Psychotic Symptoms Among Male Adolescent Detainees in The Netherlands

by Coby Vreugdenhil, Robert Vermeiren, Luuk F.J.M. Wouters, Theo A.H. Doreleijers, and Wim van den Brink

Abstract

This study investigated the prevalence of psychotic symptoms among incarcerated boys as well as the relationship between these symptoms and violent offending and criminal recidivism. The presence of psychotic symptoms was assessed in a representative sample of 204 incarcerated boys aged 12–18 using the Diagnostic Interview Schedule for Children (DISC-2.3). Seventy-two percent of the study participants had committed a violent index offense and 30 percent were criminal recidivists. Thirty-four percent (95% confidence interval [CI]: 27–41%) were DISC-2.3 psychosis screen positive: 25% (95% CI: 19–31%) reported at least one pathognomonic of schizophrenia symptom and 9% (95% CI: 6–14%) reported at least three non-pathognomonic psychotic symptoms. In addition, 33 percent (95% CI: 26–40%) reported one or two isolated, atypical psychotic symptoms. The presence of psychotic symptoms was not associated with violent offending or criminal recidivism.

The high prevalence rate of psychotic symptoms among incarcerated boys calls for increased attention to diagnosis and treatment of psychosis. To obtain conclusive answers regarding the relationship between psychosis and violent offending, additional studies are needed in general population samples.

Keywords: Juvenile delinquency, incarceration, psychosis, violent offending, criminal recidivism.


Although schizophrenia and other psychotic disorders are very common among adult incarcerated delinquents (Andersen et al. 1996; Birmingham et al. 1996), little is known about the prevalence of psychotic disorders among incarcerated juveniles. It is important to assess the prevalence of psychotic symptoms in youth because schizophrenia shows a marked rise in incidence during adolescence. In addition, pre-onset and early detection can lead to pre-onset and early intervention, which possibly can improve the prognosis, although further research on this topic is needed (Larsen et al. 2001; McGlashan et al. 2001; Harrigan et al. 2003). In the United States, a small number of methodologically sound studies have been conducted in large groups of incarcerated youth. Three recent studies found high rates of DISC psychosis screen positive individuals, predominantly males, varying from more than 25 percent to 45 percent (Atkins et al. 1999; Shelton 2001; Teplin et al. 2002). Earlier, McManus et al. (1984), using the Schedule of Affective Disorders and Schizophrenia (SADS; Spitzer and Endicott 1977), a semi-structured interview, found 18 percent of incarcerated male juveniles meeting criteria of a psychotic disorder. Until now, only one study from outside the United States has been published (Gosden et al. 2003). Using the semi-structured Schedules for Clinical Assessment in Neuropsychiatry, version 2.1 (SCAN; Wing et al. 1990), much lower psychosis rates were found in this study: 2 percent schizophrenia and 2 percent schizotypal personality disorder. However, for a direct comparison with the recent North American studies, it is necessary to investigate the prevalence of psychotic symptoms in a Western European sample of incarcerated adolescent boys using the DISC as the main assessment instrument. In addition, because the presentation of “adult” psychotic disorders is more atypical and diffuse among adolescents, it is necessary not only to assess “classic” schizophrenia and schizotypal personality disorder symptoms, but also atypical psychotic symptoms as possible markers of (prodromal) schizophrenia. With the DISC-2.3 psychosis screen, 9 pathognomonic (of schizophrenia) symptoms and 16 non-pathognomonic psychotic symptoms are assessed. A person is “psychosis screen positive” if he reports at least one pathognomonic symptom or at least three non-
pathognomonic symptoms in the past year. However, because, especially among adolescents, isolated atypical psychotic symptoms also could be markers of (prodromal symptoms of) schizophrenia, it is necessary to also investigate the prevalence of persons reporting only one or two non-pathognomonic symptoms. Therefore, in the current study, we discern three non-overlapping psychotic symptom groups: (1) a group reporting at least one pathognomonic (of schizophrenia) symptom: the specific psychotic symptoms group (SPS); (2) a group reporting at least three non-pathognomonic, but no pathognomonic psychotic symptom: the atypical psychotic symptoms group (APS); and (3) a group reporting one or two isolated non-pathognomonic symptoms only: the isolated atypical psychotic symptoms group (IPS).

More knowledge about the relationship between psychosis and both violent offending and criminal recidivism can be helpful in detecting whether psychosis is a risk factor for (violent) re-offending, and if so, to develop effective prevention strategies. An early study suggested that extremely violent incarcerated boys exhibited psychotic symptoms more often than less violent incarcerated boys (Lewis et al. 1979). These findings, although interesting, were based solely on clinical judgments and have never been replicated using modern standardized psychiatric interviews.

The relationship between psychotic disorders and criminal recidivism has never been studied among delinquent juveniles. Although an association between psychosis and violent offending or criminal recidivism may exist, certain other characteristics may explain this relationship. Factors mentioned in the literature are male gender, young age, low socioeconomic status (SES) (Walsh et al. 2002), low intelligence (Richter et al. 1996; Farrington and Loeber 2000), ethnicity (Wierson and Forehand 1995; Hoodleit 2001), comorbid substance-use disorders (Harris and Koepsell 1998; Walsh et al. 2002), substance use directly prior to the violent act (Arseneault et al. 2000), comorbid conduct disorder (Arseneault et al. 2000; Blocher et al. 2001), excessive perception of threat (Arseneault et al. 2000), and a history of trauma (Steiner et al. 1997; Crimmins et al. 2000).

In order to amass more knowledge about psychotic symptoms among incarcerated youth, the current study was performed. The study sought (1) to establish the prevalence of psychotic symptoms in a large representative sample (n = 204) of incarcerated males aged 12–18 in The Netherlands, using a standardized psychiatric assessment instrument, and (2) to investigate the relationship between psychotic symptoms and both violent offending and criminal recidivism, controlling for potential confounders.

**Method**

**Subjects**

**Target population.** Figure 1 shows that in The Netherlands, approximately 41,000 adolescent males...
(approximately 7% of all adolescent males) are arrested annually. Of these, approximately 38,900 (95% of those arrested) are ordered to perform community service or pay a fine, generally because they committed less severe offenses, such as shoplifting or vandalism. The remaining 2,100 boys (5% of those arrested) are placed in youth detention centers because they committed violent or serious non-violent criminal acts. Of these 2,100 boys who are kept in pre-trial detention (maximum 106 days), 1,500 are sent home before or immediately after the trial. The remaining 600 (1.5% of those arrested) are sentenced to post-trial detention with or without compulsory treatment (Ministry of Justice 2001). The latter group is the target population of this study.

It is not known whether pre- and post-trial detention boys are different with respect to age, ethnicity, the severity of the index offense, or criminal recidivism. However, there are not reasons to assume that boys who only get pre-trial detention differ from those who are adjudged to post-trial detention in terms of psychopathology. The courts may suspend the preliminary detention on the condition that the (less seriously delinquent) suspect submits himself to psychiatric treatment. However, data about (the supposedly small size of) that practice are not available. It should be noted that criminal (juvenile) justice in The Netherlands has no clause such as “inability to stand trial.” Seriously delinquent juveniles are taken into pre-trial detention, even if they are obviously psychiatrically disturbed. During this period, a forensic mental health evaluation can be performed, which leads to a psychiatric diagnosis and advice about the necessity of psychiatric treatment, and if so, whether it has to be executed in a psychiatric hospital (seldom) or a specialized detention center (often).

Participants. Over a 1-year period (December 1998 to December 1999), we recruited subjects from six of the nine youth detention centers in The Netherlands. (Three institutions were excluded because of their remote location.) Eligible for inclusion were all boys who were sentenced to detention less than three months before the start of the data collection and who were at that time younger than 19 years. It was not possible to compare sociodemographics and crime-related characteristics of eligible boys in the participating centers with those of boys in the nonparticipating centers, because, in the national database, accurate information about these variables was often missing. However, detention in a specific center is based only on cell availability and no specific entry criteria are applied. In The Netherlands, there is no policy to place delinquent juveniles in youth detention centers nearby their places of residence. In fact, all youth detention centers house boys from all over the country. In addition, for purely logistic reasons, during detention, juvenile delinquents are frequently moved to other youth detention centers. Therefore, there are no indications that the delinquents from the three nonparticipating centers are substantially different from our study sample.

Of the 540 boys meeting inclusion criteria, 145 were not included because they were discharged from the institution before consent to participate was obtained, leaving 395 boys eligible to be assessed. Of these 395 boys, 82 refused to participate, resulting in a response rate of 79 percent. The remaining 313 boys were administered a structured questionnaire regarding sociodemographics and psychosocial characteristics and the Youth Self-Report (YSR; Achenbach 1991). The 313 participants did not differ from the total group of nonparticipants (n = 227) with respect to age, ethnicity, crime severity, and criminal recidivism. Because in The Netherlands, incarcerated juveniles are not subject to routine clinical psychiatric examination, and file information is generally sparse, over- or under-representation of psychotic symptoms among nonparticipants cannot be excluded. It is conceivable that boys refused because of paranoid ideations. However, the clinical impression was that refusers were mostly angry about something that had happened recently in the detention situation and therefore did not want to cooperate.

Because of limited financial resources, it was not possible to interview all 313 participants with the DISC-C. Therefore, it was decided to interview the first consecutive 200 boys. Actually, however, 204 consecutive boys were interviewed and reported on. Full participants (n = 204) were not significantly different from partial (n = 109) and nonparticipants (n = 227) together (n = 336) in terms of age, ethnicity, crime severity, or criminal recidivism. In addition, full participants did not significantly differ from 109 partial participants in terms of any of the sociodemographics and crime-related variables shown in Table 1, and with respect to YSR psychopathology scores, use of psychotropic medication, psychosocial treatment, parental conflicts, and physical or sexual abuse. Therefore, it is not very likely that full participants (n = 204) differed from partial participants (n = 109) with respect to psychiatric disorders, including psychotic symptoms.

This article is reporting a part of a larger study investigating the prevalence of various psychiatric disorders, including substance use disorders, among the same 204 incarcerated male adolescents (Vreugdenhil et al. 2003, 2004).

Assessment Instruments

File information. Sociodemographic information (e.g., age and ethnicity) and crime-related data were derived from the official registration system used in all
Table 1. Sociodemographic and crime-related characteristics

<table>
<thead>
<tr>
<th>Sociodemographics</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td>194</td>
<td>25</td>
</tr>
<tr>
<td>Surinamese</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Antillean</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Moroccan</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Turkish</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Other ethnicity</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second- (vs. first-) generation immigrant</td>
<td></td>
<td>63</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low-level (vs. high-level) educational attainment</td>
<td>185</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Low-level (vs. high-level) socioeconomic status (SES)</td>
<td>178</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grew up in family with both biological parents</td>
<td>191</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Living situation before arrest</td>
<td>196</td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>Independent</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Institution</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Homeless; frequently changing</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Crime-related characteristics</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index offense</td>
<td>187</td>
<td></td>
</tr>
<tr>
<td>Sexual offense</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Violence against people</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>Violence against property</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Acquisitive crimes</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Other offenses</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Criminal recidivism</td>
<td>195</td>
<td>30</td>
</tr>
</tbody>
</table>

1. "Low level" means less than a middle school education; "high level" means a middle or high school education.
2. SES was assessed with a 6-point scale of parental education (Van Westerlaak et al. 1975) and split into low-level SES (1–3) and high-level SES (4–6).

Psychosocial history interview. To collect standardized information about educational attainment, socioeconomic status (SES), family composition, living situation before the index arrest, childhood adversities, and treatment history before the index arrest, all participants completed a structured interview designed by the authors. Educational attainment was split into two categories: low level (no high school [HS] education, some HS special education, or some HS low-level vocational training) and high level (middle or high-level HS school education). We assessed SES using a 6-point scale based on parental occupation (van Westerlaak et al. 1975) and categorized as low level (1–3) and high level (4–6). To assess psychosocial treatment, we asked respondents whether they had ever received ambulatory, day-clinical, or residential psychiatric or psychosocial treatment or had ever been placed in a foster home. We assessed psychiatric disorders of the biological parents by asking participants whether one or both parents had ever received psychiatric treatment (clinically or nonclinically). To assess substance abuse in the biological parents, we asked respondents whether one or both parents had ever used hard drugs (e.g., amphetamines, ecstasy, LSD, heroin, cocaine, or solvents), cannabis after age 35, or more than 14 (mother) or 21 (father) glasses of alcohol in a week (ever or periodically). We assessed criminality of the biological parents by asking respondents whether one or both parents had ever been sentenced. Parental conflicts were assessed by asking whether the parental figures with whom the juvenile had lived for the longest period had ever had conflicts about raising the children or whether one parent had ever
been beaten by the other parent with an object (e.g., a belt, plank, or rope) or pushed, burned, cut, or given electric shocks that were noticed by the neighbors or required a doctor’s visit. Physical abuse was assessed by asking respondents whether they had ever been beaten with an object by somebody at least 5 years older or pushed, burned, cut, or given electric shocks that were noticed by the neighbors or required a doctor’s visit. We determined sexual abuse by asking respondents whether somebody at least 5 years older had ever touched their genitals or had asked the respondents to touch their genitals (or breasts).

YSR. We administered the YSR (Achenbach 1991) to obtain standardized reports of the participants’ emotional (internalizing) and behavioral (externalizing) problems during the previous 6 months. Good reliability and validity have been demonstrated for the American as well as the Dutch versions of the YSR (Achenbach 1991; Verhulst et al. 1997).

DISC. The presence of psychiatric disorders and of two trauma-related variables were assessed with the DISC, a structured psychiatric interview (Shaffer et al. 1996, 2000). This study used the version designed for interviewing children aged 9 to 17 years or older (Shaffer et al. 2000). Because only three DISC-IV sections (anxiety, affective, and disruptive behavior disorders [DBDs]: conduct disorder [CD], oppositional defiant disorder [ODD], and attention deficit hyperactivity disorder [ADHD]) were translated into Dutch at the time of this study, the DISC-2.3 was used for the psychotic and the substance use disorder sections. A full description of the development of the DISC-2.3 (generating DSM-III-R diagnoses) and its validation is given by Schwab-Stone et al. (1996) and Shaffer et al. (1996). The test-retest reliability of the DISC-IV (generating DSM-IV diagnoses) in a clinical sample is adequate (Shaffer et al. 2000). Among adolescents with conduct and substance use problems, the discriminative validity of the DISC-IV youth report of CD and substance use disorders (SUDs) seems adequate. However, these juveniles may underreport ADHD, ODD, and major depressive disorder (Crowley et al. 2001).

The psychosis screen of the DISC-2.3 asks for the presence of 9 psychotic symptoms pathognomonic of schizophrenia and 16 non-pathognomonic psychotic symptoms ever occurring in the past year. If a person mentions to have experience at least two (pathognomonic or nonpathognomonic) psychotic symptoms in the past year, further questions are asked about the duration of symptoms, concomitant substance use, the age of onset (diagnosis-specific) functional impairment, and the need for treatment. A person is defined to be “psychosis screen positive” if he reports one pathognomonic of schizophrenia symptom or at least three nonpathognomonic psychotic symptoms occurring in the past year.

Based on the psychosis screen symptom scores, four groups were identified: (1) subjects with at least one pathognomonic of schizophrenia symptom (the SPS group), (2) subjects with no pathognomonic schizophrenia symptom and at least three nonpathognomonic psychotic symptoms (the APS group), (3) subjects with only one or two nonpathognomonic psychotic symptoms: (the subclinical group with isolated atypical psychotic symptoms [IPS]), and (4) subjects with no psychotic symptoms (NPS). Given our interest in the psychopathology prior to the index arrest of these delinquent boys, the time frames of the DISC-IV and the DISC-2.3 were changed from “last year” into “the year before arrest” and from “last 6 months” to “the 6 months before arrest,” respectively.

Two trauma-related variables were derived from the posttraumatic stress disorder (PTSD) subsection of the DISC-IV: the lifetime number of traumatic events (0, 1, > 1) and “victimization” (versus “no trauma” or “witnessing without victimization”).

Groninger Intelligence Test (short version). Intelligence was measured with the short version of the Groninger Intelligence Test (GIT) (Kooreman and Luteijn 1987). This test was chosen because individual assessment takes only 25 minutes. The short version of the GIT has shown to be especially useful in individuals with lower education (Kooreman and Luteijn 1987; Evers et al. 1992).

Procedure. All eligible boys were given oral and written information about the aims, content, duration, and the confidentiality of the interviews. They were assured that refusing to participate in the study would not influence their status or treatment. The boys then could consult their primary caregivers or other adults about participation. Only those who gave written informed consent were included in the study. Participants were interviewed in the youth detention centers by DISC-trained research psychologists, who did not belong to the clinical staff, and received a compensation of 10 euros.

Statistical Analysis. To judge the precision of the point estimates, prevalence rates of psychotic symptom groups and individual psychotic symptoms are given together with their 95 percent confidence intervals (95% CI). We used univariate analyses with chi-square tests for categorical variables and t tests for independent samples or one-way analyses of variance for continuous variables to investigate the relationship between variables of interest and the presence of psychotic symptom groups, violent offending, and criminal recidivism. These analyses detected potential confounders of the relationship between psychotic symptom groups and both violent offending and criminal recidivism. If a variable was associated (on a 25% level; Hosmer and Lemeshow 1989)
with psychotic symptoms and violent offending or with psychotic symptoms and criminal recidivism, it was classified as a potential confounder. To adjust for confounding, we performed multiple logistic regression and polytomous logistic regression analyses, including all potential confounders in the model and providing adjusted odds ratios. All tests were 2-tailed, and the significance level was set at an alpha of 0.05.

Results

Sample Characteristics. Table 1 shows the sociodemographic and crime-related characteristics of the study sample. The mean age of the participants was 16.4 years (S.D. = 1.2). Ethnic minorities were clearly overrepresented compared with the general population of the same age group in The Netherlands. Such overrepresentation is found in most crime surveys of this kind in The Netherlands.

Prevalence of Psychotic Symptoms. Thirty-four percent (95% CI: 27–41%) of the incarcerated boys were DISC-2.3 psychosis screen positive: 25 percent (95% CI: 19–31%) met criteria for at least one pathognomonic of schizophrenia symptom (SPS) and 9 percent (95% CI: 6–14%) met criteria for at least three nonpathognomonic psychotic symptoms (APS). In addition, 33 percent (95% CI: 26–40%) of the sample reported one or two isolated nonpathognomonic psychotic symptoms (IPS), and 34 percent (95% CI: 27–41%) had no psychotic symptoms at all (NPS). The prevalence of psychotic symptomatology was thus 66 percent (95% CI: 59–73%).

Factors Associated With the Presence of Psychotic Symptoms, Violent Offending, and Criminal Recidivism. Table 4 shows that the presence of psychotic symptoms was significantly ($p < 0.05$) positively associated with internalizing and externalizing psychopathology scores on the YSR, the presence of affective and anxiety disorders, and the number of traumatic events. Table 5 shows that violent offending (vs. nonviolent offending) was negatively associated with IQ, alcohol dependence, and other substance dependence and positively associated with more than one traumatic event. Table 6 shows that criminal recidivism was significantly positively associated with age and low level SES and negatively associated

Table 2. Prevalence of pathognomonic (of schizophrenia) scale items of the psychosis screen of the DISC–2.3 among incarcerated male adolescents, in % (95% CI)

<table>
<thead>
<tr>
<th>Pathognomonic scale items</th>
<th>Total ($n = 194$)</th>
<th>SPS group ($n = 48$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I thought that other people could read or manipulate my thoughts</td>
<td>12 (8–17)</td>
<td>48 (33–63)</td>
</tr>
<tr>
<td>I had a vision or saw things others could not see</td>
<td>6 (3–11)</td>
<td>25 (14–40)</td>
</tr>
<tr>
<td>I thought I possessed special powers</td>
<td>5 (2–9)</td>
<td>19 (9–33)</td>
</tr>
<tr>
<td>I thought that there were special messages, only for me, on television, radio, in newspapers, or in magazines</td>
<td>3 (1–7)</td>
<td>13 (5–25)</td>
</tr>
<tr>
<td>I thought that I was famous</td>
<td>3 (1–7)</td>
<td>13 (5–25)</td>
</tr>
<tr>
<td>I sat or stood still for a while in a strange position as if I were frozen</td>
<td>3 (1–7)</td>
<td>13 (5–25)</td>
</tr>
<tr>
<td>Somebody put thoughts in my head in a magical way</td>
<td>2 (1–5)</td>
<td>8 (2–20)</td>
</tr>
<tr>
<td>Somebody could take my thoughts out of my head or steal them</td>
<td>1 (0–4)</td>
<td>4 (1–15)</td>
</tr>
<tr>
<td>My muscles and movements were controlled by others in a certain way</td>
<td>1 (0–4)</td>
<td>4 (1–14)</td>
</tr>
</tbody>
</table>

Note.—CI = confidence interval; DISC–2.3 = Diagnostic Interview Schedule for Children; SPS group = subjects with at least one pathognomonic of schizophrenia symptom.
Table 3. Prevalence of nonpathognomonic (of schizophrenia) scale items of the psychosis screen of the DISC-2.3 among incarcerated male adolescents, in % (95% CI)

<table>
<thead>
<tr>
<th>Nonpathognomonic scale items</th>
<th>Total (n = 194)</th>
<th>IPS group (n = 63)</th>
<th>APS group (n = 18)</th>
<th>SPS group (n = 48)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I thought that I had done something very bad for which I needed punishment</td>
<td>28 (21–34)</td>
<td>44 (32–58)</td>
<td>53 (28–77)</td>
<td>33 (20–48)</td>
</tr>
<tr>
<td>I lost the gist of a conversation</td>
<td>20 (14–26)</td>
<td>14 (7–25)</td>
<td>61 (36–83)</td>
<td>38 (24–53)</td>
</tr>
<tr>
<td>I stopped talking in the middle of a sentence</td>
<td>14 (9–20)</td>
<td>5 (1–13)</td>
<td>39 (17–64)</td>
<td>36 (23–51)</td>
</tr>
<tr>
<td>I talked and talked without saying anything</td>
<td>14 (9–20)</td>
<td>13 (6–23)</td>
<td>39 (17–64)</td>
<td>26 (14–40)</td>
</tr>
<tr>
<td>I talked aloud to myself</td>
<td>13 (9–19)</td>
<td>15 (7–26)</td>
<td>17 (4–41)</td>
<td>27 (15–42)</td>
</tr>
<tr>
<td>I gave strange and confused answers</td>
<td>12 (8–18)</td>
<td>10 (4–20)</td>
<td>53 (28–77)</td>
<td>19 (9–33)</td>
</tr>
<tr>
<td>I had strange sensations, such as the feeling that someone was there</td>
<td>12 (8–17)</td>
<td>11 (5–22)</td>
<td>44 (22–69)</td>
<td>17 (7–30)</td>
</tr>
<tr>
<td>I spoke very illogically</td>
<td>10 (6–15)</td>
<td>2 (0–9)</td>
<td>28 (10–53)</td>
<td>28 (16–43)</td>
</tr>
<tr>
<td>I thought that others were spying on me</td>
<td>10 (6–15)</td>
<td>8 (3–18)</td>
<td>18 (4–43)</td>
<td>23 (12–37)</td>
</tr>
<tr>
<td>I thought I could read thoughts of others</td>
<td>9 (6–14)</td>
<td>2 (0–9)</td>
<td>17 (4–41)</td>
<td>29 (17–44)</td>
</tr>
<tr>
<td>I heard noises or voices</td>
<td>7 (4–11)</td>
<td>3 (0–11)</td>
<td>11 (1–35)</td>
<td>19 (9–33)</td>
</tr>
<tr>
<td>I had strange bodily sensations</td>
<td>7 (4–11)</td>
<td>3 (0–11)</td>
<td>11 (1–35)</td>
<td>19 (9–33)</td>
</tr>
<tr>
<td>I had strange thoughts</td>
<td>6 (3–11)</td>
<td>2 (0–8)</td>
<td>22 (6–48)</td>
<td>15 (6–29)</td>
</tr>
<tr>
<td>I thought that people were looking at, talking about, or laughing at me</td>
<td>6 (3–10)</td>
<td>5 (1–13)</td>
<td>6 (0–29)</td>
<td>15 (6–28)</td>
</tr>
<tr>
<td>Strange things happened to my body</td>
<td>5 (2–9)</td>
<td>3 (0–11)</td>
<td>11 (1–35)</td>
<td>13 (5–25)</td>
</tr>
<tr>
<td>I smelled things nobody else did</td>
<td>2 (1–5)</td>
<td>0 (*–6)</td>
<td>6 (0–27)</td>
<td>6 (1–17)</td>
</tr>
</tbody>
</table>

Note.—IPS group = subjects with only one or two nonpathognomonic psychotic symptoms; APS group = subjects with no pathognomonic of schizophrenia symptoms and at least three nonpathognomonic psychotic symptoms; SPS group = subjects with at least one pathognomonic of schizophrenic symptom.

Relationship Between Psychotic Symptoms and Violent Offending. No significant relationship between the presence of psychotic symptoms and violent offending was found ($\chi^2 = 0.21; df = 3; p = 0.98$). In a multiple logistic regression analysis, simultaneously adjusting for all potential confounders (IQ, alcohol dependence, cannabis dependence, other substance dependence, physical or sexual abuse, and the number of traumatic events), this relationship remained nonsignificant. The relationship between individual psychotic symptoms and violent offending was also investigated. Violent offenders did not report significantly higher prevalence rates of pathognomonic psychotic symptoms than did nonviolent offenders. Only one nonpathognomonic psychotic symptom, paranoid ideation, was reported more often by violent compared with nonviolent offenders ($\chi^2 = 4.17; df = 1; p = 0.04$), but this difference disappeared after Bonferroni correction for multiple comparisons.

In addition, no significant relationship between the presence of psychotic symptoms and the subclassification of violent offending (no vs. moderate vs. serious violent offending) was found ($\chi^2 = 1.83; df = 6; p = 0.94$). In a polytomous logistic regression analysis, simultaneously adjusting for all potential confounders (age, IQ, the raw YSR internalizing problems score, ethnicity, any affective disorder, any disruptive behavior disorder, alcohol dependence, other substance dependence, and the number of traumatic events), this relationship remained nonsignificant.

Also, the relationship between individual psychotic symptoms and the subclassification of violent offending...
was investigated. Between the three groups, no significant differences in the prevalence rates of nonpathognomonic symptoms were found. Only one pathognomonic psychotic symptom ("I thought that I was famous") was reported by 10 percent of the seriously violent offenders as opposed to 1 percent of the moderately violent, and 0 percent of the nonviolent offenders ($\chi^2 = 9.24; df = 2; p = 0.01$). However, this difference disappeared after Bonferroni correction for multiple comparisons.

**Relationship Between Psychotic Symptoms and Criminal Recidivism.** Similarly, no significant relationship between the presence of psychotic symptoms and criminal recidivism was also investigated. Criminal recidivists did not report significantly higher prevalence rates of pathognomonic psychotic symptoms than did nonrecidivists. Only one nonpathognomonic psychotic symptom (talking without saying anything) was reported more often by non-recidivists than by recidivists ($\chi^2 = 5.50; df = 1; p = 0.019$), but this difference disappeared after Bonferroni correction for multiple comparisons.

**Discussion.**

In the present study, 34 percent of a sample of incarcerated boys aged 12 to 18 was found to be DISC-2.3 psychosis screen positive. This prevalence is similar to the prevalence rates, ranging from 25 percent to 45 percent, that were reported in three recent North American studies using the DISC (Atkins et al. 1999; Shelton 2001; Teplin et al. 2002). Unlike a number of studies in adult clinical and general population samples (for a review, see Walsh et al. 2002) and one study among incarcerated violently delin-
confounders, such as male gender, young age, low SES, conduct disorder, substance use disorders, substance use in the hours prior to the violent act(s), acute psychotic symptoms (Walsh et al. 2003), but also ethnicity, IQ, and trauma-related variable, are needed. Second, in the current study, acute psychotic symptoms and substance use in the hours prior to the violent index offense, that could probably explain some of the link between psychotic symptoms and violent offending, were not studied.

In the search for potential confounders, it was surprising to find a negative association between alcohol dependence and other substance dependence and violent offending. In a large (n = 961) young adult general population study, a positive association was found between substance dependence and violent offending (Arseneault et al. 2000). They also found that among alcohol-dependent individuals, violence was best explained by substance use prior to the offense and among cannabis-dependent persons by a history of conduct disorder. Only two earlier studies have examined the association between substance use disorders and violent offending among incarcerated juveniles, using standardized assessment instruments. No association between drug abuse and violent offending was found by McManus et al. (1984). However, Haapasalo and Hämäläinen (1996) found a pos-

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### Table 5. Relationship between possible confounders and violent offending

<table>
<thead>
<tr>
<th>Continuous variables</th>
<th>Nonviolent index offense</th>
<th>Violent index offense</th>
<th>t; df; p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean (SD)</td>
<td>n</td>
</tr>
<tr>
<td>Age</td>
<td>51</td>
<td>16.5 (1.3)</td>
<td>135</td>
</tr>
<tr>
<td>Total IQ (GIT)</td>
<td>50</td>
<td>93.7 (11.9)</td>
<td>130</td>
</tr>
<tr>
<td>YSR Total Problems (raw score)</td>
<td>52</td>
<td>42.9 (20.6)</td>
<td>133</td>
</tr>
<tr>
<td>YSR Internalizing Problems (raw score)</td>
<td>52</td>
<td>10.9 (7.8)</td>
<td>133</td>
</tr>
<tr>
<td>YSR Externalizing Problems (raw score)</td>
<td>52</td>
<td>16.6 (8.0)</td>
<td>133</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Categorical variables</th>
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<th>Violent index offense</th>
<th>χ²; p (df=3)</th>
</tr>
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<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Ethnicity: Dutch (vs. non-Dutch)</td>
<td>52</td>
<td>27</td>
<td>133</td>
</tr>
<tr>
<td>SES: low (vs. high) level</td>
<td>49</td>
<td>86</td>
<td>121</td>
</tr>
<tr>
<td>Any anxiety disorder</td>
<td>49</td>
<td>10</td>
<td>117</td>
</tr>
<tr>
<td>Any affective disorder</td>
<td>48</td>
<td>6</td>
<td>126</td>
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<tr>
<td>Any disruptive behavior disorder</td>
<td>50</td>
<td>78</td>
<td>129</td>
</tr>
<tr>
<td>Conduct disorder</td>
<td>50</td>
<td>76</td>
<td>129</td>
</tr>
<tr>
<td>Any substance use disorder</td>
<td>46</td>
<td>63</td>
<td>123</td>
</tr>
<tr>
<td>Alcohol dependence</td>
<td>45</td>
<td>33</td>
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</tr>
<tr>
<td>Cannabis dependence</td>
<td>48</td>
<td>40</td>
<td>121</td>
</tr>
<tr>
<td>Other substance dependence (Former) psychotropic medication</td>
<td>49</td>
<td>18</td>
<td>128</td>
</tr>
<tr>
<td>Former psychosocial treatment</td>
<td>52</td>
<td>8</td>
<td>134</td>
</tr>
<tr>
<td>Parental conflicts</td>
<td>43</td>
<td>47</td>
<td>107</td>
</tr>
<tr>
<td>Physical or sexual abuse</td>
<td>52</td>
<td>21</td>
<td>134</td>
</tr>
<tr>
<td>Victimization</td>
<td>51</td>
<td>69</td>
<td>132</td>
</tr>
<tr>
<td>N° traumatic events</td>
<td>52</td>
<td>0: 12</td>
<td>132</td>
</tr>
<tr>
<td></td>
<td>1: 29</td>
<td>1: 12</td>
<td></td>
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<tr>
<td></td>
<td>&gt; 1: 60</td>
<td>&gt; 1: 75</td>
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</tr>
</tbody>
</table>

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quent boys (Lewis et al. 1979), the present study did not find a significant association between psychotic symptoms and violent offending. It should be noted, however, that Walsh et al. (2002) concluded that the association between schizophrenia and violence was consistent, but small. Lewis et al. (1979) investigated the relationship between individual psychotic symptoms and violent offending and found that only paranoid ideation and loose, illogical associations were reported more often by more violent (compared with less violent) offenders.

Nevertheless, our finding of no relationship between psychotic symptoms and violent offending needs further explanation. First, it is likely that, in a selective seriously delinquent sample with comparable definitions of psychosis and of violence, comparable sample designs with avoidance of selection bias, and control for a number of potential confounders, such as male gender, young age, low SES, conduct disorder, substance use disorders, substance use in the hours prior to the violent act(s), acute psychotic symptoms (Walsh et al. 2003), but also ethnicity, IQ, and trauma-related variable, are needed. Second, in the current study, acute psychotic symptoms and substance use in the hours prior to the violent index offense, that could probably explain some of the link between psychotic symptoms and violent offending, were not studied.

In the search for potential confounders, it was surprising to find a negative association between alcohol dependence and other substance dependence and violent offending. In a large (n = 961) young adult general population study, a positive association was found between substance dependence and violent offending (Arseneault et al. 2000). They also found that among alcohol-dependent individuals, violence was best explained by substance use prior to the offense and among cannabis-dependent persons by a history of conduct disorder. Only two earlier studies have examined the association between substance use disorders and violent offending among incarcerated juveniles, using standardized assessment instruments. No association between drug abuse and violent offending was found by McManus et al. (1984). However, Haapasalo and Hämäläinen (1996) found a pos-
itive relationship between street drug abuse (63%) and violent offending (58%), but other substance use disorders were not found to be related with violence. In both studies, substance use prior to the violent index offense was not assessed.

Possible explanations for the negative association in the current study might be (1) that, among incarcerated boys, those with (serious) dependence problems more often committed simple acquisitive crimes to finance their substance use than other criminal youngsters, and (2) that we did not examine substance use directly prior to the violent index offense, which is probably more strongly related with violent offending than substance use disorders per se.

The finding that the presence of psychotic symptoms was not associated with criminal recidivism corroborates the finding of Harris and Koepsell (1998) among adult prisoners. However, in the current study criminal recidivism was defined as "past detention history." Longitudinal research is necessary to investigate the relationship between psychotic symptoms (and other psychiatric disorders) and future seriously violent, moderately violent, and nonviolent criminal recidivism, with and without correction for potential confounders.

Some limitations of the study should be mentioned. First, only the incarcerated juveniles themselves were interviewed, even though most agree that mental disorders in children and adolescents should ideally be assessed through interviews of multiple informants (Bird et al. 1992). In an attempt to obtain collateral information, most caregivers were unwilling to actively participate in the study. This is an important limitation of most studies with delinquent juveniles (Vermeiren 2003). Second, whereas the criterion validity of most psychiatric diagnoses generated with the DISC–2.3 is moderate to good (Shaffer et al. 2000), the validity of both parent and child versions of the psychosis-screen section of the DISC–2.3 has not been demonstrated. An earlier DISC version has shown that psychotic symptoms may be overreported (Breslau 1987), and the DISC–2.3 is likely not very different in this respect. It would have been interesting to compare study rates with clinical psychiatric diagnosis rates. However, this was not possible, because in The Netherlands incarcerated juveniles are not routinely assessed by a detention center psychiatrist.

These data call for increased attention to the screening and diagnosis of psychotic symptoms among incarcerated juveniles. First, early detection of psychotic symp-
Table 7. Relationship between possible confounders and nonviolent vs. moderately violent vs. seriously violent offending

<table>
<thead>
<tr>
<th>Continuous variables</th>
<th>Nonviolent Index offence</th>
<th>Moderately violent Index offence</th>
<th>Seriously violent Index offence</th>
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<td></td>
<td>$n$</td>
<td>Mean (SD)</td>
<td>$n$</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Age</td>
<td>51</td>
<td>16.5 (1.3)</td>
<td>91</td>
<td>16.5 (1.2)</td>
</tr>
<tr>
<td>Total IQ (GIT)</td>
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<td>93.7 (11.9)</td>
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<tr>
<td>YSR Total Problems</td>
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<td>42.9 (20.6)</td>
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<tr>
<td>YSR Internalizing Problems</td>
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<td>YSR Externalizing Problems</td>
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<td>16.6 (8.0)</td>
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</table>

<table>
<thead>
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<th>Categorical variables</th>
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<th>Seriously violent Index offence</th>
<th>$\chi^2; p (df=2)$</th>
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<td>SES:low (vs. high) level</td>
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<td>Victimization</td>
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<td>&gt;1:60</td>
<td>&gt;1:76</td>
<td>&gt;1:74</td>
<td></td>
</tr>
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</table>

Symptoms is important in order to reduce the duration of untreated psychosis (DUP) with antipsychotic medication. This is probably one of the few possible strategies to improve the prognosis of psychotic disorders. There are indications that DUP predicts outcome independently of other variables, also for patients with schizophrenia or schizophreniform disorder. In an Australian follow-up study of 354 first episode psychosis patients, functional outcome appeared to decline substantially even after very short treatment delays (> 7 days) (Harrigan et al. 2003).

Second, the examination of psychotic symptoms can probably help to understand offending among juvenile delinquents. A psychiatric examination should contribute to a "crime analysis," in which (behavioral, cognitive, and emotional) antecedents and consequences of the criminal behavior are systematically mapped. A crime analysis can be used as the starting point of behavioral therapeutic interventions directed at prevention of (violent) re-offending.

For disturbed, seriously delinquent juveniles, youth detention centers could be used as focal centers for psychiatric assessment and treatment planning. In a structured, (relatively) drug-free setting with possibilities of 24-hour clinical observation, diagnosis will become clear sooner than in an outpatient mental health service center or psychiatric clinic, especially if these services are not equipped to deal with young delinquent patients with concomitant conduct disorder, substance use disorder, and/or
low educational level, that probably also mask underlying psychopathology (Lewis 1996). Although this study did not find a relationship between psychotic symptoms and violent offending, it cannot be excluded that, even among incarcerated juveniles, psychosis and violent offending are associated. The integration of diagnostic and treatment services within youth detention centers, combined with effective follow-up and case management services on release may be the most clinically and cost-effective means of prevention of violent criminal recidivism (Atkins et al. 1999).

Further investments in the development of valid diagnostic instruments are necessary. For the time being, young delinquents who are psychosis-screen positive according to the DISC–IV should be interviewed with a highly specific, semistructured psychiatric interview to diagnose the existence of different psychotic phenomena and establish the validity of the psychosis screen of the most recent version of the DISC. In addition, longitudinal research is needed to examine whether isolated psychotic symptoms and atypical psychotic disorders among incarcerated juveniles are prodromal symptoms of future schizophrenia. Youth detention centers might be important recruitment locations for pre- and early onset detection and intervention research.

References


**Acknowledgments**

This study was funded by the Ministry of Justice of The Netherlands and made possible through the support of the directors and staff of the following youth detention centers: Den Heyacker, Eikenstein, de Hartelborgt, het Jongeren Opvang Centrum, het Nieuwe Lloyd, and Teylingereind.
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