TITLE: Day Programming for Post-Traumatic Stress Disorder: A Review of the Clinical Effectiveness, Cost-Effectiveness and Guidelines

DATE: 26 March 2012

CONTEXT AND POLICY ISSUES

Post-traumatic stress disorder (PTSD) is the recurring and intrusive recollection of an overwhelming traumatic event. Individuals with PTSD relive the traumatic event in a variety of ways (e.g. memories, flashbacks, dreams), avoid stimuli associated with the event (e.g. places, people, thoughts, feelings, dissociation), and experience symptoms of increased arousal (e.g. difficulty sleeping, irritability, decreased concentration, hypervigilance). A recently published Canadian study based on a nationally representative sample of 3006 adults reported that the prevalence rates of lifetime PTSD range from 9.2% to 13.4% depending on the diagnostic criteria used, that major depressive disorder occurs concurrently in up to three-quarters of PTSD patients, and that substance and alcohol abuse are common in this population.

The treatment of PTSD includes psychotherapy (e.g. exposure psychotherapy, supportive psychotherapy) and drug therapy. As with other mental health conditions, the provision of therapy for PTSD may occur in different settings (e.g. hospital or community) and in varying program intensities (e.g. inpatient/overnight, outpatient, day programs). Day programs for mental health conditions provide therapeutic support to individuals for several hours per day while they remain in the community, and may be administered through a hospital or a community-based clinic. In general, day programs may offer certain advantages over inpatient care including a less restrictive setting for patients, lower costs, and possibly similar outcomes. In comparison to outpatient care which typically has shorter session durations (e.g. one-hour psychotherapy) and may have fewer sessions over the same period of time, day programs may be more effective. However, these findings may differ by mental health condition.

The present review was conducted to assess the evidence for the relative clinical effectiveness and cost-effectiveness of day programming, specifically in PTSD. A search for evidence-based guidelines on the use of day programming in PTSD was also conducted with the aim of informing policy on current practice.
RESEARCH QUESTIONS

1. What is the clinical effectiveness of day programming for post-traumatic stress disorder?

2. What is the cost effectiveness of day programming for post-traumatic stress disorder?

3. What are the evidence-based guidelines regarding the use of day programming for post-traumatic stress disorder?

KEY MESSAGE

A small number of studies of limited quality suggest that day programs may be effective in reducing PTSD symptoms and other psychiatric comorbidities, however the extent to which they are more or less effective than inpatient or residential and outpatient PTSD treatment programs is unclear. Cost-effectiveness evaluations of day programs and guidelines for their use were not identified. Randomized trials of day programs and their comparators are needed to address the question of their relative effectiveness in PTSD.

METHODS

Literature search strategy

A limited literature search was conducted on key resources including PubMed, PsycINFO, The Cochrane Library (2012, Issue 2), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and abbreviated list of major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2002 and February 27, 2012.

Article Selection

Titles and abstracts of the retrieved citations were screened by one reviewer, and full-text publications of selected citations were examined and further screened for final inclusion based on the selection criteria provided in Table 1.

<table>
<thead>
<tr>
<th>Table 1: Selection Criteria</th>
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<tr>
<td><strong>Population</strong></td>
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<td><strong>Intervention</strong></td>
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<td><strong>Comparator</strong></td>
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<td><strong>Outcomes</strong></td>
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<td><strong>Study Designs</strong></td>
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Exclusion Criteria

Articles were excluded if they did not meet the selection criteria in Table 1, or if they were published prior to January 2002.

Critical Appraisal of Individual Studies

The quality of the included randomized controlled trial and non-randomized studies was assessed using the Downs and Black checklist. Numeric scores were not calculated; instead the strengths and limitations of each study were described. No systematic reviews, economic evaluations, or evidence-based guidelines were identified for critical appraisal.

SUMMARY OF EVIDENCE

Quantity of Research Available

A total of 224 citations were identified through the literature search, and an additional five reports were identified in the grey literature. Screening of the abstracts resulted in the selection of 25 potentially relevant reports (20 from the literature search, and 5 from the grey literature) for full-text review.

One randomized controlled trial, three non-randomized controlled studies, and one uncontrolled study were included in the review. No health technology assessments, systematic reviews and meta-analyses, economic evaluations or guidelines providing recommendations specific to day programming were identified. Details of the study selection process are provided in the PRISMA flowchart in Appendix 1.

Summary of Study Characteristics

Study design

Five studies are included in this review; one randomized controlled trial, three prospective non-randomized controlled studies and one prospective uncontrolled study. A detailed summary of the characteristics of the included studies is provided in Table A1 in Appendix 2.

Populations

Populations included patients with diagnosed PTSD. The randomized controlled trial included homeless individuals with concurrent cocaine addiction. Three studies included patients with combat-related PTSD and one study included traumatized asylum seekers and refugees.

Interventions and comparators

The randomized controlled trial compared abstinence-contingent housing and vocational training both with and without behavioral day treatment. One non-randomized controlled study compared five group-based programs of varying intensity (i.e. inpatient, residential, day program (2 programs), and weekly outpatient). A second non-randomized controlled study compared day hospital treatment with inpatient followed by outpatient care. A third non-randomized controlled study compared three trauma focus-group day treatment programs of
varying intensity with a supportive psychotherapy group and a waiting list control group. Finally, one study\textsuperscript{12} looked at the impact of a three-week day program and did not have a comparator.

**Outcomes**

The main outcomes in the reviewed studies included PTSD symptom reduction,\textsuperscript{8-12} reduction in PTSD symptom severity,\textsuperscript{8} reduction in psychopathology\textsuperscript{8-12} (e.g. anxiety, depression, psychoticism), reduction in substance use,\textsuperscript{10,11} anger,\textsuperscript{11} change in coping,\textsuperscript{8} general health\textsuperscript{11} and general quality of life.\textsuperscript{11}

**Summary of Critical Appraisal**

The randomized study by Lester et al.\textsuperscript{8} did not appear to be originally designed to answer the research question, and the majority of the included patients did not have a diagnosis of current PTSD. Some baseline differences in patient characteristics were noted. The authors did not adjust for concurrent drug therapy, and a power calculation for adequate sample size was not reported. Because of the nature of the interventions, blinding is difficult if not unfeasible.

All three non-randomized controlled studies\textsuperscript{9-11} were prospective and clearly described their outcomes. Treatment assignment may have been systematically biased in two reports.\textsuperscript{9,10} Baseline patient characteristics were not reported in all three reports however two studies\textsuperscript{10,11} reported baseline outcome values. Potential confounding was not accounted for in any of the three studies, particularly the potential impact of concurrent drug therapy, and sample sizes were unequally distributed in two of the studies, primarily due to biased allocation.\textsuperscript{9,10} The uncontrolled study\textsuperscript{12} had no comparator, the potential impact of concurrent drug therapy on the main outcomes was not considered, and the extent to which symptom reduction would have sustained beyond three weeks is unknown.

A detailed summary of individual study strengths and limitations is provided in Table A2 of Appendix 3.

**Summary of Findings**

The main findings and authors’ conclusion of the reviewed studies are given in Table A3 of Appendix 4.

**What is the clinical effectiveness of day programming for post-traumatic stress disorder?**

**Reduction in PTSD symptoms**

A sub-analysis of an RCT\textsuperscript{8} compared the impact of two programs of abstinence-contingent housing and vocational training, with and without day programming, on PTSD symptoms as measured by the Post-Traumatic Diagnosis Scale (PDS) in homeless people with cocaine dependence and coexisting mental disorder. A multiple regression analysis on 90 of the 118 participating patients reported non-significant reductions in PTSD symptoms (B=−2.13, SE B=1.15, t-statistic=−1.85) and severity (B=−3.13, SE B=2.19, t-statistic=−1.43) with day program at 6 months. Significant predictors of symptoms and their severity at 6 months were baseline symptoms and coping measures including baseline negative avoidance, baseline positive distraction, and change in negative avoidance. The extent to which a change in coping skills could be attributed to the day treatment program was not clear in the reporting of the results.
Among the limitations of this study was that only 15% of patients met the DSM-IV criteria for current PTSD.

Three non-randomized controlled studies\textsuperscript{9-11} compared day programs with other interventions. A study from the Netherlands by Drozdek et al.\textsuperscript{9} compared three trauma-focus group treatment day programs of varying intensity (at one year) with weekly psychotherapy (at one year), and being on a six-month waiting list with medication, in asylum seekers and refugees. Significant reductions in PTSD symptoms as measured by the Harvard Trauma Questionnaire (HTQ) were seen in each of the day program groups, while no differences were seen in weekly psychotherapy and waiting list groups. An Australian study of 4339 military personnel by Forbes et al.\textsuperscript{10} compared the impact of five programs of varying intensity [inpatient-outpatient for 12 weeks (high); residential for 12 weeks (high); metropolitan day hospital for 2-3 days/week and decreasing intensity after 4-6 weeks for up to twelve weeks (moderate); regional day hospital of the same intensity as the metropolitan day hospital (moderate); and weekly cognitive behavioral sessions for up to six months (low)]. PTSD symptoms were assessed at six and at 12 months using the PTSD Checklist (PCL). The authors reported significantly improved and comparable outcomes in PTSD symptoms across the five programs. Further analyses based on categories of severity of PTSD symptoms suggested that outcomes might be maximized by matching level of PTSD severity with program intensity. A second Australian study (Creamer et al.) of 202 male Vietnam veterans compared day programs with an inpatient-outpatient model, and measured PTSD symptoms using the PCL at nine months.\textsuperscript{11} The authors described the content of both programs as being the same. Results showed significant improvement in PTSD symptoms in both treatment groups over time for up to 9 months, however there were no significant between-group differences.

A single non-comparative study (Lande et al.) of a structured day-long three-week program in 39 military personnel reported a statistically significant reduction in PTSD symptoms as measured by the PCL at three weeks.\textsuperscript{12}

\textit{Reduction in other mental health related symptoms}

All three non-randomized controlled studies reported on changes in other mental health related symptoms.\textsuperscript{9-11} Drozdek et al.\textsuperscript{9} reported statistically significant reductions in anxiety, depression, and psychoticism in two of the more intensive of three day programs, and no significant reduction of these symptoms in the weekly psychotherapy program or the 6-month waiting list with drug therapy. As was the case with PTSD symptoms, Forbes et al.\textsuperscript{10} reported comparable outcomes for depression, anxiety, and alcohol use in the five programs of varying treatment intensity that were studied. Creamer et al.\textsuperscript{11} found significant improvement in comorbidity (depression, anxiety, alcohol use) in both inpatient-outpatient and day programs over nine months, however there were no between-group differences. The non-comparative observational study by Lande et al.\textsuperscript{12} reported a statistically significant reduction in depression scores after a three-week day program.

\textit{Impact on quality of life}

The study by Creamer et al.\textsuperscript{11} assessed health-related quality of life using the 12-item Short-Form Questionnaire (SF-12) and reported no significant differences between inpatient-outpatient and day programs in either the physical or mental component of the measure.
Limitations

The quantity and quality of evidence for the effectiveness of day programs in PTSD is limited. The variation in program content and treatment intensities and durations among interventions classified as day programs poses some challenges in the assessment of its effectiveness as a category versus other treatment programs. PTSD may also be treated with medication however the extent to which the patients in most of the reviewed studies were treated with concurrent medication, how medication use may have differed by treatment group, and the extent to which the observed effects in any program can be attributed to medication is unknown. One study noted in its discussion that the majority of its patients were prescribed psychotropic medications, however this medication was not strictly controlled. The reviewed studies used different diagnostic criteria for PTSD (e.g. DSM-IV, CAPS), which would impact the types of patients included in the studies, as prevalence rates for PTSD have been shown to differ by diagnostic criteria used. The outcome measures used to evaluate PTSD symptoms varied across studies (e.g. PCL, HTQ, PCL), and may have had differing properties (e.g. responsiveness to change). The extent to which the day programs described in the reviewed studies are representative of the care available in Canadian settings is unclear. Studies assessing the cost-effectiveness of day programs compared with other treatment programs in PTSD were not identified, nor were guidelines for the use of day programs versus other treatment programs in this condition.

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING

The studies reviewed for this report suggest that day programs may be effective in reducing PTSD symptoms and other psychiatric comorbidities, however these studies all have noted methodological limitations. The extent to which day programs are more or less effective than inpatient or residential and outpatient PTSD treatment programs is unclear. Randomized studies of day programs and their comparators are needed to properly address this question, with relative program content and duration and intensity of therapy being important considerations.

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REFERENCES


APPENDIX 1: Selection of Included Studies

224 citations identified from electronic literature search and screened → 204 citations excluded

20 potentially relevant articles retrieved for scrutiny (full text, if available)

5 potentially relevant reports identified from grey literature

25 potentially relevant reports

20 reports excluded:
- irrelevant population (1)
- irrelevant intervention (12)
- other (wrong study design, guidance not provided) (7)

5 reports included in review
APPENDIX 2: Summary of Study Characteristics

<table>
<thead>
<tr>
<th>Table A1: Characteristics of Included Studies</th>
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<tbody>
<tr>
<td><strong>First author, Publication year, Country</strong></td>
</tr>
<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td><strong>Randomized Controlled Trial</strong></td>
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<tr>
<td>Lester[10] 2007, United States</td>
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<tr>
<td><strong>Non-randomized Controlled Studies</strong></td>
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<tr>
<td>Drozdek[8] 2010, Netherlands</td>
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<tr>
<td>Forbes[10] 2008, Australia</td>
</tr>
<tr>
<td>First author, Publication year, Country</td>
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<tr>
<td>----------------------------------------</td>
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<tr>
<td>Creamer et al., 2002, Australia</td>
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Uncontrolled Study

| Lande et al., 2011, United States | Prospective, 3 weeks | 39 male and female military personnel aged 21 to 30 with PTSD diagnosis based on SCID and CAPS | Structured day-long program that included individual counseling, group therapy, medication management, trauma recovery and crisis management skills focus groups, anger management focus groups | No comparator | PCL as a measure of PTSD; Zung Self-Rating Depression Scale |

*This study was a subset of a larger study. 118 patients were used in the analysis of the COPE scale and 90 patients were used in the analysis of the PDS.
AUDIT: Alcohol Use Disorders Identification Test; CAPS: Clinician-Administered PTSD Scale; COPE: Coping Orientations to Problems Experienced; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, Version IV; HADS: Hospital Anxiety and Depression Scale; HSLC-25: Hopkins Symptoms Checklist; HTQ: Harvard Trauma Questionnaire; PCL: PTSD Checklist; PDS: Post-traumatic Diagnosis Scale; PTSD: Post-traumatic stress disorder; RCT: Randomized controlled trial; SCID: Structured Clinical Interview; VA: Veterans’ Affairs
# APPENDIX 3: Summary of Critical Appraisal

## Table A2: Summary of Critical Appraisal of Included Studies (based on Downs and Black⁷)

<table>
<thead>
<tr>
<th>First author, Publication year</th>
<th>Strengths</th>
<th>Limitations</th>
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</thead>
<tbody>
<tr>
<td><strong>Randomized Controlled Trial</strong></td>
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</table>
| Lester⁷ 2007 | • Randomized controlled trial  
• Interventions clearly described  
• Outcomes clearly described | • Method of randomization not described  
• Trial not originally designed to answer research question  
• Population analyzed for one outcome measure was subset of larger group, and comparison of excluded/included patients not provided  
• Some baseline differences (better coping score in treatment group, higher rate of PTSD in comparison group)  
• All subjects did not meet criteria for PTSD  
• Patients not blinded to treatment  
• Unclear if individuals measuring outcomes were blinded to treatment  
• Adjustment of confounding may be inadequate (e.g. concurrent drug therapy not considered)  
• Probability values not provided  
• Power calculation for adequate sample size not performed |
| **Non-randomized Controlled Studies** | | |
| Drozdek⁹ 2010 | • Prospective  
• Interventions clearly described  
• Outcomes clearly described | • Patients assigned to treatment group based on language/ethnicity, gender, and program availability  
• Baseline characteristics of patients not reported  
• Confounding not accounted for  
• Power calculation for adequate sample size not performed, and sample size in treatment groups unequal due to systematic bias in allocation of patients to treatment groups |
| Forbes¹⁰ 2008 | • Prospective  
• Large population  
• Interventions clearly described  
• Outcomes clearly described | • Treatment assigned based on availability and accessibility  
• Baseline characteristics of patients not reported, with some differences in baseline outcome values reported  
• Confounding not accounted for  
• Unequal sample size in treatment groups, which may have affected the significance of some findings |
| Creamer¹¹ 2002 | • Prospective  
• Outcomes clearly described | • Interventions (program content) not clearly described  
• Baseline characteristics of patients not reported, however baseline outcome |
<table>
<thead>
<tr>
<th>Study</th>
<th>Prospective</th>
<th>Intervention clearly described</th>
<th>Outcomes clearly described</th>
<th>Baseline characteristics of patients reported</th>
<th>No comparator</th>
<th>Potential impact of drug therapy not addressed</th>
<th>Relatively short duration of follow-up</th>
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<tr>
<td>Lande\textsuperscript{12} 2011</td>
<td>Prospective</td>
<td>Intervention clearly described</td>
<td>Outcomes clearly described</td>
<td>Baseline characteristics of patients reported</td>
<td>No comparator</td>
<td>Potential impact of drug therapy not addressed</td>
<td>Relatively short duration of follow-up</td>
</tr>
</tbody>
</table>

PSTD: Post-traumatic Stress Disorder
### APPENDIX 4: Summary of Study Findings

#### Table A3: Main Study Findings and Authors’ Conclusions

<table>
<thead>
<tr>
<th>First author, Publication year</th>
<th>Main Study Findings</th>
<th>Authors’ Conclusion</th>
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<tr>
<td><strong>Randomized Controlled Trial</strong></td>
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<tr>
<td>Lester 2007</td>
<td>Repeated measures ANCOVA showed a group main effect for positive distraction (based on COPE Scale) [F(1,114)=5.73, P&lt;0.05] for the day treatment group, as well as a time x group interaction [F(1,114)=4.51, P&lt;0.05] with the day treatment group showing a decline in positive distraction and the comparator group showing an increase in positive distraction. Multiple regression analysis on all 90 patients reported non-significant reductions in PTSD symptoms (B=-2.13, SE B=1.15, t\text{-statistic}=-1.85) and severity (B=-3.13, SE B=2.19, t\text{-statistic}=-1.43) with day program at 6 months. Significant predictors of symptoms and their severity at 6 months were baseline symptoms, baseline negative avoidance, baseline positive distraction, and change in negative avoidance.</td>
<td>“For this sample, there were greater reductions in PTSD symptoms and severity for the (day program) group compared to the more clinically-oriented intervention, compared to the (comparator) group…The findings from this study provided support for coping in explaining reduction in PTSD symptoms and severity.” (Page 572)</td>
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<tr>
<td><strong>Non-randomized Controlled Studies</strong></td>
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<tr>
<td>Drozdek 2010</td>
<td>Statistically significant reductions in anxiety, depression, psychoticism, PTSD symptoms (as measured by the HTQ), and in the HTQ overall in day programs with 3+3 sessions in 3 days per week, and 3+2 sessions in 3 days per week. Reductions were also seen in the HTQ (PTSD symptoms and overall) in the 2+2 sessions in 2 days per week groups. No significant reduction in symptoms reported in the weekly psychotherapy program, or in the 6-month waiting list group.</td>
<td>“The results suggest that trauma-focus day-treatment programs lead to a significant decrease of psychopathology compared with the outpatient supportive group therapy and the control group. Within day treatment programs, the more nonverbal treatment session are applied in a week time, the better the results. Equal treatment effects were obtained with the same number of sessions per week applied over 2 and over 3 days.” (Page 117)</td>
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<tr>
<td>Forbes 2008</td>
<td>The authors reported improved and comparable outcomes in PTSD symptoms, anxiety, depression, and alcohol use at 6 and at 12 months across the 5 programs (inpatient-outpatient, residential, day hospital program 2-3 days per week (metropolitan and regional), and once-weekly session). RMANOVA using categories based on severity of PTSD symptoms found that veterans with more severe symptoms reported significantly smaller improvements in depression, anxiety, and alcohol use under low intensity program, compared with</td>
<td>“Comparable outcomes are evident across program types. Outcomes may be maximized when veterans participate in programme intensity types that match their level of PTSD severity…When such matching is not feasible, moderate intensity programs (i.e. day programs) appear to offer the most consistent outcomes.” (Page 1051)</td>
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veterans treated with moderate-to-high intensity programs. There was also a trend for those with the lowest severity to benefit less from high-intensity programs compared with low-intensity programs.

Cornier (2002) in a study of veterans treated with moderate-to-high intensity programs. There was also a trend for those with the lowest severity to benefit less from high-intensity programs compared with low-intensity programs.

**Result from ANOVA** suggested that both treatment models (inpatient-outpatient and day program) produced significant improvement in core PTSD symptoms and comorbidity over time for up to 9 months, however there was no main effect for group on any outcome, suggesting that both treatment models produced similar patterns of treatment response over time.

“**Group by time effects were not significant,** which suggests that inpatient-outpatient programs are not more efficacious than less expensive day hospital alternatives. In line with current mental health policy directions, the current study lends broad support to the recommendation that treatment services for veterans with posttraumatic stress disorder be delivered in the least restrictive environment.” (Page 183)

### Uncontrolled Study

**Lande (2011)** reported a significant reduction in PTSD and depression scores over time (mean±standard deviation):

<table>
<thead>
<tr>
<th>Measure</th>
<th>Baseline</th>
<th>Week 3</th>
<th>t-statistic</th>
<th>P-value</th>
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<tbody>
<tr>
<td>PCL</td>
<td>64.92±10.00</td>
<td>57.76±14.88</td>
<td>t(37)=3.68</td>
<td>&lt;0.001</td>
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<tr>
<td>Zung</td>
<td>71.04±9.20</td>
<td>64±13.69</td>
<td>t(34)=3.38</td>
<td>&lt;0.001</td>
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</table>

“**Results showed a statistically significant reduction in depression and PTSD symptoms after participants completed 3 weeks of intensive outpatient therapy.”** (Page 530)

**ANCOVA:** analysis of covariance; **ANOVA:** Analysis of Variance; **B:** beta; **COPE:** Coping Orientations to Problems Experienced; **HTQ:** Harvard Trauma Questionnaire; **PCL:** PTSD Checklist; **PTSD:** post-traumatic stress disorder; **RMANOVA:** repeated measures analysis of variance; **SE B:** Standard error of beta; **t:** t-statistic