The effect of amphetamine type stimulants on psychopathology, aggression and cognitive function among clients within a drug therapeutic community

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Background

• In Australia the use of amphetamine type stimulants (ATS) has increased over recent years (AIHW, 2008; NIDA, 2006).
• ATS are now the second most frequently used illicit substance after cannabis (McKetin et al., 2005).
• There are an estimated 73,000 regular users (McKetin, et al, 2005), which is nearly twice the number of regular heroin users in Australia.
Background

• ATS users are increasingly presenting to drug treatment services. An estimated 23% of treatment episodes included ATS as a drug of concern, which makes them the fourth most common substance for which people receive treatment (AIHW, 2007).

• Recent evidence links ATS use with psychopathology, aggression and cognitive decline.

• This poses particular challenges to drug treatment services.
Background – ATS & psychopathology

• A study investigated ATS use and mental illness within a large (N = 921) sample of NSW prison inmates.

• Results indicated that ATS users were significantly more likely to have had an admission to a psychiatric hospital and had higher rates of all psychiatric disorders including depression and anxiety compared to non-ATS users (Riddell et al, 2006).
Background – ATS & aggression

- In 2006, data collected at a Sydney hospital showed that for substance users presenting for medical treatment as a result of toxicity, crystal methamphetamine users presented as more agitated, violent and aggressive than other intoxicated patients (Bunting, et al, 2007).
Background – ATS & cognitive function

- ATS use linked with cognitive deficits.

- Paucity of research comparing ATS users and non-ATS users on measures of cognitive function.
Background – ATS & cognitive function

• In 2006 (Ersche et al), a study compared executive function and memory between current & former ATS users, current & former opiate users and non-drug taking individuals.

• All substance users showed significant impairment in executive functioning.

• Current ATS users exhibited > impairment compared with current opiate users.

• Impairment persisted after several years of drug abstinence for both opiate and ATS users
Aims

• The aim of the current study was to investigate differences in executive function and the prevalence of co-occurring mental health problems—psychopathology and aggression—among participants who identified as being ATS users compared with non-ATS users in treatment in DTCs.
Method - participants

- Participants were residents at one of four Australian DTCs: Karralika (ACT), Odyssey House (NSW), Mirikai (QLD), and Goldbridge (QLD).
- 104 participants (67 males + 37 females).
- Ranging in age from 19 to 60 \( (M = 31.88, \ SD = 8.89) \).
- Participants were grouped as sustained and recent ATS use \( (n=51) \) or prior and no ATS use \( (n=53) \).
Participants completed a self-report questionnaire.

- *Psychopathology* was assessed using the 21 item version of the Depression, Anxiety, and Stress Scale (DASS21; Lovibond & Lovibond, 1995).

- *Aggression* was assessed using Novaco’s Dimensions of Anger Reactions Scale 5 (DAR5; Novaco, 1975).
Method - measures

- Cognitive functioning (mental capacity to control and purposefully apply one’s own mental skills) was assessed with the Behavioural Rating Inventory of Executive Function - Adult Version Self Report Form (BRIEF-A; Roth et al., 2005).

  - BRIEF-A is comprised of 75 items within nine non-overlapping theoretically and empirically derived clinical scales that measure various aspects of executive functioning in everyday life.
Method - Measures

The scales include:

- Inhibit
- Shift
- Emotional Control
- Self-Monitor
- Initiate
- Working Memory
- Plan/Organise
- Task Monitor
- Organisation of Materials
Method - Measures

• The clinical scales form two broader indices:
  1) Behavioural Regulation Index (BRI).
  2) Metacognition Index (MI), which measures an individual’s ability to cognitively manage attention and problem solve.

• From these indices the overall summary score, or the Global Executive Composite (GEC) is calculated, which provides an overall level of executive functioning.
Method - Procedure

• Participation was voluntary, anonymous and confidential.

• All residents present at the time the questionnaire was administered were invited to participate.

• The questionnaire took approximately 20 minutes to complete.
Results

• High level of psychopathology
  – 31.7% extremely severe depression (2.9% normative)
  – 34.6% extremely severe anxiety (3.2% normative)
  – 17.5% extremely severe stress (2.9% normative)

• Depression and aggression scores were significantly higher for ATS users.
• No difference for anxiety and stress scores.
### Mean Depression, Anxiety, Stress and Aggression Scores by ATS use

<table>
<thead>
<tr>
<th></th>
<th>Total (N=104)</th>
<th>ATS (n=51)</th>
<th>Non-ATS (n=53)</th>
<th>Difference</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>t statistic</td>
</tr>
<tr>
<td>Depression</td>
<td>18.71 (13.20)</td>
<td>21.69 (12.73)</td>
<td>15.86 (13.12)</td>
<td>t(102) = -2.30, p = .024</td>
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<tr>
<td>Anxiety</td>
<td>15.27 (11.78)</td>
<td>16.71 (11.86)</td>
<td>13.89 (11.64)</td>
<td>t(102) = -1.22, p = .224</td>
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<tr>
<td>Stress</td>
<td>20.37 (10.96)</td>
<td>21.97 (10.79)</td>
<td>18.83 (10.99)</td>
<td>t(102) = -1.47, p = .144</td>
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<tr>
<td>Aggression</td>
<td>2.64 (0.85)</td>
<td>2.90 (0.78)</td>
<td>2.38 (0.85)</td>
<td>t(102) = -3.21, p = .002</td>
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</tbody>
</table>
### Intercorrelations

<table>
<thead>
<tr>
<th>Variable</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
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</thead>
<tbody>
<tr>
<td>1. ATS Use</td>
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<td>2. Aggression</td>
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<td>.30**</td>
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<tr>
<td>3. Anxiety</td>
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<td>.12</td>
<td></td>
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<tr>
<td>4. Depression</td>
<td></td>
<td></td>
<td></td>
<td>.44**</td>
<td>.76**</td>
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<td></td>
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<tr>
<td>5. Stress</td>
<td></td>
<td></td>
<td></td>
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<td>.72**</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. GEC</td>
<td></td>
<td></td>
<td></td>
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<td>.64**</td>
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<tr>
<td>7. Age</td>
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<td></td>
<td>-.20*</td>
<td>-.39**</td>
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<tr>
<td>8. Sex (male)</td>
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<td></td>
<td></td>
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<td>.57</td>
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<td>9. Time in DTC</td>
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</table>

Statically significant at **$p<.01$, *$p<.05$
### Mean Executive Function Scores by ATS use

<table>
<thead>
<tr>
<th></th>
<th>Total (N=104)</th>
<th>ATS (n=51)</th>
<th>Non-ATS (n=53)</th>
<th>Difference</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean SD</td>
<td>Mean SD</td>
<td>Mean SD</td>
<td>t statistic</td>
</tr>
<tr>
<td>Inhibit</td>
<td>16.51 (3.51)</td>
<td>17.57 (3.44)</td>
<td>15.48 (3.31)</td>
<td>$t(102) = -3.16$, $p = .002$</td>
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<tr>
<td>Shift</td>
<td>11.55 (2.44)</td>
<td>12.12 (2.16)</td>
<td>11.00 (2.59)</td>
<td>$t(102) = -2.39$, $p = .019$</td>
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<td>Emotional</td>
<td>19.90 (4.45)</td>
<td>20.69 (4.40)</td>
<td>19.15 (4.40)</td>
<td>$t(102) = -1.78$, $p = .078$</td>
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<tr>
<td>Self-Monitor</td>
<td>11.62 (2.44)</td>
<td>12.37 (2.38)</td>
<td>10.89 (2.29)</td>
<td>$t(102) = -3.24$, $p = .002$</td>
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<tr>
<td>Initiate</td>
<td>14.80 (3.74)</td>
<td>15.94 (3.90)</td>
<td>13.70 (3.25)</td>
<td>$t(102) = -3.19$, $p = .002$</td>
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<td>Working</td>
<td>15.20 (3.87)</td>
<td>16.41 (3.33)</td>
<td>14.04 (4.03)</td>
<td>$t(102) = -3.28$, $p = .001$</td>
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<tr>
<td>Plan</td>
<td>18.63 (4.51)</td>
<td>19.39 (4.49)</td>
<td>17.90 (4.44)</td>
<td>$t(102) = -1.70$, $p = .092$</td>
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<tr>
<td>Task Monitor</td>
<td>11.19 (2.44)</td>
<td>11.67 (2.32)</td>
<td>10.74 (2.48)</td>
<td>$t(102) = -1.97$, $p = .051$</td>
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<tr>
<td>Organisation</td>
<td>14.16 (3.51)</td>
<td>15.16 (3.41)</td>
<td>13.21 (3.37)</td>
<td>$t(102) = -2.93$, $p = .004$</td>
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<td>BRI</td>
<td>59.57 (10.91)</td>
<td>62.75 (10.45)</td>
<td>56.52 (10.56)</td>
<td>$t(102) = -3.02$, $p = .003$</td>
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<td>MI</td>
<td>73.99 (16.14)</td>
<td>78.57 (15.55)</td>
<td>69.58 (15.60)</td>
<td>$t(102) = -2.95$, $p = .004$</td>
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<tr>
<td>GEC</td>
<td>14.16 (3.51)</td>
<td>15.16 (3.41)</td>
<td>13.21 (3.37)</td>
<td>$t(102) = -3.16$, $p = .002$</td>
</tr>
</tbody>
</table>
Conclusions

• Co-occurring problems are very common among all drug users in residential treatment.
• Anxiety, depression and executive dysfunction were high among all participants.
• ATS users exhibited significantly higher levels of depression, executive dysfunction and aggression compared to non-ATS users.
• This poses unique challenges for treatment services.
• ATS users represent the younger generation of drug users.
Conclusions

• To be effective, treatment must take into account the cognitive abilities of clients and neuro-cognitive training could form part of drug rehabilitation procedures to improve outcomes in ATS drug dependence.

• DTC treatment practices and protocols, like peer support processes, self reflection and group work may require modification to be effective for ATS users.

• Professions working in D&A settings could benefit from training in managing aggressive clients.
Conclusions

• Findings regarding executive dysfunction in ATS users are particularly relevant in DTCs, which rely heavily on group processes, self-reflection and self-motivation as part of the treatment process.

• This research highlights the need for **ATS specific** interventions aimed at supporting the emerging young generation of ATS users.
Thank you...

Any questions?