would help better characterize the circumstances under which and the individuals for whom a greater vulnerability for developing depression as an effect of childhood maltreatment exists.

Finally, a number of clinical implications of these findings should be highlighted. Information about the specific history of childhood maltreatment may help to identify individuals who are at high risk of developing depression. Clinicians may consider that a routine inquiry concerning childhood maltreatment could add important prognostic information to their assessment, and this enquiry needs to go beyond the assessment of physical and sexual abuse. These results suggest that a history of psychological maltreatment may be an important marker in targeting depression prevention efforts in populations.

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**Doctoral Committee of the Faculty of Behavioural and Cultural Studies, of
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