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AWARD NUMBER: W81XWH-08-2-0121

TITLE: Cognitive Behavioral Social Rhythm Therapy (CBSRT) for Sleep and Mood Disturbances in Veterans with PTSD

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REPORT DATE: September 2012

TYPE OF REPORT: Final

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

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REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
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1. REPORT DATE September 2012		2. REPORT TYPE Final		3. DATES COVERED 1 September 2008 – 31 August 2012	
4. TITLE AND SUBTITLE Cognitive Behavioral Social Rhythm Therapy (CBSRT) for Sleep and Mood Disturbances in Veterans with PTSD				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER W81XWH-08-2-0121	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Patricia Haynes, Ph.D. Email: thaynes@email.arizona.edu				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) University of Arizona Tucson, AZ 85722				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Medical Research and Materiel Command Fort Detrick, Maryland 21702-5012				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release; Distribution Unlimited					
13. SUPPLEMENTARY NOTES					
14. Abstract The purpose of this study was to perform a randomized, double blind controlled trial to test the efficacy of Cognitive Behavioral Social Rhythm Therapy (CBSRT) in male veterans and active-duty personnel with posttraumatic stress disorder (PTSD), major depressive disorder (MDD), and sleep or scheduling problems over the course of 4 years (3 years plus 1 year EWO). To our knowledge, this project was the first to test a social rhythm therapy in a PTSD population. We hypothesized that CBSRT would be superior to an active control group therapy condition (Present Centered Group Therapy, PCT) in improving depression and sleep symptoms. Over the course of the study, 43 participants were randomized and started group therapies across 5 waves. Intent-to-treat analyses indicated that both therapies resulted in clinically significant improvements in depression, sleep, and PTSD with few statistically significant differences between conditions. Some data indicated that CBSRT may have slight benefit over PCT in improving depression and sleep efficiency. Significant residual symptoms remained in all outcome categories. CBSRT was associated with fewer therapy dropouts demonstrating that it may be a more acceptable therapy than PCT. Overall, these findings are valuable in that they suggest that CBSRT may be an acceptable, present-focused, adjunctive group therapy treatment option for Veterans with comorbid PTSD and MDD.					
15. SUBJECT TERMS Posttraumatic Stress Disorder (PTSD), Major Depressive Disorder (MDD), Sleep, Social Rhythms, Psychotherapy, Randomized Controlled Trial (RCT)					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			USAMRMC
			UU	43	19b. TELEPHONE NUMBER (include area code)

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b. Haynes, P., Kelly, M.R., Parthasarathy, S., Bootzin, R.R. (June 2012). A Randomized Controlled Trial of Cognitive Behavioral Social Rhythm Group Therapy for Male Veterans with PTSD, Major Depressive Disorder, and Sleep Problems. <i>Sleep</i> , 35 (Abstract Supplement), A1004.	
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INTRODUCTION

The purpose of this study is to perform a randomized, double blind controlled trial to test the efficacy of Cognitive Behavioral Social Rhythm Therapy (CBSRT) in male veterans and active-duty personnel with PTSD, Major Depressive Disorder (MDD), and sleep or scheduling problems. CBSRT is designed to improve mood and sleep by stabilizing social rhythms (daily routine), increasing exposure to ambient light, changing dysfunctional bed/bedtime associations, activating the imagery system by changing nightmare content, and challenging dysfunctional automatic thoughts that might contribute to behavioral inactivation and nonadherence to the therapy protocol. CBSRT is hypothesized to facilitate readjustment by treating insomnia and stabilizing social rhythms, thereby leading to greater mood regulation abilities and eventual improvement in depression and posttraumatic stress disorder (PTSD) symptoms. To our knowledge, this project is the first to test a social rhythm therapy in a Veteran and PTSD population. This project is also the first to compare a behavioral sleep medicine group therapy to an active mental health group therapy condition. Present-Centered Therapy is an interpersonal and supportive group therapy based on approaches delineated by Irvin Yalom.¹ The specific aims of this project were as follows:

Specific Aim 1: To test whether group Cognitive Behavior Social Rhythm Therapy is superior to a control condition (present-centered therapy, PCT) in improving depression symptoms in patients with posttraumatic stress disorder, major depressive disorder, and sleep or social rhythm disturbances from baseline to the end of treatment and 6 months post-treatment.

Specific Aim 2: To test whether group CBSRT is superior to PCT in improving sleep.

Secondary Aim 3: To test whether CBSRT is superior to PCT in improving PTSD symptoms.

Secondary Aim 4: To gather preliminary data evaluating CBSRT in veterans and active duty military personnel returning from Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF).

BODY

The following is a description of the research accomplishments associated with each task outlined in the approved Statement of Work:

Task 1. Recruit 105 veterans with PTSD, MDD, and insomnia in order to have at least two observation points for 76 patients (38 in each group). Veterans will be randomly assigned into the CBSRT or active supportive group therapy control condition (present centered therapy, PCT) stratified upon the last era in which they were active duty military. At least 24 veterans (12 in each group) will have participated in Operation Iraqi Freedom (OIF) or Operation Enduring Freedom (OEF).

We completed 5 waves of group therapy. See Appendix A, Table 1 for overall enrollment figures. Our overall enrollment figure of 115 exceeded the goal of 105 enrolled participants outlined in our SOW (110%), with Human Research Protection Office (HRPO) approval to enroll up to 125 subjects as needed. However, despite this success we ultimately had a smaller number of eligible veterans who started therapy than expected (43 actual vs. 76 expected). The

primary reason for this was a much higher overall screen fail rate (56.5% actual) than anticipated (28%) due in large part to absence of comorbid MDD, undetected sleep disorders, and recent medication changes. All veterans were required to be between the ages of 18 and 65. They were excluded for participation in shift work, recent alterations in medications, current substance abuse (< 30 days), uncontrolled medical illness, and severe traumatic brain injury/neurological disorder.

All participants were male Veterans with mean age of 48.42 years ($SD = 13.51$ years). Ethnicity distribution was 56% Caucasian, 23% Hispanic, 7% African American, 7% American Indian, 7% Other. Approximately 44% of subjects participated in the Vietnam War, 26% participated in OEF/OIF, and 30% participated in Desert Storm and other conflicts. There were no differences between groups on age or ethnicity. Randomization was stratified by military era (participation in OEF/OIF).

Task 2. Perform reliable, double-blind assessments at baseline, throughout treatment, at post-treatment, and at 3 and 6 months after the conclusion of treatment (see Schedule of Assessments below).

As part of the research protocol, we developed an extensive, structured training program on outcomes measures that utilized a standardized definition of inter-rater reliability based on the Interclass Correlation Coefficient (ICC) > .80. See Appendix A, Table 2 for assessment dates and figures documenting study assessment activity. From baseline to the 6-month follow-up assessment, the project attrition rate was 27.9%.

Task 3. Provide treatment while assuring therapist competence and fidelity

We developed scales for competency and fidelity for both PCT and CBSRT, which included breakdowns for (1) therapy common factors and (2) unique therapy factors. All competency ratings were made by Drs. Haynes and Carlson. Therapy fidelity ratings were performed by Dr. Haynes, Dr. Carlson, and two advanced clinical psychology graduate students with specific training in group therapy. Both graduate students were trained by Drs. Haynes and Carlson and had high-levels of agreement with Drs. Haynes and Carlson on individual fidelity therapy item ratings (>85% items).

All therapy sessions were videotaped. We developed a standardized competency rating system that required therapists to demonstrate competency across two sessions of group therapy. In each wave of each condition, three group therapy sessions were randomly chosen to be rated for fidelity to treatment protocol (25% of all tapes were rated). Ratings indicated that therapists maintained adequate fidelity to proposed mechanisms of treatment.

See Appendix A, Table 3 for information about the provision of treatment.

CBSRT was associated with fewer therapy dropouts ($\chi^2 = 2.75, p < .10$). Only 14% of the CBSRT group ($n = 3$) attended less than 75% sessions versus PCT, where 36% of the sample ($n = 8$) attended less than 75% of sessions. Individuals in CBSRT attended an average of 10

sessions (SD = 2.5), which was higher than those assigned to PCT (M = 8.36 sessions, SD = 3.54) via significant trend, $F(1, 42) = 3.06, p < .10$.

Task 4. Analyze data, prepare manuscripts for publication and presentations at national conferences

Major outcomes for the study were analyzed and presented at the Association for Professional Sleep Studies annual meeting in June 2012. Findings were as follows:

Specific Aim 1: To test whether group Cognitive Behavior Social Rhythm Therapy is superior to a control condition (present-centered therapy, PCT) in improving depression symptoms in patients with posttraumatic stress disorder, major depressive disorder, and sleep or social rhythm disturbances from baseline to the end of treatment and 6 months post-treatment.

See Appendix A, Table 4 for depression outcomes. We found no statistically significant group differences between CBSRT v. PCT over time, although between-group effect size was small-medium ($d = .43$). A trend ($p < .10$) indicated that both treatments resulted in improvements in depression symptoms (see Appendix A, Figure 1). From baseline to final assessment, 29% of CBSRT patients and 14% of PCT experienced a significant reduction in depression symptoms ($\geq 50\%$ drop on Hamilton Depression scores). Within-group effect sizes were large for CBSRT ($d = 1.20$) and moderate-large for PCT ($d = 0.76$).

Interpretation of these findings must be qualified by statistically significant differences in initial severity level, as individuals with CBSRT had significantly worse baseline symptoms. It must also be qualified for differential attrition. Although we performed intent-to-treat analyses with mixed modeling approaches, increased attrition in the PCT group may selectively bias the slope of change to benefit those who responded well to the therapy (especially for computation of the follow-up slope where these individuals did not possess a data point).

Specific Aim 2: To test whether group CBSRT is superior to PCT in improving sleep.

See Appendix A, Table 5 for daily sleep diary outcomes. During the treatment and follow-up periods, the rates of change in sleep efficiency (SE) in CBSRT v. PCT were significantly different (See Appendix A, Figure 2). Over the course of treatment, individuals in the CBSRT condition experienced an increase in sleep efficiency, unlike individuals in the PCT condition who experienced a decrease in sleep efficiency. In the follow-up period, there was a reversal in slope direction, with individuals in the CBSRT condition experiencing a minor decrease in SE and individuals in the PCT condition experiencing a minor increase in sleep efficiency. No other Condition x Time interactions emerged on other daily sleep diary indices. No significant changes occurred in total sleep time or wake time after sleep onset for either condition. Individuals in both conditions had a reduction in Time in Bed (TIB; average weekly decline by 6 minutes), a reduction in sleep onset latency (SOL; average weekly decline by approximately 2 minutes), and a reduction in the number of awakenings (see Appendix A, Figure 3). Improvements slowed in the follow-up period for both conditions; there was no significant Condition x PostTreatment interaction indicating no differential changes in slope post-treatment.

All findings must be qualified by initial differences in severity levels (worse sleep symptoms by individuals in CBSRT group) as well as differential attrition by condition (more drop-outs in PCT condition).

Secondary Aim 3: To test whether CBSRT is superior to PCT in improving PTSD symptoms.

See Appendix A, Table 6 for PTSD outcomes. We found no statistically significant group differences between CBSRT v. PCT over time. Between-group effect size was negligible ($d = .02$). Significant main effects for time indicated that both group treatments results in significant PTSD symptom improvement (see Appendix A, Figure 4). Approximately 57% of patients in PCT group and 71% of patients in the CBSRT had a 10-point drop in CAPS scores (using difference between baseline and last completed assessment), suggesting that both groups were clinically effective.² Within-group effect sizes were in the moderate to large range ($d = .74$ for CBSRT and $d = .64$ for PCT). Still, individuals in both groups had significant levels of residual PTSD symptoms (M 6-month CAPS score PCT group = 55.08, $SD = 25.30$; CBSRT group = 64 CAPS Score, $SD = 19.48$).

Interpretation of these finding must be qualified by statistically significant differences in initial severity level, as individuals with CBSRT had significantly worse baseline symptoms. It must also be qualified for differential attrition (increased attrition in PCT group).

Secondary Aim 4: To gather preliminary data evaluating CBSRT in veterans and active duty military personnel returning from Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF).

While we had a lower than expected recruitment rate of OEF/OIF veterans, the distribution of OEF/OIF veterans in the sample used for analyses (i.e., randomized participants who started the therapy) is very close to our SOW projections (30.2% of the sample vs. the expected 32%). Therefore, the findings reported above are consistent with a representative veteran sample, including individuals who participated in OEF/OIF. No subset analyses were conducted given the inadequate power / instability associated with small sample of OEF/OIF veterans (13 total in both conditions).

Ancillary data analysis

Several students have analyzed cross-sectional data associated with this project in order to increase our understanding of sleep disturbances in comorbid PTSD/MDD. First, we examined the relationship between PTSD symptoms, sleep, and mood regulation. Exploratory analyses indicated that poor concentration and irritability/anger each mediated the relationship between sleep and negative mood regulation (Kelly 2010). Second, we used linear regression techniques to examine the relative contributions of PTSD vs. MDD symptoms as predictors of sleep disturbance. We found that PTSD symptoms scores were a better predictor of total sleep time (TST) than depression scores ($\beta = -1.89$, $SE = .78$, $p < .05$, Kelly 2011). Third, we examined nightly variation in actigraphic sleep parameters associated with SSRI use. Use of SSRIs was found to be associated with an increase in both the nightly variability of awakenings and

percentage of time spent awake, suggesting that SSRIs might have a negative effect on patients' abilities to establish a routine sleep/wake pattern (Deoras 2010). Finally, we compared objective and subjective sleep indices and found a high correlation between total sleep time and wake time after sleep onset but a poor correlation between sleep onset latency, suggesting a misperception of the length of time to fall asleep (Kelly 2012).

Summary of data in relation to existing studies

To our knowledge, this is the first study to date comparing a group treatment that includes behavioral sleep medicine components to an active group mental health treatment designed to maximize interpersonal processes and support (consistent with Yalom-based model vs. education only). Moreover, this RCT is the first to provide a behavioral treatment to patients with both PTSD and MDD -- two highly comorbid disorders^{3,4} that may be associated with worse outcomes than MDD alone.⁵

Our findings suggested that both CBSRT and PCT improve sleep, although not to levels of complete insomnia remission. A number of studies suggest that CBT-I appears to be as effective for insomnia in the context of comorbid depression as in patients without comorbid depression when patients complete treatment.⁶⁻¹⁰ One study suggested that depression predicts drop-out of group CBT-I.¹¹ This result suggests that our sleep-related outcomes may be slightly diminished by the use of intent-to-treat analyses. Further research is necessary utilizing intent-to-treat approaches with CBTi in severe mental illness.

While there may be some advantage to behavioral sleep interventions for sleep efficiency, overall findings suggest that active mental health treatments like PCT may also significantly improve sleep. These findings are consistent with secondary analyses from several RCTs examining sleep-outcomes for mental health treatments, like Cognitive Behavioral Therapy for Depression (CBT-D, individual format). Carney and colleagues¹² found that approximately one half of individuals with baseline sleep problems no longer experienced the relative sleep symptom after successful CBT-D. Of the successful CBT-D study patients, 13% experienced early insomnia, 14% middle insomnia, and 8% late insomnia. These rates were lower than those reported by Taylor and colleagues,¹³ who found that 17%, 36%, and 24% of successful CBT-D responders continued to experience early, middle, and late insomnia, respectively. Interestingly, they also found that 29% of CBT-D responders continued to experience depressed mood and even more people continue to experience residual anxiety (37% experience psychological anxiety and 42% somatic anxiety). In the context of PTSD, Galovski¹⁴ also found that CBT for PTSD significantly improved sleep, although substantial residual symptoms remained. Overall, these results suggest that insomnia is a symptom that is relatively responsive to treatments targeting mental health specifically. Our findings correspond to this report. However, it should be noted that none of the above studies examined group mental health treatments or utilized gold-standard daily sleep diary assessments.

Since the initiation of this project, several studies have employed group behavioral sleep treatments in Veterans with PTSD. Only one study has employed an active attention control condition; Cook and colleagues¹⁵ compared group Imagery Rehearsal Therapy (IRT) to an active Sleep Education and Support condition in Vietnam Veterans with PTSD. Results were

comparable to the current study, suggesting overall few differences in major outcomes of sleep, nightmare frequency, and also PTSD symptoms.

Overall, psychiatric outcome results are consistent with those from previous studies indicating limited treatment responsiveness for PTSD group therapies, especially for group therapies administered to Vietnam Veterans in a VA setting.² To our knowledge, only one previous randomized controlled trial (RCT) compared a cognitive behavioral group therapy to an attention control condition in outpatient Veterans with PTSD. In the largest and most rigorous study to date of group therapy for PTSD, Schnurr and colleagues² found no differences on PTSD or any other outcomes between Trauma-Focused Group Therapy (TFGT) and Present Centered Group Therapy. Individuals in both conditions experienced modest-sized pre- to post-treatment improvement in PTSD, which were maintained at 12 months. Several important distinctions exist in this study. First, neither condition in the current study focused on trauma. Second, the current sample would be considered a more severe subset of Veterans with PTSD, as all Veterans in the current study had both PTSD and current MDD compared to the Schnurr study where only 57% of the sample had current MDD. Third, the duration of treatment in this study was considerable shorter than the Schnurr study; treatment in this study lasted 12 weeks vs. 24 weeks in Schnurr study. As such, it is impressive to note that 71% of Veterans in CBSRT experienced a 10-point drop in CAPS score compared to TFGT (37.1% of TFGT group at 7-months post-treatment) and PCT (34.5% of Schnurr sample at 7-months post-treatment, 57% of our sample at 6-months post-treatment).

A significant trend indicated that individuals in the CBSRT were less likely to drop out of treatment (14% completed < 75% of sessions) than individuals in the PCT condition (36% completed < 75% of sessions). A 14% drop out rate is lower than rates reported by Schnurr for TFGT (22.8%) and lower than rates reported in individual CBT for PTSD (approximately 25%). It is unclear why our PCT noncompletion rate in our study (36%) was substantially higher than those previously reported by Schnurr (8.6%). Further work is necessary in examining therapy dropout and in larger group therapy sample sizes.

Altogether, these data indicate that CBSRT may be a useful, adjunctive group therapy option for individuals with PTSD and MDD. Further studies are necessary to replicate findings, given the small sample size and low power to detect less-than large effects. Research is necessary to test whether present-focused group therapy options (such as PCT and CBSRT) improve exposure therapy outcomes.

KEY RESEARCH ACCOMPLISHMENTS

- CBSRT and PCT appear to produce comparable outcomes for both depression and PTSD, although effect size estimates indicate a small-moderate favor for CBSRT over PCT for depression.
- Both CBSRT and PCT are associated with clinically significant improvements in depression and PTSD, though significant residual symptoms remain for the majority of veterans at the end of treatment.

- Both CBSRT and PCT are associated with a reduction of time in bed, sleep onset latency, and frequency of awakenings.
- CBSRT is associated with faster improvements in sleep efficiency compared to PCT.
- Neither CBSRT nor PCT were associated with significant improvements in total sleep time or wake time after sleep onset.
- As compared to subjects in the PCT condition, subjects in CBSRT attended more therapy sessions and were less likely to drop-out of the active therapy component.

REPORTABLE OUTCOMES

The following are published abstracts and presentations over the course of this study which include data from this project (see “APPENDICES” for published abstracts). A manuscript describing major study outcomes is currently in preparation.

In Preparation

Haynes, P., Kelly, M.R., Perkins, S., Parthasarathy, S., Schnurr, P., Shea, T., Bootzin, R.R. (in preparation). A Randomized Controlled Trial of Cognitive Behavioral Social Rhythm Group Therapy for Male Veterans with PTSD, Major Depressive Disorder, and Sleep Problems.

Published Abstracts

- Kelly, M., Bootzin, R. R., Quan, S. F., Parthasarathy, S., Haynes, P. L. (June 2012). Sleep Perception in Comorbid Posttraumatic Stress Disorder and Depression; Sleep Diary versus Polysomnography. *Sleep*, 35 (Abstract Supplement), A995.
- Haynes, P., Kelly, M.R., Parthasarathy, S., Bootzin, R.R. (June 2012). A Randomized Controlled Trial of Cognitive Behavioral Social Rhythm Group Therapy for Male Veterans with PTSD, Major Depressive Disorder, and Sleep Problems. *Sleep*, 35 (Abstract Supplement), A1004.
- Kelly, M., Haynes, P. L. (June 2011). PTSD Symptom Severity Predicts Total Sleep Time in Comorbid Posttraumatic Stress Disorder and Depression. *Sleep*, 34 (Abstract Supplement), A242.
- Kelly, M., Bootzin, R. R., Quan, S. F., Parthasarathy, S., Haynes, P. L. (June 2010). Snoozing is Associated with Worse Mood Regulation in Patients with Comorbid PTSD and Depression. *Sleep*, 33 (Abstract Supplement), A237.

Presentations

- Kelly, M., Bootzin, R. R., Quan, S. F., Parthasarathy, S., Haynes, P. L. (June 2012). *Sleep Perception in Comorbid Posttraumatic Stress Disorder and Depression; Sleep Diary versus Polysomnography*. Poster presented at the Associated Professional Sleep Societies annual meeting, Boston, MA.
- Haynes, P., Kelly, M.R., Parthasarathy, S., Bootzin, R.R. (June 2012). *A Randomized Controlled Trial of Cognitive Behavioral Social Rhythm Group Therapy for Male Veterans with PTSD, Major Depressive Disorder, and Sleep Problems*. Poster presented at the Associated Professional Sleep Societies annual meeting, Boston, MA.

- Kelly, M., Haynes, P. L. (June 2011). *PTSD Symptom Severity Predicts Total Sleep Time in Comorbid Posttraumatic Stress Disorder and Depression*. Oral presentation at the Associated Professional Sleep Societies annual meeting, Minneapolis, MN.
- Kelly, M., Bootzin, R. R., Quan, S. F., Parthasarathy, S., Haynes, P. L. (June 2010). *Sleep Efficiency and Mood Regulation Expectancy: Concentration and Irritability as Mediators in Patients with Comorbid PTSD/MDD*. Poster presented at the Associated Professional Sleep Societies annual meeting, San Antonio, TX.
- Deoras, K., Kelly, M., Quan, S. F., Bootzin, R. R., Haynes, P. L. (June 2010). *Using Actigraphy to Measure the Effects of Selective Serotonin Reuptake Inhibitors on Night-To-Night Variability in Awakenings*. Poster presented at the Associated Professional Sleep Societies annual meeting, San Antonio, TX.

Awards Resulting from Published Abstracts

- Ketan Deoras (2010), Insomnia Section Investigator Award, American Academy of Sleep Medicine
- Monica Kelly (2012), Sleep Research Society Honorable Mention Abstract Award, Associated Professional Sleep Societies Annual Meeting

CONCLUSIONS

These data indicate that both CBSRT and PCT may be useful, adjunctive group therapy options for individuals with PTSD and MDD. Both forms of therapy are associated with significant levels of clinical improvement. As demonstrated by a lower attrition rate, CBSRT may be more acceptable or tolerable to patients than PCT. CBSRT may also have slight benefits over PCT in the improvement of depression and some sleep symptoms. Neither CBSRT nor PCT appear to treat PTSD, depression, or insomnia symptoms to levels of remission, thereby supporting DoD/VA Clinical Practice Guideline Review (2010) suggesting that group therapy for PTSD has overall limited treatment effectiveness. Nonetheless, group psychotherapies for PTSD are often employed in the VA system¹⁶ in order to handle high demand for mental health services. Also, the group modality provides opportunities to receive therapeutic benefit from a number of nonspecific factors (e.g., expressiveness,¹⁷ cohesion¹), which were not directly assessed as outcomes for the current study. Future work could benefit from the inclusion of outcomes that incorporate these factors, as well as ratings of patient acceptability and preference.

This study is the first randomized controlled therapy trial comparing a cognitive behavioral sleep treatment to an active mental health treatment condition in outpatient Veterans with both PTSD and MDD. The failure to find robust improvements in symptoms may relate to the chronic and severe nature of this comorbid population. The majority of participants in our study were taking psychotropic medications (74%) yet still meeting diagnostic criteria for study enrollment, thereby considered treatment nonresponders. Approximately 35% of our sample had a history of suicide attempt or psychiatric hospitalization. Our sample characteristics are consistent with previous studies indicating that patients with PTSD and MDD are more likely to have worse anxiety symptoms,¹⁸ worse objectively-assessed sleep,¹⁹ and worse health-related quality of life¹⁸ and more chronic PTSD.²⁰ Given the chronic and severe nature of the study population, sustained findings of clinical effectiveness may be significant, regardless of magnitude.

In addition, this is also the first RCT examining a social rhythm therapy in a group format and in a population of individuals with PTSD. As such, this project has provided valuable information that social rhythm therapies are feasible to administer to veterans with PTSD in a group format and are associated with clinical improvement.

Changes on Future Work

Due to a higher than expected screen-fail rate, our study lacked statistical power to detect moderate effect sizes. Future studies could benefit from testing present-focused group cognitive behavioral therapies (such as CBSRT) utilizing a larger sample size. Moreover, it is recommended that future RCTs in this area utilize a randomization scheme that stratifies based on a composite score of initial symptom severity. Other recommendations for future work includes: (a) more treatments studies designed to targeting Veterans with comorbid PTSD and MDD, (b) inclusion of patient acceptability and preference measures in behavioral RCTs to assess potential reasons for differential attrition, (c) examination of differential therapy dosing schedules. In addition, future work could benefit from examining whether group therapies, such as CBSRT, improve response to PTSD exposure therapies.

Evaluating the Knowledge

Overall, these findings are valuable in that they provide Veterans with comorbid PTSD and MDD an alternative, present-focused group therapy treatment option that (a) produces small to moderate improvements in PTSD and moderate improvements in depression and sleep and (b) appears to be well-tolerated as evidenced by a drop-out rate that is lower than PCT. These findings also contribute significantly to the literature base by supporting previous literature suggesting that group therapies for Veterans have overall limited treatment effectiveness for PTSD.

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18. Kramer TL, Booth BM, Han X, Williams DK. Service utilization and outcomes in medically ill veterans with posttraumatic stress and depressive disorders. *J Trauma Stress*. Jun 2003;16(3):211-219.
19. Leskin GA, Woodward SH, Young HE, Sheikh JI. Effects of comorbid diagnoses on sleep disturbance in PTSD. *J Psychiatr Res*. Nov-Dec 2002;36(6):449-452.
20. Blanchard EB, Buckley TC, Hickling EJ, Taylor AE. Posttraumatic stress disorder and comorbid major depression: is the correlation an illusion? *J Anxiety Disord*. Jan-Feb 1998;12(1):21-37.

APPENDICES

- A. Tables and Figures
- B. List of Personnel
- C. Curriculum Vitae – Patricia Haynes, PhD
- D. Published Research Abstracts:
 - a. Kelly, M., Bootzin, R. R., Quan, S. F., Parthasarathy, S., Haynes, P. L. (June 2012). Sleep Perception in Comorbid Posttraumatic Stress Disorder and Depression; Sleep Diary versus Polysomnography. *Sleep*, 35 (Abstract Supplement), A995.
 - b. Haynes, P., Kelly, M.R., Parthasarathy, S., Bootzin, R.R. (June 2012). A Randomized Controlled Trial of Cognitive Behavioral Social Rhythm Group Therapy for Male Veterans with PTSD, Major Depressive Disorder, and Sleep Problems. *Sleep*, 35 (Abstract Supplement), A1004.
 - c. Kelly, M., Haynes, P. L. (June 2011). PTSD Symptom Severity Predicts Total Sleep Time in Comorbid Posttraumatic Stress Disorder and Depression. *Sleep*, 34 (Abstract Supplement), A242.
 - d. Kelly, M., Bootzin, R. R., Quan, S. F., Parthasarathy, S., Haynes, P. L. (June 2010). Snoozing is Associated with Worse Mood Regulation in Patients with Comorbid PTSD and Depression. *Sleep*, 33 (Abstract Supplement), A237.

Appendix A. Tables and Figures

Table 1. Enrollment information, Entire Project

	N
Enrolled	115
OIF/OEF	20
Eligible	50
Vietnam	20
OIF/OEF	14
Desert Storm	10
Mediterranean/South America	2
Egypt	1
Kosovo	1
Somalia	1
Post Vietnam	1
Excluded	65
Reasons:	
No MDD	24
No PTSD	5
Untreated Primary Sleep Disorder	17
Bipolar	5
Past head injury w/ loss of consciousness > 30 minutes, or Moderate-Severe TBI	4
Change to medication or other therapy > 6 weeks prior to group start	5
PTSD Criterion-A trauma occurred < 18 years old	2
Stroke	1
Current Substance Abuse/Dependence	2
Withdrew prior to start of therapy	7
• Time commitment with school and family (1OIF/OEF)	3
• Travel distance	1
• Unable to contact	2
• Changed mind about study participation	1
In Therapy	
Started therapy (all Veterans)	43
Started therapy (OIF/OEF)	13
Completed therapy (≥ 9 sessions; 75% of sessions)	32
Reasons for Therapy Noncompletion	
Death in family	1
Substance abuse relapse	2
Scheduling difficulties	1
Time commitment	1
Unknown/unable to contact	5
Surgery/Recovery	1

Table 2. Assessment Dates/Figures

	Wave 1		Wave 2		Wave 3		Wave 4		Wave 5	
	<u>Date</u>	<u>N</u>	<u>Date</u>	<u>N</u>	<u>Date</u>	<u>N</u>	<u>Date</u>	<u>N</u>	<u>Date</u>	<u>N</u>
Baseline Assessment	9/4/2009 - 9/14/09	9	2/3/10 – 2/26/10	11	7/7/10 – 7/28/10	8	12/1/10 – 12/14/10	8	6/21/11 – 7/8/11	7
Week 4 Assessment	10/14/09 - 10/26/09	8	3/17/10 - 3/30/10	10	8/25/10 - 9/3/10	8	1/5/11 – 1/18/11	6	7/27/11 – 8/9/11	7
Week 8 Assessment	11/18/09 - 12/01/09	9	04/14/10 - 04/27/10	10	9/23/10 - 9/30/10	6	2/2/11 – 2/9/11	5	8/24/11 - 9/6/11	4
Post-treatment Assessment	12/16/09 - 12/29/09	9	05/13/10 - 6/19/10	10	10/20/10 - 11/5/10	7	3/2/11 – 3/10/11	5	9/21/11 – 10/6/11	6
3 Months Post-treatment Assessment	3/10/2010 - 3/24/10	7	8/4/10 - 8/24/10	10	1/20/2011- 2/7/11	6	5/6/11 – 5/31/11	5	12/20/11 – 1/3/2012	6
6 Months Post-treatment Assessment	6/1/2010 - 6/14/10	7	10/11/10 – 11/10/10	9	4/5/11 – 4/22/11	6	8/4/11 – 8/17/11	5	3/5/12 – 3/23/12	4

Table 3. Therapy Dates/Figures

Wave, Therapy Dates	<u>Wave 1</u> 9/23/09- 12/23/09	<u>Wave 2</u> 2/24/10- 5/18/10	<u>Wave 3</u> 8/4/10- 10/27/10	<u>Wave 4</u> 12/15/10- 3/9/11	<u>Wave 5</u> 7/6/11- 9/27/11
	<u>N</u>	<u>N</u>	<u>N</u>	<u>N</u>	<u>N</u>
Started Therapy	9	11	8	8	7
Completed ≥ 9 sessions	7	8	7	5	5

Table 4. Parameter Estimates (and Standard Errors) for Growth Models Examining the Rate of Change x Condition in Depression Symptoms Over the Course of Treatment and Through 6 Month Follow-Up

HamD	B	SE
Intercept	23.30***	1.23
Condition	-2.37	1.72
Time	0.21□	0.11
Condition x Time	0.1	0.17

A compound symmetry variance matrix was used to model the error variance. PCGT is the reference condition.

□ $p < .10$

Figure 1. Mean Hamilton Depression Rating Scores By Group Over Time

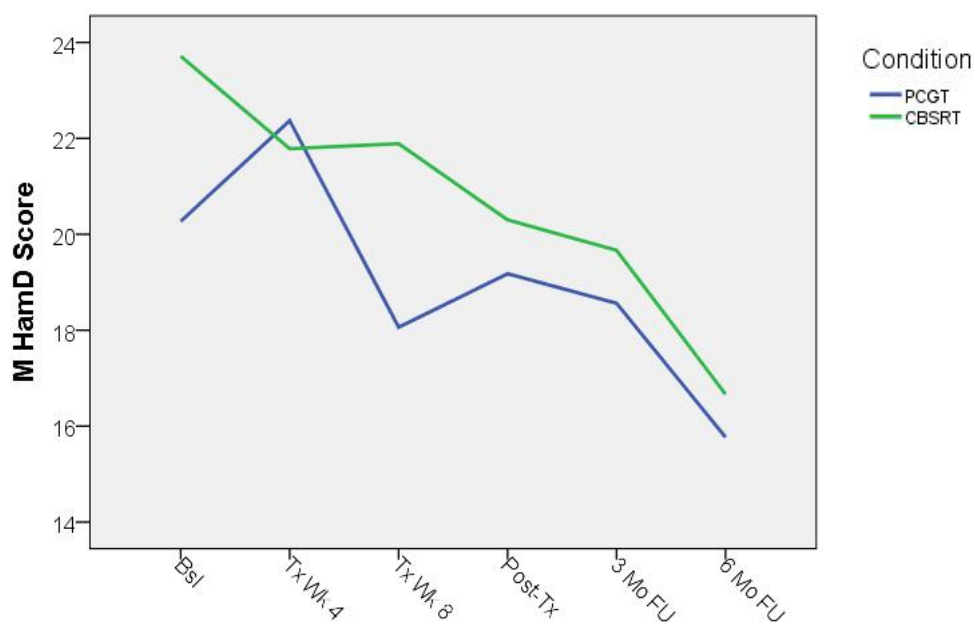


Table 5. Parameter Estimates (and Standard Errors) for Growth Models Examining the Rate of Change x Condition in Daily Sleep Diary Scores Over the Course of Treatment and Through 6 Month Follow-Up

	SE		TIB		TST		WASO		SOL		No. Awakes	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Intercept	64.45***	3.24	504.03***	21.46	333.37***	21.54	47.44***	10.78	75.70***	11.64	2.88***	0.30
Condition	12.01*	4.58	-11.80	30.29	44.94	30.39	2.12	15.19	-41.81*	16.37	-0.10	0.42
Time	0.73**	0.27	-6.36***	1.70	-2.03	1.64	-0.49	0.76	-1.90**	0.69	-0.08**	0.02
Condition x Time	-0.89*	0.40	3.71	2.56	-0.89	2.47	1.05	1.14	1.24	1.04	0.05	0.04
PostTx Time	-0.75*	0.36	9.36***	2.32	4.16□	2.24	0.78	1.03	2.46*	0.94	0.09**	0.03
Condition x PostTx Time	1.18*	0.55	-6.77□	3.53	0.10	3.41	-2.07	1.58	-1.98	1.44	-0.07	0.05

SE = Sleep Efficiency. TIB = Time in Bed. TST = Total Sleep Time. WASO = Wake Time After Sleep Onset. SOL = Sleep Onset Latency. No. Awakes = Average Number of Awakenings per Night. A compound symmetry variance matrix was used to model the error variance. PCGT is the reference condition.

□ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 2. Mean Sleep Efficiency By Group Over Time

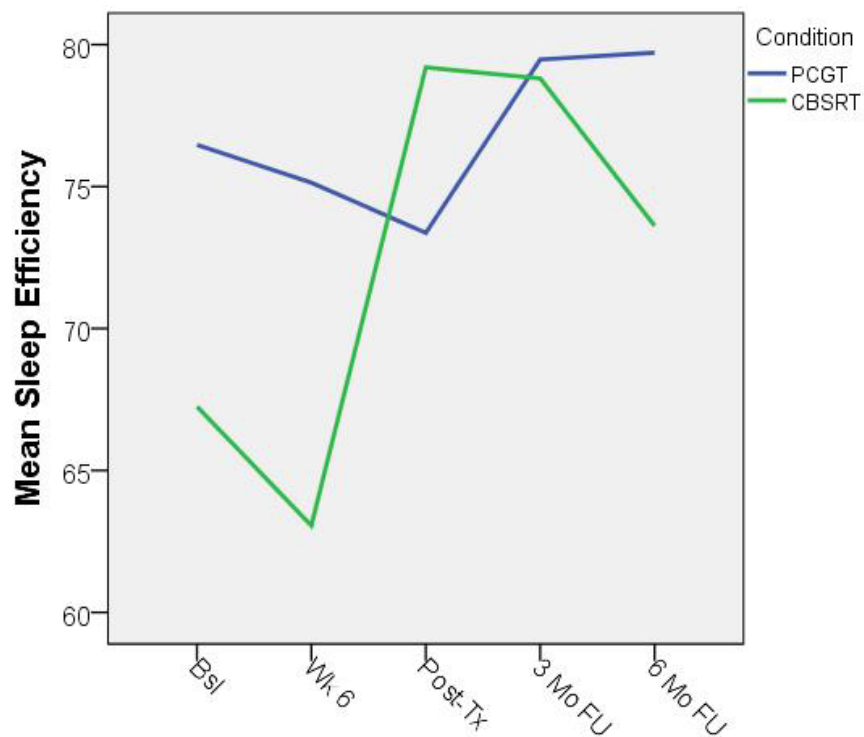


Figure 3. Mean Number of Awakenings By Group Over Time

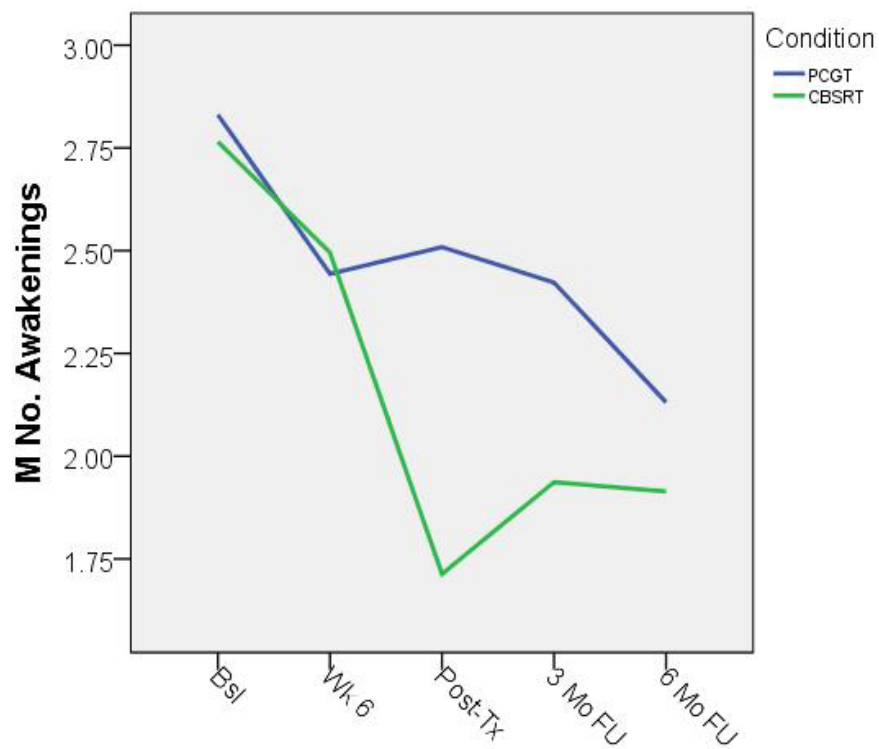
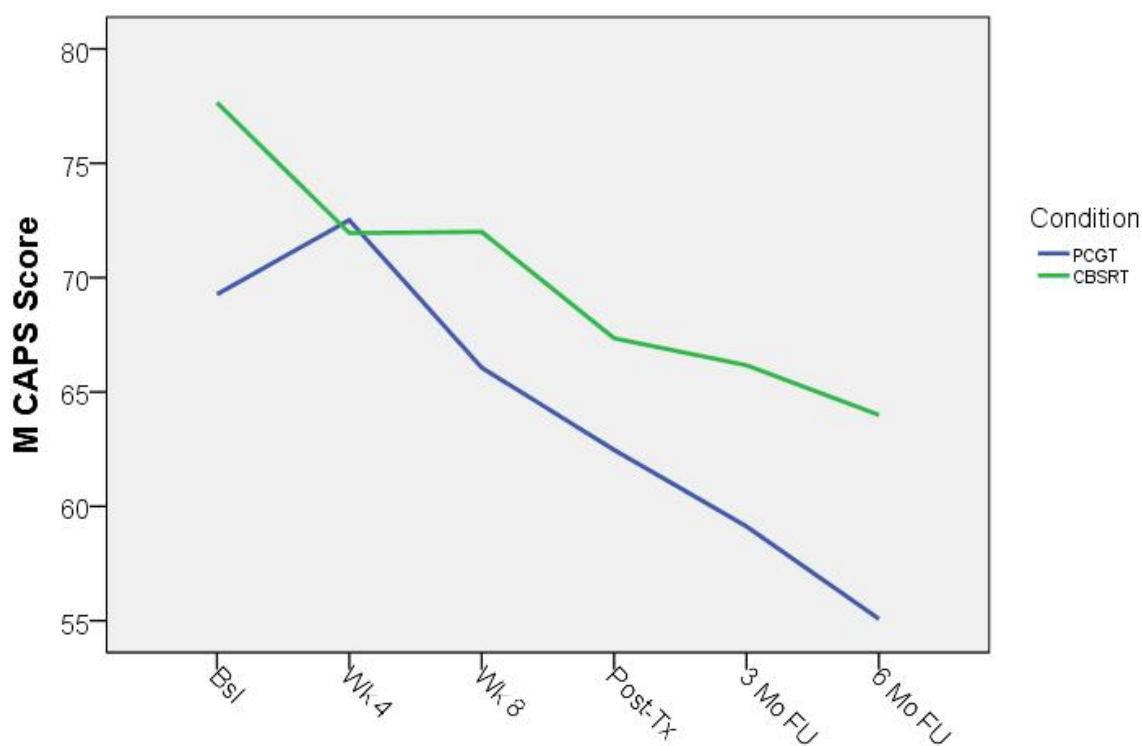


Table 6. Parameter Estimates (and Standard Errors) for Growth Models Examining the Rate of Change x Condition in PTSD Symptoms Over the Course of Treatment and Through 6 Month Follow-Up

CAPS	B	SE
Intercept	76.65***	4.59
Condition	-5.25	6.39
Time	-0.76*	0.32
Condition x Time	0.39	0.45

Figure 4. Mean Clinician Administered PTSD Scale (CAPS) Score By Group Over Time



Appendix B. List of Personnel who Received Pay from Research Effort during this Project

Appendix B. List of Personnel who Received Pay from Research Effort during this Project

Patricia Haynes, PhD, Principal Investigator, Assistant Professor, Psychiatry
John Carlson, PhD, Research Scientist, Clinical Professor of Medicine
Monica Kelly, Research Specialist
Chandra Tontsch, Research Specialist
Carolyn Fort, Research Specialist
Matthew Eckhoff, Research Assistant
Sacha Brown, Data Manager
Sarah Emert, Data Manager
Yelena Blank, Graduate Research Assistant, Fidelity Rater, Therapist
Lesley Warner, Assessor
Melissa Tehee, Graduate Research Assistant, Fidelity Rater, Therapist
George Sirakis, Sleep Technologist
Shira Fass, PhD, Therapist
Timothy Leblanc, Research Assistant
Valerie Scheller, Data Entry Assistant
Martin Ukockis, Sleep Technologist
Rebecca Bewick, Graphic Designer

Appendix C. Patricia Haynes' CV

CURRICULUM VITAE

PATRICIA L. HAYNES

PERSONAL INFORMATION

Office Address (1):

Department of Psychiatry
University of Arizona
1501 N. Campbell Ave.
P.O. Box 245002
Tucson, AZ 85724-5002
Phone: (520) 626-1855
Fax: (520) 626-6050
E-mail: thaynes@email.arizona.edu

Office Address (2):

Mental Health Care Line, 4-116A
Southern Arizona VA Healthcare System
Tucson, AZ 85723
Phone: (520) 792-1450 x6331
Fax: (520) 629-1864
Email: Patricia.Haynes3@va.gov

Home Address:

2828 W. Calle Arandas
Tucson, AZ 85745
Phone: (520) 615-9850

Citizenship: United States

PROFESSIONAL INTERESTS

Treatment and Program Development and Evaluation, Behavioral Clinical Trials
Health Psychology, Sleep Disorders
Psychiatric Comorbidities: Post-Traumatic Stress Disorder, Depression
Social Rhythm Model
Cognitive Behavioral Therapy

CHRONOLOGY OF EDUCATION

Licensed in Arizona #3804 since 7/06

Certified in Behavioral Sleep Medicine (CBSM), American Academy of Sleep Medicine, since 8/08
Provider in Cognitive Processing Therapy, certified through VA, since 2/11

Postdoctoral Research Associate, 2003 - 2005, Department of Psychology, University of Arizona

Advisor: Richard Bootzin, Ph.D.

Ph.D. in Clinical Psychology, 2003, San Diego State University/University of California, San Diego Joint
Doctoral Program in Clinical Psychology

Dissertation Title: Circadian impact of psychosocial factors in depression.

Advisor: John R. McQuaid, Ph.D., Co-Chair: Sonia Ancoli-Israel, Ph.D.

Clinical Internship, 2002 - 2003, Southern Consortium Psychology Predoctoral Internship, New Mexico
VA Healthcare System

Training Director: Evelyn Sandeen, Ph.D.

M.S. in Clinical Psychology, 2001, San Diego State University

Thesis Title: The development of mood disorders within a social context: An exploratory, interdisciplinary analysis

Advisor: John R. McQuaid, Ph.D.

B.A., Summa Cum Laude, 1996, University of Missouri, Columbia

Major: Psychology

Special Projects: The adaptive significance of postpartum depression (Advisor: Dr. Mark Flinn, Ph.D.); A comparison of learning and memory for gender-relevant words between males and females (Advisor: Dr. Michael Stadler, Ph.D.).

Post-Licensure Specialized, Intensive Mental Health Training, Evidence Based Treatments

Half day training, Generalized Anxiety Disorder, Tom Borkovec, PhD, Tucson, AZ, January 2011
One day training, Behavioral Activation, Christopher Martell, PhD, Tucson, AZ, March 2009
Two day training, Cognitive Processing Therapy, Karen Kattar, PsyD, Tucson, AZ, July 2008.
One day training, Emotion Focused Therapy, Leslie Greenberg, PhD, Tucson, AZ, February 2008
Two day training, Dialectical Behavior Therapy, Marsha Linehan, PhD, Chandler, AZ, November 2007
Two day training, Acceptance and Commitment Therapy, Robin Walser, PhD, Tucson, AZ, February 2007

RESEARCH POSITIONS HELD

Assistant Professor, Department of Psychiatry, University of Arizona, 2009 - present
Research Assistant Professor, Department of Psychiatry, University of Arizona, 2005 - 2009
Postdoctoral Research Associate, Sleep and Insomnia Lab, University of Arizona, 2003 – 2005
Research Assistant, CBT and Life Events Lab, University of California, San Diego, 1999 – 2002
Research Assistant, Female-Specific Depression and Circadian Rhythms Lab, University of California, San Diego, 1997 - 1999

CLINICAL POSITIONS HELD

Staff Psychologist, Southern Arizona VA Healthcare System, 2007- present
Postdoctoral Associate, Insomnia Clinic, University of Arizona, 2003-2005
Postdoctoral Psychology Resident, Behavioral Sleep Medicine Clinic, Southern Arizona VA, 2003-2005
Psychology Intern, New Mexico VA Healthcare System, 2002-2003
Practicum Student, Sleep Disorders Clinic, San Diego VA Healthcare System, 2001-2002
Practicum Student, Child and Family Clinic, San Diego State University Psychology Clinic, 2000-2001
Clinic Coordinator, San Diego State University Psychology Clinic, 1999-2001
Practicum Student, Mood Clinic, San Diego VA Healthcare System, 1999-2000
Summer Psychology Trainee, Neuropsychology Clinic, San Diego VA Healthcare System, 1999
Practicum Student, University of California, San Diego Outpatient Mental Health Clinic, 1998-1999
Counselor Assistant, McCambridge Center for Women, Columbia, Missouri, 1996-1997
Volunteer, The Shelter, Columbia, Missouri, 1996-1997
Counselor Assistant, Daybreak Residential Treatment Center, Columbia, Missouri, 1995-1996

PROFESSIONAL AFFILIATIONS

American Academy of Sleep Medicine
American Psychological Association
Association for Behavior and Cognitive Therapy, Insomnia Special Interest Group
The International Society for Traumatic Stress Studies
Sleep Research Society
Society of Behavioral Sleep Medicine

HONORS AND AWARDS

- Department of Defense Concept Award, 2010-2013
- VA Expert Panelist, “Insomnia Treatment, Training & Research: Existing Resources and Projected Needs,” sponsored by VA Center for Integrated Healthcare in Syracuse, Center of Excellence at the Canandaigua VAMC, University of Rochester Medical Centers’ Department of Psychiatry and the Sleep & Neurophysiology Research Laboratory, September 2008

- Distinguished Fellow, NIH Summer Training Institute on the Design and Conduct of Randomized Clinical Trials Involving Behavioral Interventions sponsored by the Office of Behavioral and Social Sciences Research (OBSSR/NIH), June 2008
- Department of Defense Young Investigator Award, 2008-2012
- Institute for Mental Health Research Award for Pilot Data Collection, 2008-2012
- Primary Faculty Mentor, Undergraduate Research Award, 2006, 2007, 2008, 2010
- American Sleep Medicine Foundation (ASMF), Faculty Career Development Award, 2006-2008
- Institute for Mental Health Research Award for Pilot Data Collection, 2006-2007
- NIMH Predoctoral National Research Service Award, 2002-2003
- Sleep Research Society Trainee Travel Award, 2001, 2002, 2004, 2005
- Phi Beta Kappa, National Honors Society, 1996
- University of Missouri-Columbia Scholar, 1994-1996

RESEARCH GRANTS AND FELLOWSHIPS

Federal

- 2012-2017 HSR&D, VA Merit Award
Haynes, P. L. (Consultant), Kuna, S. (PI). Telemedicine management of veterans with PTSD and chronic insomnia.
- 2010-2013 Department of Defense, Concept Award,
Haynes, P. L. (PI) Do Undetected or Untreated Sleep Disorders Predict PTSD Psychotherapy Outcomes?
- 2010-2011 VA Health Services Research & Development, Pilot Grant,
Haynes, P. L. (co-I), Parthasarathy, S. (PI). A pilot study of CPAP adherence promotion by peer buddies with sleep apnea.
- 2008-2012 Department of Defense, Young Investigator Award,
Haynes, P. L. (PI) Cognitive Behavioral Social Rhythm Therapy (CBSRT) for Sleep and Mood Disturbances in Veterans with PTSD
- 2002-2003 National Institute of Mental Health, National Research Service Award, F31
Haynes, P. L. (PI), McQuaid, J. R., & Ancoli-Israel, S. (Sponsors) Circadian Impact of Psychosocial Factors in Depression.

Private Foundations

- 2008-2012 Arizona Institute for Mental Health Research, Award for Pilot Data Collection,
Haynes, P. L. (PI) Development of a Behavioral Sleep Medicine Intervention for Recently Returned Operation Iraqi Freedom /Operation Enduring Freedom Military Personnel
- 2006-2008 American Sleep Medicine Foundation, Faculty Career Development Award,
Haynes, P. L. (PI) Cognitive Behavioral Social Rhythm Therapy (CBSRT) for Sleep Disturbances in PTSD/MDD
- 2006-2007 Arizona Institute for Mental Health Research, Award for Pilot Data Collection,
Haynes, P. L. (PI) Development of a Chronobiologically-Informed Intervention for Comorbid PTSD/MDD

Past Collaborations

- 2009 VA, Clinical Merit Award, PI: Ross, R.
Haynes, P. L. (Consultant, Therapy Fidelity Rater) Cognitive-Behavioral Treatment for Sleep Disorder in Combat-related PTSD
- 2007-2008 VA, HSR&D, Quality Enhancement Research Initiative (QUERI) Award, PI: Epstein, D.
Haynes, P.L. (Collaborator) Modifications to Insomnia Treatments for OIF/OEF Veterans TBI

- 2006-2007 Arizona Biomedical Research Commission, PI: Lane, R.
Haynes, P.L. (CBT Therapist) Neural Basis of Vagal Tone Dysregulation in Depression
- 2005-2006 National Institutes of Mental Health, PI: Moreno, R.
Haynes, P.L. (Research Coordinator) Tryptophan Depletion: A Phenotypic Marker for Depression.
- 2004-2006 Office of National Drug Control Policy, PIs: Bootzin, R., Stevens, S.
Haynes, P. L. (Consultant) Reducing Adolescent Substance Abuse Through Treatment of Sleep Disturbance and Daytime Sleepiness
- 2003-2005 National Institutes of Nursing Research, PI: Sidani, S., Site-PI: Bootzin, R.
Haynes, P. L. (CBT Therapist) Alternative Methods for Clinical Research

In Submission

Haynes, P. L. (PI). RO1: Examining sleep and social rhythms as mechanisms for weight gain after job loss. Role on project: Principal investigator.

PUBLICATIONS

Refereed journal articles

- Britton, W. B, **Haynes, P.L.**, Fridel, K.W., & Bootzin, R.R. (2012). Polysomnographic and subjective sleep profiles before and after Mindfulness-Based Cognitive Therapy in partially remitted depression. *Psychotherapy and Psychosomatics*, 81, 296-304.
- Epstein, D. R., Babcock-Parziale, J. L., **Haynes, P. L.**, & Herb, C. A. (2012). Insomnia Treatment Preferences of male Iraq and Afghanistan Combat Veterans and Health Care Providers, *Journal of Rehabilitation Research & Development*, 49, 867-878.
- Haynes, P. L.**, Ancoli-Israel, S., Walter, C. M., McQuaid, J. (2012). Preliminary Evidence for a Relationship Between Sleep Disturbance and Global Attributional Style in Depression. *Cognitive Therapy and Research*, 36, 140-48.
- Manber, R., Carney, C., Edinger, J., Epstein, D., Friedman, L., **Haynes, P. L.**, Karlin, B. E., Pigeon, W., Siebern, A. T., Trockel, M. (2012). Dissemination of CBTI to the Non-Sleep Specialist: Protocol Development and Training Issues. *Journal of Clinical Sleep Medicine*, 8, 209-218.
- Haynes, P. L.**, Parthasarathy, S., Kersh, B., & Bootzin, R.R. (2011). Examination of insomnia and insomnia treatment in psychiatric inpatients. *International Journal of Mental Health Nursing*, 20, 130-136.
- Britton, W. B, **Haynes, P.L.**, Fridel, K.W., & Bootzin, R.R. (2010). Polysomnographic and subjective sleep profiles before and after Mindfulness-Based Cognitive Therapy in partially remitted depression. *Psychosomatic Medicine*, 72, 539-548.
- Krakow, B., Romero, E. **Haynes, P. L.**, & Ulibarri, V. (2009). Nocturia and Snoring: Predictive Symptoms for Obstructive Sleep Apnea. *Sleep & Breathing*.
- Krakow, B., Ulibarri, V., Melendrez, D., Kikta, S., Togami, L., & **Haynes, P. L.** (2008). A Daytime, Abbreviated Cardio-Respiratory Sleep Study (CPT 95807-52) To Acclimate Insomnia Patients with Sleep-Disordered Breathing to Positive Airway Pressure (PAP-NAP). *Journal of Clinical Sleep Medicine*, 4, 193-292.
- Krakow, B., **Haynes, P. L.**, Melendrez, D., Warner, T. D., Sisley, B., Johnston, L., Hollifield, M., & Lee, S. (2007). Clinical sleep disorders in a large sample of trauma survivors: An emerging interdisciplinary view of posttraumatic sleep disturbance. *Sleep & Hypnosis*, 9.
- Stevens, S., **Haynes, P. L.**, Ruiz, B., & Bootzin, R. (2007). Effects of a behavioral sleep medicine intervention on trauma symptoms in adolescents recently treated for substance abuse. *Substance Abuse*, 28, 21-31.
- Cousins, J., Bootzin, R., Stevens, S., & **Haynes, P. L.** (2007). Parental involvement, psychological distress, and sleep: A preliminary examination in sleep-disturbed adolescents with a history of substance use. *Journal of Family Psychology*, 21, 104-113.
- Haynes, P. L.**, McQuaid, J.R., & Ancoli-Israel, S. (2006). Disrupting life events and the sleep-wake cycle in depression, *Psychological Medicine*, 36, 1363-1373.

- Parthasarathy, S., **Haynes, P. L.**, Budhiraja, R., Habib, M. P., & Quan, S. F. (2006). A National Survey of The Effect of Sleep Medicine Specialists and American Academy of Sleep Medicine Accreditation on Management of Obstructive Sleep Apnea, *Journal of Clinical Sleep Medicine*, 2, 133-139.
- Haynes, P. L.**, Bootzin, R. R., Smith, L., Cousins, J., Stevens, S., & Cameron, M. (2006). Sleep and aggression in substance abusing adolescents: Results from an integrative, behavioral sleep treatment pilot program. *Sleep*, 29, 512-520.
- Haynes, P. L.** (2005) The role of behavioral sleep medicine in the assessment and treatment of sleep disordered breathing. *Clinical Psychology Review*, 25, 673-705.
- Haynes, P. L.**, Ancoli-Israel, S., & McQuaid, J.R. (2005). Illuminating the impact of habitual behaviors in depression. *Chronobiology International*, 22, 279-297.
- Haynes, P. L.**, McQuaid, J.R., Kelsoe, J., Rapaport, M., & Gillin, J.C. (2004). Affective state and EEG sleep profile in response to rapid tryptophan depletion after cognitive behavioral therapy for depression. *Journal of Affective Disorders*, 83, 253-262.
- Krakow, B., **Haynes, P. L.**, Warner, T. D., Santana, E., Melendrez, D., Johnston, L., Hollifield, M., Sisley, B., Koss, M. & Shafer, L. (2004). Nightmares, Insomnia, and Sleep-Disordered Breathing in Fire Evacuees Seeking Treatment for Posttraumatic Sleep Disturbance. *Journal of Traumatic Stress*, 17, 257-268.
- Parry, B. & **Haynes, P.** (2000). Mood disorders and the reproductive cycle. *Journal of Gender Specific Medicine*, 3, 53-58.
- Haynes, P.** & Parry, B. (1998). Mood disorders and the reproductive cycle: Affective disorders during the menopause and premenstrual dysphoric disorder. *Psychopharmacology Bulletin*, 34, 313-318.

Research Abstracts, Peer-Reviewed

- Haynes, P. L.**, Kelly, M.R., Parthasarathy, S., & Bootzin, R.R. (2012, June). A Randomized Controlled Trial of Cognitive Behavioral Social Rhythm Group Therapy (CBSRT) for Male Veterans with PTSD, Major Depressive Disorder, and Sleep Problems. *Sleep*, 35 (Abstract Supplement), A338.
- Kelly, M.R., Bootzin, R.R., Parthasarathy, S., & **Haynes, P. L.** (2012, June). Sleep Perception in Comorbid Posttraumatic Stress Disorder and Depression: Sleep Diary vs. Polysomnography. *Sleep*, 35 (Abstract Supplement), A335.
- Kelly, M.R. & **Haynes, P. L.** (2011, June). PTSD Symptom Severity Predicts Total Sleep Time in Comorbid Posttraumatic Stress Disorder and Depression. *Sleep*, 34 (Abstract Supplement), A242.
- Haynes, P. L.**, Kelly, M.R., Quan, S.F., & Bootzin, R.R. (2010, June). Cognitive Behavioral Social Rhythm Therapy is Associated with Significant Improvement in Capacity to Regulate Negative Mood. *Sleep*, 33 (Abstract Supplement), A247-248.
- Blank, Y., Kelly, M.R., Bootzin, R.R., Quan, S.F., **Haynes, P.L.** (2010, June). Emotion regulation, nightmares, and sleep quality. *Sleep*, 33 (Abstract Supplement), A244.
- Deoras, K., Kelly, M., Quan, S. F., Bootzin, R. R., **Haynes, P. L.** (2010, June). Using Actigraphy to Measure the Effects of Selective Serotonin Reuptake Inhibitors on Night-To-Night Variability in Awakenings. *Sleep*, 33 (Abstract Supplement), A243.
- Kelly, M., Bootzin, R. R., Quan, S. F., Parthasarathy, S., **Haynes, P. L.** (2010, June). Snoozing is Associated with Worse Mood Regulation in Patients with Comorbid PTSD and Depression. *Sleep*, 33 (Abstract Supplement), A237.
- Haynes, P. L.**, Kelly, M., Scheller, V., Quan, S. F., Bootzin, R. R. (2009, June). Stabilizing Sleep and Daily Routine in Veterans with Comorbid PTSD and Depression: Follow-up Outcomes for Cognitive Behavioral Social Rhythm Therapy. *Sleep*, 32 (Abstract Supplement), A344.
- Kelly, M., Bootzin, R. R., Ancoli-Israel, S., & **Haynes, P. L.** (2009, June). Actigraphic Comparison of Sleep in Comorbid Posttraumatic Stress Disorder and Depression Versus Depression Alone. *Sleep*, 32 (Abstract Supplement), A346.
- Blank, Y., Kelly, M., Bootzin, R. R., & **Haynes, P. L.** (2009, June). Does Sleep Mediate the Relationship Between Nightmares and Symptom Severity in Patients with PTSD and Depression? *Sleep*, 32 (Abstract Supplement), A358.

- Scheller, V. K., & **Haynes, P. L.** (2009, June). A Preliminary Examination of Co-Sleeping and Relationship Quality in Veterans with PTSD and Depression. *Sleep*, 32 (Abstract Supplement), A365.
- Haynes, P. L.**, Kelly, M., Williamson, M., Marks, M., Quan, S., & Bootzin, R. R. (2008, June). Cognitive Behavioral Social Rhythm Therapy for Comorbid PTSD and Depression: Initial Results from a Pilot Study. *Sleep*, 31 (Abstract Supplement), A323.
- Kelly, M. & **Haynes, P. L.** (2008, June). Emotion Regulation and Sleep in Medical Students: A Preliminary Examination. *Sleep*, 31 (Abstract Supplement), A350.
- Epstein, D., Babcock-Parziale, J. L., & **Haynes, P. L.** (2008, June). Insomnia Treatment Preferences of Operation Iraqi Freedom/Operation Enduring Freedom Veterans: Preliminary Findings. *Sleep*, 31 (Abstract Supplement), A241-A242.
- Scott, A., & **Haynes, P. L.** (2008, June). Identifying Potential Complicating Factors in Treating Insomnia in Veterans. *Sleep*, 31 (Abstract Supplement), A252.
- Haynes, P. L.**, Kersh, B., & Bootzin, R. (2007). An Evaluation of Subjective Sleep Quality in Psychiatric Inpatients: Results of a Behavioral Sleep Medicine Pilot Intervention. *Sleep*, 30 (Abstract Supplement), A338.
- Bosshart, T., Williamson, M., McQuaid, J., Ancoli-Israel, S., & **Haynes, P.** (2007). The Relationship between Maternal Bonding and Sleep in Adults With and Without Depression. *Sleep*, 30 (Abstract Supplement), A339.
- Kelly, M., Martin, J., Ancoli-Israel, S., McQuaid, J., & **Haynes, P.** (2007). Assessing Interdaily Stability and Intradaily Variability of Rest-Activity Rhythms in Depressed and Never-Depressed Participants. *Sleep*, 30 (Abstract Supplement), A354.
- Haynes, P.**, Stevens, S., Ruiz, B., & Bootzin, R. (2006). The Effects of an Integrative Behavioral Sleep Medicine Intervention on Trauma Symptoms in Adolescents Recently Treated for Substance Abuse. *Sleep*, 29 (Abstract Supplement), A99.
- Parthasarathy, S., **Haynes, P. L.**, Budhiraja, R., Habib, M. P., & Quan, S. F. (2006). A National Survey of The Effect of Sleep Medicine Specialists and American Academy of Sleep Medicine Accreditation on Management of Obstructive Sleep Apnea, *Sleep*, 29 (Abstract Supplement), A155.
- Haynes, P.**, McQuaid, J. R., & Ancoli-Israel, S. (2005). The association between sleep continuity and depression: Evidence for partial mediation by global attributional style. *Sleep*, 28 (Abstract Supplement), A311.
- Cousins, J. C., Bootzin, R. R., Reminger, S. L., **Haynes, P. L.**, Flaten, S., & Holderman, D. (2005). Treatment outcomes and sex differences for insomnia. *Sleep*, 28 (Abstract Supplement), A252.
- Haynes, P.**, McQuaid, J. R., & Ancoli-Israel, S. (2004). Disrupting life events are associated with interrupted sleep in depressed individuals but not in normal controls. *Sleep*, 27 (Abstract Supplement), A343.
- Haynes, P.**, Ancoli-Israel, S., McQuaid, J., & Hasler, B. (2004). The relationship between habitual behaviors and depression is partially mediated by light. *Sleep*, 27 (Abstract Supplement), A342.
- Haynes, P. L.**, Krakow, B., Warner, T. D., Melendrez, D., Hollifield, M., & Koss, M. (2003). PTSD: Posttraumatic stress disorder or posttraumatic sleep disorders? *Sleep*, 26 (Abstract Supplement), A380.
- Haynes, P. L.**, McQuaid, J. R., Martin, J. L., & Ancoli-Israel, S. (2002). Sleep-wake transition variability in depressed and non-depressed participants. *Sleep*, 25 (Abstract Supplement), A506-7.
- Haynes, P. L.**, McQuaid, J., & Gillin, J. C. (2001). Electroencephalographic sleep profiles in response to tryptophan depletion after cognitive behavioral therapy for depression. *Sleep*, 24 (Abstract Supplement), A394.

Book Chapters and Other Scholarly Publications

- Haynes, P.** (in press). Application of Cognitive Behavioral Therapies for Comorbid Insomnia and Depression. In J. Hermann & M. Hirshkowitz (Eds.), *Sleep Medicine and Psychiatric Illness, 2nd Edition*. Lippincott Williams & Wilkins.
- Manber, R., **Haynes, P.**, & Siebern, A. (2012). Sleep and Psychiatric Disorders. In Colin Espie and Charles Morin (Eds.), *Oxford Handbook of Sleep and Sleep Disorders (pp. 471-501)*, Oxford: Oxford University Press.

- Haynes, P. L. & Bootzin, R.R.** (2010). Insomnia Treatments: Moving from Efficacy to Effectiveness. *Journal of Clinical Psychology*, 11, 1131-1136.
- Haynes, P. L. & Epstein, D.** (2010). A Case of the Ambivalent Sleeper [Board Review Question]. *Journal of Clinical Sleep Medicine*, 15, 511-512.
- Haynes, P. L.** (2009). Is CBT-I effective for pain? Commentary on Vitiello et al. Cognitive behavioral therapy for insomnia improves sleep and decreases pain in older adults with co-morbid insomnia and osteoarthritis [Commentary]. *Journal of Clinical Sleep Medicine*, 5, 363-364.
- Krakow, B. & **Haynes, P.** (2008). Insomnia. In G. Reyes, J. Elhai, J. Ford (Eds.), *The Encyclopedia of Psychological Trauma* (pp. 358-359), Hoboken, NJ: John Wiley & Sons, Inc.
- Nowakowski, S., **Haynes, P.**, & Parry, B. L. (2007). Premenstrual Dysphoric Disorder. In G. Fink (Ed.), *Encyclopedia of Stress, Second Edition, Volume 3* (pp. 173-179), Oxford: Academic Press.
- Haynes, P. L.** (2005). No more sweet dreams. *Sleep Review*, 6, 48-50.
- Haynes, P. L.** (2005). Understanding Sleeplessness: Perspectives on Insomnia [Book Review]. *Journal of Clinical Sleep Medicine*, 1, 313.
- Haynes, P. L.** (2004). Insomnia: A Clinical Guide to Assessment and Treatment [Book Review]. *Sleep*, 27, 343.
- Krakow, B., Melendrez, D., & **Haynes, P.** (2003). Trading recipes on CPAP Adherence Models. A commentary on: "Improving CPAP use by patients with sleep apnoea/hypopnea syndrome (SAHS)" (HM Engleman & MR Wild). *Sleep Medicine Reviews*, 7, 441-444.
- Haynes, P. & Parry, B.** (2000). Premenstrual syndrome (PMS). In G. Fink (Ed.), *Encyclopedia of Stress* (pp. 201-207), San Diego, CA: Academic Press.
- Parry, B. & **Haynes, P.** (1999). Mood disorders linked to the reproductive cycle. *American College of Neuropsychopharmacology, Fourth Generation of Progress* [On-line Edition]. Available: <http://www.acnp.org/citations/GN401000101>.

WORK IN PROGRESS

Publications

- Parthasarathy, S., Wendel, C., Haynes, P.L., Atwood, C., & Kuna, S. (in submission). A Pilot Study of CPAP Adherence Promotion by Peer Buddies with Sleep Apnea.
- Haynes, P. L., & Kelly, M. (in preparation). Diagnosis and Management of Sleep Disturbances in Veterans.
- Haynes, P.L., Kelly, M.K., Warner, L., Quan, S., & Bootzin, R.R. (in preparation) Cognitive Behavioral Social Rhythm Therapy for Male Veterans with Comorbid PTSD and Depression.
- Kelly, M. & Haynes, P. L. (in preparation). Emotion Regulation and Sleep in Medical Students: A Preliminary Examination.
- Haynes, P. L., Britt, J., Bosshart, T., & McQuaid, J. (in preparation). The Relationship between Maternal Bonding, Sleep, and Depression in Adults

Ongoing Projects, Funded

- Haynes, P. L. (PI). Do Undetected or Undiagnosed Sleep Disorders Predict PTSD Psychotherapy Outcomes? (September 2010 – March 2012). Sponsor: Department of Defense. Role on project: Principal investigator
- Haynes, P. L. (co-I). A pilot study of CPAP adherence promotion by peer buddies with sleep apnea. Sponsor: VA Health Services Research & Development (August 2010-February 2012). Sponsor: VA Health Services & Research Development. Role on Project: Co-investigator
- Haynes, P. L. (PI). Cognitive Behavioral Social Rhythm Therapy (CBSRT) for Sleep and Mood Disturbances in Veterans with PTSD (September 2008-February 2012). Sponsor: Department of Defense. Role on project: Principal investigator
- Haynes, P. L. (PI). Development of a Behavioral Sleep Medicine Intervention for Recently Returned Operation Iraqi Freedom /Operation Enduring Freedom Military Personnel (July 2008 – December 2010). Sponsor: Institute for Mental Health Research (AZ). Role on project: Principal investigator

Ongoing Projects, Other

- Haynes, P. L. (PI). Exploring Sleep and Coping in the Tucson Community after the 1/8/11 Shootings. (January 2011 – present). Role on project: Principal investigator
- Haynes, P. L. (PI). Cognitive Behavioral Social Rhythm Therapy (CBSRT) for Sleep Disturbances in PTSD/MDD (February 2007 – present). Role on project: Principal investigator
- Haynes, P. L. (mentor, PI). Examination of Sleep in Bed Partners of Patients with Post-traumatic Stress Disorder (May 2008 – present). Role on project: Faculty mentor

SCHOLARLY PRESENTATIONS**Conferences**

- Haynes, P. L., Kelly, M.R., Parthasarathy, S., & Bootzin, R.R. (2012, June). A Randomized Controlled Trial of Cognitive Behavioral Social Rhythm Group Therapy (CBSRT) for Male Veterans with PTSD, Major Depressive Disorder, and Sleep Problems. Poster presented at the Associated Professional Sleep Societies annual meeting, Baltimore, MD.
- Kelly, M.R., Bootzin, R.R., Parthasarathy, S., & Haynes, P. L. (2012, June). Sleep Perception in Comorbid Posttraumatic Stress Disorder and Depression: Sleep Diary vs. Polysomnography. Poster presented at the Associated Professional Sleep Societies annual meeting, Baltimore, MD.
- Haynes, P.L., Martin, J.L. (2012, June). Ethical Considerations in CBT-I. Presentation as part of an Ethical Issues Symposium at the first annual meeting of the Society for Behavioral Sleep Medicine, Baltimore, MD.
- Parthasarathy, S., Wendel, C., Haynes, P.L., Atwood, C., & Kuna, S. (2012, May) *A Pilot Study Of CPAP Adherence Promotion By Peer Buddies With Sleep Apnea*. Poster presented at the American Thoracic Society International Conference annual meeting, San Francisco, CA.
- Kelly, M.R. & Haynes, P. L. (2011, June). *PTSD Symptom Severity Predicts Total Sleep Time in Comorbid Posttraumatic Stress Disorder and Depression*. Poster presented at the Associated Professional Sleep Societies annual meeting, Minneapolis, MN.
- Haynes, P.L. (2011, February). *Early Trauma Intervention: Pursuing Resilience*. Invited talk at the University of Arizona Psychopharmacology Conference, Tucson, AZ.
- Haynes, P. L. (2011, February). *An Overview of Sleep Disordered Breathing: A Mental Health Perspective*. Invited talk at the University of Arizona Psychopharmacology Conference, Tucson, AZ.
- Haynes, P. L., Kelly, M., Quan, S., & Bootzin, R. R. (2010, November). *Cognitive Behavioral Social Rhythm Therapy in Older Adults with Comorbid PTSD, Depression, and Sleep Problems*. Paper presented at Association of Behavior and Cognitive Therapy annual meeting, San Francisco, CA.
- Haynes, P. L., Kelly, M., Quan, S., & Bootzin, R. R. (2010, November). *Cognitive Behavioral Social Rhythm Therapy in Older Adults with Comorbid PTSD, Depression, and Sleep Problems*. Poster presented at Association of Behavior and Cognitive Therapy annual meeting, San Francisco, CA.
- Haynes, P. L. (2010, July). *Cognitive Behavioral Therapy for Insomnia*. Presentation at the National VA Mental Health Conference, Baltimore, MD.
- Haynes, P. L., Kelly, M., Quan, S., & Bootzin, R. R. (2010, June). *Cognitive Behavioral Social Rhythm Therapy is Associated with Significant Improvement in Capacity to Regulate Negative Mood*. Poster presented at the Associated Professional Sleep Societies annual meeting, San Antonio, TX.
- Haynes, P. L. (2010, June). *The Social Rhythm Model in Mood Disorders*. Invited talk for Trainee Day at the Associated Professional Sleep Societies annual meeting, San Antonio, TX.
- Deoras, K., Quan, S., Bootzin, R., & Haynes, P. (2010, June). *Using Actigraphy to Measure the Effects of Selective Serotonin Reuptake Inhibitors on Night-to-Night Variability in Awakenings*. Poster and paper presented at the Associated Professional Sleep Societies annual meeting, San Antonio, TX.

- Kelly, M.K., Bootzin, R., Parthasarathy, S., Quan, S.F., & Haynes, P. (2010, June). *Sleep Efficiency and Mood Regulation Expectancy: Concentration and Irritability as Mediators in Patients with Comorbid PTSD/MDD*. Poster presented at the Associated Professional Sleep Societies annual meeting, San Antonio, TX.
- Haynes, P. L. (2010, February). *Sleep Disordered Breathing: A Mental Health Perspective*. Invited talk at the University of Arizona Psychopharmacology Conference, Tucson, AZ.
- Haynes, P. L., Kelly, M., Scheller, V., Quan, S. F., Bootzin, R. R. (2009, June). *Stabilizing Sleep and Daily Routine in Veterans with Comorbid PTSD and Depression: Follow-up Outcomes for Cognitive Behavioral Social Rhythm Therapy*. Paper presented at the Associated Professional Sleep Societies annual meeting, Seattle, WA.
- Kelly, M., Bootzin, R. R., Ancoli-Israel, S., & Haynes, P. L. (2009, June). *Actigraphic Comparison of Sleep in Comorbid Posttraumatic Stress Disorder and Depression Versus Depression Alone*. Paper presented at the Associated Professional Sleep Societies annual meeting, Seattle, WA.
- Blank, Y., Kelly, M., Bootzin, R. R., & Haynes, P. L. (2009, June). *Does Sleep Mediate the Relationship Between Nightmares and Symptom Severity in Patients with PTSD and Depression?* Poster presented at the Associated Professional Sleep Societies annual meeting, Seattle, WA.
- Scheller, V. K., & Haynes, P. L. (2009, June). *A Preliminary Examination of Co-Sleeping and Relationship Quality in Veterans with PTSD and Depression*. Poster presented at the Associated Professional Sleep Societies annual meeting, Seattle, WA.
- Haynes, P. L. (2009, February). *The Assessment and Treatment of Sleep Disorders from a Behavioral Sleep Medicine Perspective*. Invited talk at the University of Arizona Psychopharmacology Conference, Tucson, AZ.
- Haynes, P. L., Williamson, M., Kelly, M., Marks, M., & Bootzin, R. R. (2008, November). *Cognitive Behavioral Social Rhythm Therapy for Veterans with PTSD, Depression, and Insomnia*. Paper presented at the International Society for Traumatic Stress Studies annual meeting, Chicago, IL.
- Haynes, P. L., Kelly, M., Williamson, M., Marks, M., Quan, S., & Bootzin, R. R. (2008, June). *Cognitive Behavioral Social Rhythm Therapy for Comorbid PTSD and Depression: Initial Results from a Pilot Study*. Poster presented at the Associated Professional Sleep Societies annual meeting, Baltimore, MD.
- Kelly, M. & Haynes, P. L. (2008, June). *Emotion Regulation and Sleep in Medical Students: A Preliminary Examination*. Poster presented at the Associated Professional Sleep Societies annual meeting, Baltimore, MD.
- Epstein, D., Babcock-Parziale, J. L., & Haynes, P. L. (2008, June). *Insomnia Treatment Preferences of Operation Iraqi Freedom/ Operation Enduring Freedom Veterans: Preliminary Findings*. Poster presented at the Associated Professional Sleep Societies annual meeting, Baltimore, MD.
- Haynes, P. L. (2008, May). *Treatment of Insomnia in Veterans*. Presentation at VISN 18 Research Forum, Tucson, AZ.
- Haynes, P. L., Kersh, B., & Bootzin, R. R. (2007, November). *Results of a Pilot Insomnia Treatment in Veterans Hospitalized on a Psychiatric Ward*. Poster presented at the Association of Behavior and Cognitive Therapy annual meeting, Philadelphia, PA.
- Solomon, B., McQuaid, J. R., Moreno, F. & Haynes, P. L. (2007, November). *A Comparison of Social Support Networks in Depressed, Remitted Depressed, and Never Depressed Individuals: Does Social Support Size Function as a State or Trait Variable?* Poster presented at the Association of Behavior and Cognitive Therapy annual meeting, Philadelphia, PA.
- Deputy, K., Solomon, B., Marks, M., Perkins, S., & Haynes, P. L. (2007, November). *The Effectiveness of a Pilot Guilt and Grief Targeted Group Therapy in Combat Veterans with Post-traumatic Stress Disorder*. Poster presented at the Association of Behavior and Cognitive Therapy annual meeting, Philadelphia, PA.
- Williamson, M., McQuaid, J., Ancoli-Israel, S., & Haynes, P. L. (2007, November). *The Relationship Between Habitual Behaviors, Daily Activity Levels and Mood in Adults With and Without Depression*. Poster presented at the Association of Behavior and Cognitive Therapy annual meeting, Philadelphia, PA.
- Haynes, P. L., Kersh, B., & Bootzin, R. (2007, June). *An Evaluation of Subjective Sleep Quality in Psychiatric Inpatients: Results of a Behavioral Sleep Medicine Pilot Intervention*. Paper presented at the Associated Professional Sleep Societies annual meeting, Minneapolis, MN.
- Haynes, P. L. (2006, October). *Development of a Chronobiologically Informed Treatment for Comorbid PTSD/MDD*. Presentation at *Institute for Mental Health Research Forum*, Tucson, AZ.

- Weihls, K. L., Haynes, P. L., Ayers, T., Olson, K., & Howe, G. W. (2006, October). *Severely stressful life events predict internalizing-externalizing symptoms and impairment*. Poster presented at the American Academy of Child and Adolescent Psychiatry annual meeting, San Diego, CA.
- Haynes, P., Stevens, S., Ruiz, B., & Bootzin, R. (2006, June). *The Effects of an Integrative Behavioral Sleep Medicine Intervention on Trauma Symptoms in Adolescents Recently Treated for Substance Abuse*. Paper presented at the Associated Professional Sleep Societies annual meeting, Salt Lake City, UT.
- Haynes, P. (2006, June). *Cognitive Behavioral Social Rhythm Therapy (CBSRT) for Sleep Disturbances in PTSD/MDD*. In a clinical workshop entitled, Behavioral Sleep Medicine From Bench to Bedside: Emerging Psychosocial Interventions for Sleep Disturbances, presented at the Associated Professional Sleep Societies annual meeting, Salt Lake City, UT.
- Haynes, P., McQuaid, J. R., & Ancoli-Israel, S. (2005, June). *The association between sleep continuity and depression: Evidence for partial mediation by global attributional style*. Paper presented at the Associated Professional Sleep Societies annual meeting, Denver, CO.
- Haynes, P., McQuaid, J. R., & Ancoli-Israel, S. (2004, November). *Global attributions partially mediate the relationship between sleep continuity and depression*. Paper presented at the Association for the Advancement of Behavior Therapy annual meeting, New Orleans, LA.
- Haynes, P., McQuaid, J. R., & Ancoli-Israel, S. (2004, June). *Disrupting life events are associated with interrupted sleep in depressed individuals but not in normal controls*. Paper presented at the Associated Professional Sleep Societies annual meeting, Philadelphia, PA.
- Haynes, P. L., Krakow, B., Melendrez, D., Warner, T. D., Sisley, B., Johnston, L., Hollifield, M., & Lee, S. (2004, June). *Psychiatric morbidity among trauma survivors with insomnia and SDB*. Paper presented at the Associated Professional Sleep Societies annual meeting, Philadelphia, PA.
- Haynes, P. L., McQuaid, J. R., Andruss, L., & Maurer, E. (2003, November). *The consistency of daytime habitual behaviors in depression*. Poster presented at the Association for the Advancement of Behavior Therapy annual meeting, Boston, MA.
- Haynes, P. L. & Dettmer, E. (2003, March). *Treatment response in overweight veterans to a cognitive-behavioral weight management intervention*. Poster presented at the Society of Behavioral Medicine annual meeting, Salt Lake City, UT.
- Jefferson, A. M., Haynes, P. L., & McQuaid, J. R. (2002, November). *The utility of the Pittsburgh Sleep Quality Index as a prognostic indicator for Cognitive Behavior Therapy response in depressed outpatients*. Poster presented at the Association for the Advancement of Behavior Therapy annual meeting, Reno, NV.
- Zirpoli, G., Newton, R. P., Heyneman, E. K., Haynes, P., Mostofi, N., Tan, J. A., Martinez, L. F., Parry, B. L. (2002, June). *The sensitivity of melatonin to light suppression and light treatment in depressed and non-depressed children*. Paper presented at the Society for Light Treatment and Biological Rhythms annual meeting, San Diego, CA.
- Haynes, P. & McQuaid, J. (2001, November). *The development of mood disorders within a social context: An exploratory, interdisciplinary analysis*. Poster presented at the Association for the Advancement of Behavior Therapy annual meeting, Philadelphia, PA.
- Ramel, W., McQuaid, J., Haynes, P., & Gillin, J. C. (2001, July). *The effect of tryptophan depletion on dysfunctional attitudes after cognitive-behavioral therapy for depression*. Poster presented at the World Congress of Behavioral and Cognitive Behavioral Therapies, Vancouver, CANADA.
- Haynes, P., McQuaid, J., & Gillin, J. C. (2000, November). *Response to tryptophan depletion after cognitive behavioral therapy for depression*. Poster presented at the Association for the Advancement of Behavior Therapy annual meeting, New Orleans, LA.
- Byrd, D., Profant, J., Verney, S., Miles, L., Haynes, P., Hamilton, J., Groessl, E., & Ayala, G. X. (1999, January). *A survey of clinical and research training in cross-cultural issues*. Poster presented at the National Multicultural Conference, Newport Beach, CA.
- Parry, B. L., Heyneman, E., Newton, R. P., Tan, J. A., Haynes, P. (1998, May). *Light therapy for childhood and adolescent depression*. Poster presented at the annual meeting of the Society for Research on Biological Rhythms annual meeting, Jacksonville, FL.

Symposia

- Haynes, P. L. (2010, November). Co-Chair Symposium, *Modifications of Cognitive Behavioral Therapies for a Diverse Spectrum of Older Adults with Comorbid Conditions*. Association for the Advancement of Behavior Therapy annual meeting, San Francisco, CA.
- Haynes, P. L. (2009, May). *Posttraumatic Sleep Disturbances in Combat Veterans*. Presentation at the Advanced Practice Nursing Symposium, Southern Arizona VA Healthcare System, Tucson, AZ.
- Haynes, P. L. (2009, March). *Sleep and PTSD*. Presentation at the Women's Mental Health Symposium, University of Arizona, Tucson, AZ.
- Haynes, P. L. (2008, March). *Sleep and PTSD*. Presentation at the Women's Mental Health Symposium, Tucson, AZ.
- Haynes, P. L., (2006, November). Co-Chair Symposium, *Future directions in behavioral sleep medicine research: Characterizing sleep disturbances in novel populations*. Association for the Advancement of Behavior Therapy annual meeting, Chicago, IL.
- Haynes, P. L., (2004, November). Chair Symposium, *Depression and Insomnia*. Association for the Advancement of Behavior Therapy annual meeting, New Orleans, LA.

Colloquia/Grand Rounds

- Haynes, P. L. (2009, September). *Sleep Disordered Breathing: A Mental Health Perspective*. Presentation for Mental Health Grand Rounds, Southern Arizona VA Healthcare System, Tucson, AZ.
- Haynes, P. L. (2009, March). *Sleep Disturbances in Veterans*. Presentation for Primary Care Grand Rounds, Southern Arizona VA Healthcare System, Tucson, AZ.
- Haynes, P. L. (2009, February). Moderator, Organizer Panel Discussion, *The Art vs. Science of Psychotherapy: What Does the Research Say*, Grand Rounds, Department of Psychiatry, University of Arizona.
- Haynes, P. L. (2007, November). *The Social Rhythm Model: Applications in PTSD*. Presentation for Research Grand Rounds, Southern Arizona VA Healthcare System, Tucson, AZ.
- Haynes, P. L. (2007, January). *Characterizing Sleep Disturbances in Severe Mental Illness: Emerging Findings and New Practices in Behavioral Sleep Medicine*. Grand Rounds, Department of Psychiatry, University of Arizona.
- Haynes, P. L. (2005, July). *Taming the Beast Within: The Treatment of Guilt in PTSD*. Mental Health Grand Rounds, Southern Arizona VA Healthcare System, Tucson, AZ.
- Haynes, P. L. (2004, January). *Posttraumatic sleep disturbances: A sleep medicine perspective*. Mental Health Grand Rounds, Southern Arizona VA Healthcare System, Tucson, AZ.
- Haynes, P. L. (2003, March). *Impact of psychosocial factors on the sleep-wake cycle in depression*. Invited colloquium at Center for Sleep and Circadian Biology, Northwestern University Medical School.
- Haynes, P. L. (2003, January). *Circadian impact of psychosocial factors in depression*. Invited colloquium at Division of Sleep Medicine, Harvard Medical School.

Workshops/Clinical Skills Training

- Haynes, P. L. (2011, November). *Psychological Recommendations to Address in Insomnia in PTSD*. Presentation for VA Providers, Nationwide Telemedicine Talk.
- Haynes, P. L. & Moreno, F. (2011, January). *Best Practices for Addressing Psychiatric Referrals Resulting from Trauma*. Departmental Provider Meeting Post-1/8/11 Tucson Shootings, University of Arizona, Tucson, AZ.
- Manber, R., Epstein, D., Friedman, L., Haynes, P., Siebern, A. (2010, September). *Cognitive Behavioral Therapy for Insomnia*. Clinical Workshop for Western VA Providers, Albuquerque, NM.
- Haynes, P. L. (2008, April). *An Introduction to Exposure Based Treatments for Posttraumatic Stress Disorder (PTSD)*. Clinical Workshop at the University of Arizona, Tucson, AZ.

SERVICE/OUTREACH

- Reviewer, Merit Review Panel for Mental Health & Behavioral Sciences -A, June 2012
- Reviewer, VA Merit Award, Special Emphasis Panel, Clinical Trials of Meditation Practices for Treating PTSD, July 2011
- Member, Education Committee, *Society for Behavioral Sleep Medicine*, 2010 – present.

Program Deputy, *International Society for Traumatic Stress Studies, 2011 Annual Meeting*, 2010 – 2011.
Co-Editor, *Journal of Clinical Psychology, Special Issue: Sleep Disturbances*, 2010, Vol 6, Issue 11
Co-facilitator, *Tucson Sleep Research Group*, Interdisciplinary group of sleep medicine researchers and clinicians in the Tucson community, August 2008 – 2010.
Member, *Research and Development Committee*, Southern Arizona VA Healthcare System, November 2007 – 2011.
Member, *PTSD Special Review Committee*, Southern Arizona VA Healthcare System, January 2008 – 2011.

Ad Hoc Reviewer:

Behavioral Sleep Medicine, Behavior Research and Therapy, Behavior Therapy, Depression and Anxiety, European Psychiatry, Journal of Adolescent Health, Journal of Clinical Sleep Medicine, Journal of Clinical Psychiatry, Chronobiology International, Perceptual and Motor Skills, Sleep, Sleep Medicine Review, The American Journal of Medical Science

Local/Community Presentations

Haynes, P. L. (2012, March). *Assessing Sleep as a Moderator of PTSD Psychotherapy Outcome*, Presentation for the Mechanisms of Emotion, Social Relationships, and Health (MESH) UA group, Tucson, AZ.
Haynes, P. L. (2009, November). *Insomnia in Depression & PTSD - Comorbid Disorder or Symptomatic Complaint?* Presentation for Southern Arizona Psychology Association, Tucson, AZ.
Haynes, P. L. (2008, June). *Sleep Disturbances in Combat Trauma*. Presentation at Davis-Monthan Air Force Base, Tucson, AZ.
Haynes, P. L. (2008, April). *PTSD & Sleep. Sleep & Aging*. Presentations at the Seeds of Success Conference, Mental Health Association, Phoenix, AZ.
Haynes, P. L. (2008, April). *Sleep Disturbances in PTSD: Symptom or Comorbid Disorder*. Presentation at La Frontera, Tucson, AZ.
Haynes, P. L. (2008, February). *Cognitive Behavioral Social Rhythm Therapy (CBSRT) for Sleep Disturbances in PTSD/MDD*. Presentation at Ft. Huachuca Army Base, Sierra Vista, AZ.
Haynes, P. L. (2007, May). *Cognitive Behavioral Social Rhythm Therapy (CBSRT) for Sleep Disturbances in PTSD/MDD*. Presentation at Southern Arizona Center for Sexual Assault, Tucson, AZ.

Therapy Manuals Development

Haynes, P. L., Cognitive Behavioral Social Rhythm Group Therapy (CBSRT) for PTSD, depression, and sleep
Haynes, P. L., Motivational Enhancement Therapy for Insomnia (MET-I)
Manber, R., Carney, C., Edinger, J., Epstein, D., Friedman, L., Haynes, P. L., Karlin, B. E., Pigeon, W., Siebern, A. T., Trockel, M. Cognitive Behavioral Therapy for Insomnia (CBT-I, VA Dissemination Version)

TEACHING EXPERIENCE

Clinical Training and Supervision:

Consultant, *National VA CBT-Insomnia Dissemination Team*, 2010-present.

University of Arizona/Southern Arizona VAHCS, PTSD & Sleep Externship, June 2008 - current
Southern Arizona Predoctoral Psychology Internship (Individual Supervisor, Supervisor Health Psychology Rotation, Coordinator/Supervisor Behavioral Sleep Medicine Rotation), January 2007 – current
University of Arizona, College of Medicine, Predoctoral Psychology Internship & Psychiatric Residency Program (CBT Supervisor, Supervisor Psychopathology Rotation). October 2005 – current.

Undergraduate/Graduate Coursework:

PSYC101: Introduction to Psychology, San Diego State University

PSYC484/584: Advanced Health Psychology, University of Arizona
PSYI499/599: Independent Study, University of Arizona

Undergraduate Mentor, Undergraduate Research Grant Program:

Tim LeBlanc (2010). *Understanding the Relationship Between Tobacco Use, Sleep Quality and Self-Efficacy in Adults with PTSD.*

Valerie Scheller (2008). *Examination of Sleep in Bed Partners of Patients with Post-Traumatic Stress Disorder.*

Monica Kelly (2007). *Examining the Relationship Between Sleep Deprivation and Emotional Regulation in Medical Students.*

Brittany Soloman (2006). *A Comparison of Social Support Networks in Asymptomatic Individuals with a History of Depression Versus Never-Depressed Individuals.*

Personal Life Events:

Birth of Child, October 2006

Birth of Child, April 2011

Appendix D. Published Research Abstracts

- a. Haynes, P., Kelly, M.R., Parthasarathy, S., Bootzin, R.R. (June 2012). A Randomized Controlled Trial of Cognitive Behavioral Social Rhythm Group Therapy for Male Veterans with PTSD, Major Depressive Disorder, and Sleep Problems. *Sleep*, 35 (Abstract Supplement), A1004.
- b. Kelly, M., Bootzin, R. R., Quan, S. F., Parthasarathy, S., Haynes, P. L. (June 2012). Sleep Perception in Comorbid Posttraumatic Stress Disorder and Depression; Sleep Diary versus Polysomnography. *Sleep*, 35 (Abstract Supplement), A995.
- c. Kelly, M., Haynes, P. L. (June 2011). PTSD Symptom Severity Predicts Total Sleep Time in Comorbid Posttraumatic Stress Disorder and Depression. *Sleep*, 34 (Abstract Supplement), A242.
- d. Kelly, M., Bootzin, R. R., Quan, S. F., Parthasarathy, S., Haynes, P. L. (June 2010). Snoozing is Associated with Worse Mood Regulation in Patients with Comorbid PTSD and Depression. *Sleep*, 33 (Abstract Supplement), A237.

B. Clinical Sleep Science

1003

RESCRIPTING NIGHTMARES OF VETERANS WITH PTSD: RELATION TO TREATMENT OUTCOME

Harb GC¹, Cook JM^{2,3}, Thompson R⁴, Ross RJ⁵¹Behavioral Health Service, Philadelphia VA Medical Center, Philadelphia, PA, USA, ²Psychiatry, Yale School of Medicine, New Haven, CT, USA, ³National Center for PTSD, West Haven, CT, USA, ⁴Psychiatry, University of Illinois at Chicago, Chicago, IL, USA, ⁵Psychiatry, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, USA

Introduction: Recurrent nightmares are present in up to 70% of individuals with posttraumatic stress disorder (PTSD). Posttraumatic nightmares often replicate the trauma. Replicative nightmares are associated with greater sleep disturbance and other PTSD symptoms. Current treatments for PTSD may improve waking symptoms but not the nightmare disturbance. Imagery rehearsal (IR), a cognitive-behavioral treatment that focuses on nightmares specifically, involves identifying a target nightmare, rescripting a less distressing dream, and imaginatively rehearsing the rescript. We aimed to characterize target nightmares and rescripted dreams in a Veteran population receiving IR and to investigate associations with treatment outcome.

Methods: Participants were 48 male Vietnam War Veterans with combat-related PTSD enrolled in a trial of IR, with nightmare frequency and overall sleep quality as primary outcomes. Participants chose a target nightmare and were helped by therapists to rescript it. Nightmares and dreams were coded for content, emotions, and themes according to a new rating tool. Bivariate and multivariate analyses examined the relationships among nightmares, rescripts, and treatment outcome.

Results: Veterans chose target nightmares that most often replicated a reported trauma (77%). The emotions helplessness (90%) and fear (85%) were most common, and fear of death was the most prevalent dominant theme. Revised dream scripts contained primarily positive emotions, but 17.5% included violence. Olfactory experiences in the target nightmare predicted smaller treatment effects. Violence in the revised script was related to a smaller reduction in nightmare frequency. Resolving or addressing the nightmare theme in the revised script predicted a greater improvement in overall sleep disturbance.

Conclusion: IR for individuals with severe, chronic PTSD and largely replicative nightmares may be most effective when the rescripted dream incorporates a resolution of the nightmare theme and excludes violent details.

Support (If Any): Department of Veterans Affairs Research and Development.

1004

A RANDOMIZED CONTROLLED TRIAL OF COGNITIVE BEHAVIORAL SOCIAL RHYTHM GROUP THERAPY (CBSRT) FOR MALE VETERANS WITH PTSD, MAJOR DEPRESSIVE DISORDER, AND SLEEP PROBLEMS

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Introduction: This study employed a double blind randomized controlled design to compare group Cognitive Behavioral Social Rhythm Therapy (CBSRT) to Present Centered Group Therapy (PCGT) in 43 male Veterans with PTSD, Major Depressive Disorder, and difficulties with sleep. CBSRT is an integrative group psychotherapy targeting both sleep and psychiatric symptoms via change of daytime and nighttime behavioral patterns. PCGT is a well-established, interpersonal group therapy for PTSD that has previously been shown to have equal benefit as trauma-focused group therapy but with fewer patient drop-outs. To our knowledge, this is the first randomized controlled group therapy trial comparing a behavioral sleep treatment to a well-researched mental health treatment in Veterans with PTSD and comorbid depression.

SLEEP, Volume 35, Abstract Supplement, 2012

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Methods: Forty three male subjects (M age = 48.81 years, SD = 13.45 years) were assessed at baseline, 4 weeks, 8 weeks, post-treatment, 3 months and 6 months post-treatment. PTSD symptoms were assessed via the Clinician Assessment of PTSD Scale (CAPS), and depression symptoms were assessed via the Hamilton Rating Scale for Depression. Mixed modeling was employed to examine preliminary differences in trajectories across the course of therapy and at follow-up.

Results: Preliminary intent-to-treat analyses indicated that both therapies resulted in improvements in depression and clinically significant improvements in PTSD (> 10 point drop on CAPS) with no differences between conditions. CBSRT was associated with fewer therapy drop-outs ($\chi^2 = 2.75$, $p < .10$). Only 14% of the CBSRT group ($n = 3$) attended less than 75% sessions versus PCGT, where 36% of the sample attended less than 75% of sessions.

Conclusion: CBSRT appears to be equivalent to PCGT on psychiatric outcomes. This finding is similar to those from VA Cooperative Study 420 showing the equivalency of PCGT with trauma focused group therapy for PTSD. In the current trial, fewer participants appear to drop-out of CBSRT as compared to PCGT, suggesting that CBSRT may be a more acceptable group therapy than PCGT for Veterans with PTSD. Analysis of sleep outcomes is pending.

Support (If Any): Department of Defense (Grant #W81XWH-08-2-0121).

1005

MINDFULNESS-BASED STRESS REDUCTION IMPROVES TOTAL SLEEP TIME IN VETERANS WITH PTSD

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Introduction: Sleep disturbances are often primary complaints of PTSD patients. Frequently, sleep disturbances do not respond to first-line treatments for PTSD. Mindfulness-Based Stress Reduction (MBSR) interventions have, in healthy people, significantly reduced stress, ruminative thinking and anxiety. In this study we examined the impact of MBSR, as an adjunct therapy, on the sleep of veterans with Post Traumatic Stress Disorder (PTSD).

Methods: We recruited newly diagnosed and untreated veterans with PTSD. All veterans were diagnosed by the PTSD Clinical Team (PCT). Seventy-nine participants were randomized into the study. Veterans were randomized to receive standard care (SC) only or SC plus MBSR. Intervention participants were provided with a take-home meditation module to use in between sessions. All participants completed an initial baseline assessment and 51 completed final assessments for PTSD as well as depression, pain, anxiety, stress and sleep. Veterans were assessed with the PTSD Check-List Military version (PCL-M), PHQ-9, Beck Anxiety Inventory (BAI), visual analogue scale for pain, and the PSQI.

Results: At baseline, no differences were found for depression, anxiety, pain or sleep. Both groups showed elevated levels of depression, anxiety, pain and poor sleep quality. Compared to baseline, both groups had reduced PTSD symptoms ($p < .08$), reduced depression symptoms ($p < .015$), and reduced perceived pain ($p < .001$). After controlling for age, baseline levels of PTSD, pain, depression, and length of time in treatment, a significant treatment x time effect was found for Total Sleep Time ($p = .039$). The meditation intervention improved total sleep time independent of age, level of PTSD pain or depression.

Conclusion: MBSR may be an additional therapeutic tool that is easy to use and implement in existing treatment models, potentially improving the sleep of veterans with PTSD.

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SUBJECTIVELY AND OBJECTIVELY MEASURED SLEEP WITH AND WITHOUT POSTTRAUMATIC STRESS DISORDER AND TRAUMA EXPOSURE

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Introduction: Reports of sleep disturbances are common among individuals with posttraumatic stress disorder (PTSD). Polysomnographic (PSG) studies, however, have been inconsistent in documenting abnormalities leading some investigators to suggest "sleep state misperception" in PTSD. Our study objectives were to compare objectively and subjectively measured sleep parameters in the lab and at home in civilians with and without trauma exposure and PTSD.

Methods: 103 urban-residing African Americans with and without trauma exposure and PTSD who participated in a larger study completed lab PSG and home actigraphy. A sleep diary was completed in the morning after PSG and actigraphy recordings. Habitual sleep during the month prior to the participation was assessed using a sleep questionnaire. The Clinician Administered PTSD Scale was administered to assess participants' trauma exposure and PTSD status. We analyzed sleep parameters [total sleep time (TST), sleep onset latency (SOL), and wake after sleep onset (WASO)] using 2 (objective vs. subjective sleep measures) x 4 (Current PTSD vs. Lifetime PTSD vs. Trauma-positive without PTSD vs. Trauma-negative) mixed ANCOVAs with sleep measures as the repeated measure.

Results: Participants, regardless of trauma/PTSD status, underestimated WASO in the diary and questionnaire relative to actigraphy ($F = 81.3$, $p < .001$; $F = 13.4$, $p < .001$, respectively) and overestimated SOL in the diary relative to PSG ($F = 5.6$, $p < .05$). Among participants with current PTSD, TST diary estimates did not differ from the actigraphy measure in contrast to those without current PTSD who overestimated TST ($F = 3.3$, $p < .05$). No other group differences in subjective-objective sleep discrepancies were found.

Conclusion: Discrepancies between subjectively and objectively measured sleep parameters were not associated with trauma exposure or PTSD. This challenges prior assertions that individuals with PTSD over-report their sleep disturbances.

Support (If Any): This study was supported by NIMH grant 5K24MH001917-1, NHLBI grant 5R01HL087995-03, and NCRN grant 1UL1RR031975-01 to Thomas Mellman.

0995

SLEEP PERCEPTION IN COMORBID POSTTRAUMATIC STRESS DISORDER AND DEPRESSION; SLEEP DIARY VERSUS POLYSOMNOGRAPHY

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Introduction: Objective and subjective sleep measurements in Posttraumatic Stress Disorder (PTSD) and Major Depressive Disorder (MDD) have mixed results. Studies show, compared to polysomnography, self-reports overestimate wake after sleep onset (WASO) and nocturnal motor activity in PTSD, while underestimating sleep efficiency (SE). Moreover, patients with MDD underestimate total sleep time. However, MDD and PTSD are highly comorbid, with MDD occurring in approximately 50-80% of individuals with PTSD. Therefore, examination of the congruence between sleep measures in this population is both warranted and clinically relevant.

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Methods: Self-report sleep diaries were completed following a single-night of polysomnography (PSG) by 40 male military veteran participants (49 ± 13 years [SD]) with a diagnosis of comorbid PTSD and MDD. Zero-order correlations were used to examine the relationship between sleep diary and PSG variables.

Results: Subjective versus objective sleep measures produced significant correlations on some sleep indices. In patients with PTSD and MDD subjective and objective measures of both total sleep time (TST; $r = .59$, $p < .01$) and WASO ($r = .44$, $p < .05$) were correlated. However, these patients misperceived sleep onset latency (SOL; $r = .04$, $p = .78$). Subjective sleep efficiency (SE), as calculated from sleep diary time in bed and TST, did not match objective SE ($r = .05$, $p = .76$).

Conclusion: Patients with PTSD and MDD correctly perceive how long they sleep, as well as how long they are awake in the middle of the night. However, these patients may misperceive how long it takes to fall asleep. These results are in opposition to previous studies of patients with either MDD or PTSD alone. Many PTSD studies do not control for comorbidity, therefore, uncontrolled depression may complicate our understanding of sleep in PTSD. Further research exploring the role of each disorder in sleep may inform our understanding of their interaction in this population.

Support (If Any): Department of Defense (Grant #W81X-WH-08-2-0121).

0996

A COMPARISON OF THREE ANALYTIC SCORING METHODS OF ACTIGRAPHICALLY RECORDED SLEEP IN PTSD

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Introduction: Actigraphy is a commonly used objective measurement of sleep/wake outside the lab. There is no consensus on the best method for scoring actigraphy, especially in populations with severe sleep disturbance, e.g., Posttraumatic Stress Disorder (PTSD). Here, we compare three different scoring methods in Veterans with PTSD.

Methods: 26 Veterans (age=35.6±10.1yrs, 5F) with PTSD and comorbid insomnia wore actigraphs and kept sleep diaries for one week. Actigraphy was scored using three methods: 1) manufacturer default rest interval settings with automatic scoring (Automatic); 2) rest intervals set using Veterans' diary-reported bed/wake times (Diary-Only); 3) diary-reported times used as guidelines, though rest intervals could be extended up to 60min on either side to account for obvious sleep outside diary-reported (Diary+60). Time in bed (TIB), total sleep time (TST), Wake After Sleep Onset (WASO), and sleep efficiency (SE) were compared across methods.

Results: TIB, TST, and SE differed significantly among methods, though WASO did not. Automatic and Diary-Only produced equivalent TIB, while Diary+60 had longer TIB than both. Automatic estimated greater TST than Diary-Only and marginally greater TST than Diary+60 while Diary+60 estimated greater TST than Diary-Only. Automatic estimated higher SE than either Diary method, which were equivalent. In terms of clock times for the rest intervals, Automatic was phase-delayed vs Diary-Only for bed and wake time, and was phase-delayed vs Diary+60 for bedtime.

Conclusion: The three scoring methods yielded very different estimates of sleep in Veterans with PTSD. Relative to Automatic default settings, using Diary times to set rest intervals reduced TST and SE. Using modified Diary+60 rest intervals increased TIB and TST, and reduced SE. Importantly, rest interval clock times differed by 28-40min among the methods. Automatic misses SL, and thus over-estimates SE. These dis-

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0701

PTSD SYMPTOM SEVERITY PREDICTS TOTAL SLEEP TIME IN COMORBID POSTTRAUMATIC STRESS DISORDER AND DEPRESSION

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Introduction: A number of studies have objectively examined sleep in Posttraumatic Stress Disorder (PTSD), however results are mixed. Approximately 50–80% of individuals with PTSD have Major Depressive Disorder (MDD), and many PTSD studies include individuals with comorbid PTSD+MDD. Uncontrolled depression may complicate our understanding of sleep problems in PTSD. Exploring the role of each disorder in sleep may inform our understanding of their interaction in this unique population. We examined relative contributions of PTSD vs. MDD symptoms as predictors of sleep disturbance in patients with PTSD+MDD.

Methods: Scores from the Clinician Administered PTSD Scale (CAPS) and the Hamilton Depression Rating Scale (HamD) were used to predict actigraphic sleep indices from 45 male participants (M age = 50.96 years, SD = 13.76 years). Participants were asked to wear actigraphs for one week (M = 6 nights, SD = 1.97 nights). Linear regression techniques were used to examine the relationship between CAPS and HamD scores (with sleep items excluded) and actigraphy data.

Results: PTSD symptoms scores were a better predictor of total sleep time (TST) than depression scores (β CAPS = -1.89, SE = .78, $p > .05$). A trend emerged indicating that depression was a better predictor of WASO (β HamD = -3.05, SE = 1.56, $p = .06$) than PTSD symptoms. No significant relationships were observed between HamD or CAPS scores and bedtime, wake-time, onset latency, mean duration of awakenings, or number of awakenings.

Conclusion: In PTSD+MDD, severe PTSD symptoms were associated with shorter TST. These results are in line with our previous study showing shorter TST in PTSD+MDD vs. controls. Trend findings correspond with research showing an association between MDD severity and sleep continuity. Our outcomes support the conclusion that sleep disturbance type may be explained by different disorders, or rather that MDD impacts fragmentation whereas PTSD impacts sleep quantity.

Support (If Any): Institute for Mental Health Research, American Sleep Medicine Foundation and Department of Defense (Grant #W81X-WH-08-2-0121)

0702

FUNCTIONAL NEUROIMAGING OF REM SLEEP IN RETURNING VETERANS WITH PTSD: AN [18F]-FDG PET STUDY

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Introduction: REM sleep disturbances are the hallmark of Posttraumatic Stress Disorder (PTSD), and may arise from the persistence of dysregulation of brain regions involved in arousal regulation and fear responses, including the amygdala and medial prefrontal cortex. We compared relative regional cerebral metabolic rate of glucose (rCMRglc) in REM sleep relative to wakefulness in combat-exposed veterans with and without PTSD returning from the conflicts in Iraq and Afghanistan.

Methods: Six medication-free combat-exposed veterans with current PTSD (M age = 29.1 years old, SD = 4.6) and 6 without PTSD (M age = 29.3 years old, SD = 5.4) completed in-lab PSG and 18F-FDG positron emission tomography (PET) studies during wakefulness and

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REM sleep. Relative rCMRglc was compared between groups across wakefulness and REM sleep using SPM8.

Results: Objective sleep parameters on the baseline night did not differ between the two groups of veterans, except for REM density ($t(10) = 2.11$, $p = .06$) and % REM sleep ($t(10) = 2.7$, $p = 0.02$), which were greater in veterans with PTSD. Veterans with PTSD showed significantly greater relative rCMRglc during both wakefulness ($Z = 4.70$, $p < .001$) and REM sleep ($Z = 4.44$, $p < .001$) in large clusters that included the cerebellum, brainstem, precuneus, thalamus, dorsal striatum, and posterior, dorsal, anterior, and subgenual cingulate cortices, as well as amygdala, orbitofrontal cortex, and the occipitotemporal and parahippocampal gyri compared to veterans without PTSD.

Conclusion: The preliminary findings support the hypothesis that hyperactivation of brain regions involved in arousal regulation and fear responses persists from wakefulness to REM sleep in combat-exposed veterans with PTSD compared to those without PTSD. Persistent activity in these brain regions may subserve trauma-related nightmares.

Support (If Any): National Institute of Mental Health (MH083035; PI: Germain)& Department of Defense (PT073961; PI: Germain)

0703

SLEEP DISTURBANCE IN VETERANS OF THE IRAQ AND AFGHANISTAN CONFLICTS: A CARDIOVASCULAR DISEASE RISK FACTOR?

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Introduction: A high proportion of US Veterans deployed to Iraq or Afghanistan endorsed symptoms of insomnia upon their stateside return (64%). Up to 91% of those returning with PTSD are likely to endorse insomnia. The risk of hypertension (HTN) in those with insomnia is more than 3 times that of normal sleepers. However, research on sleep and HTN is lacking in this escalating Veteran population. We sought to: 1) examine relationships between HTN, sleep quality, and nightmares; and 2) determine if trauma symptoms and sleep quality synergistically impact risk of HTN diagnosis in recently deployed Veterans.

Methods: Participants were Veterans (N=589; 79.9% male) serving since September 11, 2001, deployed at least once (84.5%), and aged 37.04 years (SD=10.13). About ¼ endorsed a diagnosis of HTN (27%), and about ¼ met criteria for current PTSD (27%). Clinically significant sleep quality impairment (PSQI_{≥5}), PTSD symptoms (DTS_{≥32}), nightmare frequency (≥2 nights per week), and nightmare severity (moderate severity) were reported by 77.1%, 49.3%, 37%, and 38.4% respectively.

Results: After controlling for age, gender, race, and smoking status, logistic regression revealed that Veterans reporting a HTN diagnosis were more likely to report clinically significant sleep quality impairment (OR=1.68, 95% C.I.=0.95-2.97), PTSD symptoms (OR=2.1, 95% C.I.=1.40-3.15), nightmare frequency (OR=1.86, 95% C.I.=1.24-2.79), and nightmare severity (OR=2.08, 95% C.I.=1.39-3.12). Veterans having both clinically significant PTSD symptoms and impaired sleep quality were more likely to endorse a HTN diagnosis (OR=3.31, 95% C.I.=1.68-6.52) than Veterans having neither of these conditions.

Conclusion: Results suggest that: 1) sleep quality, nightmares, and PTSD symptoms are associated with HTN diagnosis in recently deployed Veterans; and 2) impaired sleep quality and trauma symptoms may combine to increase HTN risk. Further research is needed to determine if treating sleep disturbance reduces the risk of HTN in returning Veterans.

Support (If Any): This work was supported by the Office of Mental Health Services, Department of Veterans Affairs. The views expressed in this article are those of the authors and do not necessarily represent the views of the Department of Veterans Affairs.

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0705

SNOOZING IS ASSOCIATED WITH WORSE MOOD REGULATION IN PATIENTS WITH COMORBID PTSD AND DEPRESSIONKelly MR^{1,2}, Bootzin RR^{1,3}, Parthasarathy S², Quan SF^{3,4}, Haynes P^{1,3,4}¹Psychiatry, University of Arizona, Tucson, AZ, United States,²Research Service, Southern Arizona VA Healthcare System, Tucson, AZ, United States,³Psychology, University of Arizona, Tucson, AZ, United States,⁴Mental Health Service, Southern Arizona VA Healthcare System, Tucson, AZ, United States,⁵Division of Sleep Medicine, Harvard Medical School, Boston, MA, United States,⁶College of Medicine, University of Arizona, Tucson, AZ, United States

Introduction: The Negative Mood Regulation (NMR) scale assesses expectancies about one's ability to alter negative mood, with higher scores signifying stronger expectancies. To our knowledge, no studies have examined NMR and sleep. We hypothesized that patients with comorbid PTSD/MDD with lower NMR would have worse sleep as determined by actigraphy.

Methods: The NMR scale and actigraphs were administered to a total of 40 subjects (31 males; M age = 51.3 years, SD = 12.1 years). Subjects were asked to wear actigraphs for one week. Zero-order correlations and linear regression techniques were used to examine the relationship between NMR scores and actigraphy data.

Results: Subjects with lower NMR scores had longer "snooze time," or time spent in bed after their final awakening from sleep ($r = -.34$, $P < .05$). Gender correlated significantly with NMR ($r = -.31$, $P < .05$). This finding suggests that NMR may function as a mediator between gender and snooze time ($a*b = 6.26$, CI90 = .88, 13.78), although this finding was significant only at a trend level ($\alpha = .10$). No significant correlations were observed between NMR and wake time after sleep onset, mean duration of awakenings, number of awakenings, sleep/wake percent, total sleep time, or sleep efficiency.

Conclusion: Subjects with comorbid PTSD/MDD and lower NMR scores had more difficulty rising from bed in the morning. Spending more time in bed after waking may be a means of avoiding actively coping with negative mood. This finding is consistent with previous research showing that individuals with lower NMR scores are more likely to avoid versus engaging in behaviors such as problem solving and seeking social support.

Support (If Any): Institute for Mental Health Research, American Sleep Medicine Foundation, and Department of Defense (W81XWH-08-2-0121)

0706

THE EFFECT OF BRIGHT LIGHT THERAPY ON PTSD RELATED SLEEP DISTURBANCESCornelius SK^{1,2}, Kline CE^{1,2}, Anderson J^{1,2}, Ginsberg JP², Youngstedt SD^{1,2}¹Department of Exercise Science, Arnold School of Public Health,

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Introduction: Sleep disturbance is perhaps the most common complaint of Posttraumatic Stress Disorder (PTSD) patients, and may play a role in precipitating PTSD and in perpetuating the symptoms of PTSD. Treatment of disturbed sleep could provide an important means of improving mental health in PTSD patients. The objective of our ongoing study is to examine whether bright light therapy will elicit reductions in clinical and self assessment of PTSD symptom severity, and related morbidity, including depression and disturbed sleep.

Methods: Following a 1-week baseline, sixteen Operation Enduring Freedom or Operation Iraqi Freedom veterans with combat PTSD were randomized to one of two 4-week treatments: (1) bright light (daily 10,000 lux for 30 min; $n = 8$) or (2) a placebo inactivated negative ion

generator (NIG; $n = 8$). A Clinician-Administered PTSD Scale (CAPS-2) was administered at baseline and immediately following completion of the study. At weekly intervals, depression was assessed with the Beck Depression Inventory (BDI-II), and sleep quality was assessed with the Pittsburgh Sleep Quality Index (PSQI) with addendum for PTSD (PSQI-PTSD).

Results: Preliminary results showed a significantly greater reduction in the PSQI-PTSD ($P = 0.03$) following bright light (effect size: $d = -1.13$) compared with NIG ($d = -0.07$). A moderate treatment effect was seen for the CAPS-2 ($d = -0.53$ vs. -0.06 following bright light vs. placebo, respectively), and BDI-II ($d = -0.59$ vs. 0.41) measures, but no treatment effect was seen for global PSQI measures ($d = 0.10$ vs. 0.03).

Conclusion: Results of this ongoing study show significant effects of bright light on sleep disturbances associated with combat PTSD, and the potential for the use of bright light therapy in the treatment of PTSD symptoms and associated morbidity.

Support (If Any): This study is supported by VA Merit Award.

0707

ADHERENCE TO CONTINUOUS POSITIVE AIRWAY PRESSURE TREATMENT OF OBSTRUCTIVE SLEEP APNEA IN PATIENTS WITH POSTTRAUMATIC STRESS DISORDER

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Introduction: Comorbid obstructive sleep apnea (OSA) in patients with posttraumatic stress disorder (PTSD) is becoming increasingly recognized. Unfortunately, the insomnia and sleep fragmentation in PTSD may impair continuous positive airway pressure (CPAP) adherence. These issues may be neglected with focused CPAP follow-up. We hypothesized that patients with posttraumatic stress disorder would have poorer compliance with CPAP therapy than a matched control group without PTSD.

Methods: Retrospective case-control study. Patients matched for age, BMI, gender and AHI. Consecutive adult patients newly diagnosed with OSA who presented for CPAP follow-up. Compliance was objectively measured. Primary endpoints were measures of CPAP compliance.

Results: 50 patients were studied (25 control and 25 PTSD, mean age 41.8 ± 10.3 , mean BMI 31.3 ± 4.1 , mean Epworth Score 14.9 ± 5.1 , mean AHI 25.8 ± 24.5). Groups did not differ at baseline. CPAP was used on 70.1% of nights in the controls and 68.1% of nights in the PTSD group ($P = 0.09$). CPAP was used for > 4 hours per night 44% of the time in controls and 31% of the time in the PTSD group ($P = 0.18$). 44% of control patients used CPAP > 4 hours per night on $> 70\%$ of nights and 21% of patients with PTSD did the same ($P = 0.09$). CPAP was used for 5.34 hours per night used in the control group and for 3.75 hours per night used in the PTSD group ($P = 0.02$).

Conclusion: Patients with PTSD used CPAP for fewer hours per night used than controls, but did not differ in other measures of CPAP compliance. PTSD negatively impacts CPAP use. However, its impact was minimal and should not preclude CPAP use in patients with PTSD and OSA. More research is needed in this area and care must be taken to address all aspects of sleep in addition to sleep disordered breathing.

0708

INSOMNIA SEVERITY AND SLEEP ADEQUACY AS PREDICTORS OF DEPRESSIVE AND ANXIOUS SYMPTOMS IN A PSYCHIATRIC TREATMENT SEEKING POPULATIONPickett SM¹, Swanson L¹, Roberts A¹, Arnold J^{1,2}¹Psychiatry, University of Michigan, Ann Arbor, MI, United States,²Neurology, University of Michigan Medical School, Ann Arbor, MI, United States

Introduction: Sleep disruption is gaining attention among mental health professionals and the assessment of sleep disruption becoming a staple