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Sensorimotor gating characteristics of violent men with comorbid psychosis and dissocial personality disorder: Relationship with antisocial traits and psychosocial deprivation

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ABSTRACT

Evidence suggests violence amongst those with psychosis is not aetiologically homogeneous, and that a large proportion of those who engage in violent behaviour have a comorbid antisocial personality disorder. Initial investigations indicate that this subgroup has distinct historical and neuropsychological characteristics, which may indicate diverse treatment needs. This study investigated sensorimotor gating characteristics of violent men with diagnoses of both psychosis and dissocial personality disorder (DPD) ($n = 21$) relative to violent men with psychosis alone ($n = 12$), DPD alone ($n = 14$) and healthy, non-violent male controls ($n = 27$), using the prepulse inhibition (PPI) paradigm. The results indicated that, relative to the psychosis alone and healthy control groups, the comorbid group had lower PPI, especially at 60-ms prepulse-to-pulse interval. The DPD group took an intermediary position and did not differ from any group. Antisocial personality traits (factor two scores of the Psychopathy Checklist - Revised), and greater severity of childhood psychosocial deprivation (including physical and sexual abuse), were significantly correlated with poor PPI across the clinical sample. The findings suggest diverse sensorimotor gating profiles amongst subgroups of violent offenders, with comorbid psychosis and DPD showing most impairment. This is consistent with a 'double dose' of deficit explanation amongst those with both diagnoses, explained at least in part by presence of antisocial personality traits and childhood psychosocial deprivation.

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1. Introduction

The large majority of those with a mental disorder will never be violent (Walsh and Fahy, 2002) and are more likely to become the victim of violence themselves (Walsh et al., 2003). There is, however, epidemiological evidence to suggest that individuals diagnosed with a psychotic disorder are at a higher risk of engaging in violent behaviour, relative to the general population (e.g. Tiihonen et al., 1997; Eronen et al., 1998; Arseneault et al., 2000; Mullen et al., 2000). This places them at risk of deleterious outcomes, such as incarceration, loss of employment and reduced social contacts, as well as

stigma. A greater understanding of violent behaviour in the context of mental disorder should be considered a priority to reduce distress and poor functional outcomes for individuals, and protection as well as education of the wider public.

The aetiology of any violent behaviour is complex and multifaceted (Mullen, 2006). Violence amongst those with psychosis may be no different, with distinct subtypes present and heterogeneous origins (Hodgins, 2008). Some individuals present with antisocial behaviours prior to the onset of psychosis and likely meet criteria for one of the antisocial personality disorders [antisocial personality disorder (ASPD), dissocial personality disorder (DPD) and/or the clinical syndrome of psychopathy (Bo et al., 2011; Volavka and Citrome, 2008)] while others behave violently in the absence of antisocial personality traits (Hodgins, 2008). These two subgroups may have different characteristics, potentially indicating different therapeutic needs. The validity of distinct subgroups (with/without PD) is also strengthened by longitudinal cohort studies, one of which found that individuals with an adult schizophreniform disorder were 2.8

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times more likely than those without to have been diagnosed with childhood conduct disorder, equating to around 40% of the schizophreniform group (Kim-Cohen et al., 2003). This suggests a pervasive pattern of antisocial behaviour beginning in childhood and persisting to adulthood. Indeed, in a study of those experiencing their first episode of psychosis, around 34% of men and 10% of women had an existing record of criminal conviction, with approximately 20% and 5% (respectively) having a record of violent conviction (Hodgins et al., 2011).

Studies focussing on demographic and historical characteristics indicate that individuals with psychosis and an antisocial personality disorder are characterised by pervasive substance abuse, attentional problems, poor educational attainment, a lengthy criminal history which precedes illness onset, and commit crimes which are not driven by symptoms (Joyal et al., 2004; Moran and Hodgins, 2004; Steinert et al., 1998). A recent study (Tang et al., 2016) reported poorer executive function, assessed using the Wisconsin Card Sorting Test (WCST) in individuals who had both ASPD and schizophrenia, relative to non-violent individuals with schizophrenia alone. Earlier, Barkataki et al. (2005) had reported poor WCST performance in violent individuals with schizophrenia relative to non-violent individuals with schizophrenia alone; although both of their schizophrenia groups were required to be free of ASPD diagnosis, psychopathy scores (antisocial personality traits) were markedly higher in their violent schizophrenia group. A greater understanding of patients with comorbid psychosis and an antisocial personality disorder remains a priority for research since this group makes up a large percentage (~45%) of individuals utilising forensic mental health services (Blackburn et al., 2003).

Prepulse inhibition (PPI) of the startle response (Graham, 1975), a widely employed psychophysiological model to examine sensorimotor disturbances in a range of neuropsychiatric populations (Braff, 2010; Swerdlow et al., 2014), offers a valuable tool to advance the study of violence amongst those with comorbid diagnoses of psychosis and an antisocial personality disorder versus psychosis-alone for a number of reasons. Firstly, there is noted convergence between the neural substrates of PPI and the neurobiology of aggression/violence. For example, frontal and temporal lobe deficits have been associated with both reduced PPI (Kumari et al., 2003, 2005a, 2007; Hazlett et al., 1998, 2001; Swerdlow et al., 2008) and the exhibition of violent behaviour (Hoptman, 2003, 2015; Yang and Raine, 2009; Pardini et al., 2014). Secondly, there is evidence from a previous study (Kumari et al., 2005b) for an association between reduced PPI and the severity of violence across groups of patients with schizophrenia and ASPD. Lastly, PPI offers the advantage of not being subject to a number of limitations typically encountered in neuropsychological testing, such as low effort, malingering or symptom exaggeration, with the last two being particularly problematic when assessing forensic groups (Mittenberg et al., 2002).

The primary aim of the present study, therefore, was to examine PPI in violent patients with comorbid psychosis and DPD relative to violent patients with only psychosis or DPD, as well as a healthy, non-violent group. DPD is described by the International Classification of Diseases, 10th edition (ICD-10; World Health Organization, 1992), and is aligned to ASPD in the DSM-IV. Although DPD is characterised by more affective/interpersonal difficulties (e.g. callousness, incapacity to maintain relationships) in contrast to the more behaviourally defined ASPD (e.g. violation of rules, impulsivity), there is significant overlap (e.g. irresponsibility, aggression, and failure to conform to social norms). Our secondary aims were to explore the influence of psychosocial deprivation (including physical and sexual abuse) in PPI across groups, given our previous studies showing a higher prevalence of childhood deprivation in offenders with ASPD, followed by schizophrenia, and additional brain deficits in PPI-relevant regions (e.g. the thalamus) in association with a history of childhood deprivation across the groups (Kumari et al., 2013, 2014).

2. Method

2.1. Participants and design

The study involved four groups: patients with both a psychotic disorder and DPD (“Comorbid”: $n = 21$; 12 with schizophrenia and nine schizoaffective disorder); patients with a psychotic disorder (“Psychosis”: $n = 12$; 10 with schizophrenia, one schizoaffective disorder, one delusional disorder), patients with DPD (“DPD”: $n = 14$), and healthy control participants (“Controls”: $n = 27$). Patients were recruited from a high-secure forensic psychiatric hospital in the United Kingdom and all had a history of violence. Male staff from the hospital comprised the control group, who had been assessed using the screening module from the Structured Clinical Interview for DSM Disorders (non-patient version) (First et al., 2002) and found to be free from mental disorder.

All diagnoses were made by the patient’s responsible clinician (consultant psychiatrist) using the ICD-10 at admission, following a detailed clinical interview. Diagnosis at this hospital is reviewed every six months. Responsible clinicians referred patients who were deemed to have capacity to give consent to participate in research, were clinically stable enough to meaningfully partake, did not pose an imminent risk of violence to researchers, did not have a history of traumatic brain injury, and had normal hearing. All patients were free of current substance abuse (subject to random urine analysis checks as part of their routine clinical care) and non-smokers (as per the hospital policy). As PPI is sensitive to smoking (nicotine increases PPI; Hong et al., 2008; Kumari et al., 2001; Postma et al., 2006), any controls who were smokers ($n = 6$) were asked to refrain from smoking for 2 h prior to testing. All patients were non-smokers.

The study was reviewed and approved by the National Research and Ethics Service (REC Ref: 14/LO/0238) and West London Mental Health Trust Research and Development (98,463/LNW). Participants received £30 into their hospital accounts (patients) or in cash (controls) upon completion of PPI experiment and additional tasks (not reported here). Demographic, clinical and offence-related variables are displayed in Table 1.

2.2. Sample characterisation

All participants were assessed on estimated premorbid IQ using the Wechsler Test of Adult Reading (WTAR; Wechsler, 2001). In addition, medication was recorded, and the ratings of psychopathy, violence and psychosocial deprivation were obtained for patients as described below.

2.2.1. Antisocial personality traits

The Psychopathy Checklist – Revised (PCL-R; 2nd Edition) (Hare, 2003) was used as a measure of antisocial personality traits. It is a 20 item checklist, normally scored after interview and comprehensive review of clinical/forensic records. Items are rated as not present (0), partially present (1), or present (2), allowing a maximum score of 40. The PCL-R, as conceptualised by Hare (2003), is composed of two overarching factors relating to a callous, remorseless and arrogant interpersonal style (Factor 1) and a reckless, impulsive, antisocial lifestyle (Factor 2). The PCL-R has shown robust associations with antisocial conduct in meta-analysis (Leistico et al., 2008). It is widely used in clinical forensic settings, and can be applied to individuals with psychosis and PD (e.g. Coid and Ullrich, 2010; Tengström et al., 2000). For the purpose of this study, psychopathy scores were taken from clinical records where available. If psychopathy scores were not available, the PCL-R was rated on the basis of file information only, which has been deemed acceptable for research purposes if the information is detailed enough (Hare, 2003). All participants had a large amount of detailed information

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