Treatment of DUI’s – A Swedish Evaluation Study

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-Abstract-

Background: Drunken drivers with a BAC of 0.1% or more are generally convicted to prison by Swedish law. There are two special prisons for DUI’s in Sweden (Rostorp and Östragård) with three alternative treatment programs: an educational program (SWT), the Minnesota 12-step model (12-step) and Dynamic Cognitive Behaviour modification (DCB). We wanted to find out if any of the programs was superior in terms of an improved psycho-social situation, but in particular which type of client responds best to what type of program.

Method: Almost 800 convicted DUI’s were randomised to one of the three treatment programs while imprisoned for a period of 6 weeks on average. All clients were investigated with respect to their social situation, health, work and income, criminality, alcohol- and drug use and their personality through the Addiction Severity Index (ASI) and NEO personality inventory. The clients were followed up 2 years after treatment by means of ASI-interviews.

Results: Clustering clients with respect to psycho-social and personality characteristics at intake resulted in two meaningful subgroups: non-neurotic relatively normal DUI’s and antisocial and neurotic DUI’s with many psycho-social problems. All treatments were effective but none was superior to any other. Nor were there any differences between the treatment results of Rostorp and Östragård. However, the neurotic and antisocial clients improved more than the more normal DUI group with regard to psycho-social problems at follow-up. The “matching hypothesis” got meagre support but there was a trend indicating that the neurotic and antisocial clients might benefit most from the DCB program.

Introduction

During the 1980’s promises of improved alcohol treatment outcomes were reported, indicating that patient characteristics interacted with treatment set-ups affecting outcome results. The National Institute on Alcohol Abuse and Alcoholism (NIAAA) in USA then initiated the project “Matching Alcoholism Treatments to Client Heterogeneity” (Project MATCH) in 1989 (1,2). The hypothesis was that patients who are appropriately matched to treatments will show better outcomes than those who are unmatched or mismatched. A hypothesis that also has been confirmed elsewhere (3). The KAPUBRA-project in Sweden tries to replicate project MATCH in a prison-setting for DUI’s. Legislative changes in Sweden during 1994 when the legal BAC level for Gross Drunken Driving was reduced to 0.1% gave rise to two new special prisons for DUI’s in the south of Sweden - Rostorp and Östragård. The pilot and implementation phase was begun in December 1996 when program manuals were written and staff was recruited and trained. The treatment programs chosen for implementation were “the Minnesota 12-step model” (12-step) based on the principles of the Minnesota model (Reality Therapy) and Rational-Emotive Therapy (RET). Clients were familiarized with the AA
philosophy with the goal to persuade them to handle their alcohol problems through attending meetings arranged by Alcoholics Anonymous (AA) after leave. “Dynamic Cognitive Behaviour Modification” (DCB) is based on social learning theory. In the DCB program clients were engaged in group discussions and role playing giving one another feedback with the aim of influencing attitudes and alter behavior. The aim of “The Steering-Wheel Trap” (SWT), which is based on education and motivational psychology, was to give the clients knowledge and insight about the connection between DUI, social situation and alcohol use

**Objectives**

(1) Is it possible to categorize clients in meaningful subgroups with respect to psycho-social and personality characteristics? (2) Will certain client types benefit from certain programs in terms of an improved psycho-social situation, including less alcohol use at follow-up? (3) Is any program superior to the others, disregarding type of client? (4) If so, does the program effect varies with type of institution?

**Methods and materials**

**Subjects:** During the years 1996 to 1998 5 330 persons of both sexes were convicted to prison in Sweden because of one or several DUI crimes. Altogether 980 (1.2%) male clients were brought to the DUI-specialized prisons of Rostorp and Östragård. The average length of stay was six weeks. The clients were asked if they accepted to participate in one of three treatment programs. No less than 804 clients (82%) accepted and were randomly allocated to one of the programs. We have previously reported the psycho-social situation of the clients at intake and that all the programs had beneficial effects at follow-up (4). The 588 (73.1%) randomized clients at Östragård had more psycho-social problems at intake than the 216 (26.9%) clients at Rostorp. The programs were not exactly the same at the two institutions.

**Instruments:** Both at intake and follow-up the clients were interviewed with the Addiction Severity Index (ASI). The ASI is a semi-structured interview mapping seven problem areas (Physical health, Work and income, Alcohol use, Drug use, Criminality, Relations to family and friends and Psychic health). In order to measure changes over time, new indexes based on the more objective and critical questions for each problem area were constructed (5). The indexes had satisfactory internal consistency reliability and were transformed to T-scores (M=50, SD=10) based on the results of the clients investigated at intake. The clients also responded to a personality inventory (NEO-PI-R) at intake measuring five broad personality factors (Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness). The NEO-PI-R raw scores were transformed to T-scores based on the responses from a large random sample taken from the general population (6). Crime data from the Police register for the 5-year period before intake was also collected.

**Statistical analysis:** The difference between the ASI index score at follow-up and at intake for each of the seven problem areas was calculated (delta scores) and labelled “Psycho-Social Development” (“PSD”). In the same way, delta scores for the number of days with problems last month, for each of the problem areas were calculated and called “Problem Days last Month” (“PDM”). Cluster Analysis (Quick Cluster in SPSS ver. 11.0) was used to create a client typology based on the ASI-indexes and NEO-PI-R results at intake. Main effects for programs, institutions and client typology were estimated and tested for statistical significance in one-way ANOVA’s and the interactions between program and client typology and
between program and institution in two-way ANOVA`s with the 14 PSD- and PDM delta scores as dependent variables.

Results

Client typology: The clustering of clients based on the ASI-indexes and results from NEO-PI-R at intake resulted in a meaningful two cluster solution. However, 156 (10.4%) clients had incomplete data and were not included in the analysis. Cluster 1 was made up of 445 (68.6%) DUI’s with less psycho-social problems than the other DUI’s investigated. They were less neurotic and quite like the average Swedish man in the other traits of personality. The 203 clients of cluster 2 (31.3%) had more psycho-social problems than those of cluster 1 – especially with respect to Alcohol- and Drug use, Psychic health and Work and income. They were also highly Neurotic with little Agreeableness and Conscientiousness as compared to the average Swedish man. See table 1.

Table 1: A two cluster typology based on the ASI and NEO-PI-R results at intake, expressed in T-scores

<table>
<thead>
<tr>
<th></th>
<th>Cluster</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>46.90</td>
<td>63.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>53.94</td>
<td>45.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Openness</td>
<td>50.36</td>
<td>47.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreeableness</td>
<td>50.73</td>
<td>45.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>51.17</td>
<td>36.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical problems</td>
<td>48.18</td>
<td>53.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work related problems</td>
<td>47.88</td>
<td>54.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol related problems</td>
<td>46.20</td>
<td>57.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug related problems</td>
<td>47.73</td>
<td>55.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problems related to criminality</td>
<td>48.16</td>
<td>54.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problems with relations to family and friends</td>
<td>48.21</td>
<td>53.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychic problem</td>
<td>45.76</td>
<td>57.41</td>
<td></td>
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</tr>
</tbody>
</table>

Clients in cluster 1 had on average committed 3.9 DUI and 2.0 other crimes while clients in cluster 2 had committed no less than 6.4 DUI and 8.1 other crimes during the 5-year period before intake, according to register data. Cluster 1 was called “Normal DUI’s” and clients in cluster 2 “Antisocial neurotics”. A larger proportion of clients at Östragård (34.8%) belonged to the “Antisocial neurotic”cluster group than the Rostorp clients (22.0%). See table 2

Table 2: Clustering results per institution

<table>
<thead>
<tr>
<th>Typology</th>
<th>Institution</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rostorp</td>
<td>Östragård</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Non-criminal normals</td>
<td>138</td>
<td>307</td>
<td>445</td>
<td>68.7%</td>
</tr>
<tr>
<td>%</td>
<td>78.0%</td>
<td>65.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neurotic criminals</td>
<td>39</td>
<td>164</td>
<td>203</td>
<td>31.3%</td>
</tr>
<tr>
<td>%</td>
<td>22.0%</td>
<td>34.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>177</td>
<td>471</td>
<td>648</td>
<td>100.0%</td>
</tr>
<tr>
<td>%</td>
<td>100.0%</td>
<td>100.0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( (\chi^2 = 9.78, \text{ Df: 1, } p < .005) \)
**Program participation:** Random assignment of clients to programs within each institution worked well. There were no statistically significant differences in client characteristics between programs. The distribution of client types on the three programs is presented in table 3.

**Main effects of program, client type and institution:** Testing the overall effects of program, institution and client category *per se* with the 14 PSD- and PDM delta scores as dependent variables (one-way ANOVA) clearly indicated that only client type had PSD effects for Physical health ($F = 6.97, \text{Df: 1, } p < .05$), Work and income ($F = 10.86, \text{Df: 1, } p < .05$), Alcohol use ($F = 26.0, \text{Df: 1, } p < .01$), Criminality ($F = 7.64, \text{Df: 1, } p < .05$) and Psychic health ($F = 24.94, \text{Df: 1, } p < .01$). Thus, “Antisocial neurotics” gained more in all PSD delta scores as compared to “Normal DUI’s”. See tables 4. There were also significant differences in outcome between the two client types in the PDM delta scores of Alcohol use ($F = 29.2, \text{Df: 1, } p < .05$) and Drug use ($F = 29.2, \text{Df: 1, } p < .05$). Again, the “Antisocial neurotics” improved more than the “Normal DUI’s”. However, no program was superior to any of the others and there was no difference between Rostorp and Östragård in any of the PSD- and PDM delta scores. See table 4.

**Table 3: Program participation per cluster**

<table>
<thead>
<tr>
<th>Program</th>
<th>DCB</th>
<th>Count</th>
<th>%</th>
<th>Total</th>
<th>Count</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Normal DUI’s</td>
<td>Antisocial neurotics</td>
<td></td>
<td>Normal DUI’s</td>
<td>Antisocial neurotics</td>
<td></td>
</tr>
<tr>
<td>Program</td>
<td>SWT</td>
<td>154</td>
<td>34.6%</td>
<td>57</td>
<td>28.1%</td>
<td>211</td>
<td>32.6%</td>
</tr>
<tr>
<td>12-step</td>
<td>127</td>
<td>28.5%</td>
<td>62</td>
<td>30.5%</td>
<td>189</td>
<td>29.2%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>164</td>
<td>36.9%</td>
<td>84</td>
<td>41.4%</td>
<td>248</td>
<td>38.3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>445</td>
<td>100.0%</td>
<td>203</td>
<td>100.0%</td>
<td>648</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

($X^2 = 2.76, \text{Df: 1, } p > .05$)

**Table 4: Summary of main effects for Psycho-Social Development (PSD)**

<table>
<thead>
<tr>
<th>Main effects</th>
<th>Physical health</th>
<th>Work &amp; income</th>
<th>Alcohol use</th>
<th>Drug use</th>
<th>Criminality</th>
<th>Relations</th>
<th>Psychic health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
</tr>
<tr>
<td>Program</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
</tr>
<tr>
<td>Client type</td>
<td>$F = 6.97, \text{Df: 1, } p &lt; .05$</td>
<td>$F = 10.86, \text{Df: 1, } p &lt; .05$</td>
<td>$F = 26.0, \text{Df: 1, } p &lt; .05$</td>
<td>n.s</td>
<td>$F = 7.65, \text{Df: 1, } p &lt; .05$</td>
<td>n.s</td>
<td>$F = 7.65, \text{Df: 1, } p &lt; .05$</td>
</tr>
</tbody>
</table>

**Interactions between program and client typology:** No statistically significant interactions were detected for the PSD seven delta scores (3 x 2 factorial ANOVA’s). With the PDM delta scores such interactions were detected for Alcohol use ($F = 2.36, \text{Df: 2, } p<05$) and Drug...
use (F = 3.54, Df: 2, p<.05). For Alcohol use a significant reduction two years after treatment for “Antisocial neurotics” in the DCB- (M = 8.68, SD: 12.4, n = 25) and STW programs (M = 4.0, SD:10.5, n = 37) were detected. For Drug use “Antisocial neurotics” in the DCB program had fewer problem days at follow-up (M = 0.15, SD = 0.61, n = 26) while, on the contrary, such clients in the STW program had an increased number of problem days at follow-up (M = - 4.7, SD: 19.9, n = 26) as compared to the other five groups. See table 5.

Table 5: Interactions between program and client typology

<table>
<thead>
<tr>
<th>Delta scores</th>
<th>Physical health</th>
<th>Work &amp; income</th>
<th>Alcohol use</th>
<th>Drug use</th>
<th>Criminality</th>
<th>Relations</th>
<th>Psychic health</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSD</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
</tr>
<tr>
<td>PDM</td>
<td>n.s</td>
<td>n.s</td>
<td>F = 5.85, Df: 2, p&lt;.05</td>
<td>F = 3.54, Df: 2, p&lt;.05</td>
<td>n.s</td>
<td>n.s</td>
<td>n.s</td>
</tr>
</tbody>
</table>

Interactions between program and institution: Since the programs were not exactly the same at Rostorp and Östragård we finally checked for interactions between programs and institution by means of 3 x 2 factorial ANOVA’s. However no interactions was found when using the 14 PSD- and PDM delta scores as dependent variables. Thus, there was no difference between Rostorp and Östragård in effectiveness of the three programs.

Discussion
In Project MATCH alcoholic patients improved significantly after treatment, but with few interactions between type of treatment and type of patient. The KAPUBRA-project can be looked upon as a replication of Project Match but dealing with DUI’s instead of ordinary alcoholic patients. Testing for main effects, no institution or program seems to be generally better than any other. However, type of client seems to have a significant influence on the treatment results. Thus, criminal DUI’s with many psycho-social problems and with a personality characterized by a high degree of Neuroticism in combination with a low degree of Agreeableness and Conscientiousness (“Antisocial neurotics”) did benefit more from all the three treatment programs than the more “normal” DUI’s. This positive development was observed for Physical health, Work and income, Alcohol use, Criminality and Psychic health as assessed by the newly constructed composite score indexes of the Addiction Severity Index (ASI). However, the findings might be due to the simple fact that they had more to gain than clients with less psycho-social problems at intake and is not consistent with previous research(7). As in Project Match there was meagre support for the “matching hypothesis”, i.e., that a program’s effectiveness is different for different types of clients. Thus, no significant interactions between program and type of client were observed with regard to psycho-social development according to the ASI. However, such an interaction was observed with regard to number of days with problems last month. Thus, “Antisocial neurotics” benefitted more from the Dynamic Cognitive Behavior (DCB) program than the other groups in terms of alcohol- and drug-related problem days.

Since the programs were not performed in exactly the same way at the two institutions possible interactions between program and institution were checked. However, no statistically significant interactions could be detected so there is no support for the hypothesis that type of institution had any significant influence on the effects of the programs despite the fact that a
larger proportion of the Östragård clients belonged to the “Antisocial and neurotic” DUI’s with a more favourable outcome than the more “normal” DUI’s.

In our sample of DUI’s about 31% were found to have antisocial personality-like traits in combination with many legal offences. Psychopathic depredations are found in all races, cultures, and ethnic groups and at all levels of income and social status. As many as 15% or 20% of prisoners are considered psychopaths (8). Treatment of persons with antisocial personality is often considered to be difficult and such persons are not easily motivated for therapy. Usually, they come for treatment only because of court order or to gain something. They seldom see any reasons to change their attitudes and behavior to conform to social standards that they regard as irrelevant. In this study we have observed more positive changes in this group than by others in the DCB-program. This finding fits in with international treatment research. Structured cognitive behavioural treatment appears to be the best approach to working with offenders with these personalities - as compared to non-behavioural, more relationship-oriented approaches (9).

In summary, the results in this study support the conclusions of Project Match. All the treatments were effective but none was shown to be superior to any other. There was a client effect indicating that criminal, neurotic and antisocial DUI’s generally have more to gain from the treatments than more “normal” DUI’s with less psycho-social problems. There were few interactions between treatments and clients and the “matching hypothesis” got meagre support, but a trend was observed the “antisocial and neurotic” DUI’s benefit particularly from the DCB program. However, due to the large number of statistical tests, the few significant findings of the study should be interpreted with great caution. The outcome data presented here will be supplemented by register data concerning criminality, recidivism in DUI in particular up to a period of four years after intake.

References:
(9) Bonta,J., The responsivity principle and offender rehabilitation, Ministry Secretariat, Solicitor General Canada, Ontario, 2002