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A neuropsychological investigation into violence and mental illness

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Abstract

Previous research has reported cognitive impairment in patients with schizophrenia and antisocial personality disorder (APD), the two psychiatric illnesses most implicated in violent behaviour. Previous studies have focused on either group exclusively, and have been criticized for procedural inadequacies and sample heterogeneity. The authors investigated and compared neuropsychological profiles of individuals with APD and violent and nonviolent individuals with schizophrenia in a single investigation. The study involved four groups of subjects: (i) individuals with a history of serious violence and a diagnosis of APD, (ii) individuals with a history of violence and schizophrenia, (iii) individuals with schizophrenia without a history of violent behaviour and (iv) healthy control subjects. All study groups were compared on a neuropsychological battery designed to assess general intellectual function, executive function, attention, and processing speed. Cognitive deficits were more widespread among individuals with schizophrenia regardless of history of violence, compared with those with APD. Significant impairment in patients with APD was limited to processing speed. Violent individuals with schizophrenia demonstrated poorer performance than their nonviolent schizophrenia peers on a measure of executive function. Different cognitive impairments are manifested by individuals with APD and schizophrenia with violent behaviours, suggesting differences in underlying pathology. Furthermore, cognitive impairment appears to be more a feature of schizophrenia than of violent behaviour, although there is evidence that a combination of schizophrenia and violent behaviour is associated with greater cognitive deficits.

Keywords: Violence; Aggression; Antisocial personality disorder; Schizophrenia; Neuropsychology

1. Introduction

There is an undoubted significant if small association between psychosis and violent behaviour

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(Angermeyer, 2000; Tiihonen et al., 1997). The relationship between personality disorder and violence is much less clear, because of confounding between measures of personality and of antisocial behaviour, but personality disorders are heavily over-represented in prison populations, even if antisocial personality disorder (APD) per se is excluded (Fazel and Danesh, 2002). Furthermore, among people who have committed the most serious violence, many are co-morbid for psychosis and/or personality disorder and the two disorders most frequently implicated in violent behaviour are APD and schizophrenia (Taylor et al., 1998).

Neurobiological studies have suggested that certain structural neural abnormalities are associated with violent behaviour in mentally ill patients (Chesterman et al., 1994). The two neural regions that have been consistently cited in relation to violent behaviour in both APD and schizophrenia in neuroimaging studies are the prefrontal cortex and the limbic system (Das et al., 2002). The prefrontal cortex (PFC) mediates executive function and social conduct, in addition to exerting an inhibitory influence on certain behaviours, such as aggression (Damasio, 1995). Furthermore, neuroimaging studies examining this region have reported structural abnormalities in both schizophrenia (Buchanan et al., 1998) and APD samples (Raine et al., 2000). The other implicated region is the limbic system, an area involved in the processing of external emotional stimuli and relaying it into emotional response (Aggleton, 1992), and studies have demonstrated abnormal limbic structure and function in both schizophrenia (Chesterman et al., 1994) and APD (Laakso et al., 2001). At the neurobiological level, increases in violent behaviour has been linked with reductions in serotonin (Soderstrom et al., 2001; Volavka, 1999), reductions in dopamine (Berman and Coccaro, 1998) as well as increases in testosterone (Book et al., 2001). Substance abuse is also widely reported to exacerbate violent behaviour (Reiss et al., 1994; Bushman and Cooper, 1990), via its influence and interaction with neurochemical agents such as serotonin (Virkkunen and Linnoila, 1993) and GABA (Miczek et al., 1997).

Neuropsychological studies examining cognitive functioning in violent groups have supported neurobiological findings. Numerous reviews of antisocial behaviour and neuropsychological function have frequently cited the causal relationship between neural dysfunction and violence (reviews: Brower and Price, 2001; Morgan and Lilienfeld, 2000; Golden et al., 1996; Yeudall, 1977). These studies have generally reflected the cognitive deficits that can be representative of certain types of neuropathology such as executive function deficits reflecting PFC impairment, but Jones (1992) proposed multiple neuropsychopathological factors contributing to violent behaviour including reduced inhibition, as well as impairment in memory, attention and concentration.

Neuropsychological assessments of schizophrenia populations have demonstrated deficits in a wide range of cognitive domains including impairments in attention, cognitive processing speed and IQ (reviews: Sharma and Antonova, 2003; Goldberg and Gold, 1995). Schizophrenia has been linked to poor performance on several aspects of executive functioning using tests of working memory (Pantelis et al., 1997), inhibition (Perlstein et al., 1998), and strategy formation and planning (Morris et al., 1995). Within the schizophrenia population, those with violent histories are found to demonstrate impaired performance than those without a violent history on the Wechsler Adult Intelligence Scale (WAIS) (Krakowski et al., 1989) and Luria–Nebraska tests (Adams et al., 1990). One study that directly compared non-aggressive and aggressive (co-morbid APD) schizophrenia groups (Rasmussen et al., 1995) reported the aggressive group to perform poorly than the non-aggressive group on tasks of frontal functioning with the reverse being true for reaction time tasks.

Unlike schizophrenia, investigations of APD and psychopathy (a closely related condition) do not show significant differences in general intellectual performance in comparison to healthy groups (Walsh, 1991; Miller, 1987; Prentice and Kelly, 1963). However, these groups still exhibit deficits in executive function across a range of tasks especially on those indexing response inhibition and cognitive flexibility (Dolan and Park, 2002; Morgan and Lilienfeld, 2000; Lapierre et al., 1995; Devonshire et al., 1988; Gorenstein, 1982). Furthermore, performance on tests of impulsivity and emotional response have been cited as particularly impaired in APD (Dinn and Harris, 2000; Lapierre et al., 1995). Overall, the literature consistently reports that APD groups display PFC-related deficits in executive function, inhibitory control and emotional recognition. However, these