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Research article

Sexual abuse but not posttraumatic stress disorder is associated with neurocognitive deficits in South African traumatized adolescents



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ABSTRACT

Objectives: Neurocognitive impairments are commonly observed in adults suffering from post-traumatic stress disorder (PTSD). The picture is less clear in adolescents. Childhood sexual abuse (CSA) may have an independent influence on neuropsychological test performance and provide partial explanatory power of the inconsistent findings. We hypothesized that adolescents with PTSD who have also suffered sexual abuse would have most pronounced deficits on neurocognitive testing.

Methods: In a cross-sectional design, 105 traumatized South African adolescents, of whom 52 fulfilled criteria of PTSD and 34 reported CSA, were studied. A comprehensive neurocognitive battery including tests of memory, executive functioning, and language was used to analyze the associations of neurocognitive impairments with PTSD and CSA.

Results: Adolescents reporting CSA manifested impairments in proactive and retroactive interference tasks on the Rey Auditory Verbal Learning test and in the copy condition of the Rey Osterrieth figure test, indicating deficits in attention and working memory. Against our hypothesis, no independent effects of PTSD were found on neurocognitive performance. Results were independent of comorbid psychiatric diagnoses.

Conclusions: Sexual abuse seems to have an independent influence on attention and working memory. This could be an early sign of hippocampal impairment.

1. Introduction

Impairments in concentration and memory are often reported by patients of all ages suffering from posttraumatic stress disorder (PTSD). At the same time, a diagnosis of PTSD is associated with poorer performance in school and workplace settings (Kessler & Greenberg, 2002; Thompson & Massat, 2005; Zatzick et al., 1997) which may be accounted for by neurocognitive deficits. Neurocognitive functions that are known to be impaired in adults with PTSD comprise attention, working memory, verbal learning, complex information processing speed, and executive functioning (Scott et al., 2015). In children and adolescents the picture is muddier. In children with PTSD, deficits in attention and executive functioning have been found compared to healthy controls (Beers

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& De Bellis, 2002; De Bellis et al., 2009), although Barrera, Calderón, and Bell, 2013 did not find differences in attention and Beer and De Bellis et al., 2002 did not find differences in language, learning, visual spatial function and psychomotor speed. In another study, some PTSD associated performance deficits in visuospatial domains and executive functioning were found; however, maltreatment, but not PTSD diagnosis, impacted on memory, executive function and working memory (De Bellis, Woolley, & Hooper, 2013). Impairments of memory function were found by one study (De Bellis et al., 2009), although most others investigating visual and verbal memory did not find effects of PTSD in children (Barrera et al., 2013; Beers & De Bellis, 2002; De Bellis et al., 2013).

Few studies have investigated neurocognitive deficits specifically in adolescents with PTSD. Moradi and colleagues (Moradi, Doost, Taghavi, Yule, & Dalgleish, 1999) reported poorer overall everyday memory performance in children and adolescents with PTSD compared to healthy controls. In a sample of adolescent psychiatric inpatients, Kavanaugh and Holler (Kavanaugh & Holler, 2014) found PTSD associated impairments in working memory compared to non-traumatized controls, and in executive function compared to trauma exposed and non-exposed controls. Further, worse verbal memory in children and adolescents with PTSD compared to both healthy and trauma-exposed controls were reported (Yasik, Saigh, Oberfield, & Halamandaris, 2007). Studies in traumatized adolescents with and without PTSD found PTSD associated impairments in attention, delayed recall, and visual reconstruction (Ahmed, Spottiswoode, Carey, Stein, & Seedat, 2012) as well as in attention and visual memory, whereas no differences in verbal memory and executive function were detected (Schoeman, Carey, & Seedat, 2009).

A recent review of neurocognitive deficits in children and adolescents following maltreatment suggests that among other contributory factors, the experience of childhood sexual abuse (CSA) might play a critical role in explaining the above described inconsistencies (Kavanaugh, Dupont-Frechette, Jerskey, & Holler, 2016). CSA is defined as sexual contact or conduct between a child younger than 18 years of age and an adult or older person (Bernstein et al., 2003). CSA is a known risk factor for later psychopathology (Beitchman et al., 1992; De Bellis, Spratt, & Hooper, 2011), and, like PTSD, can affect academic performance (Boden, Horwood, & Fergusson, 2007; Buckle, Lancaster, Powell, & Higgins, 2005). However, the influence of CSA on neurocognition in adults has not been completely disentangled from that of PTSD as most studies have not accounted for PTSD status in their analyses. Poorer performance in long- and short-term visual and verbal memory as well as on executive functioning was seen in female CSA survivors, the majority of whom were diagnosed with PTSD, compared to healthy non-traumatized controls (Rivera-Vélez, González-Viruet, Martínez-Taboas, & Pérez-Mojica, 2014), whilst other studies have not documented CSA-associated memory deficits in mostly healthy participants (Navalta, Polcari, Webster, Boghossian, & Teicher, 2006) and PTSD patients (Stein, Hanna, Vaerum, & Koverola, 1999). Importantly, in children and adolescents, impairments in language domains and memory function have been associated with previous sexual abuse, whereas PTSD diagnosis had no effect on neuropsychological tests applied in this study (De Bellis et al., 2013). Moreover, most studies investigating neurocognition in traumatized children and adolescents did not consider comorbid diagnoses or confirm PTSD-status (for a recent review, see: Kavanaugh et al., 2016).

In sum, although PTSD leads to high effect sizes of neurocognitive deficits in adults, the results have not been consistently replicated in children and adolescents with PTSD. This finding could be influenced by the presence of sexual abuse experiences, possibly through overriding resilience factors, and thereby increasing the risk of PTSD and associated impairments (De Bellis et al., 2011). This could parallel the trajectory of neurocognitive deficits. However, systematic research in this regard is still scarce and it remains debatable as to whether sexual abuse and PTSD have distinct neuropsychological effects. Since neurocognitive performance in childhood and adolescence forms the basis of later academic achievement, it is crucial to expand knowledge in this area. We therefore investigated the associations of PTSD and CSA with cognitive deficits in a sample of over 100 traumatized adolescents. We hypothesized that (i) adolescents with PTSD would perform worse in neurocognitive tests for attention, memory as well as executive functioning, (ii) that these deficits would be more pronounced in those adolescents reporting CSA. In contrast to most former studies we included data on psychiatric comorbidities and (iii) hypothesized that the effects of PTSD and CSA would be independent of comorbid diagnoses.

2. Materials and methods

2.1. Sample

Participants comprised both English and Afrikaans speaking adolescents referred to the Bathuthuzele Youth Stress Clinic, based at the MRC (Medical Research Council) Unit for Anxiety and Stress Disorders, Department of Psychiatry, Stellenbosch University (South Africa), for emotional or behavioral problems secondary to traumatic exposure. Although data on subsets of the sample have been published, an analysis of sexual abuse was not undertaken (Ahmed et al., 2012 (n = 53); Schoeman et al., 2009 (n = 40)). A sample of 131 adolescents (11–19 years, according to World Health Organization, 2011) reporting exposure to at least one life-threatening traumatic event as defined by the DSM-IV-TR (Diagnostic and Statistical Manual for Mental Disorders; American Psychiatric Association, 2000) was recruited. Participants were included if they had at least 6 years of formal education and were proficient in Afrikaans and/or English. Exclusion criteria were known mental retardation, use of sedative psychotropic medication, visual or auditory impairment, traumatic brain injury with loss of consciousness, major medical illness that precluded participation in diagnostic/neuropsychological assessment, or use of illicit substances. Participants aged 18 and older provided written informed consent, and participants under 18 years provided informed assent and a parent or legal guardian provided informed consent. Participants who were in need of treatment were referred as appropriate. Ethical approval to conduct the study was obtained from the Western Cape Department of Education as well as from the Health Research Ethics Committee at Stellenbosch University.

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