

Characteristics of Childhood Experiences in Women with Remitted Major Depression

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Research into the relationships between psychiatric disorders and childhood adversities (e.g. neglect, physical abuse, sexual abuse) has been limited by the use of self-report assessments, which may provide incomplete or biased information. The Childhood Experience of Care and Abuse (CECA; Bifulco, Brown, & Harris, 1994) is a rigorous semi-structured interview, but is limited in utility because of its length. The goal of this project was to more efficiently classify detailed reports of childhood events gathered from the CECA. An exploratory factor analysis was performed using a sample of women (N=142) with remitted, recurrent major depression. One definable factor was found, Noxious Environment, which accounted for a large proportion of the variance in the CECA. This suggests that the development of a briefer CECA rating method is warranted. Additional exploratory analyses indicated that childhood experiences might be significantly influenced by the composition of the household and any caregiver transitions that occur. These findings suggest the CECA can be condensed, making it less time-consuming and burdensome to score and thus more widely usable in research settings. Additionally, these findings reinforce the advantages of using the CECA over self-report measures of adverse experiences by allowing for changes in ratings over time and accounting for changes in household composition.

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Introduction

The etiology of most psychiatric disorders, including depression, is largely unknown, but risk factors can be broadly separated into personal factors or diathesis (for example, genetic risk) and external factors, or stressors. It has been hypothesized that cumulative or interactive effects of multiple risks are needed to develop a psychiatric disorder (Paris, 1998). For example, vulnerability to adult psychopathology could be genetic but also influenced by prior life experience (Young, Abelson, Curtis, & Nesse, 1997). Stresses that occur early in life may be particularly likely to increase risk for psychopathology later in life.

Early childhood adversities are one important type of stressor that may influence the development of psychopathology. Early adverse experiences are fairly common (Brown, 1996), and it has been reported that 25% of people exposed to adversities such as parental dysfunction, parental violence, parental neglect, or separation from parents in childhood will develop a psychiatric disorder (Blatt, Wein, Sarte, Chevron, & Quinlan, 1979; Draijer & Langeland, 1999; Mullen, Martin, Anderson, Romans, & Herbison, 1996; Paris, 1998; Parker 1983; Werner & Smith, 1992). Studies have found associations between early adversities and a range of psychiatric diagnoses. Bulimia nervosa has been associated with parental antipathy, neglect, hostility, and sexual abuse (Steiger, Jabalpurwala, & Champagne, 1996). It has also been associated with increased parental indifference, discord, discipline, physical abuse, and overall adversity as compared to controls and subjects with mixed eating disorders or anorexia nervosa (Webster & Palmer, 2000). Alcoholics have a higher rate of childhood adversity than seen in the community and an increased suicide risk associated with childhood adversity (Windle, Windle, Scheidt, & Miller, 1995). Subjects with reported or documented abuse and neglect in childhood are four times more likely to develop personality disorders than those without childhood maltreatment (Johnson, Cohen, Brown, Smailes, & Bernstein, 1999). Several studies have found

that there are higher rates of childhood adversity, especially sexual abuse, in borderline personality disorder (Silk, Lee, Hill, & Lohr, 1995; Zanarini, Williams, Lewis, et al., 1997); however, other studies have not found any differences in the rates of childhood adversity between borderline personality disorder and other personality disorders (Modestin, Oberson, & Enri, 1998). Maternal dysfunction, sexual abuse, and physical abuse are related to adult dissociative symptoms (Draijer & Langeland, 1999; Mulder, Beautrais, Joyce, & Fergusson, 1998). Dysthymic disorder, especially if early-onset, is also associated with adverse home environments (Alnaes & Torgerson, 1989; Draijer & Langeland, 1999; Lizardi, Klein, Ouimette, et al., 1995).

Early theories about childhood trauma

Childhood adversity has been posited as a risk factor for psychopathology since Freud theorized that events in the first few years of life were critical in shaping the rest of the life, and that it is then that vulnerability to adult neurosis was acquired (Maughan & McCarthy, 1997). Another influential theorist, Aaron Beck, also believed childhood experiences to be important in the development of psychopathology (Beck, 1967). In his cognitive theory of depression, cognitive schemata develop as a consequence of parental behavior. A depressed patient is assumed to have had parents who were critical and non-approving, leading the person to form negative cognitive schemata, which dominate evaluations about themselves, their environment, and their future. These negative cognitive schemata are reactivated by a stressor and cause a depressive episode. Therefore, adverse childhood experience may lead to depression by the development of cognitive beliefs that increase vulnerability to stress (Maughan & McCarthy, 1997; Brown & Moran, 1994; Beck, Rush, Shaw, & Emery, 1979).

John Bowlby developed one of the most influential theories on outcomes of childhood adversity. He thought that maternal deprivation in childhood causes irreversible psychological damage (Maughan & McCarthy, 1997). Bowlby (1977) described several aspects of parental behavior that are likely to lead to an “anxious attachment”: unresponsiveness to the child’s care-eliciting behaviors, discontinuities of parenting, persistent threats not to love a child, threats to desert or kill the other parent or to commit suicide, inducing guilt, and exerting pressure on the child to be an attachment figure for her or him (role reversal). Bowlby thought that a child exposed to this behavior was likely to not feel anger towards the parent, but rather to inhibit the expression of anger.

Current theories about childhood trauma

Among the current theoretical pathways from early adversities to adult mental disorders is the diathesis-stress or vulnerability model. This model posits that there a predisposition to a particular disorder exacerbated or triggered by the stress of childhood abuse, or that childhood adversity produces a greater vulnerability to the effects of a pre-existing biochemical or neural mechanism associated with the development of psychopathology (Briere, Woo, McCrae, et al., 1997). Early adversities may increase the person’s exposure or vulnerability to more proximal risks for a particular mental illness (Maughan & McCarthy, 1997). Perris, Perris, and Eisemann (1987) stress the importance of multiple cultural, biological, psychological, and social factors in the etiology of psychopathology. They state that the interaction among several factors determines vulnerability and that this vulnerability reflects a cumulative feedback relationship that changes over time and interacts with experience (Perris, Perris, & Eisemann, 1987). Brown and Harris (1978) and Bifulco and colleagues (1998) suggest a similar model to explain the association between early adverse experiences and adult depression. Their vulnerability model

suggests that there are vulnerability factors encountered either in childhood or adulthood that may increase the risk for developing symptoms of psychiatric disorders in the presence of a triggering agent. Adverse childhood experiences are one of the potential vulnerability factors. They stress that it is the accumulation of risk across the lifespan that is detrimental to mental health and that childhood adversity increases vulnerability to adversities in adulthood (Bifulco & Moran, 1998). For example, childhood abuse leads to low self-esteem and poor coping skills, leaving the person vulnerable to more damaging experiences in adulthood, which may result in a clinical depression (Bifulco & Moran).

Chronic and pervasive stressors in childhood are likely to be associated with greater risk for adverse outcomes in both the short-term and long-term (Sandberg, Rutter, Giles, et al., 1993). For example, difficulties in emotion regulation, low quality of peer relationships, and poor academic performance have been found to be short-term effects of childhood adversity (Cicchetti & Toth, 1995). Adversities encountered at earlier stages of development continue to have relevance throughout the life span (Cicchetti & Schneider-Rosen, 1986). Therefore, maltreatment at an early stage of development can impact each subsequent stage. Maladaptive coping behaviors in response to stress in childhood may also create a vulnerability that can later be triggered by a negative event or difficulty in adulthood, leading to the onset of psychiatric disorders (Rutter, 1983). Childhood adversities have been associated with feelings of helplessness, low self-esteem, and interpersonal dependency in adulthood, which may mediate the relationship between childhood adversities and adult psychiatric disorders (Kessler & McGee, 1993).

Early adversities and adult depression

The relationship between Major Depressive Disorder (MDD) and childhood adversities has been widely studied. MDD has been associated with abuse, poor parenting, marital discord, and family violence. Prevalence rates of childhood abuse or adversity range from 8% to 83% in clinical samples of depressed patients and 23% to 68% in community studies (Brown & Anderson, 1991; Carlin, Kemper, Ward, et al., 1994; Kessler, Davis, & Kendler, 1997; Mullen, Martin, Anderson, Romans, & Herbison, 1996). Rates vary depending on the sample characteristics and on the definitions and scales used to measure the adversity. A majority of research has focused on the adult outcomes of childhood sexual abuse, with relatively little attention focused on the effects of other childhood adversities including physical abuse, emotional abuse, or parental indifference or neglect.

Family, adoption, and twin studies indicate that MDD runs in families and that there are significant genetic contributions to its occurrence (see review by Sullivan, Neale, & Kendler, 2000). In a large meta-analysis of twin studies in MDD, Sullivan and colleagues found additive genetic effects and non-shared environmental effects accounted for the majority of risk for MDD. Shared environmental effects, such as parenting styles or SES, accounted for little of this risk (0 to 5%). While this may seem discouraging for early adversity research, Sullivan and colleagues warn against concluding from these studies that parenting is unimportant. Other twin studies have found support for a causal relationship between sexual abuse and psychopathology (Bulik, Prescott, & Kendler, 2001; Dinwiddie, Heath, Dunne, et al., 2000; Kendler, Bulik, Silberg, et al., 2000; McLaughlin, Heath, Bucholz, et al., 2000). Studies using two different twin populations found that in twins discordant for childhood sexual abuse, the affected twin was consistently at a greater risk for developing psychopathology. The exposed twin was at elevated risk for psychopathology compared to the unexposed twin, despite equal genetic relationships to

parents and highly correlated exposure to family conflict or dysfunction (Kendler, Bulik, Silberg, et al., 2000; McLaughlin, Heath, Bucholz, et al., 2000). These studies indicate there is a relationship between common experiences in childhood and risk for MDD. The nature of this relationship deserves further attention. It is possible that shared environment is less influential for causing MDD but rather for influencing age of onset, duration, or treatment response.

Several studies have found a link between childhood adversity and increased chronicity of depressive episodes (Brown, Harris, Hepworth, & Robinson, 1994; Brown & Moran, 1994; Lara, Klein, & Kasch, 2000; Zlotnick, Ryan, Miller, & Keitner, 1995). Other studies have found an association between childhood adversity and earlier age of onset of depression (Bernet & Stein, 1999; Bifulco, Brown, Moran, Ball, & Campbell, 1998; Kessler, Davis, & Kendler, 1997; Young, Abelson, Curtis, & Nesse, 1997). The link between early adversity and adult mood disorders may be most apparent in early-onset chronic forms of depression (Andrews, Brown, & Creasey, 1990; Hammen, 1992; Kessler & Magee, 1993; Lizardi & Klein, 2000). Recent studies have also suggested an association between early adverse experiences and increased comorbidity of MDD with other axis I and axis II disorders (Bernet & Stein, 1999; Zlotnick, 1997; Zlotnick, Mattia, & Zimmerman, 2001). Increased risk of suicide has also been found in adults who reported adverse childhood experiences (Brown, Cohen, Johnson, & Smailes, 1999; Dube, Anda, Felitti, Chapman, Williamson, & Giles, 2001). Hammen, Risha, and Daley (2000) found that young women with more adverse childhood experiences were more likely to become depressed under low stress conditions than those without adverse experiences, suggesting a possible sensitization effect. The experience of childhood adversities has also been associated with poorer treatment response to antidepressant medication or psychotherapy (Bagley & Young,

1998; Holmes, 1995; Kaplan & Klinetob, 2000; Sakado, Sato, Uehara, Sakado, & Someya, 1999).

Common measures of childhood adversity

There are several different methods employed to study the relationship between childhood adversities and adult MDD. A majority of retrospective studies of childhood adversity use self-report questionnaires (Bifulco, Brown, & Harris, 1994), such as the Childhood Trauma Questionnaire (CTQ), the Egna Minnen Beträfande Uppfostran (EMBU), and the Parental Bonding Instrument (PBI). The CTQ (Bernstein, 1995) is a 53-item self-report measure of traumatic experiences. It provides a brief assessment along five dimensions: sexual abuse, physical abuse, emotional abuse, physical neglect, and emotional neglect. Each item is rated on a one to five likert scale with one being “never true” and five being “very often true”.

The EMBU (Perris, Jacobsson, Lindstrom, vonKnorring, & Perris, 1980) is designed to assess memories about each parent on a four-point scale. The 81 items are classified among 14 dimensions: abusive, depriving, punitive, shaming, rejecting, overprotective, over-involved, tolerant, affectionate, performance oriented, guilt engendering, stimulating, favoring siblings, favoring subject, and two general questions regarding severity of parental strictness. One disadvantage of the EMBU is that it does not specify a time frame or age that the subject is supposed to remember while rating the items.

One of the most widely used retrospective self-report questionnaires is the PBI (Parker, Tupling, & Brown, 1979). It measures subjective reports of parental care and control. It is a 25-item questionnaire about the subject’s relationship with each parent during childhood ages of 0-16. Studies have shown that the PBI is useful in identifying adverse parent-child relationships; however, it is limited in the amount of data that can be gathered. For example, it does not

address physical or sexual abuse during childhood. As a response to this criticism, Parker and colleagues (1997) developed the Measure of Parenting Style (MOPS). The MOPS is a 15-item questionnaire that assesses parental interactions, parental abuse, separation, and refined PBI dimensions of care and protection (Parker, Roussos, Hadzi-Pavlovic, et al., 1997). Factor loadings of the MOPS suggest 3 dimensions: parental indifference, over-control, and abuse (Parker et al.). These factors are comparable for both mothers and fathers (Parker et al.). Despite their wide use and consistent findings, the PBI and the MOPS cannot examine abusive experiences in detail and are intended as screening tools or in conjunction with other detailed assessments (Parker et al., 1997; Parker, Tupling, & Brown, 1979).

Despite the ease of administration of self-report questionnaires, there are disadvantages to their use. Self-report measures utilize subjective ratings that may be biased by the respondent's emotions. They also cannot provide detailed information about childhood experiences. Structured or semi-structured interviews may provide more detailed and accurate reports by enhancing recall of an event (Finkelhor, 1986; Russell, 1984). Interviews take advantage of investigator-made ratings to decrease subjective bias. One of the few such interviews that assess childhood experiences is the Childhood Experience of Care and Abuse (CECA; Bifulco, Brown, & Harris, 1994). The CECA is a semi-structured interview that gathers qualitative data based on a subject's narrative account of their childhood (ages 0-18). The CECA operationalizes childhood adversity as parental or caregiver lack of warmth or positive regard, emotional or material neglect, physical, sexual, and/or psychological abuse, and tension and discord in the home environment (Bifulco, Brown, & Harris, 1994). The subject's own feelings or opinions as to the severity of the event are not taken into account in the ratings, and behavioral indicators are probed for during the interview in order to obtain clear examples on which a rating can be based.

Ratings are made on a 1 to 4 scale (4-little/none, 3-some, 2-moderate, 1-marked). The CECA is advantageous over self-report ratings in several ways (Bifulco, Brown, & Harris, 1994). First, it gathers detailed information on a wide range of childhood experiences including quality of care, relationships, and physical and sexual abuse. Second, the interview format may enhance retrospective recall. Third, the CECA assesses all household members, not just mother and father, in the ratings. Fourth, it takes into account the sequence and duration of experiences to allow for more precise hypothesis testing. Finally, the CECA does not require subjects to average their experiences over their entire childhood but rather allows for change points in the ratings. The CECA gathers detailed information including the time course and severity of the abuse, as well as accounting for various household members and caregivers. The CECA is time consuming to score; however, it provides a wealth of information for examining the relationship between childhood experiences and adult psychiatric disorders.

Limitations of early adversity research

Most studies of the relationship between childhood adversity and adult outcomes are retrospective in nature. There are several limitations to retrospective studies including exaggeration or minimization in recall, recall bias for negative events, forgetting or repressing memories, and engaging in “effort after meaning” (Brown, 1974), which involves searching the past for explanations for current distress. Bifulco and colleagues (1997) examined a series of siblings to attempt to corroborate the abuse reports in their sample of high-risk women. They measured both concordance and corroboration in independent assessments for childhood experiences among pairs of sisters. Their findings suggest that overall concordance rates are good (.64) for childhood experiences, and their sample showed corroboration among sisters to be at least .70 for those sisters with shared experiences (Bifulco et al., 1997). Widom and Shepard

(1996) used a prospective design to measure the accuracy of recollections of childhood abuse in adults. They examined subjects from a study that collected data on severe physical abuse, neglect, and sexual abuse cases supported by court records. They then interviewed the same subjects 20 years later. They found accuracy and good discriminant validity (subjects who were physically abused recalled themselves as such versus calling themselves sexually abused or neglected) in the retrospective accounts; however, there was a substantial amount of underreporting by the subjects who had experienced childhood physical abuse. The authors suggested several reasons for the high rate of underreporting; including construct validity of the scales, forgetting by the subjects, or the subject's not defining the experience as abuse (Widom & Shepard, 1996). Carlin and colleagues (1994) found evidence supporting the hypothesis that subjects are not defining their experiences as abuse even though objective measures classify them as such. They found that 28.2% of their sample met criteria for physical abuse on an objective measure, but only 11.4% subjectively defined themselves as abused. From this finding, the authors concluded current research using self-report measures of abuse might only be identifying a specific subtype of all people who have experienced childhood adversity (Carlin et al., 1994). Overall, these findings show that underreporting is a significant problem and caution is warranted when interpreting retrospective data.

Another limitation is that many studies interview subjects during a current depressive episode, which may negatively bias recall of experiences. Parker (1981) did not find any differences in the recall bias of parental behavior when comparing the PBI between patients and nonclinical persons and concluded that negative mood does not affect recall of parental behavior. However, this study used a sample of his personal clinical patients that may have been motivated to "please" their psychiatrist. A community study compared controls with no depression history,

people with remitted depression, people in a current depressive episode, and people who were not depressed at interview 1 but were depressed at interview 2, in measures of parental behavior in childhood (Lewinsohn & Rosenbaum, 1987). They found significant mood-dependent effects with respect to recall of parental behavior: subjects in a depressive episode recalled significantly more negative childhood experiences than controls, while remitted depressives did not differ significantly from controls. Some have argued that remitted subjects or controls display a positive bias on recall, and that the depressives are more realistic (Alloy & Abramson, 1979; Lewinsohn, Mischel, Chaplin, & Barton, 1980; Rapee, 1997; Robins et al., 1985). Nevertheless, caution must be made when interpreting child abuse reports in depressed samples (Lewinsohn & Rosenbaum, 1987).

Types of childhood abuse associated with adult depression

Estimates of the incidence of childhood sexual abuse in girls vary from 6% to 62% (Weiss, Longhurst, & Mazure, 1999), depending on the definition used and the method of data collection. Definitions of sexual abuse range from the narrow: “sexual contact between a girl under the age of 15 by an individual at least 15 years older” (Briere & Runtz, 1988) to the broad: “some kind of sexual experience with another person while growing up” (Sedney & Brooks, 1984). Of 21 studies reviewed by Weiss and colleagues (1999), 20 found higher occurrence of adult depression in women who reported sexual abuse in childhood compared to those who did not report any sexual abuse. Research in both children and adults suggests that greater frequency, severity, and duration of sexual abuse increase the risk for depression (Bifulco, Brown, & Adler, 1991; Briere & Runtz, 1988; Mennen, 1993; Mullen, Martin, Anderson, Romans, & Herbison, 1993; Murphy, Kilpatrick, Amick-McMullen, et al., 1988; Sedney & Brooks, 1984).

It has been suggested that poor parenting (Bagley & McDonald, 1984), family dysfunction, family violence, physical punishment, or lack of parental warmth (Bagley & Ramsey, 1985; Bifulco, Brown, & Adler, 1991; Gold, 1986; Yama, Tovey, & Fogas, 1993) may mediate the relationship between sexual abuse and the development of depression. However, in studies controlling for these factors, the relationship between sexual abuse and depression remained (Bagley & Ramsey, 1985; Bifulco et al., 1991; Fergusson, Horwood, & Lynskey, 1996; Mullen, et al., 1993). There are few prospective studies of childhood adversities designed to study the relationship between childhood sexual abuse and adult depression. One such study found that women with histories of sexual abuse had more symptoms of depression than women removed from their home as children for other types of abuse or women who were never abused or removed from the home as children (Bagley & McDonald, 1984).

As in studies of sexual abuse, definitions of physical abuse vary widely across studies; however, it is commonly defined as any violence shown towards the subject by a household member, including being hit, slapped, or beaten as well as threats with a gun or other weapon. The prevalence of childhood physical abuse varies widely in both clinical and community samples of depressed subjects. One study found that there was an 8% rate of physical abuse history in MDD (Brown & Anderson, 1991) while another found an 83% rate (Carlin, Kemper, Ward, et al., 1994). Similar to studies of sexual abuse, these clinical studies used different measures of abuse, making it difficult to compare rates across studies. Prevalence rates for childhood physical abuse in subjects with MDD in Great Britain and New Zealand community samples ranged from 39% to 68% (Bifulco, Brown, & Adler, 1991; Mullen, Martin, Anderson, Romans, & Herbison, 1996). Results from the US National Comorbidity Study found 23% of the total sample experienced at least one childhood adversity (Kessler, Davis, & Kendler, 1997).

Holmes and Robins (1988) found that subjects with major depression reported having more harsh or unfair discipline, physical abuse, physical injury, inconsistent discipline, and being punished more severely than siblings. One study found that respondents with a history of physical assault were twice as likely to have a history of MDD and four times as likely to be in a current MDD episode (Duncan, Saunders, Kilpatrick, Hanson, & Resnick, 1996). However, another study found that subjects who reported having family violence were twice more likely to have MDD, but only when high chronic adult interpersonal stress was present (Kessler & Magee, 1994). In summary, there is a high prevalence of physical abuse histories in subjects with MDD, but relatively few studies have addressed the implications of this.

Other types of abuse can include adverse parental behaviors such as rejecting, isolating, terrorizing, ignoring, corrupting behaviors, or behaviors that are inappropriate to the developmental needs of the child. Such behaviors have been termed psychological abuse, emotional abuse, low parental care, or neglect. Identification and assessment of emotional or psychological abuse is difficult because of the lack of consensus as to what constitutes abuse and what label is used to identify the behaviors (Thompson & Kaplan, 1996). Often these concepts are overlapping; for example, both neglect and emotional abuse can be defined as lack of warmth or regard from parent. There are few studies examining the relationship of these concepts with adult depression relative to the number of studies examining the relationship between sexual abuse and depression. One study using the PBI separated subjects with major depression into melancholic and non-melancholic subtypes. They found that non-melancholics reported lower parental care compared with melancholics and controls (Parker & Hadzi-Pavlovic, 1992). Six studies using the PBI in clinical samples found that major depression was associated with lower parental care (Lizardi, Klein, Ouimette, et al., 1995; Mulder, Joyce, & Cloninger, 1994; Parker,

1979; Parker & Hadzi-Pavlovic, 1992; Plantes, Prusoff, Brennan, & Parker, 1988; Rodriguez-Vega, Bayonn, Franco, et al., 1993). Other studies using the PBI in community samples found that low parental care was associated with adult major depression, similar to the findings in clinical studies using the PBI (Mullen, Martin, Anderson, Romans, & Herbison, 1996; Oakley-Browne, Joyce, Wells, Bushnell, & Hornblow, 1995; Parker, Hadzi-Pavlovic, Greenwald, & Weissman, 1995). Stuart, Laraia, Ballenger, and Lydiard (1990) found similar results using a childhood experience questionnaire in a study with a small sample size (n=15 MDD vs. 100 controls). Bifulco and colleagues (1994; 1998) also found similar results using the CECA in a large community sample of working class women. They found that community subjects with depression reported their parents to be more rejecting and experienced a lack of parental care.

In most cases, people do not report one form of abuse alone. Often multiple forms are present, making analysis of causal links between a specific type of abuse and outcomes difficult. Bernet and Stein (1999) found that subjects with depression had greater rates of emotional abuse, emotional neglect, and physical abuse compared to controls. Bifulco, Brown, Lillie, and Jarvis (1987) studied a sample of high risk, working class mothers in Great Britain using the CECA. They found that both loss of mother in childhood and lack of care after the loss were both related to adult depression, but that lack of parental care was a more potent predictor of depression. In subsequent high-risk community samples of working class mothers, Bifulco and colleagues (1994; 1998) found that parental antipathy (lack of positive regard), parental indifference or neglect, family discord, and physical abuse were all significantly associated with major depression. In a large clinical sample (n=650), Young, Abelson, Curtis, and Nesse (1997) found that emotional abuse was present in 90% of the cases also reporting physical or sexual abuse and that 72% of the patients reporting marital conflict in their parents during childhood also

experienced some other form of childhood adversity (Young, Abelson, Curtis, & Nesse, 1997). In the Newcastle Thousand Family Study, a prospective study designed to investigate illness in the first years of life (Sadowski, Ugarte, Kolvin, Kaplan, & Barnes, 1999), a select subsample was utilized to study the effects of early adversity on adult psychopathology. When the participants were approximately 33 years of age, 266 were relocated and interviewed about psychosocial and mental health information. A significantly greater prevalence of major depression was found in those who experienced both poor physical care and poor mothering compared to those who had not (Sadowski et al., 1999). The study also found that interactions between family instability, poor physical care and poor mothering were significant predictors of depression (Sadowski et al, 1999). The authors concluded that early life disadvantages predispose to depression in adulthood, but these disadvantages can be mediated by protective factors (Sadowski et al., 1999). Unfortunately the study did not include any measures of emotional abuse or physical abuse; many interpretations of the data are limited because of unknown interactions (Sadowski et al., 1999). In a longitudinal study of abuse in children ages 7 through 18, Ney, Fung, and Wickett, (1994) found that less than 5% of their sample reported experiencing one type of abuse alone. Based on self-reported Childhood Experiences Questionnaire (CEQ) scores, the combination of physical neglect, emotional neglect, and verbal abuse was correlated with the worst outcomes in adulthood (Ney, Fung, & Wickett, 1994). Despite these findings, little research addresses the implications of various combinations of abuse and neglect (Ney, Fung, & Wickett). More research is needed to address the relationships between experiencing multiple forms of adversity and MDD.

Correlations between early adversity domains

As previously noted, definitions of adversity constructs may be overlapping. A few studies have reported significant correlations among adversity measures. In a study using the CEQ in children, verbal abuse and emotional neglect were significantly related to physical abuse (.28-.56), and sexual abuse was correlated with physical neglect (.47) (Ney, Fung, & Wickett, 1994). Studies using adult samples have found similar interrelationships among scales. Arrindell and colleagues (1986) studied childhood adversities in depressed and healthy adults using the EMBU. The Rejection domain was moderately negatively related to the Emotional warmth scale (-.50) and positively correlated with the Overprotection scale (.48) (Arrindell, Perris, Perris, et al., 1986). The EMBU subscales were factor analyzed and compared between Swedish and Dutch samples. The 14 subscales yielded three factors; Rejection, Emotional warmth, and Overprotection, with Tucker's ϕ coefficients greater than 0.99 between cross-cultural correlational structures (Arrindell, Perris, Perris, et al., 1986).

Similar findings have resulted from studies using the PBI. The PBI domains of Parental care and Protection are moderately negatively correlated (-.44) (Parker, Roussos, Hadzi-Pavlovic, et al., 1997; Parker, Tupling, & Brown, 1979). Parker and colleague's (1997) refined measure of parenting styles, the MOPS, also resulted in moderate to high relationships between adversity domains. The MOPS domain Indifference positively correlated with Over-control (.50-.58) and with the general abuse domain (.72) (Parker, Roussos, Hadzi-Pavlovic, et al., 1997); Over-control was also highly correlated with the general abuse domain (.62) (Parker, Roussos, Hadzi-Pavlovic, et al., 1997).

A modest degree of inter-relatedness between scales was also found in the semi-structured interview CECA in two large community samples. Physical abuse and Discord scales

were correlated with several of the other scales including; Indifference (.30/.34), Antipathy (.36/.21), Control (.31), and Sexual abuse (.17/.18) (Bifulco, Brown, & Harris, 1994). Antipathy was also significantly related to Indifference (.59) and Control (.19) (Bifulco, Brown, & Harris, 1994). These findings suggest that there may be moderate to high amounts of overlap between adversity constructs or that people reporting one type of adversity are more likely to report other adversities as well. Further research is needed to help clarify and define these constructs to more efficiently investigate their implications for psychopathology.

Summary

Research into the nature of the relationship between childhood adversity and adult depression is important. Experience of adversity seems to not only increase the risk for depression in adulthood, but also predict a more chronic course and poorer response to treatment. Thus, the limitation of the field of childhood adversity by the lack of clear definitions of abuse is a problem that deserves further attention. Many studies of childhood experiences use different constructs to describe similar adverse experiences that may not actually be independent events. For example, some studies measure “neglect” whereas other studies measure “emotional abuse”; however, both neglect and emotional abuse can be defined in the same or similar ways. In addition, adversity constructs that are defined and measured separately in an instrument are often moderately to highly correlated with one another. Because of this, existing studies of childhood adversities are difficult to interpret. When types of adversities are defined differently, the concepts cannot be compared across studies, which limits conclusions about what types of early adversity or features of adversities relate to outcomes. Clear, parsimonious definitions of adversities are needed to more conclusively determine psychopathological outcomes of early

adversities. In addition, very few studies include measures of abuse frequency, severity, or duration, which may also influence the relationship between adversity and MDD.

The CECA is one of the more rigorous measures of childhood adversity; its semi-structured interview format enhances recall and the objective rating system minimizes subject bias. The CECA also provides detailed information across many domains of experiences and across many different caregivers that takes into account severity, frequency, duration, and time course of events. The information provided by this interview is critical to psychopathology research as it may have identification and treatment implications. However, this instrument is cumbersome and expensive to use, and it is not practical to use in research settings.

Goals of this project

The CECA is a valuable instrument for collecting retrospective data; however, it is limited in research settings by excessive time and costs. Ratings for each interview are divided into sections called “family arrangements” which are based on the various combinations of caregivers present in the household during the ages of 0-18. These caregiver combinations are referred to as “caregiving units” and may consist of biological mother and father, mother only, father only, or mother and step-father, to name a few. For each family arrangement, every individual caregiver as well as the overall caregiving unit is rated on 11 core domains; antipathy, emotional neglect, material neglect, emotional role reversal, material role reversal, supervision, discipline, discord, physical abuse, sexual abuse, and psychological abuse. Many of these domains rated in the CECA may be overlapping or redundant. For example, if the subject reported that their mother did not provide adequate food and clothing and the mother forced the subject to beg on the street to obtain money to buy food, this information could be used to rate antipathy, material neglect, and material role reversal. If the scoring of the data could be reduced, this instrument could be used more effectively in psychopathology research.

This proposal will examine the development of a briefer CECA rating method to classify CECA reports of childhood adversity in subjects with recurrent major depression. The goal is to limit the number of domains that are assessed and rated. To limit the number of domains the following questions will need to be examined: 1) Do the a priori CECA domains stand alone in our clinical setting or is there a significant degree of correlation between the domains? 2) Do all of the different types of caregiving units (e.g. mother and father, mother only) measured in the CECA show similar patterns of correlations between the domains?

The hypotheses are:

- 1) Subgroups within the 11 a priori CECA domains are inter-correlated. Using Cohen's (1988) definitions of small (.10), medium (.30), and large (.50) effect sizes the following relationships are expected. Antipathy will have large correlations with emotional neglect and psychological abuse; medium correlations with material neglect, emotional role reversal, and discord; and small correlations with material role reversal, discipline, and physical abuse. Emotional neglect will have large correlations with material neglect; medium correlations with material role reversal, supervision (-), discord, and psychological abuse; and small correlations with emotional role reversal and physical abuse. Material neglect will have large correlations with material role reversal; medium correlations with supervision (-); and small correlations with emotional role reversal, discord, and psychological abuse. Emotional role reversal will have a medium correlation with material role reversal and psychological abuse and a small correlation with supervision (-) and discord. Material role reversal will have small relationships with supervision, discord, and psychological abuse. Supervision will have a medium correlation with discipline and physical abuse. Discipline will have a large correlation with physical abuse, medium with discord, and small with psychological abuse.

Discord will have medium correlations with psychological abuse and physical abuse.

Psychological abuse will also have a small correlation with physical abuse. Significant inter-correlation between sexual abuse and the other domains is not expected.

- 2) These domains can be collapsed into 3 main factors: Factor 1, which includes emotional neglect, material neglect, antipathy, psychological abuse, emotional role reversal, material role reversal, and discord; Factor 2, which includes physical abuse, discipline, and supervision; and Factor 3, which consists of sexual abuse
- 3) This factor structure will be stable across different caregiving units.

Methods

Participants

The sample was obtained from subjects participating in the Maintenance Psychotherapy in Recurrent Depression (MPRD) study, (MH 49115-06-10), Principal Investigator, Dr. Ellen Frank. This study was carried out at the Depression and Manic Depression Prevention Program of the Western Psychiatric Institute and Clinic at the University of Pittsburgh Medical Center.

The study population was composed of adult women with recurrent major depression. Inclusion criteria for the study were: 1) current episode of unipolar major depression by Structured Clinical Interview for DSM-III-R (SCID) criteria (Spitzer, Williams, Gibbon, & First, 1992); 2) at least one prior episode of major depression within the last two and one half years; 3) a remission period of at least 10 and not more than 130 weeks; 4) female; 5) age 20-60; 6) willingness to forego psychotropic medications; 7) capacity to give informed consent. Exclusion criteria were: 1) meeting criteria for other Axis I disorders except comorbid anxiety or eating disorders by SCID criteria; 2) drug or alcohol abuse within past two years; 3) history of mania; 4) meeting full criteria for anti-social or borderline personality disorder; 5) requiring inpatient treatment due to suicide risk or psychotic symptoms; 6) dysthymia; 7) index episode secondary

to the effect of prescribed medications; 8) significant medical illness. The University of Pittsburgh Institutional Review Board approved this protocol, and all participants gave written informed consent prior to participation.

The goal of the MPRD study was to examine the effectiveness of varying frequencies of psychotherapy in the prevention of recurrence in major depression. Participants entered the first phase of the protocol in an acute major depressive episode and began treatment with Interpersonal Psychotherapy (IPT). Following remission of the index episode, subjects were entered into an 8-week Continuation Phase. Remission was defined as a score of 7 or less on the Hamilton Rating Scale for Depression (HRSD) (Hamilton, 1960) for at least three consecutive weeks and clinical agreement that the episode had remitted. Participants who remained in remission during the Continuation Phase entered a two-year Maintenance Phase of preventive psychotherapy. Participants who did not enter remission with psychotherapy alone were assigned to a combination treatment of IPT and pharmacotherapy. This treatment continued until remission at which point they would enter the Continuation Phase of 20 weeks. If they remained in remission during the 20 weeks, they were then discontinued from medication. If they were able to tolerate the discontinuation without relapse they entered the Maintenance Phase for two years.

A total of 233 participants entered into the Acute Phase of the MPRD study. The measurement of childhood experiences was started as a pilot study within the MPRD study two years after the original study had begun. A total of 142 participants were available to be interviewed with the CECA during the Continuation Phase of the study, while in remission from their depressive episode.

Childhood Experience of Care and Abuse (CECA) (Bifulco, et al., 1994)

The CECA is a retrospective semi-structured interview that gathers qualitative data based on a subject's narrative account of their childhood (ages 0-18). Childhood adversity in this measure is conceptualized as caregiver lack of warmth or positive regard, emotional or material neglect, physical abuse, sexual abuse, psychological abuse, and tension or discord in the home environment. Subject responses are audio taped, allowing the interviewer to focus on the interview. The interviewer transcribes the audiotapes soon after the interview, and ratings are made from the transcriptions.

The ratings are divided up into sections called "family arrangements". A family arrangement consists of a particular combination of caregivers, called "caregiving units", with which the child resides for at least one year. Each subject has one or more family arrangements; if the composition of the household changes, a new family arrangement is created. For example, S lives with her mother and father from age 0-5. At age 5, S's father dies. At age 7, S's mother re-marries and she then lives with her mother and stepfather. S will have three different family arrangements: 1) age 0-5, 2) age 5-7, and 3) age 7-18; and three different caregiving units: 1) mother and father, 2) mother only, and 3) mother and step-father.

Each family arrangement consists of 11 core domains: antipathy, emotional indifference/neglect, material indifference/neglect, emotional role reversal, material role reversal, supervision, discipline, discord/tension, physical abuse, sexual abuse, and psychological abuse. The first eight domains are only rated for the caregiving unit in that family arrangement; the other three abuse domains can be rated for any perpetrator. The core domains are defined as follows:

Antipathy: criticism, dislike, coldness, rejection, or hostility towards the child

Emotional Indifference/Neglect: the degree to which the caretaker provides for the child's emotional needs (interest in school, friends, child's happiness, health and well-being)

Material Indifference/Neglect: the degree to which the caretaker provides for the child's basic material needs (food, clothing, shelter, protection)

Emotional Role Reversal: the extent to which the child is used for the parent's emotional needs (confiding in the child, child as go-between for parents)

Material Role Reversal: the extent to which the child is held responsible for provision of material needs (money, food, meals, child care)

Supervision: the degree to which the caretaker provides a safe environment for the child and monitors the child's activities

Discipline: the rules and behavioral expectations for the child and the extent to which those rules and expectations are enforced

Discord Tension: the degree of conflict, with or without violence, which occurs in the home between parents, siblings, other family members, including arguments, threats, non-personal violence (throwing objects, slamming doors), and interpersonal violence (physical contact)

Physical Abuse: violence directed towards the child by any other person (including strangers, peers, parents, etc.); severity ranges from pushing or slaps on bottom, hits on head, hit with object, kicked, bitten, or burned, to threats with gun or knife

Sexual Abuse: age-inappropriate sexual contact, any sexual contact between children and family members, any sexual contact between children and adult teachers, authority figures, family friends, etc. Sexual abuse includes intercourse, violation or penetration with object, oral sex, touching of breasts/genitals, requiring subject to watch sexual activity or pornography, and verbal solicitations or age inappropriate verbal content

Psychological Abuse: cruel or distressing behavior, either verbal or non-verbal. This includes denigration, humiliation, ridicule, cruelty, deprivation of basic things (food, light, sleep), deprivation of treasured objects (social contacts, comfort objects, tormenting or killing pets), threats of abandonment, emotional blackmail, terrorizing, and corruption or exploitation.

Ratings are based on precedent examples available in the CECA rating manual, developed by Bifulco and colleagues. The manual includes both rules for rating and threshold examples. The subject's own feelings or opinions as to the severity of the event are not taken into account in the ratings. Rather, behavioral indicators are probed for during the interview in order to obtain clear examples on which a rating can be based. Ratings are made on a 1-4 scale (4-little/none, 3-some, 2-moderate, 1-marked) for all of the domains except for supervision and discipline. These ratings are dichotomous in nature, such that a rating of a 2 (moderate) is distinctly more severe than a rating of a 3 (some). Supervision and discipline are rated on a 1-3 scale (3-lax, 2-moderate, 1-high). Supervision and discipline ratings are categorical rather than continuous ratings, representing a U-shaped curve where both ends of the curve are undesirable. This categorization is roughly based on Baumrind's model of Authoritarian, Authoritative, and Permissive parenting (Baumrind, 1971). Each domain is given a "typical" rating and a "worst" rating for each caregiver in every family arrangement. Overall caregiving unit ratings for each domain are then determined by taking into account the severity and duration of all of the caregiver ratings in that family arrangement.

In the MPRD protocol, each subject was rated by one rater and then reviewed by one "expert rater". Discrepant ratings were brought to a consensus meeting comprised of at least three reviewers, blind to the subject's reporting style. The behavioral indicators and pertinent background information (age of subject) were presented in the consensus meeting. All

reviewers present utilized the manual to determine an agreed upon rating. Final ratings were based upon the reviewer consensus. That rating and its subsequent rationale were then included in the rating dictionary to be used for future reference.

CECA Reliability and Validity

Reliability ratings were conducted on a randomly selected sub-sample of 42 participants. Three reviewers trained in CECA methodology participated in the reliability process. Two reviewers reviewed each of the 42 charts on all of the CECA domains. A reviewer could not review the chart if he or she had originally rated the interview. The ratings for each reviewer were then recorded.

The following intraclass correlations (ICCs) were obtained for the overall caregiving unit rating for each domain (subject by family arrangement): antipathy (.92), emotional neglect (.86), material neglect (.82), emotional role reversal (.80), material role reversal (.97), supervision (.71), discipline (.91), discord and tension (.82). The abuse domain ICCs were calculated for each abuse record (subject by reviewer): physical abuse (.70), sexual abuse (.83), psychological abuse (.49). We further classified the abuse domains into three categories of abuse: high (combination of 1 and 2 ratings), low (combination of 3 and 4 ratings) and none. We then calculated kappa statistics for each abuse record (subject by reviewer) using these categorical variables and obtained the following values: physical abuse (.66), sexual abuse (.98), and psychological abuse (.67). It should be noted that these reliability correlations were calculated using pre-consensus ratings. All discrepancies between reviewers were resolved in consensus meetings to determine a final rating to be used in subsequent data analysis.

The CECA has also been shown to be reliable in community studies conducted in Great Britain (Bifulco, Brown, & Harris, 1994). A corroboration study in a series of sisters using the CECA established content validity (Bifulco, Brown, Lillie, & Jarvis, 1997).

Data Analysis

For each subject, a sum across family arrangements of the overall caregiving unit ratings multiplied by the duration of the family arrangement was compiled as a weighted caregiving unit score for each domain. The weighted caregiving unit ratings were used in all of the subsequent analyses. Since the physical, psychological, and sexual abuse domains were rated for any perpetrator, not just members of the caregiving units, only the ratings for members of the caregiving unit were utilized. All data analyses were performed using SAS System for Windows, version eight.

To test the hypothesis that the a priori CECA domains are highly correlated with one another, Pearson correlations were run between the standardized overall ratings from each of the domains. Demographic factors including, age, ethnicity, and education were included in the correlation matrix to test for significant effects. The resulting correlation matrix was examined for significant relationships.

To test the second hypothesis regarding the factor structure, an exploratory factor analysis was performed using the total sample of weighted caregiving units (N=142). An initial principal component extraction was computed in order to determine the number of factors to use in the extraction model. Then a scree plot, which plots eigenvalues against factors, was examined to confirm the fit. Factor extraction was then calculated using principal factor analysis. Factors were then rotated using Promax, an oblique rotation procedure, which allows for minor to moderate correlation between the factors.

A factor analysis could not be reliably performed in order to test whether the factor structure varied by caregiving unit (hypothesis 3) because of small sample sizes. A series of descriptive Pearson correlations were performed on these caregiving unit scores as exploratory

analyses. The following groups were compared: subjects raised by mother and father only throughout childhood (n=104); subjects with caregiver transitions during childhood (n=38).

Results

A summary of demographic information is presented in Table 1. The sample consists of primarily Caucasian and well-educated participants. The majority of participants reported experiencing low levels of childhood adversity. CECA scale-point frequencies for each domain are shown in Table 2.

Table 1. Demographics and clinical characteristics of the total sample (N=142).

	Mean (<i>SD</i>)
Age at time of Interview	38.88 (10.53)
Number of Previous MDD Episodes	4.71 (2.66)
Age at First Episode	24.84 (9.72)
Duration of Current Episode	26.49 (21.54) months
Baseline HRS-17	18.55 (2.88)
Education Level	14.87 (1.85) years
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Ethnicity	
Caucasian	126 (88.7%)
African American	12 (8.4%)
Latino	1 (.07%)
Other	3 (2%)
Marital Status	
Never Married	51 (36%)
Married	55 (38.7%)
Separated	6 (4%)
Divorced	25 (17.6%)
Widowed	5 (3.5%)

Table 2. CECA scale point frequencies

4-point scales	Mean (SD)	1. Marked % (n)	2. Moderate % (n)	3. Some % (n)	4. Little/None % (n)
Antipathy	3.32 (.80)	2.11 (3)	18.31 (26)	31.69 (45)	47.89 (68)
Emotional Neglect	3.23 (.91)	8.45 (12)	14.09 (20)	32.39 (46)	45.07 (64)
Material Neglect	3.73 (.59)	1.41 (2)	6.34 (9)	14.79 (21)	77.46 (110)
Emotional Role Reversal	3.34 (.79)	2.82 (4)	16.19 (23)	33.81 (48)	47.18 (67)
Material Role Reversal	3.55 (.80)	3.52 (5)	11.97 (17)	17.61 (25)	66.90 (95)
Discord/ Tension	2.70 (.96)	16.9 (24)	25.35 (36)	38.03 (54)	19.72 (28)
Sexual Abuse	3.98 (.11)	0 (0)	0 (0)	2.82 (4)	97.18 (138)
Physical Abuse	3.62 (.66)	2.82 (4)	13.38 (19)	27.46 (39)	56.34 (80)
Psychological Abuse	3.83 (.55)	3.52 (5)	2.11 (3)	7.05 (10)	87.32 (124)
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3-Point scales	Mean (SD)	1. High	2. Moderate	3. Lax	
Supervision	2.09 (.42)	7.75 (11)	80.98 (115)	11.27 (16)	
Discipline	1.94 (.40)	14.79 (21)	80.98 (115)	4.23 (6)	

Thirteen of the 142 (11%) participants had missing data for one or more CECA domains: two participants were missing five domains, eight participants were missing two domains, and three participants were missing one domain. The missing data was due to the interviewer not asking a probe question that elicited enough information from the participant to make a reliable rating. Multiple imputation techniques were used to estimate values for missing data (SOLAS™ 2.0; Rubin, 1978). Univariate analyses indicated that ten of the eleven domains were negatively skewed and the eleventh, supervision, was slightly positively skewed. Neither Log transformations nor Square Root transformations alleviated the skewness. Although normally distribution of data is ideal, it is not a pre-requisite of factor analysis because of the minimal effects on the size of the correlation coefficient (Gorsuch, 1983). Tests for linearity indicated that all the domains were linearly related with no apparent outliers.

Pearson correlations were computed using the overall ratings from each of the domains in order to test if subgroups within the eleven a priori CECA domains were inter-correlated. With a sample size of 142 there is adequate statistical power to detect correlations of .25 and higher at a significance level of $\alpha = .05$ (Cohen, 1988). As can be seen in the correlation matrix (Table 3), there were several correlations above .30, indicating a factorable matrix. In addition to the magnitude of the correlations, matrix factorability can also be tested by Kaiser's measure of sampling adequacy (MSA) (Tabachnick & Fidell, 2001). MSA values exceeded the desired level of .60, except for Supervision (.54) and Sexual Abuse (.38). Education was not significantly related to any of the CECA variables. Ethnicity also was not significantly related to any of the CECA variables, although power may not have been adequate to detect differences for this variable. Age at the time of interview was positively correlated with Material Role Reversal

($r = -.19$; $p = .025$); however, because of the large number of correlations, it is possible that this was a result of Type I error. Age, education, and ethnicity were not included in the subsequent factor analyses.

Table 3. Correlation Matrix for all CECA domains (N=142)

	Antipathy	Emotional Neglect	Material Neglect	Emotional Role Reversal	Material Role Reversal	Supervision	Discipline	Discord	Sexual Abuse	Psych. Abuse	Physical Abuse
Antipathy	—	.56††	.26**	.28†	.22**	-.003	.30†	.47††	-.01	.52††	.39††
Emotional Neglect		—	.62††	.35††	.39††	-.20*	.19*	.53††	-.003	.43††	.31†
Material Neglect			—	.33††	.49††	-.25†	.21**	.40††	-.01	.41††	.38††
Emotional Role Reversal				—	.49††	-.04	.15	.49††	.03	.33††	.22†
Material Role Reversal					—	-.18*	.28†	.27†	.03	.31†	.33††
Supervision						—	.24**	.17*	-.007	-.03	-.14
Discipline							—	.16	.03	.29†	.48††
Discord								—	.04	.37††	.31†
Sexual Abuse									—	-.01	-.02
Psych. Abuse										—	.52††
Physical Abuse											—

* p<.05
 ** p<.01
 † p<.001
 †† p<.0001

Squared multiple correlations (SMC) were used to assess singularity, multicollinearity, and the presence of outliers among variables. No SMCs were approaching one and the largest SMC was .59. The SMC for sexual abuse was very low (.07) and this variable was not correlated with any other variable, suggesting that this was an outlier. Outlier variables are typically ignored in the factor analysis (Tabachnik & Fidell, 2001). Principal Component extraction was initially run to determine the number of factors needed. The initial principal component analysis including sexual abuse resulted in three eigenvalues greater than 1.0. Principal factor analysis using a three-factor solution yielded communalities greater than one, suggesting a two-factor solution was indicated. Initial principal component analyses were re-executed specifying a two-factor extraction. Examination of the residual correlation demonstrated sufficiently small co-variances, indicating a two-factor solution was appropriate. The same results were found when the analysis was re-run excluding sexual abuse. Therefore, subsequent factor analyses were run using a two-factor solution and excluding sexual abuse because of low SMCs and final communality estimates.

Principal factor analysis with Promax rotation indicated an inter-factor correlation of .44, confirming the need for an oblique rotation. Examination of final communality estimates indicated that the variables were well defined by the solution. Several variables loaded on one and only one factor; however, three variables loaded on both factors indicating the existence of a complex variable (the influence of more than one factor on the variable). The high SMCs of the variables with each factor (factor 1= .86; factor 2= .72) indicated that the factors are internally consistent and the observed variables on each factor accounted for substantial variance in the factor scores.

Loadings of variables on factors are shown in Table 4. Variables are ordered by size of loading. The cut-off score for interpretation of the Reference Vector Structure (unique relationship of factor to the variable) was set at .45, allowing for 20% of overlapping variance (Comrey & Lee, 1992; Tabachnik & Fidell, 2001). Gorsuch (1983) suggests that for a sample size of 100, only elements with Factor Structure loadings greater than .4 should be interpreted; lower cut-off scores (i.e. .3) need at least a sample of 175 to meet a significance level of $p = .05$. Therefore, the cut-off score for interpretation of the Factor Structure (correlations of the variables with the factors) was set at .40. Supervision was the only variable that did not load on either factor. Three variables loaded on both factors (antipathy, psychological abuse, and physical abuse) indicating that they may be complex variables. The existence of complex variables makes interpretation of the factor more ambiguous. Factor 2 would not be considered to be a well-defined factor since only one variable uniquely defines it. The importance of the factors is determined by the amount of variance explained by each factor after rotation. Because of the oblique rotation, the proportion of variance can only be a rough estimate of its importance (Tabachnik & Fidell, 2001). The approximate percent of variance and covariance explained by Factor 1 was 67% and 80%, respectively. The approximate percent of variance and covariance explained by Factor 2 was 17% and 20%, respectively.

Table 4. Factor loadings for Principal Factors extraction and Promax rotation of two factors.

	Factor Structure (Correlations)		Reference Structure (Semipartial Correlations)		
	Factor 1	Factor 2		Factor 1	Factor 2
Emotional neglect	.80	.27	Emotional neglect	.76	-.10
Material neglect	.71	.28	Material neglect	.65	-.04
Discord tension	.65	.24	Discord tension	.61	-.05
Emotional role reversal	.52	.24	Emotional role reversal	.46	.01
Antipathy	.61	.44	Antipathy	.46	.19
Material role reversal	.55	.33	Material role reversal	.45	.10
Psychological abuse	.61	.50	Psychological abuse	.43	.25
Supervision	-.25	.21	Supervision	-.38	.36
Discipline	.30	.77	Discipline	-.04	.70
Physical abuse	.52	.62	Physical abuse	.27	.43

Order (by Size of Loadings) in which Variables Contribute to Factors

Factor 1:
Noxious Environment

Factor 2:
Undefined

Emotional Neglect
Material Neglect
Discord Tension
Antipathy
Psychological abuse
Material Role Reversal
Emotional Role Reversal
Physical Abuse

Discipline
Physical abuse
Psychological abuse
Antipathy

Exploratory analyses were conducted to determine whether there were any differences in the relationship among the CECA variables depending on the type of caregiving unit reported by the participant (hypothesis three). Participants were categorized into three groups according to family arrangement status. The first group consisted of participants raised by mother and father only throughout childhood (Mother + Father Only; n=90); the second group consisted of the remaining participants who experienced some type of transition in caregivers during childhood (n= 52). This group was further broken down into subjects who were raised by other caregivers throughout the rating period (i.e. father dies, step-father moves in) (Multiple Transitions; n=38) and those that were raised by mother and father throughout childhood but experienced other caregiver (e.g. grandparents) transitions (Mother, Father + Other; n=14). Because of the ambiguous nature of the small third group (mother and father both present but also the presence of transitions), the Mother, Father + Other group was included with the Mother + Father Only group in the analyses and also excluded from the analyses for comparison.

Pearson correlations were performed to examine whether the pattern of correlations between the CECA variables differed depending on caregiving unit status. Fisher's Z transformation and a Chi-square test of homogeneity were used to compare the correlation coefficients for equality. Results are shown for the Mother, Father + Other group included with the Mother + Father Only group in Table 5. To reduce the possibility of Type I error, statistical significance was set at $\alpha = .01$. Three correlation coefficients have significant difference between caregiving unit groups: antipathy with material neglect, antipathy with emotional neglect, and discipline with physical abuse. In all three cases the correlation coefficient was larger for the Multiple Transition group than the Mother + Father Only group. Table 6 shows the results when Mother, Father + Other group is excluded from the analyses. Five correlation

coefficients were significantly different: antipathy with material neglect, material neglect with discord, material neglect with psychological abuse, material neglect with physical abuse, and discipline with physical abuse. In all five cases the correlation coefficient was larger for the Multiple Transition group than the Mother + Father Only group.

Table 5. Chi-Square test of homogeneity for Mother + Father Only group and Mother, Father + Other group versus Multiple Transition group.

	Antipathy	Emotional Neglect	Material Neglect	Emotional Role Reversal	Material Role Reversal	Supervision	Discipline	Discord	Sexual Abuse	Psych. Abuse	Physical Abuse
Antipathy	–	6.02*	11.5**	.92	1.23	2.46	.16	.25	.27	.28	.25
Emotional Neglect		–	3.38	.30	.34	2.27	.003	2.91	.20	.61	.78
Material Neglect			–	1.21	.20	2.98	.01	4.36	.00	1.19	2.73
Emotional Role Reversal				–	1.57	2.73	.02	.25	1.72	.86	.26
Material Role Reversal					–	.20	.71	1.8	.49	.07	.07
Supervision						–	1.61	.20	.09	.19	2.16
Discipline							–	.90	.27	.001	8.23*
Discord								–	.01	.14	.13
Sexual Abuse									–	.00	.02
Psych. Abuse										–	.17
Physical Abuse											–

Note: X² statistic shown for the test of homogeneity.

* p < .01

** p < .001

Table 6. Chi-Square test of homogeneity for Mother + Father Only group versus Multiple Transition group.

	Antipathy	Emotional Neglect	Material Neglect	Emotional Role Reversal	Material Role Reversal	Supervision	Discipline	Discord	Sexual Abuse	Psych. Abuse	Physical Abuse
Antipathy	–	5.48	13.15*	1.51	.82	2.12	.26	.21	.29	.21	.73
Emotional Neglect		–	5.48	.20	.96	3.34	.35	4.42	.24	1.89	2.43
Material Neglect			–	3.12	1.03	1.98	1.09	6.94*	.00	7.62*	7.84*
Emotional Role Reversal				–	2.42	3.51	.01	.22	1.71	1.99	.02
Material Role Reversal					–	.40	.26	2.8	.48	.03	.04
Supervision						–	1.45	.45	.10	.12	2.08
Discipline							–	1.7	.23	.001	10.89**
Discord								–	.003	.04	.002
Sexual Abuse									–	.00	.02
Psych. Abuse										–	.01
Physical Abuse											–

Note: X² statistic shown for the test of homogeneity.

* p<.01

** p<.001

Chi-square comparisons were performed to further test for differences between the different types of caregiving unit groups. Cell sizes less than five were not interpreted. Because of multiple comparisons, statistical significance was set at $\alpha = .01$. When the Mother, Father + Other group was included with Mother + Father Only group, there was a significant difference between ethnicities with respect to caregiving unit statuses: Caucasian participants were significantly less likely to experience caregiver transitions than other races (black, Asian, Latino, American Indian, Alaska native, or other) [$X^2(1, N=142) = 16.22, p < .0001$]. When the Mother, Father, + Other group was excluded from the analysis, the cell size was too small to complete the analysis. There was no significant effect of age with respect to caregiving unit statuses.

Wilcoxon Rank Sum tests were used to test for differences in the CECA domains depending on type of caregiving unit. Statistical significance was set at $\alpha = .01$. Participants in the Multiple Transitions group were more likely to report more severe levels of psychological abuse (Wilcoxon's $T=2111, n=90, 38, p=.001$), higher levels of discipline (Wilcoxon's $T=2101, n=90, 38, p=.003$), and a trend towards more severe sexual abuse (Wilcoxon's $T= 2334.5, n= 90, 38, p=.02$) than the Mother + Father Only group. None of the other CECA domains differed significantly by caregiving unit status. When the Mother, Father + Other group was included with the Mother + Father Only group, the Multiple Transitions group was significantly more likely to report more severe levels of psychological abuse (Wilcoxon's $T= 2374.5, n=104,38, p=.003$), discipline (Wilcoxon's $T= 2378, n=104, 38, p=.01$), sexual abuse (Wilcoxon's $T= 2579.5, n= 104, 38, p=.01$), and material neglect (Wilcoxon's $T= 2353.5, n= 104, 38, p=.01$). None of the other CECA domains differed significantly by caregiving unit status.

Discussion

This study used factor analysis to examine detailed reports of childhood events gathered from the CECA. The current investigation revealed a factor, Noxious Environment, which describes a large portion of the variance of the CECA. Noxious Environment includes the degree to which the participant reports experiencing lack of provision of basic emotional and material needs, conflict and tension in the home, and hostility or rejection in childhood. This finding suggests that a high degree of overlap exists among the CECA domains. Therefore, it should be possible to collapse these domains into a smaller number of variables that need to be assessed and rated, making the CECA easier and less time consuming to score. In addition, exploratory analyses indicate that childhood experiences may be significantly influenced by the composition of the household and any caregiver transitions that occur.

Consistent with the first hypothesis, Pearson correlations of the CECA domains in our sample indicate that several of the CECA adversity domains are significantly inter-correlated, suggesting a degree of overlap or redundancy among the domains. Only sexual abuse was not related to any other variable in the CECA. This may be attributed to the fact that although 37% of our sample reports experiencing some type of sexual abuse, only four of the participants reported experiencing sexual abuse by a primary caregiver, and none of these ratings were higher than the “some” (3) level. Other studies using the CECA have found similar patterns of correlations. For example, Bifulco, Brown, and Harris (1994) in two different community samples found moderate relationships between indifference (a combination of emotional and material neglect) and discord/tension, antipathy, physical abuse, and sexual abuse. It should be noted that Bifulco and colleagues included sexual abuse committed by any perpetrator not just primary caregivers, which could account for the discrepant finding of a relationship between

sexual abuse and other domains in their sample. Harkness and Monroe (2002) also found a large correlation between antipathy and emotional neglect in a clinical sample of depressed women.

Contrary to the three-factor hypothesis, only one definable factor was evident in this sample. Although a two-factor solution to the factor analysis was statistically appropriate, only one factor could be interpreted based on saliency of the factor loadings. Several of the CECA domains seem to be redundant. This redundancy can best be described by the term “Noxious Environment”. Thus, neglect, antipathy, psychological abuse, role reversal, and discord may be similar constructs that are measuring the same adversities. These domains are capturing the degree to which the caretaker provides for the child’s emotional and material needs, the degree of conflict in the home, the extent of hostility or rejecting behavior toward the child, and the degree to which child is responsible for her own needs and the needs of the caregiver. The CECA seems to be measuring the extent to which the home environment is unpleasant and possibly toxic for the child.

The CECA domain of discipline does not seem to be related to Noxious Environment but rather another facet of childhood experience. Discipline is the only domain that uniquely loads onto the second factor, leaving it an undefined factor. Although discipline is related to physical abuse, there seems to be a complex relationship between physical abuse, antipathy, and psychological abuse. Researchers have argued that it is not possible to separate physical abuse from the context of psychological maltreatment (Brassard & McNeill, 1987; Hart, Germain, & Brassard, 1987; Shaver, Goodman, Rosenberg, & Orcutt, 1991; Sternberg & Lamb, 1991). Consistent with the above studies, the current findings seem to support the need to account for all types of abuse simultaneously. Many studies have not taken into account the co-occurrence of multiple types of abuse, so outcomes that seem to be associated with one type of abuse may

actually be due to the combination of adversity experiences or an unmeasured experience (Briere, 1992). This complexity is an interesting one that deserves further attention.

Given the rare occurrence of sexual abuse perpetrated by caretakers in this sample, it is not surprising that sexual abuse is unrelated to other CECA domains. It is unclear why supervision is an outlier in this sample while in other studies using the CECA it highly correlated with discipline and modestly correlated with neglect (Bifulco, Brown, & Harris, 1994; Harkness & Monroe, 2002).

Other questionnaire measures of childhood adversity have usually resulted in two or three factor solutions. For example, factor analyses of Parental Bonding Instrument (PBI) items yielded a factor concerning parental affection and warmth (Parental Care) and a factor concerning supervision (Parental Protection) (Parker, Roussos, Hadzi-Pavlovic, et al., 1997; Parker, Tupling, & Brown, 1979). Factor analyses of Measure Of Parenting Style (MOPS) questionnaire items yielded a three-factor solution; Indifference, Over-control, and Abuse. These factors have also been inter-correlated with medium to large effect sizes, similar to the inter-factor correlations found in the present study using the CECA. The factors found in PBI and MOPS questionnaire measures are analogous to the factors found in this study; items measuring the home environment or atmosphere load on one factor, whereas items measuring discipline or parental control seem to form another factor.

The current study also found that there are significant differences in the strength of correlations among the adversity domains depending on the composition of the caregiving unit. These exploratory analyses of the correlational patterns relative to caregiving unit structure indicate that there may be differences in adversity factor patterns depending on household structure and mobility. Correlation coefficients between the domains of antipathy, emotional

neglect, material neglect, discord, and physical abuse are larger for those participants who experienced multiple caregiver transitions throughout childhood than participants who did not experience caregiver transitions during childhood. This may be indicative of a different factor structure of the CECA in this subset of families. These results show that families that experience multiple transitions may have a greater likelihood of having more adverse experiences due to the chaotic nature of the family system than families without transitions and that this makes the domains more likely to group together. These statistical measures are not robust, however, and not many differences in correlation coefficients were found. A more diverse sample would be needed to test this hypothesis.

Multiple caregiver transitions were also significantly associated with ethnicity (Caucasian less likely to have transitions) as well as discipline (transitions associated with more severe levels). US Census data of families with children under the age of 18 shows that 48% of Black families compared to 83% of White, non-Hispanic families have a two-parent family structure (US Bureau of the Census, 2001), supporting this finding. Studies in child populations have not revealed consistent associations between family structure and longitudinal outcomes in African American families compared to European American families (Shaw, Winslow, & Flanagan, 1999). It has been suggested that in low-income young children, family structure may differentially affect the family system depending on ethnicity (Shaw, Winslow, & Flanagan). Further research into the nature of these differences is needed. The current study did not find a significant relationship between ethnicity and any of the CECA domains; however, it must be acknowledged that power for tests of hypotheses related to ethnicity was limited. If ethnicity is related to family structure and family structure influences the nature of the relationships between adversity domains, studies that assess demographic factors like ethnicity without also addressing

family structure and family structure changes over time may be losing important information about how childhood experiences affect adult psychological outcomes.

The relationship between family structure transitions and discipline might be explained by the relationship between ethnicity and family structure transitions. The CECA defines discipline as the ways in which rules are enforced and the proportionality of punishment to the infraction. This domain is rated with a middle point suggesting optimal levels of discipline and two extreme points (high and lax) indicating sub-optimal levels of discipline, analogous to Baumrind's (1971) authoritarian, authoritative, and lax parenting styles. Previous research has shown that African Americans are more likely to use authoritarian styles of discipline compared to European Americans, and that this style of discipline may have protective properties depending on social and environmental circumstances (Baumrind, 1972). Given the similarities of the definitions used, it is not surprising that a significant relationship between ethnicity and discipline arise in the current study.

The current findings reinforce the advantages of using the CECA over self-report questionnaire measures of childhood experiences. Its semi-structured interview format may be a more effective assessment of specific childhood experiences because of the provision of explicit recognition cues; questionnaires are more suited to measure global attitudes (Brewin, Andrews, & Gotlib, 1993). The current investigation suggests there may be differences in adversity experiences depending on household composition or family structure as well as changes in this structure. The CECA allows for changes in ratings or caregivers across time, rather than an average rating of the entirety of childhood experiences. Data from the US National Comorbidity Survey also support the importance of using a measure of adversity that can account for changing circumstances and severity of levels of abuse (Kessler, Davis, & Kendler, 1997). By

assessing all possible caregivers in the home, the CECA allows for the investigation of these relationships, which is not possible in traditional questionnaire measures. Further, the current study suggests that the composition of the household impacts the relationship among childhood experiences, which indicates that the ability to measure more than just mother and father over time may have important implications for adversity research. In support of this finding, studies in adolescent populations have shown that the impact of different environmental factors varies depending on the developmental stage of the child as well as the family structure (Hetherington, 1993). Changes in household composition are likely to impact relationships among family members, yet little is known about the long-term effects of family structure changes on children (Hines, 1997). Therefore, the possible effects of family structure on adult psychopathology warrant further attention.

Based on the results of the factor analysis, a briefer CECA could be developed that would contain fewer domains to assess and rate. This CECA rating method would not change the interview or the information gathered but rather how that information is placed into categories. The original CECA was designed to be a flexible interview comprised of seven core scales and several optional scales that could also be used. The current factor analysis shows that five domains may be sufficient to capture the primary essence of adverse childhood experiences. In order to test this brief rating method, subjects would need to be rated using both the old rating systems to see if the old method captures information above and beyond that of the new rating method. The brief CECA would include five domains: noxious environment, control, psychological abuse, physical abuse, and sexual abuse. The domains are defined as follows:

Noxious environment: includes the overall atmosphere in the home. It reflects the degree to which there is tension, fighting, or discord between household members; the degree of hostility,

rejection, or dislike shown towards the child; the degree to which the child's emotion and material needs are attended to and taken care of by the adults in the home; and the degree to which the child is expected to care for others emotional or material needs.

Control: consists of the degree to which the caretaker provides a safe environment for the child and monitors the child's activities and the extent to which rules and behavioral expectations are made and enforced.

Psychological Abuse: includes cruel or distressing behavior, either verbal or non-verbal. This includes denigration, humiliation, ridicule, cruelty, deprivation of basic things (food, light, sleep), deprivation of treasured objects (social contacts, comfort objects, tormenting or killing pets), threats of abandonment, emotional blackmail, terrorizing, corruption or exploitation.

Physical abuse: includes violence directed towards the child by any other person (including strangers, peers, parents, etc.), including any physical punishment used to enforce rules.

Sexual abuse: includes age-inappropriate sexual contact, any sexual contact between children and family members, any sexual contact between children and adult teachers, authority figures, family friends, etc. It includes intercourse, violation or penetration with object, oral sex, touching of breasts/genitals, requiring subject to watch sexual activity or pornography, and verbal solicitations or age inappropriate verbal content.

The noxious environment domain reflects an amalgamation of the original CECA domains captured by the first factor in the current analysis. The control domain reflects a combination of parental supervision and discipline behaviors, similar to the parental control domain utilized in the original CECA (Bifulco and colleagues later separated parental control into the two separate domains of discipline and supervision because of difficulties with reliability and the desire to tap into the two different parental behaviors). Although supervision and

discipline were only modestly correlated in this sample, other investigations using the CECA have found these domains to be highly related (Bifulco, Brown, & Harris, 1994; Harkness & Monroe, 2002). Further research examining the nature of these relationships is needed to refine these definitions. It is possible that reliability may be improved by refining the definition of control to include those behaviors that reflect the way in which discipline is imposed (i.e. humiliation or physical punishment) in the abuse domain that defines the behavior. This would allow for the parental behaviors surrounding the presence of rules, monitoring activities and compliance with rules, and provision of a safe environment to be combined into the control domain. The other three domains (psychological abuse, physical abuse, and sexual abuse) are the same as the original CECA abuse domains.

Methodological limitations of factor analysis must be discussed. Factor analysis is useful for consolidating variables and generating hypotheses; however, there are no criterion variables against which to test factor solutions (Gorsuch, 1983; Tabachnick & Fidell, 2001). A factor is only one interpretation of an implicit construct. Conclusions that can be drawn from factor analysis are therefore limited and further research is necessary to assure that the resulting factors are legitimate constructs (Gorsuch, 1983). In addition, even though the data were treated as continuous in this investigation, CECA ratings may be dichotomous in nature. Because of the large number of little/none (4) ratings, it is possible that the factors found in this analysis are “difficulty factors”. Difficulty factors arise in data-sets where many subjects receive the same score, causing the factors to bring together variables based on similar mean scores (Gorsuch, 1983). This does not seem to be the case in the present analysis as supervision, discipline, and discord have similar mean scores but are not loading on the same factor.

There are other limitations to this study that should be addressed. Participants with a psychological disorder may be motivated to construe events to fit their own beliefs or explanations about the development of the disorder. Similarly, researchers must be cautious when measuring the perception of family functioning in the context of victimization because the victimization may cause the perception (Boney-McCoy & Finkelhor, 1998). Bias in retrospective reporting also includes the under-reporting of events because of simple forgetting over long periods of time (Robins, Schoenberg, Holmes, et al., 1985). In a comprehensive review of the reliability of retrospective reports of childhood experiences, Brewin, Andrews, and Gotlib (1993) concluded that, although claims that retrospective reports are unreliable are exaggerated, limitations to retrospective reports must be addressed in order to improve their reliability. Although certain techniques were used to enhance recall in the current study, these techniques do not cure all of the problems with retrospective reporting. Sample size is also an important consideration. This study meets “rule of thumb” criteria for factor analysis that indicates at least ten subjects are needed for each variable included (Gorsuch, 1983). However, this number of subjects is not ideal for a factor analysis; most statisticians recommend at least 200 to 300 subjects as a minimum sample size. It is possible that with a larger sample, a better-defined factor structure could be found. One disadvantage of semi-structured interviews includes the chance that some information is not elicited from the participant. Although all of the CECA interviewers were highly trained, missing data was still an obstacle in this sample. In order to maximize the sample size, multiple imputation techniques were used to estimate missing data. This method has several advantages to its use in data analysis; however multiple imputation does underestimate uncertainty in the data and does not account for variability. Additionally, scores used in the analyses were averaged over childhood. This may underestimate the impact of higher

ratings that occur for a shorter period of time. An alternative to using average scores would be to use the peak score for each domain; however, this would not allow for duration to be taken into account. Another potential study limitation is that the raters in this study were not blind to diagnosis, which could have biased the ratings. Consensus meetings were conducted and ratings dictionary were used to reduce this bias; however, this must be taken into consideration. Finally, the findings of this study may not be generalizable to other populations. This sample consisted of primarily white, highly educated women. The women in this sample were treatment responders; all of the participants had to reach remission in order to receive the CECA interview. It is likely that treatment non-responders would have different reports of childhood adversity.

Despite these caveats, this study characterizing remitted depressed women using a systematic semi-structured interview format indicates that a more efficient adversity classification process can be developed. As hypothesized, the CECA seems to be capturing an overall factor of Noxious Environment in the home rather than discrete abuse types. These results can help to develop a more parsimonious measure of childhood adversity. These results also suggest that interview-style measures with objective ratings that can account for transitions in family structure and all categories of caregivers in the household will provide more comprehensive assessments of these experiences. The Noxious Environment Factor accounted for a large amount of variance; however, the other factor was characterized by complex variables and was not definable in this sample. It is possible that the factor analysis techniques used in this analysis are limited in ability to condense this type of instrument; Gibbons and colleagues (1985) have suggested that item-response models may be a better way to look at psychiatric rating scale data. Item-response methods may better account for the relationship between the CECA variables because it will allow the variables to be treated as categorical or dichotomous. Item-

response models test the likelihood that categorical variables can be explained parsimoniously by their relationship to a single dimension or several underlying or latent dimensions. For example, depression rating scales may be measuring latent dimensions such as vegetative symptoms and cognitive symptoms (Gibbons, Clark, VonAmmon, & Davis, 1985). This type of analysis may reveal more than one latent dimension that the CECA seems to be assessing.

Future research to determine the role that childhood adversity plays in Major Depressive Disorder is needed given the serious consequences of experiencing adversity in childhood. This investigation indicates that it is possible to condense the CECA rating process by limiting the number of domains that need to be assessed and scored. This briefer CECA rating method would limit researchers' time and costs and be more practical for use. This greater utility of a rigorous semi-structured interview that can make objective ratings and account for household changes over time would greatly advance the field of adversity research.

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