When things are getting out of hand: Prevalence, assessment, and treatment of substance use disorder(s) and violent behavior

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Substance use disorders in forensic psychiatry: Differences among different types of offenders

Abstract
This is the first study that compared different types of offenders in forensic outpatient treatment (i.e., offenders of general violence (GV), intimate partner violence (IPV), sex crimes, and ‘other offenses’ such as drug smuggling and property crimes) regarding the prevalence of substance use disorders at the time of the offense. In total, 35.8% of participants (N = 187) were diagnosed with any substance use disorder. Specifically, 61.5% of GV perpetrators, 30.9% of IPV perpetrators, 9.1% of sex offenders, and 26.7% of ‘other offenders’ were diagnosed with substance abuse or dependence. More GV offenders and less sex offenders fulfilled diagnostic criteria for a substance use disorder. Furthermore, 29.9% of the offenders were intoxicated by substance at the moment they committed the offense (48.5% of GV perpetrators, 25.0% of IPV perpetrators, 17.4% of sex offenders and 21.0% of ‘other offenders’). More GV perpetrators were intoxicated during the offense. Since there is a clear association between substance abuse and criminal behavior, substance abuse in offenders should be assessed and, if present, be treated.
Introduction

In the past year, 5.6% of the Dutch population was diagnosed with any substance use disorder (De Graaf, Ten Have, & Van Dorsselaer, 2010). Somewhat higher prevalence figures were found in the U.S., where 8.5% was diagnosed with an alcohol use disorder and 2.0% with a drug use disorder in the past 12 months. In the offender population, these numbers have been found to be remarkably higher. Many studies reported that substance use disorders were overrepresented in criminal populations, such as offenders in prison (e.g., Brooke, Taylor, Gunn, & Maden, 1998) and forensic psychiatry (e.g., Leue, Borchard, & Hoyer, 2004). Particularly, physical assault outside the family (general violence; GV), intimate partner violence (IPV), and sex offenses have often been connected to substance abuse. The relationship between these offenses and the abuse of substances is discussed in more detail below.

The association between substance abuse and GV has been recognized for a number of decades (Boles & Miotto, 2003). For example, over half of the patients in substance abuse treatment reported physical violence toward a nonpartner in the year prior to treatment (Murray et al., 2008; Chermack, Fuller, & Blow, 2000). IPV is also connected to substance abuse, particularly alcohol misuse (e.g., Li et al., 2010; McKinney, Caetano, Rodriguez, & Okoro, 2010; Zalesky et al., 2010; Chermack et al., 2008; Foran & O’Leary, 2008; Thompson & Kingree, 2006; Lipsky, Caetano, Field, & Larkin, 2005; Lipsky, Caetano, Field, & Bazargan, 2004). Research has shown that 40-60% of male alcohol abusers entering treatment for substance abuse reported one or more incidents of physical IPV in the year prior to treatment (e.g., Chermack et al., 2008; Vedel et al., 2007; O’Farrell & Murphy, 1995; Murphy & O’Farrell, 1994). The opposite was found as well: alcohol misuse was overrepresented in IPV perpetrators in domestic violence treatment (e.g., Brown et al., 1999; Stuart, Moore, Kahler, & Ramsey, 2003a; Kraanen, Scholing, & Emmelkamp, 2010). A number of studies investigated the effect of alcohol abuse treatment on IPV and found that a decrease in alcohol use resulted in a decrease in IPV in men in alcoholism treatment (e.g., Vedel, 2007; Stuart et al., 2003; O’Farrell & Murphy, 1995). Two years after treatment this effect was still evident in participants that were abstinent from alcohol but not in those who had relapsed (O’Farrell, Van Hutton, & Murphy, 1999). In addition, a recent meta-analysis showed that drug use, particularly the use of cocaine and marijuana, was connected to IPV (Moore et al., 2008). Finally, approximately one third of IPV perpetrators in domestic violence treatment were diagnosed with any drug use disorder (Kraanen et al., 2010; Stuart, Moore, Ramsey, & Kahler, 2003b; Brown et al., 1999; Fitch & Papantonio, 1983).

Sexual aggression is also connected with substance abuse. A recent review showed that about half of the sex offenders had a history of any substance abuse
(Kraanen & Emmelkamp, 2011). The relationship between alcohol use and sexual aggression has been the subject of many studies (for reviews, see: Testa, 2004; Testa, 2002; Abbey, Zawacki, Buck, Clinton, & McAuslan, 2001; Seto & Barbaree, 1995). Testa (2002) found in prevalence studies a modest correlation between alcohol abuse and committing sex offenses. However, in event-based studies (that studied whether alcohol was used at the same time as the sex offense was committed) mixed evidence was found for a relationship between alcohol use and sexual aggression. Experimental studies revealed evidence of a direct, pharmacological effect of alcohol on committing sex offenses, as well as modest evidence for the existence of an "alcohol expectancy effect". The latter means that people decide to drink alcohol because they expect a certain outcome, for example, that drinking alcohol makes it easier to approach women and increases aggressive behavior. This may lead to sexual harassment (Testa, 2002).

The above summary shows that different substances are linked to violent behavior. Most research focused on the alcohol-violence nexus and showed evidence for a temporal, and perhaps even a causal, relationship between the use of alcohol and violent behavior (e.g., Chermack & Giancola, 1997; Boles & Miotto, 2003; Hoaken & Stewart, 2003; Murdoch, Pihl, & Ross, 1990). Other substances, such as benzodiazepines, opiates, cocaine, amphetamine, and phencyclidine (PCP), were also found to be associated with violent behavior (Hoaken & Stewart, 2003). Mixed results were found regarding the association between cannabis use and aggressive behavior: cannabis intoxication was associated with a decrease in violent behavior (Boles & Miotto, 2003; Hoaken & Stewart, 2003) whereas withdrawal from cannabis was associated with increased aggressive behavior (Hoaken & Stewart, 2003).

Although the relationship between substance abuse and violent offenses has often been investigated, to our knowledge, most researchers (except Karberg & James, 2005; Oliemeulen, Vuijk, Rovers, & Van den Eijnden, 2007; see below) studied offenders either with one type of criminal behavior (mostly IPV) or with different types of criminal behavior but without comparing the subgroups with each other (e.g., Watzke, Ullrich, & Marneros, 2006). However, comparison of substance (mis)use among different offender groups may give important information about differences in types and functions of substance (mis)use, which in turn may have implications for assessment and treatment. For example, substance abuse may be causally related to IPV (Leonard, 2001), whereas disinhibition as a result of substance use may play a role in the relationship between substance abuse and sex offenses (for further details, see Seto & Barbaree, 1995). Also, substance abusers may engage in economically oriented crime to support substance use (Goldstein, 1985).

In addition, most studies on this topic share some limitations. First, many studies concentrated on the prevalence of alcohol but not drug use disorders in offenders.
Second, if studies did investigate drug use disorders in offenders, they often did not differentiate between the different types of drugs that were used. Third, the majority of previously conducted studies diagnosed lifetime instead of substance use disorders at the time of the offense. Lifetime substance abuse, however, does not imply a temporal connection between substance abuse and criminal behavior. Fourth, many studies used screening instruments to assess substance abuse that tend to overestimate the prevalence of substance abuse (Hendriks, 2009) or studied files retrospectively to assess substance abuse instead of using structured interviews. Finally, the two studies we found that did compare more than two different types of offenders with one another with regard to the prevalence of substance related disorders (Karberg & James, 2005; Oliemeulen et al., 2007) were conducted in prison and not in a forensic treatment facility. It is unclear whether their results can be generalized to treatment settings. Moreover, Karberg and James’s (2005) and Oliemeulen et al.’s (2007) studies did not treat IPV perpetrators as a separate category.

Different from previous research, this study examined, apart from substance abuse in IPV perpetrators, substance use disorders in offenders of GV, sex crimes and ‘other crimes’ as well. Instead of file research, participants were firstly screened for alcohol and / or drug abuse; subsequently substance use disorders were assessed using a valid structured clinical interview. Not only alcohol or drug use disorders without distinguishing between different types of drugs were examined, but also specific drug use disorder diagnoses, such as cannabis abuse and dependence. Further, different from other studies, substance use disorders were (retrospectively) assessed at the time of the offense, instead of current or lifetime substance use disorders. Taking the shortcomings from our previous study and the limitations of other prior research in consideration, this study aimed to answer the following questions: 1) what is the prevalence of specific substance use disorders at the time of the offense in forensic psychiatric outpatients? 2) Is there a difference in the prevalence of substance use disorders at the time of the offense among different types of offenders in forensic outpatient treatment, i.e., offenders of GV, offenders of IPV, sex offenders and ‘other offenders’? And 3) How often were offenders intoxicated by substances at the moment they committed the offense and are there differences among different offenders in intoxication at the moment of committing the offense?

Method
Participants
All male patients of 18 years or older (mean age = 32.79; s.d. = 11.26) entering treatment at a forensic psychiatry outpatient clinic (De Waag) in Amsterdam, the Netherlands, between October 20th 2008 and April 20th 2009, were included (N = 295). In the Dutch Justice system, judges very often oblige offenders to follow out-
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patient treatment aimed at reducing dynamic risk factors, often in combination with prison sentence and money penalties. De Waag is by far the largest forensic outpatient clinic in the Netherlands, with nine centers in the west of the country (Amsterdam is the second in size), and offers multidisciplinary treatments for offenders. Treatments are mainly cognitive behavior therapy, if necessary supplemented with pharmacotherapy. Most participants were court referred to forensic psychiatric treatment (N = 155; 59.8%). Part of them already finished a prison sentence; others received a conditional sentence (they had to finish treatment with good results in order to avoid being put in prison). Furthermore, 30 participants (11.6%) were in treatment semi-voluntary, i.e., were awaiting trial. Seventy-four participants (28.6%) were in treatment voluntarily, i.e., had indeed committed a crime, but were not charged with the crime. The voluntary group had engaged in criminal behavior but had (at least this time) not been charged with or was not convicted of an offense. Crimes that were committed by voluntary patients ranged from less severe crimes to as severe crimes as committed by patients who were court referred to or semi-voluntarily in treatment. So, the total group was characterized by a broad range in severity of criminal behavior and was representative of the forensic population in the Netherlands. Participants consisted of four different types of offenders, i.e., perpetrators of GV, perpetrators of physical IPV, sex offenders (including child pornography downloaders), and ‘other offenders’ (e.g., offenders of drug smuggling, property crimes, other domestic violence, arson, etcetera). A random sample selection of 33 participants that was representative for both committed crime and legal status (in treatment voluntarily, semi-voluntarily or court-ordered) showed that the average time between committed crime and intake was 11.9 months (s.d. = 10.48). Participants did not receive compensation for participating in the study.

**Measures**

*Screening questionnaires.* To screen for alcohol abuse, the Alcohol Use Disorder Identification Test (AUDIT; Saunders, Aasland, Babor, De la Fuente, & Grant, 1993) was used. The AUDIT consists of 10 questions that are scored on a 5-point scale ranging from 0 - 4. The maximum score is 40. The AUDIT has been studied extensively and has shown good reliability (Reinert & Allen, 2002) and validity (Allen, Litten, Fertig, & Babor, 1997). The cut-off score was set at 6 for men instead of 8 (Saunders et al. 1993) to enhance sensitivity, because individuals in forensic psychiatry tend to underreport their substance use (Golub, Liberty, & Johnson, 2005; Sloan, Bodapati, & Tucker, 2004). For women, the cut-off score was set at 4, as recommended by the National Institute on Alcohol Abuse and Alcoholism (NIAAA, 2007). Participants were orally instructed to report about their pattern of alcohol use at the time of the offense when completing the AUDIT. An additional question, that asked whether participants had used any substance at the moment of the offense, was added. If participants answered “yes”, they were asked which substance(s) they were intoxicated by.
To screen for drug abuse, the Drug Use Disorder Identification Test (DUDIT; Berman, Bergman, Palmstierna, & Schlyter, 2005; Dutch translation: Kraanen & Flutt-tert, 2008) was used. The DUDIT consists of 11 questions that are scored on a 5 point scale ranging from 0 - 4. The maximum score is 44. Reliability was found to be good (Berman et al., 2005). Similar to the AUDIT, in order to enhance sensitivity, the cut-off score for men was set at 4 and for women at 2, which are somewhat lower cut-off scores than suggested by Berman et al. (i.e., 6 for men and 4 for women). As with the AUDIT, participants were orally instructed to report about their pattern of drug use at the time of the offense when completing the DUDIT.

**Diagnostic interviews.** In patients who scored at cut-off or above cut-off on AUDIT and DUDIT, substance use disorders (abuse and dependence) were assessed with the Dutch version of the substance use disorders module (module E.) from the Structured Clinical Interview for DSM-IV Axis-I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1996; Dutch translation: Van Groenestijn, Akkerhuis, Kupka, Schneider, & Nolen, 1998). Validity and reliability of the SCID-I module E. are good (Kranzler, Kadden, Babor, Tennen, & Rounsaville, 1996). Because we were interested in substance use disorders at the time of the offense, the SCID was conducted according to the manual and after every question there was asked whether the symptom was present or absent at the time of the offense. E.g., after asking the question “Have you often found that when you started drinking you ended up drinking much more than you were planning to?”, there was asked “And at the time of the offense?”.  

**Procedure**
At the end of the intake session, participants were asked to fill out the AUDIT and DUDIT. Participants were specifically instructed to report about their pattern of substance use at the time of the offense. If participants obtained the cut-off score or higher on AUDIT and / or DUDIT and / or if they reported being intoxicated at the moment they committed the offense, they were invited to participate in the SCID-I interview. Demographics were extracted from patients’ files. No informed consent had to be obtained, because it is standard procedure to diagnose substance related disorders in patients entering treatment at De Waag. Besides, all patients receiving treatment at De Waag consent that their files can be used anonymously for research purposes.

**Data analysis**
Categorical demographic variables, as well as the proportion of offenders that scored at cut-off or above cut-off on AUDIT and DUDIT, substance use disorder diagnoses and intoxication at the moment of committing the offense were compared with one another using Chi-square and Fisher’s exact tests (depending on numbers per cell). If Chi-square or Fisher’s exact tests were significant, standardized residu-
als were used to identify which offender-group scored significantly higher or lower than expected. To control for Type I error, Bonferroni correction was used when comparing substance use disorders among different types of offenders. Since all data we collected were not distributed normally (also after transformation procedures as described by Field, 2009, p. 155), Kruskal-Wallis tests were used to compare offenders with regard to age, education, and AUDIT and DUDIT scores. If Kruskal-Wallis tests were significant, Mann-Whitney tests with Bonferroni correction were used for post-hoc analyses, resulting in the use of $p < .008$.

**Results**

**Demographics**

Of the 295 participants, 48 participants (16.3%) did not complete the screeners for logistic reasons, 5 participants (1.7%) were not able to complete questionnaires and 5 participants (1.7%) refused to complete the questionnaires. In total, 237 (80.3%) participants completed both screeners. For a complete overview of participants per phase of the study, see Figure 1. Differences between dropouts and completers were analyzed with Chi-square tests (type of committed crime, cultural identity) and Mann-Whitney tests (age). No statistically significant differences between groups were found.

Table 1 displays demographic and legal variables among perpetrators of 4 different offenses, i.e., GV, IPV, sex offenses, and ‘other offenses’. Several between group differences were found. Offenders differed significantly from one another regarding age ($H (3) = 28.94, p = .00$). Perpetrators of IPV were significantly older than perpetrators of GV ($U = 1902.00, p = .00$) and ‘other offenders’ ($U = 1679.00, p = .00$) and sex offenders were significantly older than perpetrators of IPV ($U = 610.00; p = .01$), GV ($U = 370.00, p = .00$) and ‘other offenders’ ($U = 350.00; p = .00$). Also after Bonferroni correction ($p < .008$) these results remained significant. Offenders also differed significantly regarding cultural identity ($X^2 (3) = 22.55; p = .01$); more participants with the Dutch and less participants with the Surinam / Antillean and Turkish / Moroccan cultural identity had committed sex crimes. In addition, differences were found regarding legal status ($X^2 (6) = 14.40; p = .03$); more sex offenders were in treatment semi-voluntarily.

**AUDIT and DUDIT scores among different types of offenders**

In Table 2 mean AUDIT and DUDIT scores for perpetrators of different types of offenses as well as the proportion of offenders that scored above the cut-off score on the AUDIT and / or DUDIT are displayed. The mean AUDIT score was 5.91 (s.d. $= 6.26$). No differences were found with regard to mean AUDIT scores as well as the proportion of participants that scored above the cut-off score among different types of offenders.
The mean DUDIT score was 5.00 (s.d. = 8.40). Offenders differed significantly with regard to DUDIT scores ($H (3) = 17.49; p = .00$). Post hoc analyses showed that GV perpetrators obtained significantly higher DUDIT scores than IPV perpetrators ($U = 2006.00; p = .00$), sex offenders ($U = 485.50; p = .00$), and ‘other offenders’ ($U = 1580.50; p = .00$). These results remained significant after Bonferroni correction ($p < .008$). Also, offenders differed in the proportion of participants that scored above the cut-off score ($X^2 (3) = 11.71; p = .01$); more GV perpetrators scored above the cut-off score.

Figure 1. Percentages of patients during different phases in the study.

Intoxication at the moment of committing the offense among different types of offenders

Table 3 shows that 29.9% of offenders were intoxicated by any substance when committing the offense. An omnibus test showed that offenders differed significantly from one another regarding the substance they were intoxicated by at the time of the offense ($X^2 (12) = 23.07; p = .03$); more GV perpetrators and less ‘other offenders’ were intoxicated by alcohol. When there was distinguished between whether participants were and were not intoxicated by any substance, there were also differences among offenders ($X^2 (3) = 15.88; p = .00$); more GV perpetrators were intoxicated at the time of the offense.
Table 1. Demographic and legal variables among different types of male offenders.

<table>
<thead>
<tr>
<th>Cultural identity²</th>
<th>Off. = offenses; ¹ Perpetrators of IPV were significantly older than GV perpetrators and ‘other offenders’ and sex offenders were significantly older than GV perpetrators, IPV perpetrators and ‘other offenders’ (p &lt; .008). ² More participants with the Dutch, and less participants with the Surinam / Antillean and Turkish / Moroccan cultural identity were in treatment for committing sex crimes (p &lt; .05). ³ More sex offenders were in treatment semi-voluntarily (p &lt; .05).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offenders</td>
<td>GV N = 70</td>
</tr>
<tr>
<td>N</td>
<td>29.5 %</td>
</tr>
<tr>
<td>Age M (SD)¹</td>
<td>29.5 (9.69) %</td>
</tr>
<tr>
<td>Sexual identity</td>
<td>Dutch</td>
</tr>
<tr>
<td></td>
<td>Surinam/Antillean</td>
</tr>
<tr>
<td></td>
<td>Turkish/Moroccan</td>
</tr>
<tr>
<td></td>
<td>Other</td>
</tr>
<tr>
<td>Legal status³</td>
<td>Voluntary</td>
</tr>
<tr>
<td></td>
<td>Semi-voluntary</td>
</tr>
<tr>
<td></td>
<td>Court-ordered</td>
</tr>
</tbody>
</table>

Table 2. AUDIT and DUDIT scores among different types of offenders.

<table>
<thead>
<tr>
<th>Score AUDIT</th>
<th>Off. = offenses; ¹ GV perpetrators DUDIT-scores were significantly higher than DUDIT-scores of IPV perpetrators, sex offenders and ‘other offenders’ (p &lt; .008). ² More violent offenders scored above the DUDIT cut-off score (p &lt; .05).</th>
</tr>
</thead>
<tbody>
<tr>
<td>M (s.d.)</td>
<td>GV N = 70</td>
</tr>
<tr>
<td></td>
<td>7.07 (6.63)</td>
</tr>
<tr>
<td>At/above cut-off AUDIT (%)</td>
<td>48.6</td>
</tr>
<tr>
<td>Score DUDIT</td>
<td>Off. = offenses; ¹ GV perpetrators DUDIT-scores were significantly higher than DUDIT-scores of IPV perpetrators, sex offenders and ‘other offenders’ (p &lt; .008). ² More violent offenders scored above the DUDIT cut-off score (p &lt; .05).</td>
</tr>
<tr>
<td>M (s.d.)</td>
<td>GV N = 70</td>
</tr>
<tr>
<td></td>
<td>8.47 (10.76)</td>
</tr>
<tr>
<td>At/above cut-off DUDIT (%)</td>
<td>48.6</td>
</tr>
</tbody>
</table>

The prevalence of substance use disorders among different types of offenders at the time of the offense

In total, 136 of 237 participants (57.4%) were eligible for the SCID-I interview; 86 of these 136 participants (63.2%) completed the interview. Fifty participants did not complete the interview because of the following reasons: 30 participants (22.1%) did not return to De Waag after completing the AUDIT and DUDIT, with 17 participants (12.5%) the SCID-I interview could not be scheduled, and 3 participants (2.2%) did not complete the interview for other reasons. Chi-square tests showed that dropouts and completers did not differ significantly regarding the crime they had committed and their cultural identity. However, other variables did differ significantly among dropouts and completers. Given the non-normality of the data, the
non-parametric Mann-Whitney test was used to compare age between dropouts and completers. The test showed that dropouts were significantly younger (M = 29.34 (8.38)) than completers (M = 33.62 (11.98); U = 4500.50; p = .04). Also, legal status differed among dropouts and completers (X² (2) = 6.53; p = .04) whereas more dropouts were in treatment voluntarily. Thirdly, more dropouts (46.9%) than completers (23.8%) of the SCID-interview were intoxicated at the time of the offense (X² (1) = 10.47; p = .00). Furthermore, dropouts of the SCID-interview obtained higher mean AUDIT scores (M = 8.66 (7.72)) than completers (M = 5.01 (6.00); U = 3484.00; p = .00) as well as higher mean DUDIT scores (M = 8.74 (10.03)) than completers (M = 3.68 (7.25); U = 3363.50; p = .00).

Table 3. Intoxication at the moment of committing the offense among different types of offenders.

<table>
<thead>
<tr>
<th>Off. = offenses; ¹ More GV perpetrators and less ‘other offenders’ were intoxicated by alcohol at the moment they committed the offense (p &lt; .05). ² More GV perpetrators were intoxicated by any substance at the moment they committed the offense (p &lt; .05).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No intoxication</strong></td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>GV (N = 86) %</td>
</tr>
<tr>
<td>IPV (N = 80) %</td>
</tr>
<tr>
<td>Sex-off. (N = 23) %</td>
</tr>
<tr>
<td>Other-off. (N = 60) %</td>
</tr>
<tr>
<td>Total (N = 231) %</td>
</tr>
</tbody>
</table>

Results from participants that completed the SCID-I interview are displayed in Table 4. Of the total population, 35.8% was diagnosed with any substance use disorder at the time of the offense. Specifically, 27.3% was diagnosed with an alcohol use disorder, 20.3% with a cannabis use disorder, 5.3% with a cocaine use disorder. When abuse and dependence of different substances among different types of offenders were compared separately, the prevalence of alcohol (X² (6) = 21.28; p = .00) and cannabis (X² (6) = 16.78; p = .00) related disorders at the time of the offense differed significantly among offenders; more GV perpetrators and less ‘other offenders’ were diagnosed with alcohol dependence and more GV perpetrators were diagnosed with cannabis dependence at the time of the offense. Furthermore, the prevalence of any alcohol related disorder (abuse or dependence) at the time of the offense differed significantly among different types of offenders (X² (3) = 18.21; p = .00); more GV perpetrators and less sex offenders were diagnosed with an alcohol related disorder at the time of the offense. Also for the prevalence of any cannabis related disorder (abuse or dependence) significant differences among different
types of offenders were found ($X^2 (3) = 16.51; p = .00$); again, more GV perpetrators were diagnosed with any cannabis related disorder.

Table 4. The prevalence of substance use disorders among different male offenders at the time of the offense.

<table>
<thead>
<tr>
<th>SUDs</th>
<th>GV (N = 52)</th>
<th>IPV (N = 68)</th>
<th>Sex off. (N = 22)</th>
<th>Other off. (N = 45)</th>
<th>Total (N = 187)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol&lt;sup&gt;1&lt;/sup&gt;</td>
<td>46.2</td>
<td>27.9</td>
<td>4.5</td>
<td>15.6</td>
<td>27.3</td>
</tr>
<tr>
<td>Abuse</td>
<td>28.8</td>
<td>16.2</td>
<td>4.5</td>
<td>15.6</td>
<td>18.2</td>
</tr>
<tr>
<td>Dependence&lt;sup&gt;2&lt;/sup&gt;</td>
<td>17.3</td>
<td>11.8</td>
<td>0.0</td>
<td>0.0</td>
<td>9.1</td>
</tr>
<tr>
<td>Cannabis&lt;sup&gt;3&lt;/sup&gt;</td>
<td>38.5</td>
<td>10.3</td>
<td>9.1</td>
<td>20.0</td>
<td>20.3</td>
</tr>
<tr>
<td>Abuse</td>
<td>17.3</td>
<td>4.4</td>
<td>4.5</td>
<td>15.6</td>
<td>10.7</td>
</tr>
<tr>
<td>Dependence&lt;sup&gt;4&lt;/sup&gt;</td>
<td>21.2</td>
<td>5.9</td>
<td>4.5</td>
<td>4.4</td>
<td>9.6</td>
</tr>
<tr>
<td>Cocaine</td>
<td>9.6</td>
<td>4.4</td>
<td>0.0</td>
<td>4.4</td>
<td>5.3</td>
</tr>
<tr>
<td>Abuse</td>
<td>5.8</td>
<td>2.9</td>
<td>0.0</td>
<td>4.4</td>
<td>3.7</td>
</tr>
<tr>
<td>Dependence</td>
<td>3.8</td>
<td>1.5</td>
<td>0.0</td>
<td>0.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Other</td>
<td>1.9</td>
<td>0.0</td>
<td>0.0</td>
<td>2.2</td>
<td>1.1</td>
</tr>
<tr>
<td>Abuse</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Dependence</td>
<td>1.9</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Any drug use disorder&lt;sup&gt;5&lt;/sup&gt;</td>
<td>40.4</td>
<td>13.2</td>
<td>9.1</td>
<td>17.8</td>
<td>21.4</td>
</tr>
<tr>
<td>Abuse</td>
<td>17.3</td>
<td>5.9</td>
<td>4.5</td>
<td>15.6</td>
<td>11.2</td>
</tr>
<tr>
<td>Dependence&lt;sup&gt;6&lt;/sup&gt;</td>
<td>23.1</td>
<td>7.4</td>
<td>4.5</td>
<td>2.2</td>
<td>10.2</td>
</tr>
<tr>
<td>Any SUD</td>
<td>61.5</td>
<td>30.9</td>
<td>9.1</td>
<td>26.7</td>
<td>35.8</td>
</tr>
<tr>
<td>Abuse</td>
<td>26.9</td>
<td>14.7</td>
<td>4.5</td>
<td>24.4</td>
<td>19.3</td>
</tr>
<tr>
<td>Dependence&lt;sup&gt;7&lt;/sup&gt;</td>
<td>34.6</td>
<td>16.2</td>
<td>4.5</td>
<td>2.2</td>
<td>16.6</td>
</tr>
</tbody>
</table>

GV = general violence; IPV = intimate partner violence; SUD = substance use disorder; <sup>1</sup> More GV perpetrators and less sex offenders were diagnosed with any alcohol use disorder ($p < .008$). <sup>2</sup> More GV perpetrators and less 'other offenders' were diagnosed with alcohol dependence ($p < .008$). <sup>3</sup> More GV perpetrators were diagnosed with any cannabis use disorder ($p < .008$). <sup>4</sup> More GV perpetrators were diagnosed with cannabis dependence ($p < .008$). <sup>5</sup> More GV perpetrators were diagnosed with any drug use disorder ($p < .008$). <sup>6</sup> More GV perpetrators and less 'other offenders' were diagnosed with any drug dependence ($p < .008$). <sup>7</sup> More GV perpetrators and less sex offenders were diagnosed with any substance use disorder ($p < .008$). <sup>8</sup> More GV perpetrators and less 'other offenders' were diagnosed with any substance dependence ($p < .008$).

When all drug abuse diagnoses and all drug dependence diagnoses were taken together, offenders differed significantly with regard to the prevalence of any drug abuse or drug dependence diagnosis at the time of the offense ($X^2 (6) = 21.07; p = .00$); more GV perpetrators were dependent of any drug. The same was found when there was distinguished between no drug related diagnosis and any drug related diagnosis (abuse or dependence) ($X^2 (3) = 16.18; p = .00$); more GV perpetrators were diagnosed with any drug related diagnosis. Besides, when all substance use disorder diagnoses were taken together, there was a significant difference with regard to the prevalence of any substance abuse or substance dependence at the time of the offense among different offenders ($X^2 (6) = 31.80; p = .00$); more GV perpetrators were diagnosed with substance dependence and less 'other offenders' were diagnosed with substance dependence. When there was not distinguished
between substance abuse and dependence, there also was a significant difference among different offenders \( (X^2 (3) = 24.16; p = .00) \); more GV perpetrators and less sex offenders were diagnosed with any substance abuse or dependence. All results remained significant after Bonferroni correction \( (p < .008) \).

Discussion
The present study is the first study that assessed the prevalence of specific substance use disorders at the time of the offense as well as the proportion of perpetrators that was intoxicated at the moment they committed the offense among different groups of offenders in treatment in a forensic outpatient treatment facility. Of offenders that completed screening questionnaires and that completed the substance use disorder module of the SCID-I (those who were eligible), 27.3% was diagnosed with any alcohol use disorder, and 21.4% was diagnosed with any drug use disorder at the time of the offense. Specifically, 20.3% was diagnosed with any cannabis related disorder, 5.3% with any cocaine related disorder and 1.1% with any other drug related disorder. In sum, over one third of offenders who completed screening questionnaires as well as the SCID-I (35.8%) were diagnosed with any substance related disorder according to the SCID-I at the time of the offense.

When the prevalence of substance use disorders was compared among different types of offenders, more GV perpetrators and less sex offenders were diagnosed with different substance use disorders. However, perpetrators of different crimes differed significantly regarding age (GV offenders were younger and sex offenders were older than other offenders). Moreover, participants with substance use disorders also differed significantly from participants without substance use disorders regarding age, whereas perpetrators with any substance \( (U = 3366.50; p = .05) \) and any drug use disorder \( (U = 2636.50; p = .04) \) were significantly younger than participants without substance and drug use disorders, respectively. It could therefore not be excluded that the relationship between crime type and substance use disorder is influenced by age. However, since groups are preexisting and participants can thus not be randomly assigned to the different 'conditions', it is not possible to control for age (Miller & Chapman, 2001). The conclusion that substance use disorders are more prevalent in offenders of GV should be interpreted bearing this in mind.

In addition, there could be argued that participants who entered treatment semi-voluntarily possibly underreport their substance abuse since they were awaiting trial and admitting substance abuse might influence the courts’ verdict. However, statistical analyses show that participants who are in treatment voluntarily, semi-voluntarily or were court-ordered to receive treatment do not differ regarding the prevalence of any substance use disorder, or age, or cultural identity.
Furthermore, almost one third of the offenders were intoxicated at the moment they committed the offense (48.5% of GV perpetrators, 25.0% of IPV perpetrators, 17.4% of sex offenders and 21.0% of 'other offenders'); GV perpetrators were the most often intoxicated group. Participants who were intoxicated at the time of the offense did not differ significantly from one another regarding age or cultural identity and thus are not confounding variables.

Prevalence figures of substance use disorders that we found in this study are different from the figures that we found in our previous study (Kraanen et al., 2010). In the present study we found that 30.9% of IPV perpetrators were diagnosed with any substance use disorder compared with 50.0% in the previous study, which is considerably lower. This might be explained by the use of a structured interview in the current study, while the results of the Kraanen et al. (2010) study were derived from retrospective file research. Another explanation for the different outcomes of the two studies is the high dropout rate in the present study.

Furthermore, we found that only 9.2% of sex offenders were diagnosed with any substance related disorder, which is low when compared with figures of a review that found that about half of the sex offenders was diagnosed with lifetime substance abuse or dependence (Kraanen & Emmelkamp, 2011). This might be explained by differences in types of sex offenders that were investigated: most sex offenders in this study were hands-off offenders, such as child pornography downloaders, compared with hands-on offenders, such as rapists and child molesters, in most studies included in Kraanen and Emmelkamp’s (2011) review. It would be interesting to investigate this, particularly because explanations for the relationship between substance abuse and committing sex offenses (i.e., a direct pharmacological effect of alcohol use and an alcohol expectancy effect; Testa, 2002) might not apply to hands-off sex offenders.

When substance use disorder rates in this offender population are compared to the normal population, the prevalence of substance use disorders in this study is very high. In the Netherlands, a large household survey (NEMESIS-2) showed that 9.2% of the male population was diagnosed with any substance use disorder diagnosis in the past year (De Graaf et al., 2010), compared with a prevalence of 35.8% in the current study.

Limitations
The present study holds several limitations. Firstly, we were interested in assessing substance abuse at the time of the offense. Although the SCID-I is well validated for asking about substance use disorder symptoms in the past year as well as ever in life (Kranzler et al., 1996), it has not been investigated whether the instrument is also valid when asking about substance use disorder symptoms at a specific point...
in the past. Also, the AUDIT and DUDIT were designed to assess current alcohol and drug abuse. However, there are no structured interviews or screening instruments that do assess substance abuse at a specific point in the past. Moreover, the SCID-I also asks for substance use disorder symptoms at any time in the past. Therefore, we have no reason to believe that using the SCID-I is not appropriate for this purpose.

Furthermore, dropout rates were high among participants that were eligible for the SCID-I interview (63.2% of those who were eligible completed the interview). This high dropout rate is significant because dropouts were more often intoxicated at the time of the offense and scored higher on the AUDIT and DUDIT than completers. There can be inferred that substance abuse in SCID-dropouts was more severe than substance abuse in SCID-completers. In addition, more participants that were selected for the SCID-I interview ended treatment because of not showing up on appointments than participants that scored negative on the screeners (X² (1) = 11.32; p = .00). Therefore, there should be taken caution when generalizing SCID-I data of completers to the total population including dropouts. Thirdly, the results of the present study relied on self-report of the participants, which made it possible for them to deny or minimize their (ab)use of substances. To obtain more valid information about offenders’ substance abuse, collateral reports could be obtained. Finally, no (matched) normal population control group was included as a result of which it was not possible to directly compare the prevalence of substance use disorders in offenders with normal population control subjects. However, the NEMESIS-2 prevalence study in the Dutch community (De Graaf et al., 2010) used a structured interview to diagnose substance use disorders as well, which makes comparison feasible. Considering the facts that dropout rates of substance abusers were high and substance abuse could be denied by participants, the prevalence of substance abuse found in this study is probably even underestimated.

Despite the limitations described above, this study showed that alcohol as well as drug use disorders are prevalent among different types of offenders, particularly among violent offenders. Research has demonstrated that offenders who use alcohol or drugs regularly have more extensive criminal histories than other inmates (Belenko, 2002). Also, research has shown that substance abusing offenders who completed substance abuse treatment (instead of going to prison) were less likely to be rearrested than traditionally sentenced offenders (Warner & Kramer, 2009) and had significantly fewer arrests than offenders in a control group (Gottfredson, Najaka, & Kearly, 2003; Gottfredson, Najaka, Kearly, & Rocha, 2005). Also, research has demonstrated that therapeutic community based interventions addressing drug abuse in offenders in prison were associated with reduced rearrest and reconviction rates (e.g., Wexler, Falkin, & Lipton 1990; Martin, Butzin, & Inciardi, 1995; Wexler, De Leon, Kressel, & Peters, 1999; Knight, Hiller, & Simpson, 1999).
Clinical implications

Results of the present study lead to the following suggestions for clinical practice. Firstly, substance abuse should be examined in all offenders upon admission to forensic psychiatric treatment or when entering prison. Using screening instruments, such as the AUDIT and DUDIT, is a fast and structured method for this purpose. Patients who are classified as substance abusers by means of screening instruments, should be questioned about their substance use, preferably using a structured interview, such as the SCID-I. Another option is to assess individual risk factors for criminal behavior, including substance abuse, with structured risk assessment methods, which are common in patients entering forensic treatment in the Netherlands. Furthermore, if substance use is indeed problematic, it should be one of the main goals of therapy or during the stay in prison to treat substance use disorders, because successful addiction treatment reduces recidivism significantly (Warner & Kramer, 2009; Gottfredson et al., 2005; Gottfredson et al., 2003). For example, there is evidence that treating alcohol use disorders in IPV perpetrators is effective in reducing IPV (for reviews, see: Stuart, O’Farrell, & Temple, 2009; Murphy & Ting, 2010), whereas meta-analyses show that treatment addressing IPV alone is only marginally effective (Babcock, Green, & Robie, 2004; Feder & Wilson, 2005).

Also, it is important that when addressing substance abuse in perpetrators, substance abuse is addressed in relation to the offense the patient has committed. After all, as mentioned in the introduction, the nature of the association between substance abuse and committing offenses is different among different crimes. Furthermore, it is recommended to apply motivational interviewing, a technique that is developed by Miller and Rollnick (2002) to enhance intrinsic motivation to change problematic alcohol and drug use and has proved to be effective when treating substance abuse (for a meta-analysis, see Hettema, Steele, & Miller, 2005). Besides, treating offenders using motivational enhancement techniques has also shown promising results for the treatment of offenders: a small number of studies that applied motivational interviewing to offenders have demonstrated improved treatment adherence, enhanced motivation to change and less recidivism among offenders (for a review, see McMurran, 2009). Since GV offenders have more substance use disorders, it might be particularly important to apply motivational interviewing to this category of offenders.

Finally, more substance abusers than non-substance abusers tend to drop out of treatment. Moreover, substance abusers that terminate treatment prematurely score higher on substance abuse screeners than substance abusers that do not dropout of treatment. Intakers and therapists should be aware of the relative high risk of early treatment termination in substance abusers. Preferably, they should take extra measures to increase therapy adherence. Interventions that have proven to be ef-
Effective in this population (and have been adapted from motivational interviewing) are, for example, sending handwritten notes and phoning patients to motivate them to attend treatment, and phoning or writing patients who have missed sessions without prior notification to express concern, summarize progress and express interest in working with the patient (Taft, Murphy, Elliott, & Morel, 2001).