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## Research article

# Childhood adversity and cognitive functioning in patients with major depression



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## ABSTRACT

**Objective:** Major depression is often accompanied by deficits in cognitive functioning and lowered executive functions. However, not all depressed patients show impairments in these domains. The aim of this study was to examine whether different kinds of childhood adversity might account for cognitive deficits in patients with major depression.

**Methods:** Ninety-one patients with major depression (DSM-IV) and 40 healthy controls completed a neuropsychological test battery assessing memory, processing speed and executive functions. The Childhood Trauma Questionnaire (CTQ) was used to measure the severity and number of incidences of sexual, physical and emotional abuse and physical and emotional neglect.

**Results:** Patients with major depression had a significantly higher number of traumas and reported more severe emotional abuse, emotional neglect and physical neglect than healthy controls. Patients performed less well in memory tasks, general knowledge and processing speed than healthy controls. Hierarchical regression analyses indicated that the overall number of traumas was significantly associated with poorer general knowledge, lower processing speed and impaired executive functions in patients with major depression. A second model including all CTQ-subcales simultaneously demonstrated an association between physical neglect and poorer verbal learning, and physical abuse and diminished executive functions.

**Conclusion:** A higher number of childhood adversities may influence general knowledge, processing speed and executive functions in patients with major depression. In addition, physical abuse and neglect seemed to be associated with verbal learning deficits and poorer executive functions.

## 1. Introduction

A growing body of evidence suggests an association between childhood adversity and the development and course of major depressive (MD) (Kessler, 1997; Kessler et al., 2010). Meta-analytic results have revealed an association between sexual and physical abuse experienced in childhood and higher levels of depression in adulthood (Lindert et al., 2013). The severity of emotional abuse might be associated with depressive symptoms in adults (Shapero et al., 2014). Childhood adversities seem to influence an earlier onset of depression, the number of depressive episodes and its more chronic course (Gillespie & Nemeroff, 2005; Klein et al., 2009).

An explanation for this association is offered by hypothalamic-pituitary-adrenal axis (HPA axis) hyperreactivity. Heim, Newport, Mletzko, Miller and Nemeroff (2008) demonstrated that HPA axis hyperreactivity might be a consequence of childhood abuse and several studies report the influence of the HPA axis itself on depression (Heim et al., 2008; for an overview see Stetler & Miller, 2011)

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Another proposed pathway involves the brain-derived neurotrophic factor (BDNF). Plasma BDNF has appeared lower in depressed women with a history of physical neglect compared to nonabused depressed women and controls (Grassi-Oliveira, Stein, Lopes, Teixeira, & Bauer, 2008). In addition, maltreatment in childhood seems to be associated with enduring immune and metabolic abnormalities which in turn might be important factors in the pathophysiology of depression (Slopen, Kubzansky, McLaughlin, & Koenen, 2013; Danese et al., 2013).

Childhood adversity has also been linked to poor cognitive functioning in adulthood. An association between emotional abuse and physical neglect in childhood and worse memory performance has been identified in healthy populations, but no association was observed between any type of childhood adversity and executive functions, psychomotor speed or attention (Majer, Nater, Lin, Capuron, & Reeves, 2010). Spann et al. (2012) demonstrated an association between physical abuse/neglect and diminished cognitive flexibility in adolescence. Contrary findings have also been reported: a population-based study of adults aged 50 years and older revealed an association between sexual abuse in childhood and better global cognition, memory, executive function and processing speed (Feeney, Kamiya, Robertson, & Kenny, 2013). In a sample of individuals over 65 years, Ritchie et al. (2011) showed that experiencing physical, mental or sexual abuse was associated with a lower risk of cognitively impaired verbal fluency.

Impaired memory and executive functions are common features in MD. Although many meta-analyses have confirmed the association between depression and different kinds of cognitive impairment (Burt, Zembar, & Niederehe, 1995; Hammar & Ardal, 2009; Lee et al., 2012; Veiel, 1997), not all patients with MD show cognitive deficits (Porter, Bourke, & Gallagher, 2007). So far, only one study examined childhood maltreatment as a potential explanation for poor cognitive functioning in MD (Gould et al., 2012). The authors detected an association between early life adversities and cognitive deficits, but only in a mixed sample containing healthy participants, patients with MD and those with PTSD.

To overcome these limitations, we aimed to investigate a sample of patients specifically diagnosed with MD and a healthy control sample. Neuropsychological functions were to be investigated in detail, paying particular attention to the role of different kinds of childhood adversities for explaining cognitive deficits in depression. Such knowledge might help prevent major depression and identify the appropriate treatment of this heterogeneous disorder.

## 2. Method

### 2.1. Participants

Patients were recruited via the Outpatient Clinic for Psychological Interventions of the XXX via advertisements, leaflets in pharmacies and waiting rooms of doctors and press releases in local papers. A high number of patients participated in a larger longitudinal study (XXX) after completing assessments for the present purpose. A sample of 40 non-depressed age- and sex-matched healthy controls from the same community was involved to examine potential baseline alterations in cognitive functioning in MD. Healthy controls were recruited via advertisements and press releases in local papers. The study was approved by the ethics committees of the XXX Psychological Society.

### 2.2. Procedure

All participants underwent a diagnostic session which included the structured clinical interview for DSM-IV (SCID) and an interview that focused on exclusion criteria and demographic variables. Exclusion criteria were neurological illness, psychotic symptoms, alcohol and/or drug abuse, antipsychotics, stimulants, current pregnancy and lactation in women and any psychiatric diagnosis according to DSM-IV in controls. After the diagnostic session and having provided informed consent, individuals were invited for neuropsychological tests on the following days. All participants were tested between 7:00 am and 10:00 am in the same test order as follows:

- 1) Mini Mental State Examination (MMSE, Folstein, Folstein, & McHugh, 1975): general cognitive status
- 2) Logical Memory Test 1 (LM, Härting et al., 2000): verbal learning and memory
- 3) Trail Making Test A and B (TMT, Reitan & Wolfson, 1985): processing speed and executive functions (cognitive flexibility, working memory, set-shifting abilities)
- 4) Modified Card Sorting Test (computer version, Nelson, 1976): executive functions (categorization, set-shifting, cognitive flexibility, perseveration, the ability to utilize feedback)
- 5) Digit span subtest of the Wechsler Adult Intelligence Scale (WAIS, Wechsler, 2008): memory, working memory, attention
- 6) Subtest “general knowledge” of the Wechsler Adult Intelligence Scale (WAIS, Wechsler, 2008): semantic memory
- 7) Logical Memory Test 2 (LM 2): verbal learning and memory
- 8) Verbal learning and memory test (VLMT, Helmstaedter, Lendt, & Lux, 2001): verbal learning and memory

### 2.3. Measures

#### 2.3.1. Psychopathology and childhood adversity

As mentioned above, we applied the SCID to confirm the diagnosis of major depression and to specify the depressive subtype and comorbid axis-I disorders. Furthermore, we noted the time of onset of the first depressive episode, the number of depressive episodes and a potentially chronic course of depression. Each participant's symptom severity was assessed via the Beck Depression Inventory

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