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# The consequences of Conduct Disorder for males who develop schizophrenia: Associations with criminality, aggressive behavior, substance use, and psychiatric services

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## Abstract

Men with schizophrenia are at increased risk, as compared to the general population, for criminal offending and to have displayed Conduct Disorder (CD) before age 15. The present study examined the consequences of CD among a sample of 248 men with schizophrenia or schizo-affective disorder, aged, on average, 39 years old. Participants were intensively assessed at discharge from the hospital and four times during the subsequent two-year period. CD was associated with criminality and substance misuse among first-degree male relatives and substance misuse among female relatives. In childhood and adolescence, CD was associated with poor academic performance, substance abuse, and physical abuse. In adulthood, the diagnosis of CD and each CD symptom were associated with increased non-violent and violent criminal offending, after adjusting for life-time diagnoses of substance misuse disorders. CD was not associated with homicide. CD was associated with life-time diagnoses of alcohol and drug abuse and/or dependence. During the 24 month follow-up period, CD and the number of CD symptoms were associated with aggressive behavior, controlling for life-time diagnoses of substance use disorders, substance misuse measured objectively and subjectively, medication compliance, and obligatory care. CD was associated with an earlier age at onset of schizophrenia and at first admission to hospital, and with length of time spent in hospital. During the two-year follow-up period, neither the diagnosis of CD nor the number of CD symptoms was associated with levels of positive and negative symptoms assessed five times, compliance with medication, substance use, or readmission. The results are interpreted to suggest that CD is a distinct co-morbid disorder that runs parallel to the course of schizophrenia.

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## 1. Introduction

Evidence has accumulated indicating that persons who develop schizophrenia are at increased risk for non-violent offending, at higher risk for violent offending, and at even higher risk to commit homicide. This evidence derives from investigations of large birth cohorts (Arseneault et al., 2000; Brennan et al., 2000; Tiihonen et al., 1997) and population cohorts (Wallace et al., 2004) in which the criminality of persons who developed schizophrenia is compared to that of other cohort members, from studies comparing the criminality of persons with schizophrenia living in the community to that of their neighbors (Lindqvist and Allebeck, 1999), and from diagnostic studies of random samples of convicted offenders (Fazel and Danesh, 2002) and of complete cohorts of homicide offenders (Erb et al., 2001). The increased risk of non-violent and violent crime among persons who develop schizophrenia has been observed using different types of investigations, conducted in different countries, by different research teams. These consistent findings impel us to discover why persons with schizophrenia engage in criminal behaviors and to develop interventions to prevent it.

Recently, a report from a prospective investigation of a New Zealand birth cohort indicated that as many as 40% of the cohort members who developed schizophreniform disorders by age 26 met the criteria for Conduct Disorder (CD) by age 15 (Kim-Cohen et al., 2003). This finding replicates an older report from a prospective US study indicating that children with antisocial behavior were at an increased risk for schizophrenia (Robins, 1966). These observations from prospective investigations concur with results from a cross-sectional study of a large, representative sample of US adults (Robins, 1993; Robins and Price, 1991; Robins et al., 1991) again indicating an increased prevalence of CD among individuals who develop schizophrenia. Consistent with these findings are results showing that among children of parents with schizophrenia, there is a sub-group, larger among males than females, who display persistent behavior problems in childhood and adolescence prior to the onset of schizophrenia (Asnarow, 1988; Olin et al., 1997).

In general population samples, CD has very negative consequences for adult life, either by leading to persistent criminality or to other serious forms of

maladjustment. Longitudinal investigations suggest that few, if any, individuals who display CD by adolescence become healthy autonomous adults (Farrington et al., 1988; Moffit et al., 2002). Little is known about the consequences of CD among individuals who develop schizophrenia. We have found four previous studies and they all suggest a link between CD and violence. But one included only 39 men and women, aged 21, with schizophrenia-spectrum disorders participants with schizophrenia (Arseneault et al., 2000); one did not present results separately for participants with schizophrenia (Fulwiler and Ruthazer, 1999); one examined only participants with co-morbid substance use disorders (Mueser et al., 1997); and a fourth included only offenders with schizophrenia and assessed the link with childhood problems and not CD (Tengström et al., 2001).

CD precedes the onset of substance misuse both in general population samples (Armstrong and Costello, 2002; Robins and McEvoy, 1990) and in patients with severe mental illness (Mueser et al., 1999). Two studies, one prospective and one cross-sectional, reported that among patients with major mental disorders substance misuse in childhood or early adolescence was a more powerful predictor of adult violence than substance misuse in adulthood (Fulwiler et al., 1997; Hodgins and Janson, 2002). While CD and childhood onset substance misuse overlap, they have been shown to be at least partially independent in predicting violence in adulthood (Fulwiler et al., 1997). Most studies that have identified substance misuse as a correlate of violence among persons with schizophrenia (Eronen et al., 1996; Monahan et al., 2001; Swartz et al., 1998) have not measured CD or Antisocial Personality Disorder (APD). Yet, one study has shown that among male offenders with schizophrenia, substance misuse was associated with criminality only among those men who did not have a childhood history of antisocial behavior (Tengström et al., 2004).

One view posits that CD is distinct from schizophrenia and that the courses of the two disorders run in parallel across the life-span. This view suggests that adult criminality is a consequence of CD among individuals who develop schizophrenia as among those without a psychotic illness. We reasoned that if CD is distinct from schizophrenia, then it would not be associated with features of schizophrenia, such as age of onset and symptom presentation. However,

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