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PRINCIPAL INVESTIGATOR:
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14. ABSTRACT The fourth year of the MSRC included supporting a total of twenty-one MSRC funded studies, funding four postdoctoral pilot grants, and providing three \$2000 dissertation awards to expert and future leaders in the field of military suicide research. The Denver staff continues to collaborate with the Florida State University site and seek guidance from its senior advisors and the Military External Advisory Board. The MSRC is on track with its goals and is financially mindful in leveraging funds and reviewing its infrastructure to increase the funds available to support additional research. The MSRC submitted a grant application and addendum to extend through years 6-10, establishing new research priorities and extending its scope.					
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Annual Report to Department of Defense

(Fiscal Year 2014: September 28, 2013-September 27, 2014)

“Military Suicide Research Consortium”

DoD Award: W81XWH-10-2-0178

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Introduction:

The Military Suicide Research Consortium's ultimate goal is suicide prevention in the military, through research, including on primary, secondary, and tertiary interventions, as well as through information management/scientific communications (cataloguing and disseminating knowledge on military suicide). Specifically, suicidal personnel compromise force readiness, place a strain on the healthcare resources of the military, impact unit morale, and take a large emotional toll on the involved friends, family, and commanders. There is significant stigma associated with being suicidal, which limits the extent to which at-risk individuals are willing to seek help. Moreover, decision-makers need a go-to resource for accurate, efficient, and fast answers regarding suicidal behavior as policies and programs are developed. The Military Suicide Research Consortium is designed to facilitate information management/scientific communications for the DoD and to maximize research efforts at understanding and improving suicide risk screening and assessment, interventions, and population-level prevention programs, as well as to address other pressing research needs (e.g., basic research including neuroscientific and genetic approaches). Programs and projects conducted by the Consortium ensure that information management/scientific communications occur seamlessly, and that screening and assessment, intervention, and prevention efforts are based on the best possible scientific evidence, specific to military personnel. Further, the Consortium contributes to the goal of the research program by expanding our knowledge, understanding, and capacity to prevent, treat, and enhance the quality of life of persons in military communities and the general public who are affected by suicide-related problems.

The Consortium's overall mission can be summarized as follows; each function is developed with the goal of clear military relevance:

1. Produce new scientific knowledge about suicidal behavior in the military that will improve mental health outcomes for our men and women in uniform.
2. Use high quality research methods and analyses to address problems in policy and practice that will have a direct impact on suicide-related and other mental health outcomes for military personnel.
3. Disseminate Consortium knowledge, information, and findings through a variety of methods appropriate for decision makers, practitioners, and others who are accountable for ensuring the mental health of military personnel. This includes a rapid response function so that queries from decision makers and others to the Consortium are answered with speed and efficiency. Technical assistance and support for decision makers and others is an integral aspect of this Consortium function. This aspect of the Consortium warehouses knowledge about suicidal behavior in general (e.g., from civilian and international sources as well as from military sources), so that military issues can be informed in a comprehensive manner.
4. Train future leaders in military suicide research through experience within a multi-disciplinary setting for Ph.D. students and postdoctoral scholars interested in research questions on military suicide of both a basic and applied nature.

The inter-relations and flow of information between the Cores and the research program is an important component of the Consortium. By its nature, the Executive Management Core, Core A, is involved with all other Cores and the research program, to exert leadership and quality control over them. In its capacity as our knowledge warehouse/ communication center, the Information Management/Scientific Communications Core (Core B) receives input from all elements of the Consortium, and outputs information to military decision makers and others in rapid and efficient fashion. Core B content experts also provide oversight with specific reference to military relevance and sensitivity to military culture. The Database Management/Statistical Core, Core C, represents a highly valuable asset to the Consortium as a whole, perhaps particularly to the research program. Core C provides world-class data management and analysis infrastructure and consulting.

Body:

Statement of Work

Task 1. Project Start-up (months 1-3)

1a. Create infrastructure for all Cores (month 1)

- Core A and Core Directors have bi-monthly conference calls to discuss the Consortium, including its infrastructure.
- Core A and Core B research assistants developed the Consortium's Standard Operating Procedures (SOP; Started in August 2010, received MOMRP legal approval in February 2011). There have been three versions of the SOP; the most recent version was approved April 2012.

1b. Hire and train staff (month 2)

- Denver staff were hired and trained by August 2010, with pre-award funding approval.
- The MSRC reviewed its infrastructure and merged The Military/Civilian Research Monitoring Core with the Information Management/Scientific Communications Core, referred to as Core B. Originally Core D, The Database Management/Statistical Core was renamed Core C with the infrastructure changes.
- Denver staff hired an IRB Coordinator in May 2012.

1c. Core B (Military/Civilian Research Monitoring research assistants) conduct first comprehensive literature review (month 3)

- Accomplished by month 3 and distributed results to Cores A and C.

Task 2. Plan research projects (months 4-9)

2a. Establish research priorities in consultation with External Advisory Board (month 4)

- Core A chose preliminary research priorities in month 3, while External Advisory Board members were selected.
- The Military External Advisory Board (MEAB) and Independent Scientific Peer Review Program (ISPRP) members were chosen by month 7.
- The MEAB and Core A met with funded research teams in June 2011, November 2011, May 2012, August 2012, and May 2013.
- The MEAB and Core met in May 2014 to review the research portfolio and discuss research gaps and goals.
- Core A reviews MEAB research priorities at regular MEAB, IPR, and MSRC meetings.

2b. Assemble research teams (months 5-6)

- Assembling MSRC funded research teams began in month 5 and completed in month 40, with the last MSRC project funded.
 - There are 54 MSRC research members who receive information quarterly on the development of research within the MSRC.
 - Eight Principal Investigators remain on the Unfunded Priorities List, should the MSRC application for years 6-10 be accepted.
- 2c. Continue creation of Core B infrastructure (months 4-9)
- Core B is co-located at the FSU site and the Denver site. Its infrastructure was enhanced in month 16, with the merging of the Cores.
 - Core A contributed to the creation of Core B's infrastructure.
- 2c. Core A and Core B assist with protocol development and production (months 7-8)
- Core A and Core B collaborated on protocol development and production.
 - Core A and Core C created a set of common data elements in collaboration with experts in the field of military and suicide.
- 2d. Core B review protocols to ensure proper military relevance (month 9)
- Core B reviewed all proposals ensuring military relevance.
 - The MEAB also reviews protocols and ensures military relevance when research teams present proposals to the board.

Task 3. Implement intramural research projects (months 10-12)

- 3a. Preliminary study information submitted to Core B (month 12)
- Preliminary study information was submitted to Core B and added to the Consortium's website.
 - Core B promotes research projects through multiple media venues and maintains the website on a daily basis.
 - As of month 48, the MSRC Research Program has funded 21 research projects and 4 postdoctoral pilot grants. Three research projects and two postdoctoral pilot grants are successfully complete.

Task 4. Initial Consortium review by External Advisory Board (month 12)

- The Military External Advisory Board (MEAB) met with Core A in June 2011 (month 9) and November 2011 (month 14).
- Core A reviews the progress of the Consortium with their senior advisors, the MEAB and MOMRP at annual meetings and regular conference calls.

Task 5. Preparing year one quarterly reports (months 3, 6, 9, 12)

- The 1st, 2nd, 3rd and 4th quarter reports were prepared and distributed on time.

Task 6. Continue intramural research projects (months 13-60)

- Denver Research Institute funds 12 research projects:
 - *Usability and Utility of a Virtual Hope Box for Reducing Suicidal Ideation*, Dr. Nigel Bush, National Center for Telehealth and Technology/Portland VAMC, \$307,128 (Appendix 2)
 - *A Behavioral Sleep Intervention for Suicidal Behaviors in Military Veterans: A Randomized Controlled Study*, Dr. Rebecca Bernert, Stanford University/Palo Alto VAMC, \$1,182,369 (Appendix 3)

- *Suicide Bereavement in Military and their Families*, Dr. Julie Cerel, University of Kentucky, \$672,989 (Appendix 4)
- *Window to Hope: Evaluating a Psychological Treatment for Hopelessness among Veterans with TBI: A Phase II RCT and an Active Control Component*, Drs. Lisa Brenner and Grahame Simpson, Denver VAMC, \$986,789 (Appendix 5)
- *Suicide Risk Assessments within Suicide-Specific Group Therapy Treatment for Veterans: A Pilot Study*, Drs. Lori Johnson and David Jobes, Robley Rex VAMC, \$429,801 (Appendix 6)
- *Toward a Gold Standard for Suicide Risk Assessment for Military Personnel*, Drs. Peter Gutierrez and Thomas Joiner, Denver VAMC/Florida State University, \$2,852,189 (Appendix 7)
- *Psychophysiology of Suicidal States*, Drs. Michael Allen and Theresa Hernández, Denver VAMC, \$305,823 (Appendix 8)
- *Neuroimaging Correlates of Suicide*, Drs. Deborah Yurgelun-Todd and Perry Renshaw, University of Utah Brain Institute/Salt Lake City VAMC, \$755,096 (Appendix 9)
- *A Novel Approach to Identifying Behavioral and Neural Markers of Active Suicidal Ideation: Effects of Cognitive and Emotional Stress on Working Memory in OEF/OIF/OND Veterans*, Drs. Melissa Amick and Beeta Homaifar, Boston VAMC/Denver VAMC, \$648,313 (Appendix 10)
- *Home-Based Mental Health Evaluation (HOME) to Assist Suicidal Veterans with the Transition from Inpatient to Outpatient Settings: A Multi-site Interventional Trial*, Dr. Bridget Matarazzo, Denver VAMC, \$1,516,055 (Appendix 11)
- *Effectiveness of a Virtual Hope Box Smartphone App in Enhancing Veteran's Coping with Suicidal Ideation: A Randomized Clinical Trial*, Dr. Nigel Bush, National Center for Telehealth and Technology/Portland VAMC, \$888,703 (Appendix 12)
- *Warning Signs for Suicide Attempts*, Drs. Courtney Bagge and Ken Conner, University of Mississippi Medical Center/University of Rochester Medical Center, \$2,322,993 (Appendix 13)
- Florida State University funds 8 studies:
 - *Reason for Living (RFL) Intervention*, Dr. Craig Bryan, University of Utah, \$1,013,904
 - *Development and Evaluation of a Brief, Suicide Prevention Intervention Reducing Anxiety Sensitivity*, Dr. N. Brad Schmidt, Florida State University, \$299,756
 - *Military Continuity Project (MCP)*, Dr. Katherine Comtois, University of Washington, \$1,594,104
 - *A Taxometric Investigation of Suicide*, Drs. Jill Holm-Denoma and Tracy Witte, University of Denver/Auburn University, \$139, 620
 - *Identifying Factors Associated with Future Suicidal Self-Directed Violence within a Sample of Mississippi National Guard Personnel*, Dr. Michael Anestis, University of Southern Mississippi, \$704,000
 - *Controlled Evaluation of a Computerized Anger-Reduction Treatment for Suicide Prevention*, Dr. Jesse Cogle, Florida State University, \$200,000

- *New Approaches to the Measurement and Modification of Suicide-Related Cognition*, Dr. Matthew Nock, Harvard University, \$886,665
- *Development and Evaluation of a Brief, Suicide Prevention Intervention Targeting Anxiety and Mood Vulnerabilities*, Dr. N. Brad Schmidt, Florida State University, \$1,600,000
- *Using Evaluative Conditioning to Improve Marriage*, Dr. Jim McNulty, Florida State University, \$97,435

Task 7. Establish pre-doctoral and postdoctoral training experiences at FSU and MIRECC (month 24)

- Pre-doctoral and postdoctoral training experiences were established at FSU and the VISN 19 MIRECC.
- The MSRC funds four postdoctoral pilot grants:
 - *Assessment of Cognitive Functioning as it relates to Risk for Suicide in Veterans with HIV/AIDS*, Dr. Gina Signoracci, Denver VAMC, \$47,454
 - *Behaviorally Assessing Suicide Risk*, Dr. Sean Barnes, Denver VAMC, \$46,328
 - *Romantic Relationship Satisfaction and Self-Directed Violence in Veterans*, Dr. Amanda Stoeckel, Salt Lake City VAMC, \$40,160
 - *Longitudinal Assessment of Physical Activity and Suicide Risk*, Dr. Collin Davidson, Denver VAMC, \$46,665
- The MSRC offers annual Dissertation Completion Awards:
 - 2012 recipient: Jessica Ribeiro earned this award for her work on *Overarousal and Fearlessness about Death in Imminent Suicidal Behavior*. Ms. Ribeiro successfully defended her dissertation in June 2013.
 - 2013 recipients: Dan Capron earned the award for his study on the *Evaluation of a Cortisol-Augmented Interpretation Bias Modification for Anxiety Sensitivity on Suicidal Ideation*. Mr. Capron successfully defended his dissertation in June 2014. Alexis May earned the award for her study on *Assessing Motivations for Suicide Attempts: Developing and Validating a Theoretically Driven Instrument*.
 - 2014 recipients: Erin Poindexter was awarded for her study, *An Experimental Manipulation of Acquired Capability in a sample of Combat Veterans: A Longitudinal Study*. Caroline Silva earned the award for her work on *Effects of a Burdensomeness Manipulation and the Capability for Suicide on a Proxy for Lethal Approach Behavior*. Sarah Victor earned the dissertation completion award for her study, *The Contributions of Affect, Cognition, and Life Experiences to Self-Directed Violence*.
- The MSRC held an annual Pre-Conference Research Training Day for students and research fellows, with the purpose of developing pre-doctoral and postdoctoral students and fellows' skills as military/Veteran suicide researchers in April 2013 and 2014. The MSRC offered a \$1,000 stipend to a total of 58 students and fellows to participate in this workshop. The event occurred in conjunction with the American Association of Suicidology's Annual Conference. The aims were to educate advanced students and fellows in state-of-the-art research techniques, grant writing, research design, and regulatory issues. The faculty found the day to be productive, with 100% of the faculty interested in participating in the next

MSRC training day. Since the training day, participants started corresponding with potential collaborators, accessing national databases to answer research questions, writing grant applications, and four students earned an MSRC Dissertation Completion Award. The planning of the 2015 Pre-Conference Training Day is underway.

- MSRC postdoctoral fellow, Mike Anestis, accepted a tenure-track position as an Assistant Professor in the Department of Psychology, at the University of Southern Mississippi and is a funded MSRC PI. In 2014, Dr. Anestis was awarded the Nina Bell Suggs Endowed Professorship, determined to have the greatest potential for a junior faculty member to make a substantial contribution to his or her field of expertise.
- The current MSRC postdoctoral fellows include Ted Bender and Jessica Ribeiro. In addition, Dr. Ribeiro is supporting MSRC PI Matthew Nock's lab at Harvard University.

Task 8. Consortium review by External Advisory Board (month 24)

- The Military External Advisory Board (MEAB) met with Core A in May 2012 (month 20) and August 2012 (month 23).
- Drs. Gutierrez and Joiner presented to the MOMRP at the May 2012 In-Progress Review (IPR) meeting (month 20).
- Core A reviews the progress of the Consortium with their senior advisors at annual meetings and quarterly conference calls.

Task 9. Preparing year two quarterly reports (months 15, 18, 21, 24)

- The 1st, 2nd, 3rd and 4th quarter reports were prepared and distributed on time.

Task 10. Continue to refine research priorities (months 25-60):

- The MSRC maintains an Unfunded Priorities List and has ongoing dialogue with MOMRP and the MEAB on research priorities.

10a. Disseminate results in hand (month 27)

- Dr. Cerel completed a preliminary data analysis which she shared with Core C.
- Drs. Bush, Cerel, Johnson, Schmidt, Comtois, Bryan, Gutierrez and Joiner, Yurgelun-Todd, Cogle, Anestis, Bagge and Conner, Nock, Signoracci, Barnes, Davidson, and Stoeckel are uploading data quarterly to Core C, after it is cleaned.
- Dr. Bush's Virtual Hope Box application press release occurred in May 2014 (month 44). The beta version of the application is available for download and has been disseminated widely through DOD, T2, VA, and MSRC channels.
- Dr. Cerel and MSRC Senior Advisor, Ret. COL Castro, co-authored a white paper from the Military Suicide Bereavement study on promoting resilience following suicide exposure in military populations (month 45).

10b. Plan future projects (month 33-36)

- The MSRC regularly communicates with DSPO, Army STARRS, and the DOD on future collaborations.
- The MSRC submitted a grant application in September 2013, for the Consortium to continue for years 6-10. If accepted, the MSRC will resume addressing the field's research priorities for the next several years.
- At the request of MOMRP, the MSRC provided an addendum in August 2014 on its accomplishments since September 2013.

Task 11. Consortium review by the MEAB (month 36)

- The Military External Advisory Board (MEAB) met with Core A in May 2013 (month 32).
- Drs. Gutierrez and Joiner presented to the MOMRP at the May 2013 In-Progress Review (IPR) meeting (month 32).
- Core A reviews the progress of the Consortium with their senior advisors at annual meetings and on an as needed basis.

Task 12. Preparing year three quarterly reports (months 27, 30, 33, 36)

- The 1st, 2nd, 3rd and 4th quarter reports were prepared and distributed on time.

Task 13. Consortium review by the MEAB (month 48)

- The Military External Advisory Board (MEAB) met with Core A in May 2014 (month 44).
- Drs. Gutierrez and Joiner presented to the MOMRP at the May 2014 In-Progress Review (IPR) meeting (month 44).
- The MSRC hosted its first annual IPR Meeting in June 2014 with MSRC Funded PIs and a MOMRP representative in attendance, to review the projects' progress, challenges, and solutions (month 45).
- Core A reviews the progress of the Consortium with their senior advisors at annual meetings and on an as needed basis.

Task 14. Preparing year three quarterly reports (months 39, 42, 45, 48)

- The 1st, 2nd, 3rd and 4th quarter reports were prepared and distributed on time.

Overall project timeline:

Year 1 — Complete Task s 1, 2, 3, 4, and 5

- Tasks 1, 2, 3, 4, 5, and 7 were completed. Task 6 is ongoing.

Year 2 — Complete Tasks 7, 8, and 9, Task 6 is ongoing for the length of the grant

- Task is 6 is ongoing, Tasks 7, 8, and 9 are completed. Task 10 was initiated.

Year 3 — Complete Tasks 10a, 10b, 11, and 12, Tasks 6 and 10 are ongoing for the length of grant.

- Tasks 6 and 10 are ongoing; Tasks 10a, 10b, 11 and 12 are completed.

Year 4 – Complete Tasks 13 and 14, Tasks 6 and 10 are ongoing for the length of the grant.

- Tasks 6 and 10 are ongoing; Tasks 13 and 14 are completed.

Key Research Accomplishments:

- With the advisory support of the ISPRP and MEAB, the MSRC funded twenty-one research projects and four postdoctoral pilot grants exploring suicide prevention, intervention, and postvention within active duty and Veteran populations.
- Authored 18 white papers at the request of MOMRP and other government entities.
- Dissemination and implementation for MSRC funded research in underway and influencing practice and policy. The VHB application and clinical guidelines have been released widely through the efforts of the DOD, T2, VA, and MSRC. The Window to Hope Intervention has been translated to meet the needs of a US

Veteran population and policy recommendations from the Military Suicide Bereavement study were disseminated and available on the MSRC website.

- In addition to the 25 studies funded by the MSRC, the MSRC Common Data Elements were distributed to other researchers collecting data relevant to military suicide research.
- The MSRC estimates over \$76 million was leveraged to support research in line with the Consortium's mission.

Reportable Outcomes:

Data collection is underway or complete for all DRI subcontracted studies. Drs. Bush (pilot grant), Cerel and Johnson completed data collection and uploaded their measures to the MSRC Core C database. Drs. Bernert, Brenner, Bush (RCT grant), Gutierrez and Joiner, Homaifar and Amick, Matarazzo, Yurgelun-Todd and Bagge are actively recruiting for their studies.

Presentations:

MSRC staff presented at 14 conferences and meetings in FY2011 and attended a total of 26. In FY2012, the MSRC staff and funded PIs attended and presented at 11 conferences, for multiple breakout sessions. In FY2013, MSRC staff presented at 10 conferences and MSRC funded PIs introduced their research at 14 conferences. In 2014, MSRC staff presented at 12 conferences and meetings. Funded PIs at presented their MSRC projects at 15 conferences.

Below are references for a number of the conference presentations:

Brenner LA, Simpson GK, Matarazzo BB, Signoracci GM, Clemans TA, Forster JE, Hoffberg AS (March 2014). Cross-Cultural Adaption, Feasibility, and Acceptability of the Window to Hope Program among US Veterans with Traumatic Brain Injury (TBI). 10th World Congress on Brain Injury. San Francisco, CA.

Bush N. & Dobscha S. Effectiveness of a Virtual Hope Box Smartphone App in Enhancing Veterans' Coping with Suicidal Ideation: A Randomized Controlled Trial. Military Health System

Bush N. & Stewart A. Integration of Mobile Health Technologies in Clinical Practice. Dept. of Defense Public Health Quad Service Collaboration. Webinar. September 11, 2014.

Bush N. & Wheeler W. The Virtual Hope Box. American Association of Suicidology, Suicide Prevention Social Media- Weekly Twitter Chats with Expert Guests. September 21, 2014.

Gutierrez, P. (Keynote Speaker; July 2014). Is Alcohol Use Really a Direct Risk Factor for Suicide? Missouri Institute of Mental Health (MIMH) Show Me You Care About Suicide Prevention Conference. Jefferson City, MO.

Gutierrez, P. (August 2014) Veteran Suicide Risk Assessment. Grand Rounds Presentation University of Mississippi Medical Center. Jackson, MS.

Gutierrez, P. (September 2014). Veteran Suicide Risk Assessment. Grand Rounds Presentation Jackson VAMC. Jackson, MS.

Gutierrez, P. (September 2014). Suicide Prevention in VA and DoD. Military Officers Association of America. Boulder, CO

Gutierrez, P. (September 2014). Veteran Suicide Risk Assessment. Grand Rounds Presentation Robley Rex VAMC. Louisville, KY.

Gutierrez (Moderator), Hughes, Andover, Arme, Stanley, & Chesin (April 2014). Developing & Testing Four Novel Adjunctive Psychosocial Interventions to Prevent Suicide and Non-Suicidal Self-Injury: An Overview of the Interventions, Lessons Learned & Preliminary Outcomes. Workshop presented at the American Association of Suicidology 47th Annual Conference, Los Angeles, CA.

Gutierrez, P. M., & Joiner, T. E. (April 2014). Military Suicide Research Consortium Pre-Conference Training Day. Full-day workshop presented at the American Association of Suicidology 47th Annual Conference, Los Angeles, CA.

Johnson, L., Kaminer, B., O'Connor, S., & Jobes, D. (April 2014). Group treatment for suicide attempt survivors. Workshop presented at the American Association of Suicidology 47th Annual Conference, Los Angeles, CA.

Morris, B., O'Connor, S., Johnson, L., Jobes, D., Gutierrez, P., & Kaminer, B. (April 2014). Examining group differences between suicidal veterans classified as wish to live, ambivalent, or wish to die using the suicide index score. Poster presented at the American Association of Suicidology 47th Annual Conference, Los Angeles, CA.

O'Connor, Villate, & Gutierrez (April 2014). Predictors of Suicidality Among Help-Seeking Active Duty Military and OEF/OIF Veterans: Analysis of Baseline Data from Current Clinical Trials. Symposium presented at the American Association of Suicidology 47th Annual Conference, Los Angeles, CA.

Rudd, M. D., Gutierrez, P. M., Jobes, D. A., & Griffith, J. E. (August 2014). Assessing Suicide Risk in U.S. Military Veterans: Lessons Learned From the Current Conflicts. American Association of Psychology. Washington, D.C.

Publications:

In 2012, staff from the MIRECC and FSU sites collaborated on a secondary data analysis project resulting in the following article:

Ribeiro, J. D., Pease, J. L., Gutierrez, P. M., Silva, C., Bernert, R. A., Rudd, M. D., & Joiner, T. E. Jr. (2012). Sleep problems outperform depression and hopelessness as cross-sectional and longitudinal predictors of suicidal ideation and behavior in young adults in the military. *Journal of Affective Disorders*, 136, 743-750.

ABSTRACT:

Background: Sleep problems appear to represent an underappreciated and important warning sign and risk factor for suicidal behaviors. Given past research indicating that disturbed sleep may

confer such risk independent of depressed mood, in the present report we compared self-reported insomnia symptoms to several more traditional, well-established suicide risk factors: depression severity, hopelessness, PTSD diagnosis, as well as anxiety, drug abuse, and alcohol abuse symptoms.

Methods: Using multiple regression, we examined the cross-sectional and longitudinal relationships between insomnia symptoms and suicidal ideation and behavior, controlling for depressive symptom severity, hopelessness, PTSD diagnosis, anxiety symptoms, and drug and alcohol abuse symptoms in a sample of military personnel (N=311).

Results: In support of a priori hypotheses, self-reported insomnia symptoms were cross-sectionally associated with suicidal ideation, even after accounting for symptoms of depression, hopelessness, PTSD diagnosis, anxiety symptoms and drug and alcohol abuse. Self-reported insomnia symptoms also predicted suicide attempts prospectively at one-month follow up at the level of a non-significant trend, when controlling for baseline self-reported insomnia symptoms, depression, hopelessness, PTSD diagnosis and anxiety, drug and alcohol abuse symptoms.

Insomnia symptoms were unique predictors of suicide attempt longitudinally when only baseline self-reported insomnia symptoms, depressive symptoms and hopelessness were controlled.

Conclusions: These findings suggest that insomnia symptoms may be an important target for suicide risk assessment and the treatment development of interventions to prevent suicide.

Staff from the VISN 19 MIRECC completed an extensive literature review resulting in the following article:

Matarazzo, B. B., Barnes, S. M., Pease, J. L., Russell, L. M., Hanson, J. E., Soberay, K. A., & Gutierrez, P. M. (2014). Suicide Risk among Lesbian, Gay, Bisexual, and Transgender Military Personnel and Veterans: What Does the Literature Tell Us? *Suicide & Life-Threatening Behavior*, 44, 200-217. doi: 10.1111/sltb.12073.

ABSTRACT:

Research suggests that both the military/Veteran and the lesbian, gay, bisexual and transgender (LGBT) populations may be at increased risk for suicide. A literature review was conducted to identify research related to suicide risk in the LGBT military/Veteran population. Despite the paucity of research directly addressing this issue, themes evident in the literature emerged related to LGBT status and suicide risk as well as LGBT military service members and Veterans. Factors such as social support and victimization appear to be particularly relevant. Suggestions are made with respect to future research that is needed on this very important and timely topic.

In 2014, staff from the Denver and FSU MSRC sites collaborated with MSRC funded PIs on a meta-analysis resulting in the following article:

Anestis, M. D., Soberay, K. A., Gutierrez, P. M., Hernández, T. D., & Joiner, T. E. Jr. (2014). Reconsidering the link between impulsivity and suicidal behavior. *Personality and Social Psychology Review*, 18, 366-386. doi: 10.1177/1088868314535988

ABSTRACT:

It is widely accepted that suicidal behavior often occurs with little planning. We propose, however, that suicidal behavior is rarely if ever impulsive-that it is too frightening and physically

distressing to engage in without forethought-and that suicidal behavior in impulsive individuals is accounted for by painful and fearsome behaviors capable of enhancing their capacity for suicide. We conducted a meta-analysis of the association between trait impulsivity and suicidal behavior and a critical review of research considering the impulsiveness of specific suicide attempts. Meta-analytic results suggest the relationship between trait impulsivity and suicidal behavior is small. Furthermore, studies examining a mediating role of painful and provocative behaviors have uniformly supported our model. Results from our review suggest that researchers have been unable to adequately measure impulsivity of attempts and that measures sensitive to episodic planning must be developed to further our understanding of this phenomenon.

Publications in Press:

Anestis, M.D., Joiner, T. E. Jr., Gutierrez, P. M., & Hanson, J. E. (in press). The modal suicide decedent was not intoxicated at the time of death: A meta-analysis with implications for understanding suicidal behavior and human nature. *Journal of Abnormal Psychology*.

Bodell, L. P., Forney, K. J., Keel, P. K., Gutierrez, P. M. & Joiner, T. E. (in press). A Review of Eating Disorders in the United States Military. *Clinical Psychology: Science and Practice*.

Publication under Review:

Soberay, K., Cerel, J., van de Venne, J., Moore, M., & Maple, M. (under review) Exposure to suicide versus traumatic deaths explored within an interpersonal theory. *Military Medicine*.

MSRC Funded PI Publications

MSRC funded PIs are submitting manuscripts regularly as studies are in their final stages:

Bush, N. E., Dobscha, S. K., Denneson, L. M., Hoffman, J. E., Crain, A., Crumpton, R., Cromer, R., & Kinn, J. T. (epub May 2014). A Virtual Hope Box Smartphone App as an Accessory to Therapy: Proof of Concept in a Clinical Sample of Veterans. *Suicide & Life-Threatening Behavior*.

Cerel, J., Maple, M., van de Venne, J, Moore, M , Flaherty, C, Brown, M. & Brown, S. (in submission) Exposure to Suicide in the Community: A random digit dial study.

Johnson, L. L., O'Connor, S. S., Kaminer, B., Jobes, D. A., & Gutierrez, P. M. (in press). Suicide-focused group therapy for veterans. *Military Behavioral Health*.

Matarazzo B, Clemans T, Signoracci G, Hoffberg A, Simpson GK, Brenner LA (2014). Cross-Cultural Adaptation of Window to Hope: A Psychological Intervention to Reduce Hopelessness in Individuals with a History of Traumatic Brain Injury. *Brain Injury*, 10, 1238-1247. doi: 10.3109/02699052.2014.916419

White Papers:

The MSRC disseminated four white papers in 2014:

Dwyer, M., Hanson, J. & Gutierrez, P. M. (May 7, 2014). Information paper on Mefloquine and Suicide. <https://msrc.fsu.edu/sites/msrc.fsu.edu/files//MefloquineandSuicidePMG.pdf>.

Tucker, R. (May 21, 2014). Summary of the 2013 and 2014 MSRC Pre-conference Workshops. <https://msrc.fsu.edu/sites/msrc.fsu.edu/files//WhitePaperMSRCPreconferenceWorkshopTucker.pdf>

Cerel, J., & Castro, C. (June 27, 2014). Promoting Resilience Following Suicide Exposure in Military Populations.

<https://msrc.fsu.edu/sites/msrc.fsu.edu/files//Military%2520Suicide%2520Exposure.pdf>

Anestis, M. D., & Green, B. A. (September 4, 2014). Recruitment of National Guard Personnel for Research Protocols.

<https://msrc.fsu.edu/sites/msrc.fsu.edu/files//RecruitmentNationalGuardWhitePaper.pdf>.

As of September 2014, the MSRC responded to 8 media inquiries, addressed 8 research information requests and referred 12 researchers to the BAA.

In an effort to take advantage of leveraging funds, this is a reoccurring agenda item on the bi-monthly conference calls and requested on quarterly reports from funded investigators. The MSRC collaborates in leveraging funds that include an increase of grant funds, time, and infrastructure support. Below are some of the most noteworthy leveraging funds efforts:

- Dr. Trine Madsen, Danish Veteran Centre contacted Dr. Gutierrez about including suicide questions within an internet survey for Danish Veterans prior to their first visit with a military psychologist and articles for a presentation to the Chief of the Danish Defense on soldiers' reintegration problems. The MSRC provided articles and information to Dr. Madsen and may reach out to her for future international collaboration. In addition, Dr. Joiner met with Dr. Madsen to discuss further collaboration during the 15th European Symposium on Suicide and Suicidal Behavior in August 2014.
- Dr. Peter Gutierrez provided consultation for the awarded \$10,000,000 Omega-3 and Suicide Prevention grant, in exchange for Dr. Acierno including the MSRC Common Data Elements in its data collection.
- Dr. Peter Gutierrez consulted with Dr. Bob Heinssen, with the National Institute of Health (NIH), on possibly requiring the inclusion of the MSRC's Common Data Elements in all NIH funded grants. A suicide common data elements work group has been convened by NIMH. Dr. Gutierrez attended their first in-person meeting on 30 April 2014 as a liaison and Dr. Joiner will be an expert reviewer of their report prior to implementation.
- Dr. Gutierrez is working with the Colorado Office of Suicide Prevention as an advisor on their public health campaign targeting working age men. Dr. Gutierrez sent the MSRC common data elements to them as an opportunity to use as a self-assessment on their website. He continues to collaborate with the Colorado Office of Suicide Prevention on ways to support each other's efforts, such as program evaluations relevant to military populations. Drs. Gutierrez and Joiner consulted on the Mantherapy.org website team that provides mental health outreach to adult males. Mantherapy.org continues to receive praise for its suicide awareness and prevention efforts; an Australian version launched this summer. In addition, the Mantherapy.org website will be promoting the MSRC funded Virtual Hope Box app.
- Dr. Thomas Joiner collaborated with Dr. Pamela Keel on a study of suicidal behavior and eating disorders. They are discussing opportunities to include military history questions to the survey.

- Drs. Peter Gutierrez and Thomas Joiner provide consultative services to several projects including a new FSU initiative connecting student veterans to national science foundation grant opportunities.
- At the request of Jane Pearson at NIMH, Drs. Gutierrez and Joiner are discussing ways to leverage the MSRC CDE and make use of existing data sets to explore questions of treatment effectiveness.
- Dr. Peter Gutierrez reviewed and consulted on the Defense Center of Excellence's (DCoE) Screening and Assessment Tools for Suicide Prevention Guide Resource.
- Drs. Peter Gutierrez and Thomas Joiner provided a general response letter to inquiries regarding research funding that frees time for officials and other funding sources.
- In efforts to support the next generation of suicidologists, the MSRC is providing pilot grant opportunities for Denver VAMC MIRECC postdoctoral fellows. The postdoctoral fellows' salaries are supported by the fellowship program; MSRC pilot grants allow fellows to conduct research relevant to the Consortium, within the structure of a developed program.
- Dr. Gutierrez provides consultative support to Dr. Joiner's Ft. Jackson study, with two papers and preliminary data analysis underway.
- Dr. Gutierrez participated on a panel during the Virtual Mentoring Network to Enhance Diversity of the Mental Health Research Workforce (VMED) program at the AAS Annual Conference in 2013, to discuss career options and strategies that allow one to contribute to the goal of reducing the toll of suicide.
- Dr. Gutierrez provided consultation on DSPO's suicide screening and assessment review, at the request of Dr. Stephen Axelrad.
- Drs. Gutierrez and Joiner and COL Castro provided written input on the VA-DOD Clinical Practice Guidelines for Suicide Prevention.
- Drs. Gutierrez and Joiner, at the request of COL Castro and the House of Representatives, discussed the development of a proposal and designating an expert team to research IED exposure and possibly include this in the Common Data Elements.
- The MSRC provided a Research Training Day to doctoral and postdoctoral students prior to the AAS Annual Conference in 2013 and 2014. This allowed for space and infrastructure of the conference to be leveraged. Also MSRC members served as faculty, allowing the leveraging of honorarium fees.
- At the request of MSRC appearance at the 2013 Military Health System Research Symposium, Dr. Joiner offered the support of FSU graduate students or an MSRC member, due to MSRC prior commitments. With this recommendation, Dr. Blatt was able to secure graduate student Jay Carreno, student of MSRC member Marjan Holloway and attendee of the MSRC Research Training Day.
- Dr. Joiner provided his expert opinion to Dr. Andrew Blatt regarding Dr. Elder and the DOD study on Predictive Analytics for Suicide Risk, on the application of these techniques.
- At the request of Dr. Nassauer, Dr. Joiner consulted on hyperbaric oxygen therapy (HBOT).
- Jennifer Hames, FSU graduate student, earned a dissertation grant for the amount of \$10,000 with the support of MSRC Co-Director, Thomas Joiner. The grant was awarded by the Greater Good Science Center/John Templeton Foundation to support research on gratitude. Ms. Hames' research is titled, "Testing the Efficacy of a Gratitude Intervention in Individuals at Risk for Suicide and Depression."

MSRC Funded Studies' Leveraged Funds

- Dr. Rebecca Bernert was invited to serve as a consultant on an additional grant. (Science in Society Fellowship, Focused on female hormones, stress, and imaging, funded 5 years).
- Dr. Rebecca Bernert was invited to join a work group to develop VHA mental health innovations for suicide prevention, and a work subgroup focused on sleep and suicide prevention specifically.
- Dr. Rebecca Bernert, funded PI, received an NIMH K Award, which allowed funds to hire more staff. With the support of the MSRC, Dr. Bernert is recognized as a leading expert in sleep and suicide, impacting the future of the field.
- Dr. Rebecca Bernert, funded PI, was awarded the NIH Extramural Career Development LRP for Clinical Researchers.
- Dr. Lisa Brenner applied for and received additional funding from the MSRC (\$112,470) to add the active control PST-SP component to the WtoH study. Using already established infrastructure and staff, this component is at a low cost to the MSRC and leverages funds of a previously funded study.
- Dr. Lisa Brenner and the VISN 19 MIRECC submitted the MSRC Common Data Elements within a Neurotrauma Consortium application, requesting \$62 million in funding.
- Dr. Lora Johnson has been asked to share de-identified data with Dr. Comtois (University of Washington) on a collaborative project she is doing examining the prevalence rates of specific types of suicide attempts and self-injury in military and Veteran personnel. Other sites contributing to this effort include the Denver MIRECC, Joint Base Lewis/McChord, and the University of Utah.
- Through the MSRC funded Gold Standard Study, Dr. Gutierrez collaborated with POC Leah Shelef to add the Beck Suicidal Intent Scale (SIS) to Gold Standard Study protocol and Dr. Shelef to add the Self-Harm Behavior Questionnaire (SHBQ) and Suicidal Behaviors Questionnaire-Revised (SBQ-R) to their protocol. By administering the same measures to military personnel in the two countries, international data will be gathered and used to determine the best suicide risk assessment or combination of assessments. Both the SBQ-R & SHBQ have been translated into Hebrew. Data are now being actively collected in both countries.
- Dr. Bridget Matarazzo's HOME Clinical Demonstration Project (which led to the MSRC funded HOME RCT), was expanded by VA Mental Health Services to include two additional sites (Seattle and Raleigh-Durham) and continue the project in Salt Lake City. They received an additional \$461,727 to do this. The expansion of HOME serves as a nice compliment to the work they are doing with the MSRC grant. The VISN 19 MIRECC received additional funding (\$285,554) from VA Office of Rural Health to expand and further develop the HOME Clinical Demonstration Project to accommodate the needs of rural Veterans in North Carolina (Durham). The expansion of the HOME Clinical Demonstration Project serves as support of the overall intervention studied in this grant.
- The expansion of the HOME Clinical Demonstration Project serves as support of the overall intervention studied in this grant.
- Dr. Deborah Yurgelun-Todd is receiving upwards of \$3,000,000 in support from the state of Utah for providing the imaging equipment necessary for the Neurocorrelates of Suicide Risk project, funded by the MSRC.

- Dr. Jesse Cogle was awarded two grants, to expand his research supported by the MSRC, on anger treatment. The first grant is a planning grant for \$13,000 and the second awarded by the National Institute of Drug Abuse for \$690,000.
- Dr. Brad Schmidt received a grant for \$100,000 to continue his MSRC funded research on the effects of cognitive anxiety on suicide.
- For Dr. Sean Barnes' pilot grant, the VISN19 MIRECC provided funding for Kelly Stearns, the research coordinator, to continue working on this project at 25% effort for an additional 6 weeks following the planned completion of her work. Approximately \$2,000 was leveraged through this support.
- Elizabeth Allen, Ph.D., USAMRMC/TATRC funded PI requested the support of the MSRC to help recruit Army couples for a family study with a military suicide risk component. The MSRC connected Dr. Allen with MSRC funded PI, Dr. Julie Cerel to support each other's recruitment efforts. The MSRC also posted information on Dr. Allen's study on the Consortium website.

Total leveraged funds: approximately \$76,000,000.

Conclusion:

The Military Suicide Research Consortium reached its annual goals and research aims. Denver Research Institute is currently funding twelve research projects and four postdoctoral research pilot grants. Florida State University funds eight research teams. There are eight studies on the unfunded priorities list. The three Cores collaborate on a daily basis, working toward the ultimate goals of suicide prevention in the military and information dissemination to decision makers, practitioners, and others who are accountable for ensuring the mental health of military personnel.

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Appendixes:

- A1. Peter Gutierrez, Ph.D. CV Appendix Pages: 18-32
- A2. *Usability and Utility of a Virtual Hope Box for Reducing Suicidal Ideation*, Dr. Nigel Bush, National Center for Telehealth and Technology/Portland VA Appendix Pages: 33-34
- A3. *A Behavioral Sleep Intervention for Suicidal Behaviors in Military Veterans: A Randomized Controlled Study*, Dr. Rebecca Bernert, Stanford University Appendix Pages: 35-36
- A4. *Suicide Bereavement in Military and their Families*, Dr. Julie Cerel, University of Kentucky Appendix Pages: 37-38
- A5. *Window to Hope: Evaluating a Psychological Treatment for Hopelessness among Veterans with TBI*, Drs. Lisa Brenner & Grahame Simpson, Denver VAMC Appendix Pages: 39-42
- A6. *Suicide Risk Assessments within Suicide-Specific Group Therapy Treatment for Veterans: A Pilot Study*, Drs. Lori Johnson & David Jobes, Robley Rex VAMC Appendix Pages: 43-44
- A7. *Toward a Gold Standard for Suicide Risk Assessment for Military Personnel*, Drs. Peter Gutierrez & Thomas Joiner, Denver VAMC/FSU Appendix Pages: 45-46
- A8. *Psychophysiology of Suicidal States*, Drs. Michael Allen and Theresa Hernández, Denver VAMC Appendix Pages: 47
- A9. *Neuroimaging Correlates of Suicide*, Drs. Deborah Yurgelun-Todd and Perry Renshaw, University of Utah Brain Institute/Salt Lake City VAMC Appendix Pages: 48-49
- A10. *A Novel Approach to Identifying Behavioral and Neural Markers of Active Suicidal Ideation: Effects of Cognitive and Emotional Stress on Working Memory in OEF/OIF/OND Veterans*, Drs. Melissa Amick and Beeta Homaifar, Boston VAMC/Denver VAMC Appendix Pages: 50
- A11. *Home-Based Mental Health Evaluation (HOME) to Assist Suicidal Veterans with the Transition from Inpatient to Outpatient Settings: A Multi-site Interventional Trial*, Dr. Bridget Matarazzo, Denver VAMC Appendix Pages: 51-52
- A12. *Effectiveness of a Virtual Hope Box Smartphone App in Enhancing Veteran's Coping with Suicidal Ideation: A Randomized Clinical Trial*, Dr. Nigel Bush, National Center for Telehealth and Technology/Portland VAMC Appendix Pages: 53-54
- A13. *Warning Signs for Suicide Attempts*, Drs. Courtney Bagge and Ken Conner, University of Mississippi Medical Center/University of Rochester Medical Center Appendix Pages: 55-56
- A16. Anestis et al. (2014) Full Article Appendix Pages: 57-78
- A14. Bush et al. (2014) Full Article Appendix Pages: 79-87
- A15. Matarazzo et al. (2014a) Full Article Appendix Pages: 88-105
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- A14. Ribeiro et al. (2012) Full Article Appendix Pages: 116-123

A1

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Ph.D., Clinical Psychology	1997	University of Michigan	Ann Arbor, MI
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Suicide risk factors, assessment, and prevention. Young adult suicidality. Cultural validity of assessment tools and suicide risk models. Scale development and psychometric evaluation.

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7/1/14- Professor, University of Colorado School of Medicine, Department of Psychiatry.
2009-2014 Associate Professor, University of Colorado School of Medicine, Department of Psychiatry.
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2008- Clinical/ Research Psychologist, Denver VA Medical Center, Mental Illness Research and Education Clinical Center.
2008-2009 Visiting Associate Professor, University of Colorado Denver School of Medicine, Department of Psychiatry.
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2002-2007 Associate Professor, Northern Illinois University, Department of Psychology.
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BOOK/CHAPTERS (7):

- Gutierrez, P. M., Brenner, L. A., Wortzel, H., Harwood, J. E. F., Leitner, R., Rings, J., & Bartlett, S. (2012). Blister packaging medication to increase treatment adherence and clinical response: Impact on suicide-related morbidity and mortality. In J. E. Lavigne (Ed.), *Frontiers in suicide risk: Research, Treatment and Prevention*. Hauppauge, NY: Nova Science Publishers, Inc.

- Brenner, L. A., Gutierrez, P. M., Huggins, J., & Olson-Madden, J. (2011). Suicide and traumatic brain injury. In A. L. Berman & M. Pompili (Eds.), *Medical conditions associated with suicide risk* (pp. 299-307). Washington, DC: American Association of Suicidology.
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- Gutierrez, P. M., & Brenner, L. A. (2011). Highlight section: Helping military personnel/Veterans and families manage stress reactions and navigate reintegration. In A. J. Palmo, W. J. Weikel, & D. P. Borsos (Eds.), *Foundations of mental health counseling, 4th Edition*. Springfield, IL: Charles C. Thomas Publisher, Inc.
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- Jobes, D. A., Comtois, K. A., Brenner, L. A., & Gutierrez, P. M. (2011). Clinical trial feasibility studies of the Collaborative Assessment and Management of Suicidality (CAMS). In R. O'Connor, S. Platt, & J. Gordon (Eds.), *International handbook of suicide prevention: Research, policy, and practice*. Oxford, UK: John Wiley & Sons, Ltd.
- Gutierrez, P. M., & Osman, A. (2008). *Adolescent suicide: An integrated approach to assessment of risk and protective factors*. DeKalb, IL: Northern Illinois University Press.

PAPER PRESENTATIONS (60):

- Gutierrez, P. M. Veteran suicide risk assessment. Grand Rounds presentation at the University of Mississippi Medical Center, Department of Psychiatry and Human Behavior, Jackson, MS, September 5, 2014.
- Gutierrez, P. M. Veteran suicide risk assessment. Presented at the American Psychological Association convention, Washington, DC, August 8, 2014.
- Gutierrez, P. M. Is alcohol use really a direct risk factor for suicide? Presented at the Show Me You Care About Suicide Prevention Conference, Jefferson City, MO, July 15, 2014.
- Gutierrez, P. M. Providing for our youngest Veterans: Similarities and Differences in College Student and Veteran Suicide Prevention Efforts. Presented at the Preventing Suicide Among Youth and Young Adults conference, Springfield, IL, April 25, 2014.
- Chesin, M. S., Hughes, J., Andover, P., & Gutierrez, P. M. Developing and testing three novel adjunctive psychosocial interventions to prevent suicide and non-suicidal self-injury: An overview of the interventions, lessons learned, and preliminary outcomes. Presented at the American Association of Suicidology conference, Los Angeles, CA, April 10, 2014.
- O'Connor, S. S., Villatte, J., & Gutierrez, P. M. Differences in characteristics of suicide attempts between active duty military personnel and veterans. Presented at the American Association of Suicidology conference, Los Angeles, CA, April 11, 2014.
- Gutierrez, P. M. Toward a gold standard for suicide risk assessment for military personnel. Presented at the International Association for Suicide Prevention Congress, Oslo, Norway, September 27, 2013.
- Gutierrez, P. M., Joiner, T., Blatt, A., & Castro, C. United States military suicide prevention research: Navigating challenges and capitalizing on opportunities. Presented at the International Academy of Suicide Research World Congress on Suicide, Montreal, Quebec, Canada, June 12, 2013.
- Goodman, M., Gutierrez, P. M., Bossarte, R., Rasmussen, A. M., Brenner, L., & Stanley, B. Research updates and new directions for suicide prevention in the Veterans Administration. Discussant for symposium presented at the American Psychiatric Association annual meeting, San Francisco, CA, May, 19, 2013.
- Gutierrez, P. M. Alcohol and suicide: A deadly cocktail or misinterpretation of data? Plenary address presented at the American Association of Suicidology conference, Austin, TX, April 26, 2013.

- Gutierrez, P. M., Joiner, T., & Castro, C. Preventing suicide in the United States military: Research challenges and opportunities. Presented at the 14th European Symposium of Suicide & Suicidal Behavior, Tel Aviv-Jaffa, Israel, September 5, 2012.
- Gutierrez, P. M., Castro, C., Fitek, D. J., Holloway, M., & Jobes, D. A. Status of DoD funded suicide research. Presented at the Annual DoD/VA Suicide Prevention Conference, Washington, DC, June 20, 2012.
- Matarazzo, B., Gutierrez, P. M., & Silverman, M. M. The Self-Directed Violence Classification System: What it is and why it matters. Presented at the Annual DoD/VA Suicide Prevention Conference, Washington, DC, June 20, 2012.
- Gutierrez, P. M., Fitek, D. J., Joiner, T., Holloway, M., Jobes, D., & Rudd, M. D. Status of Department of Defense funded suicide research. Featured Panel presentation at the American Association of Suicidology conference, Baltimore, MD, April 20, 2012.
- Gutierrez, P. M. Navigating IRBs as a suicide researcher. Presented at the American Association of Suicidology conference, Baltimore, MD, April 19, 2012.
- Kemp, J., Thompson, C., Brown, G. K., Brenner, L. A., & Gutierrez, P. M. VA continuum of care for suicidal Veterans. Panel presentation at the American Association of Suicidology conference, Portland, OR, April 16, 2011.
- Gutierrez, P. M., & Lineberry, T. United States Army Medical Research and Materiel Command United States military suicide research: Activities and opportunities. Panel presentation at the American Association of Suicidology conference, Portland, OR, April 14, 2011.
- Bahraini, N., Gutierrez, P. M., Brenner, L. A., Hedegaard, H., & Huggins, J. The Colorado Violent Death Reporting System (COVDRS): Exploring factors associated with suicide in VA and non-VA services utilizing Veterans. Presented at the American Association of Suicidology conference, Portland, OR, April 14, 2011.
- Marshall, J., Gutierrez, P. M., Lineberry, T., & Jobes, D. United States Army Medical Research and Material Command United States military suicide research activities: Activities and opportunities. Panel presentation at the DOD/VA Annual Suicide Prevention Conference, Boston, MA, March 15, 2011.
- Gutierrez, P. M., Bahraini, N., Basham, C. M., Brenner, L. A., Hedegaard, H., Denneson, L. M., & Dobscha, S. K. Lessons learned about veteran suicide from the Colorado and Oregon Violent Death Reporting Systems. Presented at the American Association of Suicidology conference, Orlando, FL, April 22, 2010.
- Gutierrez, P. M. Blister packaging medication to increase treatment adherence and clinical response: Impact on suicide related morbidity and mortality. Presented at the 2010 DoD/VA Suicide Prevention Conference, Washington, DC, January 12, 2010.
- Gutierrez, P. M. Theater of War. Plenary Panel member at the 2010 DoD/VA Suicide Prevention Conference, Washington, DC, January 12, 2010.
- Bahraini, N., Gutierrez, P. M., Brenner, L. A., Hedegaard, H., Chase, M., & Shupe, A. The Colorado violent death reporting system: Exploring factors associated with suicide in VA and non-VA services utilizing veterans. Presented at the Centers for Disease Control and Prevention's NVDRS Reverse Site Visit, Denver, CO, May 14, 2009.
- Leach, R. L., Breshears, R. E., Brenner, L. A., Homaifar, B. Y., Gutierrez, P. M., Gorgens, K. M., & Harwood, J. E. F. The utility of the Personality Assessment Inventory for predicting violence in veterans with traumatic brain injury. Presented at the Rehabilitation Psychology Conference, Jacksonville, FL, February 27, 2009.
- Gutierrez, P. M. Collaborative assessment and management of suicide (CAMS): A feasibility study. DoD/VA Annual Suicide Prevention Conference, San Antonio, TX, January 13, 2009.
- Gutierrez, P. M., Brenner, L. A., Homaifar, B. Y., & Olson-Madden, J. H. VA VISN 19 MIRECC research and clinical efforts at suicide prevention. Symposium presented at the American Psychological Association convention, Boston, MA, August 15, 2008.
- Brausch, A. M., & Gutierrez, P. M. Body image and disordered eating in adolescent suicidality. Presented at the American Association of Suicidology conference, Boston, MA, April 17, 2008.
- Gutierrez, P. M. Redefining diversity: The chronically suicidal veteran as one example. Presidential address at the American Association of Suicidology conference, Boston, MA, April 17, 2008.

- Breshears, R. E., Brenner, L. A., & Gutierrez P. M. Predictive validity of the Personality Assessment Inventory in veterans with traumatic brain injury. Presented at the Rehabilitation Psychology Conference, Tucson, AZ, March 13, 2008.
- King, C. A., Gutierrez, P. M., & Jobes, D. A. Looking back – looking ahead: American suicidology at mid-life. Plenary panel presentation at the American Association of Suicidology conference, New Orleans, LA, April 12, 2007.
- Mazza, J. J., Reynolds, W. M., & Gutierrez, P. M. Screening for youth suicidal behavior revisited. Panel presentation at the American Association of Suicidology conference, New Orleans, LA, April 12, 2007.
- Schumacher, M., Quinnett, P., & Gutierrez, P. M. QPRT suicide risk assessment and management course utility. Panel presentation at the American Association of Suicidology conference, New Orleans, LA, April 12, 2007.
- Gutierrez, P. M. Change is good: What the past 40 years tell us about the future. Presidential address at the American Association of Suicidology conference, New Orleans, LA, April 12, 2007.
- Gutierrez, P. M. Suicide in the young adult population. Presented at the Department of Veterans Affairs Employee Education System's Evidence-Based Interventions for Suicidal Persons conference, Denver, CO, February 8, 2007.
- Rudd, M. D., Berman, L., Silverman, M. M., Gutierrez, P. M., & Schumacher, M. Warning signs for suicide: Theory, research, and clinical applications. Panel presented at the American Association of Suicidology conference, Seattle, WA, April 30, 2006.
- Freedenthal, S. L., & Gutierrez, P. M. Adolescents' disclosures of suicidality: Who knows? Presented at the American Association of Suicidology conference, Seattle, WA, April 30, 2006.
- Gutierrez, P. M. Shneidman Award Presentation – An integrated approach to assessing risk and protective factors for adolescent suicide. Presented at the American Association of Suicidology conference, Broomfield, CO, April 15, 2005.
- Schumacher, M., & Gutierrez, P. M. Bipolar spectrum traits and suicide risk. Presented at the American Association of Suicidology conference, Broomfield, CO, April 15, 2005.
- Gutierrez, P. M., & Osman, A. Prediction of adolescent suicide reattempts. Presented at the Kansas Conference in Clinical Child and Adolescent Psychology, Lawrence, KS, October 22, 2004.
- Gutierrez, P. M., & Konick, L. C. Evaluation of school-based suicide prevention programs. Presented at the Suicide Prevention: Advancing the Illinois Strategic Plan conference, Springfield, IL, September 23, 2004.
- Williams, J. E., Osman, A., Barrios, F., Kopper, B. A., & Gutierrez, P. M. Reliability and validity of the Inventory for Suicide Ideation – 30. Presented at the American Psychological Society conference, Chicago, IL, May 28, 2004.
- Hovey, J. D., Freedenthal, S., Gutierrez, P. M., & Fernquist, R. Career development strategies in suicide research #1: Working with a mentor. Panel presented at the American Association of Suicidology conference, Miami, FL, April 15, 2004.
- Conwell, Y., Silverman, M., Gutierrez, P. M., Konick, L. C., & Muehlenkamp, J. J. Career development strategies in suicide research #3: Publishing your findings. Workshop presented at the American Association of Suicidology conference, Miami, FL, April 16, 2004.
- Konick, L. C., & Gutierrez, P. M. Suicide risk in college students: A test of a model. Presented at the 2004 American Association of Suicidology conference, Miami, FL, April 16, 2004.
- Brausch, A. M., & Gutierrez, P. M. Does this magazine make me look fat? Media's impact on body image, depression, and eating. Presented at the Midwestern Psychological Association Conference, Chicago, IL, May 1, 2004.
- Muehlenkamp, J. J., Swanson, J., & Gutierrez, P. M. Differences between self-injury and suicide on measures of depression and suicidal ideation. Presented at the Midwestern Psychological Association annual meeting, Chicago, IL, May 9, 2003.
- Kaplan, M., Schultz, D., Gutierrez, P. M., Sanddal, N., & Fernquist, N. Suicide research: Working with a mentor. Panel presentation at the American Association of Suicidology annual conference, Santa Fe, NM, April 24, 2003.

- Konick, L. C., & Gutierrez, P. M. Is spirituality a moderator of risk for suicide? Presented at the American Association of Suicidology annual conference, Santa Fe, NM, April 25, 2003.
- Watkins, R. L., & Gutierrez, P. M. Exposure to peer suicide in college students. Presented at the American Association of Suicidology annual conference, Santa Fe, NM, April 25, 2003.
- Gutierrez, P. M., Osman, A., Watkins, R. L., Konick, L. C., Muehlenkamp, J. J., & Brausch, A. M. Development and validation of the Suicide Resilience Inventory - 25 (SRI-25) in clinical and nonclinical samples. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 19, 2002.
- Konick, L. C., Brausch, A. M., Gutierrez, P. M., & Pawlowski, C. CBT in depressed kids: What factors moderate treatment effectiveness? Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 19, 2002.
- Hovey, J. D., Gutierrez, P. M., & Jha, A. Measuring cultural risk factors in suicide research. Panel presented at the American Association of Suicidology annual conference, Atlanta, GA, April 19, 2001.
- Gutierrez, P. M., Osman, A., Barrios, F. X., & Kopper, B. A. The Self-Harm Behavior Questionnaire. Presented at the American Association of Suicidology annual conference, Atlanta, GA, April 21, 2001.
- Gutierrez, P. M., Collura, D., & Watkins, R. A case for regular suicide risk screening in high schools. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October 14, 2000.
- Osman, A., Gutierrez, P. M., Kopper, B. A., Barrios, F. X., Breitenstein, J. L., & Silich, N. Validity and utility of the Adolescent Psychopathology Scale (APS) with adolescent psychiatric inpatients. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October 13, 2000.
- Kopper, B. A., Gutierrez, P. M., Osman, A., & Barrios, F. X. Helping kids stay alive: The Reasons for Living Inventory - Adolescents. Presented at Western Psychological Association Annual Convention, Portland, OR, April 14, 2000.
- Gutierrez, P. M., Rodriguez, P. J., & Foat, N. K. A model of late adolescent suicidality. Presented at the American Association of Suicidology annual conference, Houston, TX, April 15, 1999.
- Gutierrez, P. M., Osman, A., Kopper, B. A., & Barrios, F. X. Quality of risk assessment with common measures. Presented at the American Association of Suicidology annual conference, Bethesda, MD, April 18, 1998.

POSTER PRESENTATIONS (54):

- Morris, B., O'Connor, S., Johnson, L. L., Jobes, D. A., Gutierrez, P. M., & Kaminer, B. B. Examining group differences between suicidal veterans classified as wish to live, ambivalent, or wish to die using the suicide index score. Presented at the American Association of Suicidology conference, Los Angeles, CA, April 11, 2014.
- Davidson, C. L., Babson, K. A., Hostetter, T. A., Crowley, K. J., Forster, J. F., Gutierrez, P. M.. *Exploring the relationship between physical activity and suicide risk among Veterans in the Behavioral Risk Factor Surveillance System Questionnaire*. Poster presented at the Suicide and Self-Injury Special Interest Group at the annual Association of Behavioral and Cognitive Therapies Conference, Nashville, TN, November 22, 2013.
- Soberay, K., Dwyer, M., Hanson, J., Ribeiro, J., Gronau, K., Gutierrez, P. M., & Maner, J. Exploring the MSRC common data elements: The relationship between TBI, severe insomnia, and suicidal behaviors in military populations. Presented at the American Psychological Association conference, Honolulu, HI, August 1, 2013.
- Pease, J., Soberay, K., Dwyer, M., Gronau, K., & Gutierrez, P. M. Thwarted belonging makes a modest contribution to suicidal ideation after controlling for universalism and relationships. Presented at the American Psychological Association conference, Honolulu, HI, August 1, 2013.
- Leitner, R., Gutierrez, P. M., Brenner, L., Wortzel, H., Forster, J. E., & Huggins, J. Psychometric properties of the Self-harm Behavior Questionnaire in Veterans. Presented at the American Psychological Association conference, Honolulu, HI, July 31, 2013.
- Dwyer, M. M., Soberay, K., Hanson, J., & Gutierrez, P. M. Military suicide research consortium (MSRC). Presented at the American Association of Suicidology conference, Austin, TX, April 26, 2013.

- Rings, J. A., Gutierrez, P. M., Harwood, J. E. F., & Leitner, R. Examining prolonged grief symptomatology and its relationship to self-directed violence among Veterans. Presented at the Veterans Affairs Mental Health Conference. Baltimore, MD, August 23, 2011.
- Rings, J. A., Gutierrez, P. M., & Harwood, J. E. F. Prolonged grief disorder and its relationship to self-directed violence among Veterans: Preliminary findings. Presented at the Departments of Defense and Veterans Affairs Suicide Prevention Conference. Boston, MA, March 15, 2011.
- Huggins, J., Homaifar, B.Y., Skopp, N.A., Reger, M., Gahm, G., Gutierrez, P., & Brenner, L.A. Suicide prevention through the transformation of data into information. Presented at the Departments of Defense and Veterans Affairs Suicide Prevention Conference. Boston, MA, March 15, 2011.
- Betthausen, L. M., Allen, E., Brenner, L. A., & Gutierrez, P. M. Centrality of intimate relationships on failed belongingness and perceived burdensomeness in returning combat Veterans. Presented at the International Association for Relationship Research, Lawrence, KS, November, 2009.
- Bahraini, N., Gutierrez, P. M., Brenner, L. A., Huggins, J., Hedegaard, H., Shupe, A., & Chase, M. The Colorado violent death reporting system: Exploring factors associated with suicide in VA and non-VA services utilizing veterans. Presented at the American Psychological Association conference, Toronto, Ontario Canada, August 6, 2009.
- Brausch, A. M., & Gutierrez, P. M. Psychosocial factors related to non-suicidal self-injury in adolescents. Presented at the American Association of Suicidology annual conference, San Francisco, CA, April 17, 2009.
- Ballard, E. D., Jobes, D., Brenner, L., Gutierrez, P. M., Nagamoto, H., Kemp, J., et al. Qualitative suicide status form responses of suicidal veterans. Presented at the American Association of Suicidology conference, Boston, MA, April 18, 2008.
- Bahraini, N., Gutierrez, P. M., Brenner, L. A., Staves, P., Cornette, M., & Betthausen, L. Pain tolerance and links to increased suicide risk. Presented at the American Association of Suicidology conference, Boston, MA, April 18, 2008.
- Cornette, M. M., DeBoard, R. L., Clark, D. C., Holloway, R. H., Brenner, L., Gutierrez, P. M., & Joiner, T. E. Examination of an interpersonal-behavioural model of suicide: Toward greater specificity in suicide risk prediction. Presented at the International Association for Suicide Prevention conference, Dublin, Ireland, August 31, 2007.
- Brenner, L. A., Gutierrez, P. M., Cornette, M., Staves, P. J., & Betthausen, L. M. Veterans' experiences of habituation to painful stimuli, perceived burdensomeness and failed belongingness. Presented at the American Psychological Association conference, San Francisco, CA, August 19, 2007.
- Fang, Q., Choma, K., Salvatore, A., Mack, T., Bailey, J., & Gutierrez, P. M. Validation of the Pain Distress Inventory using an adolescent inpatient sample. Presented at the Kansas Conference in Clinical Child and Adolescent Psychology, Lawrence, KS, October 19, 2006.
- Brausch, A. M., & Gutierrez, P. M. Adolescent gender differences in reasons for living. Poster presented at the American Association of Suicidology conference, Seattle, WA, April 30, 2006.
- Swanson, J. D., & Gutierrez, P. M. Gender, social support, and student suicidality. Poster presented at the American Association of Suicidology conference, Seattle, WA, April 30, 2006.
- Kopper, B. A., Osman, A., Gutierrez, P. M., Williams, J. E., & Barrios, F. X. Suicide Resilience Inventory-25: Validation with normal and adolescent psychiatric inpatients. Poster presented at the 2005 APA conference, Washington, DC.
- Kopper, B. A., Osman, A., Barrios, F. X., Gutierrez, P. M., & Williams, J. E. The Beck Depression Inventory-II with nonclinical and inpatient adolescents. Poster presented at the 2005 APA conference, Washington, DC.
- Brausch, A. M., & Gutierrez, P. M. Ethnic differences in body image, affect, and eating behaviors and the impact of media exposure. Presented at the Association for the Advancement of Behavior Therapy conference, New Orleans, LA, November 11, 2004.
- Muehlenkamp, J. J., & Gutierrez, P. M. Validation of the Self-Harm Behavior Questionnaire in adolescents. Presented at the Association for the Advancement of Behavior Therapy conference, New Orleans, LA, November 11, 2004.

- Linden, S., Osman, A., Barrios, F. X., Kopper, B. A., Williams, J. E., & Gutierrez, P. M. Structure of the Adolescent Psychopathology Scale (APS) clinical subscales in psychiatric inpatients. Presented at the Association for the Advancement of Behavior Therapy conference, New Orleans, LA, November 11, 2004.
- Osman, A., Williams, J. E., Barrios, F. X., Kopper, B. A., Gutierrez, P. M., Linden, S. C., & Carlson, N. Development of cutoff scores for the Beck scales in adolescent psychiatric inpatients. Presented at the Kansas Conference in Clinical Child and Adolescent Psychology, Lawrence, KS, October 21, 2004.
- Osman, A., Barrios, F. X., Gutierrez, P. M., Kopper, B. A., Williams, J. E., Carlson, N., & Koser, K. Reliability and validity of the Multidimensional Anxiety Scale for Children and the Children's Depression Inventory. Presented at the Kansas Conference in Clinical Child and Adolescent Psychology, Lawrence, KS, October 21, 2004.
- Osman, A., Gutierrez, P. M., Barrios, F. X., Kopper, B. A., Linden, S. C., Carlson, N., & Koser, K. The Reynolds Adolescent Depression Scale 2: Reliability and validity. Presented at the Kansas Conference in Clinical Child and Adolescent Psychology, Lawrence, KS, October 21, 2004.
- Muehlenkamp, J. J., & Gutierrez, P. M. Are self-injurious behaviors and suicide attempts different points on the same continuum? Presented at the Suicide Prevention: Advancing the Illinois Strategic Plan conference, Springfield, IL, September 23, 2004.
- Brausch, A. M., Swanson, J., & Gutierrez, P. M. Parent marital status, depression and suicide. Presented at the American Association of Suicidology conference, Miami, FL, April 16, 2004.
- Konick, L. C., Gutierrez, P. M., Muehlenkamp, J. J., Watkins, R. L., Ward, K. E., & Haase, K. Development of the Spiritual Attitudes and Beliefs Inventory: Phase II. Presented at the Midwestern Psychological Association annual meeting, Chicago, IL, May 8, 2003.
- Konick, L. C., Gutierrez, P. M., & Watkins, R. L. Adult Suicidal Ideation Questionnaire psychometrics. Presented at the American Association of Suicidology annual conference, Santa Fe, NM, April 25, 2003.
- Gutierrez, P. M., & Muehlenkamp, J. J. Understanding differences between self-injurious behavior and suicide attempts in high school students. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 18, 2002.
- Gutierrez, P. M., Osman, A., Brausch, A. M., Muehlenkamp, J. J., Watkins, R. L., & Konick, L. C. Reliability and validity of the Beck scales in the assessment of suicide-related behaviors in adolescent psychiatric inpatients. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 18, 2002.
- Gutierrez, P. M., Osman, A., Watkins, R. L., & Muehlenkamp, J. J. Potential racial differences in adolescent suicide risk. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 18, 2002.
- Osman, A., Gutierrez, P. M., Kopper, B. A., Barrios, F. X., Boyle, T., & Duncan, A. The Inventory of Suicide Orientation - 30: Further validation with adolescent inpatients. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 18, 2002.
- Osman, A., Linden, S., Gutierrez, P. M., Barrios, F. X., Kopper, B. A., & Forman, K. Validity of the Adolescent Psychopathology Content Scales (APS) in Pediatric Medical Institute for Children (PMIC) inpatients. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 18, 2002.
- Konick, L. C., Wrangham, J. J., Gutierrez, P. M., Blacker, D., Watkins, R. L., Aalders, G., Giannerini, J., Miller, M. J., Rapp, J. M., Shayne, L. E., & Ward, K. E. Development of the Spiritual Attitudes and Beliefs Inventory (SABI). Presented at the annual meeting of the Midwestern Psychological Association, Chicago, IL, May 2, 2002.
- Gutierrez, P. M., Wrangham, J., Konick, L., Osman, A., & Barrios, F. X. Does ethnicity influence adolescent suicide risk? Presented at the American Association of Suicidology annual conference, Bethesda, MD, April 12, 2002.
- Wrangham, J., Gutierrez, P. M., Osman, A., & Barrios, F. X. Validation of the PANSI with minority young adults. Presented at the American Association of Suicidology annual conference, Bethesda, MD, April 12, 2002.

- Konick, L. C., Brandt, L. A., & Gutierrez, P. M. School-based suicide prevention programs: A meta-analysis. Presented at the American Association of Suicidology annual conference, Bethesda, MD, April 12, 2002.
- Gutierrez, P. M., Osman, A., Kopper, B. A., & Barrios, F. X. Use of the Multi-Attitude Suicide Tendency Scale with minority individuals. Presented at the meeting of the Midwestern Psychological Association, Chicago, IL, May 4, 2001.
- Valentiner, D., Gutierrez, P. M., Deacon, B., & Blacker, D. Factor structure and incremental validity of the Anxiety Sensitivity Index for Children in an adolescent sample. Presented at the annual meeting of the Society for Research in Child Development, Minneapolis, MN, April 21, 2001.
- Gutierrez, P. M., Rodriguez, P. J., & Garcia, P. Minority suicide risk. Presented at the American Association of Suicidology annual conference, Los Angeles, CA, April 13, 2000.
- Kopper, B. A., Gutierrez, P. M., Osman, A., Barrios, F. X., Baker, M. T., & Haraburda, C. M. Reasons for Living Inventory for Young Adults: Psychometric properties. Presented for Division 17 - Counseling Psychology - at the annual convention of the American Psychological Association, Washington, DC, August 5, 2000.
- Kopper, B. A., Gutierrez, P. M., Osman, A., Barrios, F. X., & Bagge, C. L. Assessment of suicidal ideation in college students. Presented for Division 17 - Counseling Psychology - at the annual convention of the American Psychological Association, Washington, DC, August 5, 2000.
- Gutierrez, P. M., Rubin, E. C., & Blacker, D. A preliminary investigation of the role of suicide exposure and attitudes about death on adolescent suicidal ideation. Presented at the Midwestern Psychological Association annual conference, Chicago, IL, May 4, 2000.
- Martin, H., & Gutierrez, P. M. The role of mediating factors on the long-term relationship between early parental death and later depression and anxiety. Presented at the Midwestern Psychological Association Annual Conference, Chicago, IL, May 4, 2000.
- Kopper, B. A., Osman, A., Gilpin, A. R., Panak, W. F., Barrios, F. X., Gutierrez, P. M., & Chiros, C. E. The Multi-Attitude Suicide Tendency Scale: Further validation with adolescent psychiatric inpatients. Presented at the annual convention of the American Psychological Association, Boston, MA August 22, 1999.
- Kopper, B. A., Osman, A., Linehan, M. M., Barrios, F. X., Gutierrez, P. M., & Bagge, C. L. Validation of the Adult Suicide Ideation Questionnaire and the Reasons for Living Inventory in an adult psychiatric inpatient sample. Presented at the annual convention of the American Psychological Association, Boston, MA August 22, 1999.
- Osman, A., Bagge, C. L., Barrios, F. X., Gutierrez, P. M., & Kopper, B. A. Receiver operating characteristic curve analyses of the Beck Depression Inventory - II in adolescent psychiatric inpatients. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October 9, 1998.
- Osman, A., Bagge, C. L., Gutierrez, P. M., Kopper, B. A., & Barrios, F. X. Validation of the Reasons for Living Inventory for Adolescents (RFL-A) in a clinical sample. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October 9, 1998.
- Kopper, B. A., Osman, A., Hoffman, J., Gutierrez, P. M., & Barrios, F. X. Reliability and validity of the BDI-II with inpatient psychiatric adolescents. Presented at Division 12 - Clinical Psychology - at the annual convention of the American Psychological Association, San Francisco, CA, August 16, 1998.
- Gutierrez, P. M., & Hagstrom, A. H. Uses for the Multi-Attitude Suicide Tendency Scale. Presented at the American Association of Suicidology annual conference, Bethesda, MD, April 17, 1998.
- Gutierrez, P., & Williams, J. Children's understanding of death. Presented at the Midwestern Psychological Association annual meeting, Chicago, IL, May, 3, 1991.

GRANTS AND AWARDS:

- 2014 Roger J. Tierney Award for Service, American Association of Suicidology.
- 10/12-9/15 Department of Veterans Affairs National Center for Patient Safety; Advisory Board member (PI Monica Matthieu, Ph.D., LCSW); **\$569,222** for *Patient Safety Center of Inquiry for Suicide Prevention*.

7/12-7/15	Military Suicide Research Consortium; Principal Investigator; \$2,381,228 for <i>Toward a Gold Standard for Suicide Risk Assessment for Military Personnel</i> .
3/11-2/13	Department of Defense, Military Operational Medicine Research Program, grant; Consultant (PI Steven Vannoy, Ph.D., MPH); \$1,354,386 for <i>Development and Validation of a Theory Based Screening Process for Suicide Risk</i> .
3/11-3/15	Department of Defense, Military Operational Medicine Research Program, grant; Co-Investigator; \$3,400,000 for <i>A Randomized Clinical Trial of the Collaborative Assessment and Management of Suicidality vs. Enhanced Care as Usual for Suicidal Soldiers</i> .
9/10-9/15	Department of Defense, Military Operational Medicine Research Program, grant; Principal Investigator: jointly with Thomas Joiner, Ph.D., Florida State University; \$15,000,000 (additional \$15,000,000 going to FSU) for <i>Military Suicide Research Consortium</i> .
9/09-9/14	Department of Defense, Military Operational Medicine Research Program, grant; Principal Investigator; \$1,173,408 for <i>Blister Packaging Medication to Increase Treatment Adherence and Clinical Response: Impact on Suicide-related Morbidity and Mortality</i> .
5/09-5/10	Colorado TBI Trust Fund Education grant; \$8427 to support the hosting of a conference of national experts in suicide safety planning and TBI rehabilitation.
5/08-5/09	Colorado TBI Trust Fund Education grant; \$5,000 to support the hosting of a conference of national experts in assessment of TBI and suicide risk and the role of executive dysfunction in linking the two problems.
2005	Shneidman Award for Significant Contributions to Suicide Research, American Association of Suicidology
2003	Outstanding Young Alumni, Winona State University

PROFESSIONAL SERVICE:

6/14-8/14	Expert Adviser for the Royal Australian & New Zealand College of Psychiatrists Clinical Practice Guidelines Project on Deliberate Self-harm, Prof. Gregory Carter, Chair
1/12-	Department of Psychiatry Faculty Promotions Committee
1/12-	Editorial Board Member, <i>Archives of Suicide Research</i> , Barbara Stanley, Ph.D., Editor-in-Chief
4/09-	Associate Editor, <i>Suicide and Life-Threatening Behavior</i> , Thomas Joiner, Ph.D., Editor-in-Chief.
4/09-4/11	Past-president, Board position, of the American Association of Suicidology.
3/09-12/09	U. S. Army Suicide Reduction and Prevention Research Strategic Planning Workgroup, Soldier Identification and Case Management Expert Lead.
5/07-10/08	Member of the International Advisory Board for the Australian National Study of Self Injury (ANESSI), Professor Graham Martin, Director.
4/07-4/09	President of the American Association of Suicidology.
3/06-3/07	Reviewer for National Registry of Evidence-based Programs and Practices, Substance Abuse and Mental Health Services Administration.
4/05-4/07	President-Elect of the American Association of Suicidology.
2/04-4/09	Consulting Editor and Editorial Board member, <i>Suicide and Life-Threatening Behavior</i> , Morton M. Silverman, M.D., Editor-in-Chief.
11/02-6/06	Member, Illinois Suicide Prevention Strategic Planning Task Force, Illinois Department of Public Health.
3/02-1/06	Member, American Association of Suicidology Institutional Review Board.
4/00-4/03	Director, Research Division, American Association of Suicidology.

- 4/99- Ad hoc reviewer for *Psychiatry Research*; *Journal of Personality Assessment*; *American Journal of Public Health*; *Internal Journal of Circumpolar Health*; *Death Studies*; *Social Problems*; *Journal of Adolescent Research*; *Child Abuse and Neglect*; *British Journal of Clinical Psychology*; *Journal of Clinical and Consulting Psychology*; *Journal of Abnormal Psychology*; *International Journal of Psychology*; *Archives of Suicide Research*; *American Journal of Orthopsychiatry*; *Journal of Mental Health Counseling*; *Crisis*.
- 1998-2002 Member, North Central Association Outcomes Endorsement Team for Auburn High School, Rockford, IL.
- 7/98-4/00 Chair, Publications Committee, American Association of Suicidology.
- 1998-2006 Director, Adolescent Risk Project, Auburn High School, Rockford, IL.
Combined research and suicide risk screening project.
- 1997-2006 Faculty Associate of the Center for Latino and Latin-American Studies at Northern Illinois University.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

- 2010- International Academy for Suicide Research, Fellow
- 2007- Colorado Psychological Association
- 2003-2010 International Academy for Suicide Research, Associate Member
- 1999- APA Div. 12, Section VII, Clinical Emergencies and Crises
- 1998-2010 APA Div. 53, Society of Clinical Child and Adolescent Psychology
- 1997-2007 Midwestern Psychological Association
- 1996- American Association of Suicidology

A2 Usability and Utility of a Virtual Hope Box for Reducing Suicidal Ideation Nigel Bush, Ph.D.

Task 1: Finalize agreements and subcontracts with participating clinical site (Months 1-2)

- Final completion in Month 5.
 - The process for subcontract agreement with VA Portland was started in months 1 and 2 and finally executed on March 19, 2012.

Task 2: Hire and train Phase 1 (P1) study staff (Months 1-3)

- Completed on schedule.
 - The mobile application developer was hired in November 2011 and equipment for him was procured. Development and testing of the VHB app began December 2011.

Task 3: Develop and test VHB app. (Months 4-9).

- Completed on schedule.
 - Android and iPhone versions of the VHB were developed concurrently using an iterative process of “agile” modular designing, testing and modifying.
 - Heuristic usability testing of progressing prototypes, including graphics, layout and interface was completed by the T2 TEC lab on February 10.
 - Functionality usability testing by the TEC lab commenced on March 26 and was completed April 6 and the VHB was determined to be ready for Phase 2.

Task 4: Set up Phase 2 (P2) clinical site (Months 10-12).

- Completed on schedule.
 - Initial training for the clinical site staff was conducted April 24 by Dr. Bush in Portland.
 - Preliminary Portland VA IRB approval was obtained in April followed by MSRC and HRPO in July. Final minor modifications to the protocol, study materials and processes were made through a series of collaborative dialogs between T2 and Portland. Final Portland IRB approval process was close to complete as of 10/19/2012.
 - The Portland onsite study coordinator was hired July 30, 2012 and completed training at T2 August 31, 2012.
 - Training of participating clinic providers was completed by the coordinator November 1, 2012.
 - Portland VA clinic space was allocated for study participant recruitment and assessment in October 2012.
 - In preparation for recruitment, cell-phone signal hot-spot equipment was installed for study use October 2012.
 - Obtained approval from Portland IRB to add iPhone version of VHB to study and introduced the iPhone version of VHB as option to participants in October 2012.

Task 5: Hire and train Phase 2 study staff (Months 10-12)

- Completed on schedule

Task 6: Implementation of Phase 2 intervention and data collection (Months 10-18)

- Completed by month 24.
 - Recruitment for Phase 2 began November 2012.

- All participants have completed construction of their respective VHB or Physical Hope Box and are either actively field testing them or have completed the first phase of the study and moved on to constructing and testing the alternative hope box medium, as of March 2013.
- As of October 2013, enrollment is complete. The specified sample size was 10-25, 19 Veterans were recruited with 9 assigned to the VHB-PHB arm and 10 assigned to the PHB-VHB arm (virtual hope box or physical hope box cross-over design). One participant of the latter group withdrew, leaving 9 in each group.

Task 7: Data analysis and dissemination of results (Months 19-27)

- Completed by month 27.
 - Recruiting has ceased with a final sample of 18.

Task 8: VHB App Modification (Months 25-29)

- Complete in month 29.
 - VHB application updates based on initial user and provider feedback were implemented.
 - VHB application is starting its RCT and updates will be ongoing.

As of March 2013, the pilot grant for the Virtual Hope Box was completed.

Presentations

Bush N. & Dobscha S. (August 2014). Effectiveness of a Virtual Hope Box Smartphone App in Enhancing Veterans' Coping with Suicidal Ideation: A Randomized Controlled Trial. Military Health System Research Symposium (MHSRS) 2014. Ft. Lauderdale FL.

Bush N. & Stewart A. (September 2014). Integration of Mobile Health Technologies in Clinical Practice. Dept. of Defense Public Health Quad Service Collaboration. Webinar.

Bush N. & Wheeler W. (September 2014). The Virtual Hope Box. American Association of Suicidology, Suicide Prevention Social Media- Weekly Twitter Chats with Expert Guests.

Publications

Bush, N. E., Dobscha, S. K., Denneson, L. M., Hoffman, J. E., Crain, A., Crumpton, R., Cromer, R., & Kinn, J. T. (available online May 2014). A Virtual Hope Box Smartphone App as an Accessory to Therapy: Proof of Concept in a Clinical Sample of Veterans. *Suicide & Life-Threatening Behavior*.

A3 A Behavioral Sleep Intervention for Suicidal Behaviors in Military Veterans: A Randomized Controlled Study
Rebecca Bernert, Ph.D.

Task 1: Secure Approvals, Hire/Train Personnel, Prepare for Data Collection

Months 1-3: Complete

IRB/ R&D/ HRPO/ Sponsor Approvals: Complete

- IRB submission and approval for several modifications (Approved August 2014)
- HRPO approval for recent modifications submitted September 2014

Data and Safety Monitoring Board Assembly and Clinical Trials Registry: Complete

- Finalized assembly and membership of DSMB
- Registered protocol at Clinicaltrials.gov
- Registered protocol at Stanford Clinical Trials Registry

Task 2: Hire/Train Personnel, Prepare for Data Collection, Initiate Recruitment and Screening/Randomize 120 Eligible OEF/OIF returnees, Conduct RCT Data Collection

Months 3-21: Ongoing, request for No-Cost Extension Approved

Personnel/ Stanford/ PAIRE Hiring and WOC VAPAHCS Appointment Processing/ Badging: Complete

- Completed hiring search and institutionally-required job postings/ employment paperwork for project staff
- Founded research program (Suicide Prevention Research Laboratory) and initiated formal affiliation with Stanford Mood Disorders Centers
- Developed trainee apprenticeship program in affiliation with Stanford University, Palo Alto University (clinical psychology graduate programs PhD/PsyD), and VA Palo Alto HCS Volunteer Services to further expand lab and research assistant infrastructure to support project management; retained two PhD students as part of this 2-year program; initiated associated Stanford-related and WOC paperwork

Study Investigator Meetings/ Consultation Meetings: Ongoing

- Completed regularly-scheduled Consultation and Co-Investigator meetings

Equipment/ Infrastructure/ Protocol Development and SOP Manual Development: Complete

- Purchased all sleep monitoring (Actigraphy) devices (24) and commercialized software; and docking systems; completed training inservice by Respironics on site at Stanford
- Completed beta testing for Actigraphy equipment and software installation; obtained additional license for VA-installation of software and docking systems for study use
- Purchased/ Ordered additional budgeted equipment/ Supplies/ OI&T Services for infrastructure: Initiated contracting for recruitment-related study advertising, including web development and design (for both Study website and Lab webpage-linked to Stanford.edu), as well as print media recruitment services; researched use of RedCap to facilitate internet-based screening and recruitment.
- Completed Manual of Operations to standardize site-specific recruitment and randomization procedures and standard operating procedures; secured fMRI imaging scan access/ defined procedures for scheduling for scans by treatment group
- Completed MSPI treatment manual, including treatment manual for therapists, session-by-session PowerPoints, study scripts, homework assignments, and patient/therapist handouts)

- Organized laboratory radioimmunoassay/ genotyping/ tissue banking services and billing with Stanford Hospitals and Clinics, Clinical Translational Research Unit (CTRU) under award via VA Palo Alto HCS; secured long-term VA -80 freezer space for sample storage
- Partnered with collaborating labs to remodel and design new study space for participant computer use, ratings, and treatment sessions

Recruitment and Screening: Ongoing

- Recruitment efforts include a comprehensive recruitment plan developed in partnership with military installations and outreach services within VA programs, clinic presentations, chart reviews and direct mailings, and participation in military-specific events.
- Initiated recontacts for notifying inclusion criteria change through phone and email, and conducted rescreen assessments over phone
- Conducting subject recruitment and screening
- Conducting Baseline, Treatment Weeks 1-4, and Follow-up visits for 120 eligible warriors.
- Invitation of participants for additional treatment following study unblinding at follow-up.
- Conducting quality control checks of clinical data. Monitored safety, adverse events for DSMB reporting.
- To date, N=217 individuals have been screened, of whom N=33 met inclusion criteria for eligibility assessment visit; N=6 met criteria for delayed eligibility visit.
- Following eligibility assessment, N=13 have been enrolled to complete baseline and successfully randomized to treatment. N=1 participant withdrew prior to receiving the treatment due to personal scheduling constraints.
- N=5 participants have completed treatment and are now in follow-up.
- Conducted quality control checks of clinical data. Monitored safety, adverse events for DSMB reporting.

Initiated Database Development & Data Entry

- Began development of databases to support the initiation of study data entry
- Began conducting quality control checks of clinical data
- Completed training of undergraduate research assistants to enter data using a double-scoring, double-entry protocol

Task 3: Complete Follow-Up Testing, Conduct Data Analyses, Prepare for Publications

Months 21-24: Request for No-Cost Extension Approved

Results and Significance

- Successful coordination and execution of two group and seven individuals serves as a feasibility proof of concept
- No formal data analyses have been conducted at this point, but study database development and data entry are currently underway

A4 Suicide Bereavement in Military and their Families

Julie Cerel, Ph.D.

Task 1. Protocols submitted to and approved by IRB – Completed

The project was approved by the University of Kentucky IRB and HRPO.

Task 2. Obtain sample for random digit-dial survey – Completed

The Suicide Bereavement in Military and their Families research team obtained a sample for random-digit dial survey via landline and cell phone.

Task 3. Engagement with local/national organizations to obtain sample of family members – Completed

The Suicide Bereavement team engaged with organizations to be able to help recruit family members.

Task 4. Family interviews – Completed

The research team completed 24 family interviews.

Task 5. Veteran and community members invited to complete online surveys – Completed

The team revised the methodology so that they get phone numbers at phase 1 and schedule people directly for phase 3 interviews. Participants can later return and complete the online measures for phase 2.
105 phase 2 online surveys completed.

Task 6. Interview of suicide and traumatic-death exposed veterans and suicide-exposed community members – Completed

105 phase 3 interviews have been completed.

Task 7. Transcription of interviews and data analysis – Completed

105 interviews transcribed.
Preliminary data analysis completed and data analyses for secondary and exploratory hypotheses underway.

Presentations

Cerel, J., Maple, M., van de Venne, J., Moore, M. (April 2014). Relationships Matter: Examining the Role of Relationships on Closeness and Impact of Suicide Exposure. Poster presentation at the American Association of Suicidology 47th Annual Conference, Los Angeles, CA.

Moore, M., van de Venne, J., Cerel, J. The fruits of trauma? (April 2014). Posttraumatic growth in suicide exposed military veterans and community members. Poster presentation at the American Association of Suicidology 47th Annual Conference, Los Angeles, CA.

Publications

White papers submitted and disseminated:

1. Cerel, J., & Castro, C. (June 27, 2014). Promoting Resilience Following Suicide Exposure in Military Populations.
<https://msrc.fsu.edu/sites/msrc.fsu.edu/files//Military%2520Suicide%2520Exposure.pdf>

Submitted manuscripts:

1. Cerel, J., Maple, M., van de Venne, J, Moore, M , Flaherty, C, Brown, M. & Brown, S. (in submission) Exposure to Suicide in the Community: A random digit dial

study.

2. Soberay, K., Cerel, J., van de Venne J., Moore, M., & Maple, M. (in submission) Exposure to suicide versus traumatic deaths explored within an interpersonal theory. *Military Medicine*.

Planned manuscripts for submission:

1. Cerel, J., van de Venne, J, Moore, M , Flaherty, C, Maple, M., Brown, M. & Brown, S. (in preparation) Exposure to suicide and military-related traumatic death in veterans.
2. Cerel, J., Maple, M. van de Venne, J. & Moore, M. & Flaherty, C. (in preparation) Relationships matter: Examining the role of relationships on closeness and impact of suicide exposure
3. Moore, M., van de Venne, J., Maple, M. & Cerel, J. (in preparation). Posttraumatic growth in suicide exposed military veterans and community members

A5 Window to Hope: Evaluating a Psychological Treatment for Hopelessness among Veterans with TBI: A Phase II RCT and an Active Control Component
Lisa A. Brenner, Ph.D., ABPP

PHASE I: Study Initiation/Cross-cultural Adaptation/Feasibility/Acceptability & Conduct WtoH Pilot

Task 1: Build infrastructure; begin adapting WtoH for a Veteran population; hire and train personnel; create database/measures; expert consensus meeting; revise intervention; obtain regulatory approval

- Staff hired and trained, database created (Q1: **Completed**)
- Initial cross-cultural adaptation procedures completed (Q1-Q2: **Completed**)
- Regulatory approval to conduct human subjects research obtained (Q1-Q2: **Completed**)

Task 2: Train treatment providers on WtoH; recruit for WtoH pilot phase; conduct pilot group, analyze pilot data, and adapt WtoH treatment

- Pilot groups completed; data analyzed (Q1-Q2: **Completed**)
- WtoH further adapted according to feedback and ready for RCT(Q1-Q2: **Completed**)

PHASE II: RCT

Task 3: Recruit and consent participants for RCT; collect and enter Time 1 data

- 90 recruited to complete study procedures; Time 1 data collected and entered (Q2-Q8: **In Progress**)
Progress: RCT screening and recruitment procedures continue with Block 11 participants. 47 participants have been consented, 40 randomized, 33 completed all study procedures and 4 are currently enrolled. Database architecture is complete, time 1 data has been entered for participants through Block 6, with the exception of neurological measures pending scoring.

Task 4: Conduct Phase II RCT WtoH intervention and complete Time 2 data collection

- RCT WtoH intervention complete; Time 2 data collected for all participants; Time 2 data entered in database (Q2-Q8: **In Progress**)
Progress: WtoH Blocks 1-10 participants have passed the time 2 data collection period. Database architecture is complete, and all time 2 follow-up data has been entered for participants through Block 6.

Task 5: Complete Time 3 data collection

- Time 3 data collected and entered in database; all data checked for accuracy (Q2-Q8: **In Progress**)
Progress: WtoH Blocks 1-9 participants have passed the time 3 data collection period. Block 10 time 3 data collection is pending. Database architecture is complete, and all time 3 follow-up data has been entered for participants through Block 6.

Task 6: Evaluate treatment adherence

- FRS scores generated and feedback provided to clinicians (Q2-Q8: **Complete**)
Progress: All 3 WtoH study clinicians have passed the FRS checks for their initial RCT groups, and feedback has been provided to each clinician. Further sessions may be listened to as needed per study protocol.

Task 7: Analyze quantitative and qualitative data

- Data analyzed and results interpreted (Q7-Q8: **In Progress**)
Progress: WtoH Pilot group acceptability and feasibility data has been analyzed and interpreted. RCT data analysis is pending due to ongoing recruitment, data entry, and data integrity checks.

Task 8: Disseminate findings

- Findings disseminated through: presentations at scientific conferences; submission of manuscripts for publication; study information posted on MIRECC website (Q7-Q8: **In Progress**)
Progress: Cross-cultural adaptation, pilot results, and RCT progress have been presented at multiple scientific conferences, a manuscript on the cross-cultural adaptation and pilot results is in progress, and study information has been posted on MIRECC website.

Task 9: Submit final research progress and fiscal reports

- Final reports successfully submitted (Q7-Q8: **Pending**)
Progress: Final reports are pending due to ongoing recruitment.

PST-SP PILOT

Task 1: Train study therapists in the delivery of problem solving therapy for suicide prevention

- Study therapists read relevant literature and available treatment manuals; attend supervised training with experienced PST providers. (Q3-Q5: **Complete**)

Task 2: Adapt PST treatment manual for acceptability and feasibility among veteran population

- Revise existing PST treatment manual to focus on suicide prevention in a Veteran/Military population with a history of traumatic brain injury. (Q4-Q5: **Complete**)
Progress: The PST manual has been developed through a collaborative process among the research team and the PST trainers.

Task 3: Enroll 24 participants across 8 groups

- 24 participants recruited and Time 1, 2, 3 assessments completed along with attendance data. (Q5-Q8: **In Progress**)
Progress: PST-SP for TBI pilot recruitment has commenced, 8 participants have been consented for Groups 1-4. Time 1 data has been collected for the Groups 1-4, and attendance data has been collected for Groups 1-3, ongoing for Group 4. Time 2 data has been collected for Groups 1-3, Group 4 time 2 data is pending. Currently recruiting for Group 5.

Participant recruitment and data collection

WtoH RCT Group Recruitment:

681 potential participants expressed interest and screened for RCT

- 631 did not meet inclusion criteria
- 50 met inclusion criteria
- 47 enrolled in RCT

RCT Group Data Collection:

Time 1 assessment data has been collected for 47 participants (some baseline interviews were terminated early and have incomplete data due to participant not meeting eligibility criteria during the Time 1 assessment).

Attendance data has been collected for Block 1-9 participants and Block 10 intervention participants. Attendance data is in progress for Block 10 waitlist group participants.

Time 2 follow-up assessment data has been collected for Block 1-10 participants. Time 3 follow-up data has been collected for Block 1-9 participants. Time 3 follow-up assessment data for Block 10 participants is pending.

PST-SP Group Recruitment:

49 potential participants expressed interest and screened for PST-SP

- 41 did not meet inclusion criteria
- 8 enrolled in PST-SP Group

PST-SP Data Collection:

Time 1 assessment data has been collected for 8 participants.

Attendance data has been collected for Group 1-3 participants, in progress for Group 4

Publications, Presentation and Other Deliverables:

Brenner LA. Exploring the link between suicide and TBI, Interview with Voelker R of the APA Monitor Vol 43, No. 11, 2012 Dec.

Brenner LA. Mental Health Needs of those with TBI. *5th Annual Conference Brain Injury Association of Kansas: Beyond Rehab: Succeeding at Life*. 2013 Mar 7-8; Kansas City, Kansas.

Brenner LA. Rehabilitation Psychology and Suicide Prevention: Evidence-Based Assessment and Treatment Strategies. *15th Annual Conference Rehabilitation Psychology: Expanding the Boundaries of Rehabilitation Psychology*. 2013 Feb 21-24; Jacksonville, Florida.

Brenner LA. White Paper Response at Request of COL Castro (MOMRP/DOD), on Window to Hope: Evaluating a Psychological Treatment for Hopelessness among Veterans with TBI. 2011 Dec 15.

Brenner LA, Simpson GK, Matarazzo BB, Signoracci GM, Forster JE, Clemans TA, Hoffberg AS. Cross-Cultural Adaption, Feasibility, and Acceptability of the Window to Hope Program among US Veterans with Traumatic Brain Injury (TBI): A Pilot Study. *1st International Academy for Suicide Research, World Congress on Suicide: From Research to Practice*. 2013 Jun 10-13; Montreal, Quebec.

Brenner LA, Simpson GK, Matarazzo BB, Signoracci GM, Clemans TA, Forster JE, Hoffberg AS. Cross-Cultural Adaption, Feasibility, and Acceptability of the Window to Hope Program among US Veterans with Traumatic Brain Injury (TBI). *10th World Congress on Brain Injury*. 2014 Mar 19-22; San Francisco, CA.

Brenner LA, Simpson GK, Matarazzo BB, Signoracci GM, Forster JE, Clemans TA, Hoffberg AS. Window to Hope: Evaluating a Psychological Treatment for Hopelessness among Veterans with Traumatic Brain Injury. *46th Annual Conference American Association of Suicidology: Challenging our Assumptions and Moving Forward Together*. 2013 Apr 24-27; Austin, Texas.

Brenner LA, Simpson GK, Matarazzo BB, Signoracci GM, Forster JE, Clemans TA, Hoffberg AS. Window to Hope: A Psychological Treatment for Hopelessness among Veterans with TBI. *121st Annual Convention American Psychological Association*. 2013 Jul 31 – Aug 4; Honolulu, Hawaii.

Matarazzo BB, Hoffberg AS, Clemans TC, Signoracci GM, Simpson GK, Brenner LA (Sep 2014). Cross-cultural adaptation of the Window to Hope: A psychological intervention to reduce hopelessness among US Veterans with traumatic brain injury. *Brain Inj*; 28(10): 1238-1247. DOI: 10.3109/02699052.2014.916419

MIRECC Webpage redesigned and featured page created with educational information on the Window to Hope research study. Dec13.

Signoracci GM, Brenner LA, Simpson GK, Matarazzo BB, Forster JE, Clemans TA, Hoffberg AS. Window to Hope: Evaluating a Psychological Treatment for Hopelessness among Veterans with Traumatic Brain Injury. *DoD/VA Suicide Prevention Summit: Innovative Practices in Research*. 2013 Dec 13; Washington, DC.

Simpson GK, Brenner LA, Matarazzo BB, Signoracci GM, Harwood J, Clemans TA, Hoffberg AS. Testing the fidelity and acceptability of the Window to Hope program among US veterans with traumatic brain injury: A pilot study. *7th Annual Research and Teaching Showcase, Ingham Institute for Applied Medical Research*. 2012 Nov 30; Liverpool Hospital, Australia.

Simpson GK, Brenner LA, Matarazzo BB, Signoracci GM, Harwood J, Clemans TA, Hoffberg AS. Testing the fidelity and acceptability of the Window to Hope program among US veterans with traumatic brain injury: A pilot study. *7th International Conference on Social Work in Health and Mental Health: Pathways to Client-Centred Care*. 2013 Jun 23-27; Los Angeles, California.

A6 Suicide Risk Assessments within Suicide-Specific Group Therapy Treatment for Veterans: A Pilot Study
Lori Johnson, Ph.D. & David Jobes, Ph.D.

Task 1: Hire and train study staff. (Year 1 Months 1-3)

1a: RRVAMC PI and CO-I, recruit, select, and hire study staff – **Complete**

1b: RRVAMC PI and Co-I ensure all study staff complete VAMC human subjects and IRB trainings (Year 1 Month 2) – **Complete**

1c: CUA and UW Co-Is train all RRVAMC staff in study policies and procedure and administering study assessments. (Year 1 Month 2) - **Complete**

1d: RRVAMC staff begins recruitment and initial assessment procedures for pilot cases. Staff consults with CUA and UW Co-Is and Denver VA MIRECC consultant concerning effectiveness of recruitment procedures and initial assessment. Research team develops adaptations as needed prior to test cases. (Year 1 Month 3) – **Complete**

1e: Experimental and control groups begin pilot cases. Team consults with Co-Is for effectiveness of procedures and adaptations as needed prior to test cases. (Year 1 Month 3) – **Complete**

Task 2: Data Collection. (Year 1 Month 4 – Year 2 Month 12)

2a: RRVAMC staff recruits study participants and assures fast and efficient randomization to study conditions. (Year 1 Month 4 – Year 2 Month 9) – **Complete**

2b: Groups run. (Year 1 Month 4 – Year 2 Month 12) – **Complete, enrolled 141 Participants before closing enrollment**

2c: RRVAMC staff members complete group entry assessment and follow-up assessments at 1 month, and 3 months. (Year 1 Month 4 - Year 2 Month 12) – **In Progress, Baseline and 1 month follow ups all complete**

2d: CUA and UW Co-Is provide feedback and supervision to RRVAMC group co-leaders (Year 1 Month 4 – Year 2 Month 12) - **Complete**

2f: Denver VA MIRECC consultant provides consultation on difficult cases, study issues, and data collection and management as issues arise. (Year 1 Month 1 through Year 3 Month 3) – **In Progress**

2g: In accordance with Military Suicide Research Consortium (MSRC) standard operating procedure (Attachment CC), the PI and UW Co-I establish final database systems and data entry and cleansing procedures appropriate to data collected. All data will be collected by RRVAMC staff in accordance with the highest of HIPAA, VA, and MSRC standards. All data will be entered and maintained according to the strictest of HIPAA, VA, and MSRC standards. Data entry and management occurs on an ongoing basis. (Year 1 Month 3 through Year 3 Month 3)- **In Progress**

Task 3: Hiring and training of replacement staff, if needed.

3a: PI provides study training to any replacement staff, to assure sufficient flow through clinical trial (any time between Year 1 Month 3 and Year 2 Month as needed). –**Complete (unless needed)**

Task 4: Data analysis and dissemination of results.

4a: Data analysis. (Year 3 Months1-3) - **In Progress**

4b: Presentations, reports, and publications reflecting analyses will be prepared. (Year 3 Months1-3) - **In Progress. Manuscript in press with Military Behavioral**

Health, presentation and poster at AAS 2014, submitting for paper presentation and 3 posters for AAS 2015.

4c: Manual Development – In Progress

Other Progress:

Johnson, L., Kaminer, B., O'Connor, S., & Jobes, D. (2014, April). Group treatment for suicide attempt survivors. Workshop presented at the American Association of Suicidology 47th Annual Conference, Los Angeles, CA.

Morris, B., O'Connor, S., Johnson, L., Jobes, D., Gutierrez, P., & Kaminer, B. (2014, April). Group differences between suicidal veterans classified as wish to live, ambivalent, or wish to die using the suicide index score. Poster presented at the American Association of Suicidology 47th Annual Conference, Los Angeles, CA.

Johnson, L. L., O'Connor, S. S., Kaminer, B., Jobes, D. A., & Gutierrez, P. M. (in press). Suicide-focused group therapy for veterans. *Military Behavioral Health*.

A7 Toward a Gold Standard for Suicide Risk Assessment for Military Personnel
Peter M. Gutierrez, Ph.D. & Thomas Joiner, Ph.D.

Task 1. Hire and train staff (timeframe, months 1-4):

1a. Hire and train project coordinators at MIRECC and FSU (timeframe, months 1-2) - Complete

Project Coordinators for both sites were hired and trained on study procedures.

1b. Hire and train site assessors (timeframe, months 3-4) - Complete

Five full-time site assessors and one part-time site assessor have been fully trained on study procedures.

Task 2. Begin and complete baseline data collection; start longitudinal tracking (timeframe, months 4-24):

2a. Begin baseline data collection (timeframe, month 4) – Complete

2b. Continue and complete baseline data collection (timeframe, months 4-24). - In Progress

2c. Begin longitudinal tracking (timeframe, months 4-24). - In Progress

Recruitment totals:

Baseline Completed	Follow-ups Completed	Follow-ups unable to be completed	Withdrawn/ unable to re-consent
160	23	11	20

Below are the recruitment breakdowns per site.

NMCP

- Recruitment: Please see reports and delay section regarding re-consenting participants.

Baseline Completed	Follow-ups Completed	Follow-ups unable to be completed	Withdrawn/ unable to re-consent
108	4	10	19

Andrews

- Recruitment:

Baseline Completed	Follow-ups Completed	Follow-ups unable to be completed	Withdrawn/ unable to re-consent
1	N/A	N/A	0

Ft. Campbell

- Recruitment:

Baseline Completed	Follow-ups Completed	Follow-ups unable to be completed	Withdrawn/ unable to re-consent
51	19	1	1

Publications and Presentations

September 2013: Dr. Peter Gutierrez presented at Joint Base Andrews. This presentation was done during the Joint Base Andrews site visit. The presentation's purpose was to explain the study to the referring clinicians and provide background on the study.

September 2014: Dr. Peter Gutierrez presented at Ft. Campbell. This presentation was done during the Ft. Campbell site visit. CEUs were provided to participants.

Other Progress.

Dr. Gutierrez worked out collaboration with the Israel Defense Forces Suicide Prevention Team. Dr. Leah Shelef is an IDF psychologist currently running a study using the C-SSRS, BSS and SIS. Dr. Shelef has added the SHBQ and SBQ-R to their assessment study protocol in exchange for us adding the SIS to ours. This will allow us to combine data from the two studies and look at the predictive validity of the measures cross-nationally. The translations have been completed. Dr. Shelef received approval from their IRB in January and has secured grant funding to hire additional research assistants to aid with data collection. This collaboration stemmed from Dr. Gutierrez's presentation at the Shores conference at Ft. Detrick, MD in October 2012.

- A8** Psychophysiology of Suicidal States: Temperamental and Physiologic Suicide Risk Assessment Measures and Their Relation to Self-Reported Ideation and Subsequent Behavior
Michael Allen, M.D. & Theresa Hernández, Ph.D.

Task 1: Regulatory Review/Approval –Complete

Received COMIRB and VA approval. HRPO final approval received July 8, 2013.

Task 2: Study Coordinator Hiring and Training – Complete

All administrative tasks on hiring and training were completed.

Task 3: Purchase and train on Equipment – Complete

The purchasing of equipment and training of study coordinator completed.

Task 4: Recruit, consent, and enroll participants, and complete data acquisition through the 6-week follow-up.

Participant recruitment initiated; enrollment into study after consent and ongoing data acquisition through 6-week follow-up.

This study closed as of 10/01/2013: The one participant who was enrolled was notified of closure of the study, and no further contact will be initiated.

A9 Neuroimaging Correlates of Suicide

Deborah Yurgelun-Todd, Ph.D. & Perry Renshaw, MD, Ph.D., MBA

Phase 1: Submission/Planning Phase (months 0-1) - **Complete**

Task 1: Submission of an amendment to our previously approved neuroimaging study entitled Neurobiology of Suicide Risk in Traumatic Brain Injury and Substance Abuse (IRB#: 34725; Date of Approval: 5/22/2009) to the Institutional Review Board (IRB) (months 0-1). The IRB application will be submitted within 1 month of receiving a Notice of Award. We anticipate receiving approval within 1 month of submitting the amendment.

Phase II: Recruitment, Clinical Assessments, Neuroimaging and Data Collection (months 1-21). – **In Progress**

Task 1: Subject Recruitment (months 1-21).

We will recruit 80 Veterans with and without a history of SDV. The study coordinator will develop and prepare recruitment materials including duplication and distribution of materials to selected target audiences.

- We have created a study database and entered demographic data and MSRC common elements data for 34 subjects.
- Table 1 summarizes basic demographic and service information.

Age (mean years)	36.11
Age (range)	23-54
Gender	30 m, 4 f
Air Force	5
Army	19
Marines	7
Navy	3
Number with service connection	17
GAF (mean)	77.23

Task 2: Clinical Assessment and Neuroimaging (months 1-21). – **In Progress**

All participants will receive extensive diagnostic and clinical assessments, neuropsychological evaluation neuroimaging.

- We have reviewed scoring for the neuropsychological measures and these assessments are currently being scored. All imaging data has been downloaded and anonymized. Back up files for the imaging data have also been created. Morphometric analysis for the first 32 subjects has been completed using FreeSurfer V 5.3. (See Figure 1 and Table 2). The data presented are for both study groups and provide an integrity check on acquired images.

Figure 1. Coronal, axial, and sagittal slices from MSRC participant showing regional delineation.



Table 2. Regional volumes (mL³) for select regions of interest

Regional Volume (mL ³)	Mean	Std.
Anterior Cingulate Cortex	7700.37	936.63
Orbitofrontal Cortex	23694.19	2599.85
Gray Matter	500554.33	62037.10
White Matter	534086.41	71123.92
Total Ventricles	17228.33	7846.01
Total Brain	1268467.00	148784.05

Task 3: Data Collection and Storage (months 1-21). – **In Progress (see above)**

The study coordinator will ensure all study forms, clinical and neuroimaging data is received in correct form and safely stored. - **Complete**

Phase III. Data Analysis and Reporting (months 1-26). – **In Progress**

Task 1: Analysis of neuroimaging data (1-26 months). An integrity check of the imaging data will be performed during the first 4 months of the proposed project. Processing of the imaging data will begin as soon as the data is collected with more complex imaging analyses occurring in months 9-26. – **In Progress (see above)**

Task 2: Analysis of clinical data (months 5-26). Statistical analysis of the clinical data will be performed beginning in the 5th month of study and be completed by the 26th month of the study. – **In Progress (see above)**

Task 3: Presentations and publications (months 9-26). Team members will present preliminary data at conferences and finalize and publish manuscripts of the results by the end of the 26th month. – **In Progress**

- Proton Metabolite Correlates of Anxiety in Veterans. December 2014. *Special Operations Medical Association (SOMA)*. Tampa, FL.
- Water Bound Pool Fraction (BPF) Imaging as an Indicator of White Matter Integrity in Veterans with TBI. December 2014. *Special Operations Medical Association (SOMA)*. Tampa, FL.

Task 4: Application for further funding (months 21-26): Applications for further funding will occur during the last 6 months.

A10 A Novel Approach to Identifying Behavioral and Neural Markers of Active Suicidal Ideation: Effects of Cognitive and Emotional Stress on Working Memory in OEF/OIF/OND Veterans
Melissa Amick, Ph.D. & Beeta Homaifar, Ph.D.

Objective 1: Create infrastructure for study implementation and execution – **Complete**

Task 1: Build infrastructure, obtain regulatory approval for both sites, hire and train personnel, acquire measures, create database (Quarter 1-2)

- All staff has been identified, hired, and fully trained on the research protocols.
- All measures have been obtained and are in use.

Objective 2: Conduct study –**In Progress**

Task 2: Recruit and consent participants (Quarters 3-6)

- Recruitment efforts are active and ongoing according to the recruitment plan.
- Data collection has begun, with complete data obtained on all measures for fifteen participants. Three participants have partial data collected and are scheduled for completion in the near future. The primary outcome measure was developed, programmed, piloted, and has successfully obtained data for incoming participants.
- The database was completed and is in place as data entry continues with participant enrollment. All data has been entered to n=18.

Task 3: Execute post neuroimaging processing

- Initial analyses have begun on the functional and structural neuroimaging data, including image preprocessing and script development.

Recruitment and Enrollment Numbers:

Screened through TRACTS dataset: 272

Screened in CPRS Medical Records (Brockton inpatient unit and physician referrals): 128

Total screened: 400

Attempted contact by phone: 55

Successful phone contact and screening: 29

Screened in person after TRACTS visit: 9

Enrolled: 18

A11 Home-Based Mental Health Evaluation (HOME) to Assist Suicidal Veterans with the Transition from Inpatient to Outpatient Settings: A Multi-site Interventional Trial

Bridget Matarazzo, Psy.D.

Specific Aim 1: Prepare HOME for Project Interventional Trial - **Complete**

Task 1: Build infrastructure for project - **Complete**

- Full regulatory approval has been obtained at all sites. The study is currently progressing according to the Statement of Work.

Specific Aim 2: Conduct HOME Project Interventional Trial –**In Progress**

Task 2: Recruit and consent participants for interventional trial; collect and enter Time 1 data

Task 3: Conduct HOME intervention at active sites and complete Time 2 data collection

Task 4: Complete Time 3 data collection

Task 5: Complete Time 4 data collection

- We are recruiting at all sites, delivering the HOME intervention at active sites, and collecting, entering, and checking Time 1 through Time 4 data for all sites. We are also engaging in ongoing calls between all sites to ensure accuracy and consistency of study procedures.
- The Denver site has screened 186 potential participants and enrolled 11 participants into the study. Members of the Denver team continue to attend the daily “morning report” on their inpatient unit to engage and partner with inpatient staff members. The Denver team continues to monitor the 19 databases for this project for accuracy and utilization. Ongoing PI, Clinician and Study Coordinator calls continue to be led by Denver staff to ensure collaborative communications and consistency across sites.
- The Philadelphia site has screened 278 potential participants and enrolled 7 participants into the study. Members of the Philadelphia team continue to attend meetings on their inpatient unit to engage and partner with inpatient staff members. The Portland staff continues to have a strong working relationship with their inpatient staff, which helps to facilitate recruitment. Members of the Philadelphia team continue to engage in collaborative communications with Denver via phone calls and email to facilitate consistency across sites.
- The Houston site has screened 508 potential participants and enrolled 10 participants into the study. Members of the Houston team continue to attend the "morning huddle" on their inpatient unit to engage and partner with inpatient staff members. In order to improve recruitment efforts, an additional staff member is assisting with the consenting process on the inpatient unit. Members of the Houston team continue to engage in collaborative communications with Denver via phone calls and email to facilitate consistency across sites.

- The Portland site has screened 387 potential participants and enrolled 15 participants into the study. Members of the Portland team continue to attend meetings on their inpatient unit to engage and partner with inpatient staff members. The Portland staff continues to have a strong working relationship with their inpatient staff, which helps to facilitate recruitment. Members of the Portland team continue to engage in collaborative communications with Denver via phone calls and email to facilitate consistency across sites.

Recruitment numbers are as follows:

RUNNING TOTAL		By Site:	Denver	Houston	Portland	Philadelphia
# Screened	1359		186	508	387	278
# Screened In	79		18	27	22	12
# Screened out	1127		153	355	363	256
Approached but declined	23		5	7	7	4
# Consents Signed	43		11	10	15	7
# Baselines Completed	35		11	9	14	5
# Withdrew from study	8		0	2	3	3
Completed Study	2		0	0	2	0

Presentations:

Meeting Suicidal Veterans and Military Personnel on Their Turf: The Home-Based Mental Health Evaluation (HOME) Program (Poster). December 2014. *Special Operations Medical Association (SOMA)*. Tampa, FL.

Leveraged Funds:

Denver: The VISN 19 MIRECC received funding (\$285,554) from VA Office of Rural Health to expand and further develop the HOME Clinical Demonstration Project to accommodate the needs of rural Veterans in North Carolina (Durham). The expansion of the HOME Clinical Demonstration Project serves as support of the overall intervention studied in this grant.

Portland: Current PVAMC research assistant (Sarah Andrea) is supported by VA HSR&D Center of Innovation.

A12 Effectiveness of a Virtual Hope Box Smartphone App in Enhancing Veteran's Coping with Suicidal Ideation: A Randomized Clinical Trial
Nigel Bush, Ph.D.

Task 1: Finalize agreements and subcontracts with participating clinical site (Months 1) - Complete

1a: Finalize agreement with VAMC-Portland clinical test site and its leadership for this project;

1b: Finalize subcontracts with this site.

Task 2: Hire and train T2 and Portland study staff (Months 1-3) - Complete

2a: Hire T2 software engineer;

2b: Hire site research coordinator.

2c: Site project manager and site clinical coordinator.

2d: train new site research coordinator in human subjects and other research protections, study policies and procedures, app specifications, and patient participant recruitment and testing procedures;

Task 3: Refine Pilot VHB-β into Production VHB 1.0 and test. (Months 1-12) – In Progress

3a: Software engineer translates updated specs derived from pilot testing of VHB-β into production VHB 1.0 app; - **Complete**

3b: Study staff recruits participants from active service member population to test the production VHB 1.0 app for usability; - **In Progress**

3c: If necessary, software engineer modifies VHB 1.0 app further based on usability testing feedback from participants;

3d: Software engineer provides initial technical support to clinical site for first year.

Task 4: Set up Portland clinical site (Months 1-4) - Complete

4a: Co-PI, T2 Research Coordinator (RC), site-PI, local behavioral health staff/clinicians, and relevant site operations staff meet at VA-based clinical test site introduce the study, and finalize procedures;

4b: VA site obtains approval from site IRB.

Task 5: Implementation of clinical site intervention and data collection (Months 5-18) – In Progress

5a: Site research and clinical coordinators work with behavioral health staff/clinicians to recruit patient participants; - **In Progress**

- Recruitment at the Portland VA continues on track with 67 subjects enrolled to date.
- Enrolled: 67
- In screening: 34
- Completed study: 34
- Scheduled to enroll: 6
- 234 recruitment letters currently awaiting response.

5b: participants randomized to two arms comparing VHB with enhanced treatment as usual (ETAU); - **In Progress**

5c: intervention participants work iteratively over course of therapy with clinicians to develop personal VHB; - **In Progress**

5d: participants use VHB or enhanced TAU offsite; - **In Progress**

5e: outcome measures collected. - **In Progress**

Publications, Presentations, and Media Requests:

- MSRC IPR 05-06 June 2014
- Armed Forces Press Office issuance
- National media coverage through multiple outlets
- Publication: Bush N, Dobscha SK, Crumpton R, et al. A Virtual Hope Box Smartphone App as an Accessory to Therapy: Proof-of-Concept in a Clinical Sample of Veterans. *Suicide & Life-Threatening Behavior*. 2014. DOI: 10.1111/sltb.12103
- Armed Forces Radio interview with Dr. Mark Reger
- Presentations:
 - Bush N. & Dobscha S. Effectiveness of a Virtual Hope Box Smartphone App in Enhancing Veterans' Coping with Suicidal Ideation: A Randomized Controlled Trial. *Military Health System*
 - Research Symposium (MHSRS) 2014. Ft. Lauderdale FL. August 21, 2014.
 - Bush N. & Stewart A. Integration of Mobile Health Technologies in Clinical Practice. Dept. of Defense Public Health Quad Service Collaboration. Webinar. September 11, 2014.
 - Bush N. & Wheeler W. The Virtual Hope Box. American Association of Suicidology, Suicide Prevention Social Media- Weekly Twitter Chats with Expert Guests. September 21, 2014.

A13 Warning Signs for Suicide Attempts

Courtney Bagge, Ph.D. & Ken Conner, Psy.D., MPH

Task 1. Hire and train staff (timeframe, months 0-3): -**Complete**

1a. Hire and train project coordinators/assessors (timeframe, months 0-3).

Task 2. Creation of an interviewer-administrated computerized follow-back interview - Complete

2a. Hire programmer and create interview (timeframe, months 0-1.5).

2b. Test and finalize interview (timeframe, months 1.5-2.5).

- Administering Self-Report Data and Common Data Elements: Three additional personnel were added to the project to aid in administering the self-report battery. All site interviewers have practiced the self-report packet and script for administering this battery. These practice sessions continued until the individual interviewer started data collection.
- Facilitating data accuracy: Double entry was completed by individuals at all sites, and UMMC personnel ran data comparison reports to check for accuracy. Feedback for sites was compiled by UMMC and provided to trainers of other sites.
- Practicing the TLFB interviews (role plays) with UMMC staff: For the past three months, all sites attended weekly virtual meetings with UMMC staff and practiced giving the TLFB interview
- Engage in Meta-Supervision Feedback on Practice TLFB Interviews with UMMC staff: For the past three months, all site interviewers received meta-supervision feedback via telephone and email after each practice TLFB interview. All trainees are signed-off to initial fidelity standards and can complete the TLFB with participants.
- Adverse Event Decision Making Tool: CoE developed a Significant Adverse Event decision making tool this quarter, disseminated this to sites, and provided training during monthly calls on identifying and reporting adverse events. This tool has streamlined and clarified the process for reporting adverse events to CoE, MSRC, and HRPO.
- VAMC Treatment History Data Collection from Medical Records: An electronic data collection tool was developed and pilot tested with sites this quarter for use in collecting the study wide, current admission medical records data. All VAMC sites have received training on collecting medical chart and treatment history data.
- Study Wide Current Admission Medical Chart: A “Guide for Chart Abstraction” was developed by the CoE Coordinator with input from Dr. Conner and UMMC staff, during Q4. Effort was extended to further train staff in use of an electronic version of the study wide/current admission chart abstraction tool. VA sites are getting started with data collection and at this time have not yet received medical records data from the VA sites.

Task 3. Begin and complete data collection (timeframe, months 3-22): - **In Progress**

3a. Complete data collection (timeframe, month 3-22).

3b. Complete fidelity checks of data (timeframe, months 3-22).

Recruitment

- Final Kickoff Meeting to Start Data Collection: All sites had a kick off meeting to start data collection with permission from site PIs, Co-Is, local IRBs, and HRPO.
 - UMMC: 6/6/14
 - San Diego: 7/3/14
 - Rochester: 7/23/14
 - Seattle: 8/26/14
 - Arkansas: 9/19/14
- Time in the Field: (since final approvals met)
 - UMMC: 105 days
 - San Diego: 78 days
 - Seattle: 24 days
 - Arkansas: .5 days
 - Rochester: 58 days
- Enrollment
 - As of 9/19/14 these are the recruitment statistics:

	Time in the Field (days)	Total Eligible from Screening	Total Consented	Total Fully Completed	Total Required	Total Left to Go	Goal Complete (%)
UMMC	105	50 (79.36%)	46 (92%)	41 (89.13%)	125	84	32.80%
Rochester	58	15 (83.33%)	11 (73.33%)	9 (81.81%)	125	116	7.20%
San Diego (VA)	78	8 (80%)	8 (100%)	5 (62.5%)	86	81	5.81%
Seattle (VA)	24	5 (100%)	5 (100%)	3 (60%)	86	83	3.48%
Little Rock (VA)	.5	0 (0%)	0 (0%)	0 (0%)	86	86	0 (0%)

Fidelity of Interviews of Participants and Consultation with UMMC Regarding Study Procedures:

- All trainees have consulted with UMMC staff via telephone and email regarding eligibility status and questions regarding participant tracking and study procedures
- Each TLFB Interview and audio is being received by the UMMC Project Coordinator and discussed with Dr. Schumacher to ascertain fidelity ratings
- Trainees routinely meet virtually with the UMMC Project Coordinator to review their fidelity rankings on the TLFB with real participants and receive meta-supervision in order to troubleshoot strategies to help facilitate interviews with difficult participants

Meetings Between Sites and Recruitment and Data Tracking:

A standing monthly meeting occurred regularly. The UMMC Coordinators, CoE Coordinator, and Co-PIs also conduct ad hoc meetings by phone and address questions from sites by email on a frequent basis.

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Reconsidering the Link Between Impulsivity and Suicidal Behavior

Michael D. Anestis¹, Kelly A. Soberay^{2,3}, Peter M. Gutierrez^{2,3,4},
Theresa D. Hernández⁴, and Thomas E. Joiner^{2,5}

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Abstract

It is widely accepted that suicidal behavior often occurs with little planning. We propose, however, that suicidal behavior is rarely if ever impulsive—that it is too frightening and physically distressing to engage in without forethought—and that suicidal behavior in impulsive individuals is accounted for by painful and fearsome behaviors capable of enhancing their capacity for suicide. We conducted a meta-analysis of the association between trait impulsivity and suicidal behavior and a critical review of research considering the impulsiveness of specific suicide attempts. Meta-analytic results suggest the relationship between trait impulsivity and suicidal behavior is small. Furthermore, studies examining a mediating role of painful and provocative behaviors have uniformly supported our model. Results from our review suggest that researchers have been unable to adequately measure impulsivity of attempts and that measures sensitive to episodic planning must be developed to further our understanding of this phenomenon.

Keywords

suicide, impulsivity, acquired capability

Suicide is a global concern, resulting in the annual deaths of approximately one million individuals worldwide (National Institute of Mental Health, 2008). With this in mind, researchers have devoted substantial attention to the identification of risk factors for suicidal behavior. This work has yielded a growing list of variables linked to risk, including hopelessness (e.g., Beck, Steer, Kovacs, & Garrison, 1985), depression (e.g., Bostwick & Pankratz, 2000), non-suicidal self-injury (NSSI; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006), thwarted belonging, and perceived burdensomeness (Joiner, 2005). Although the mechanisms through which these variables are thought to confer risk for suicidal behavior are often delineated and supported by empirical associations, this is not always the case. One variable for which this is noteworthy is impulsivity, which has been reported to be associated with suicidal behavior across a large number of studies (e.g., Dougherty et al., 2004).

Impulsivity is a broad construct defined and measured differently across investigations (Lynam & Miller, 2004). Definitions vary in emphasis, with some focusing on the act of engaging in risky behavior (e.g., Barratt, 1993), some focusing on the tendency to opt for smaller immediate rewards over longer term larger rewards (e.g., Bickel & Marsch, 2001), and some emphasizing the importance of specific affective states as influences over an individual's ability to inhibit sudden drives to engage in problematic behaviors (e.g., Whiteside & Lynam, 2001). Across theories, the construct of impulsivity is typically thought to involve

several subcomponents (e.g., negative urgency, deficits in planning), nearly all of which involve a tendency to act without forethought (sensation seeking and lack of perseverance may represent exceptions; e.g., Whiteside & Lynam, 2001).

Several theories have been proposed to explain the mechanisms through which impulsivity might be associated with suicidal behavior. Virtually all of these include reference to a distal role for impulsivity but also posit a proximal relationship in which impulsivity explains the nature of the behavior itself. For instance, some researchers posit that the relationship is best thought to represent impulsive-aggression, a tendency to aggress toward others or oneself in response to acute stress (e.g., Mann & Currier, 2009). Consistent with this approach, some have proposed that deficient serotonergic neurotransmission, represented by low cerebrospinal fluid 5-hydroxyindolacetic acid (CSF-5HIAA) levels, explains the relationship (e.g., Rifai, Reynolds, & Mann, 1992); however, empirical evaluations of this

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conceptualization have not been consistently supportive (e.g., Roggenbach, Muller-Oerlinghausen, & Franke, 2002).

Relatedly, Baumeister (1990) proposed that suicide attempts represent an escape from aversive self-awareness and that individuals develop a diminished ability to resist impulses to engage in suicidal behavior while experiencing such a state and, as a result, become increasingly at risk for engaging in such behavior impulsively. Similarly, some believe that impulsivity serves as the diathesis in a diathesis-stress model in which stressors such as negative life events might interact with impulsivity to result in rash efforts to enact lethal self-harm (e.g., Mann, Waternaux, Haas, & Malone, 1999). In this conceptualization, suicidal behavior is viewed as a frequently unplanned behavioral response to momentary aversive experiences, more likely to occur in individuals who display a general tendency to act without forethought. Indeed, in explaining the role of impulsivity in suicidal behavior, Mann et al. (1999) noted that, due to their propensity toward impulsive action, suicide attempters “feel more suicidal and are more likely to act on feelings” (p. 186). Implicit in such a statement is the notion that suicidal behavior often emerges explosively in response to affect in people who are less capable of inhibiting rash responses to sudden urges. In addition, the same researchers proposed that planning and impulsive action are not mutually exclusive, stating that “the decision to act on a careful plan may be impulsive” (Mann et al., 1996, p. 582). This raises questions regarding the definition of impulsivity, as a decision to act on a plan previously developed in great depth seems to directly contrast many common conceptualizations of the construct (e.g., Whiteside & Lynam, 2001). In this review, the focus is on conceptualizations of impulsivity that emphasize the tendency to act without forethought.

A theme across each of the theories just described is the notion that people often engage in suicidal behavior without significant planning and that suicide attempts are often fueled by intense affective states. Indeed, the notion that suicidal behavior frequently occurs with little to no forethought is regularly noted as a statement of fact in literature reviews. For instance, Jeon and colleagues (2010) cited a number of studies detailed later in this review, noting that “with respect to the literature, studies have consistently reported that a considerable proportion of suicidal attempts are unplanned” (p. 275). Inherent in this viewpoint is the belief that suicidal behavior frequently occurs without any detectable progression from low to imminent risk. This supposition has obvious implications with respect to our understanding of risk factors related to imminent suicidal behavior and the role of clinicians in identifying and mitigating risk (A. R. Smith et al., 2008).

If an individual can engage in suicidal behavior without prior consideration, this speaks to the notion that momentary affective and/or cognitive states are capable of overcoming what many would argue is a fundamental component of human nature and an evolutionary imperative:

the relentless will to remain alive (Joiner, 2010). Should such models prove untrue, however, the implication would be that, to override the drive to survive, an individual would need to chip away at it over time. In this article, we present an alternative model that argues that little, if any, suicidal behavior—lethal or non-lethal—occurs without substantial planning. Although further research testing important components of this model is needed, we argue that every effort to test it thus far has been supportive, whereas evidence that purportedly supports models proposing suicidal behavior is frequently impulsive is problematic.

The prominence of models that describe suicidal behavior as frequently impulsive is perhaps best seen through the frequent (and highly cited) efforts to measure impulsive suicidal behavior (e.g., Conner et al., 2007; de Leo, Cerin, Spathonis, & Burgis, 2005; Mann et al., 1996). Such studies have typically approached the association from one of two angles: the trait impulsivity of the individual or the degree to which specific acts of suicidal behavior were engaged in impulsively. We argue that the nature of the measures and the designs used in such investigations have precluded researchers from directly testing models that propose that suicidal behavior is frequently impulsive (see Figure 1a). Furthermore, we believe interpretations of published data have resulted in erroneous conclusions. In addition, we argue that a failure to consider plausible alternative models fully has fueled the belief that suicidal behavior frequently occurs impulsively. The purpose of this review is to consolidate findings, discuss their implications and limitations, and propose a new theoretical framework from which to consider the relationship between impulsivity and suicidal behavior (see Figure 1b).

To accomplish these goals, our article is divided into three separate sections. In the first section, we provide a meta-analysis that examines the strength of the relationship between trait impulsivity and suicidal behavior. We anticipate that this relationship will be small in magnitude, thereby highlighting the point that a general tendency to act impulsively is unlikely a central component of suicidal behavior. This analysis represents a critical first step in considering the relationship between impulsivity and suicidal behavior and the results could place the magnitude of this association into a clearer context. In the second section, we provide a critical review of literature examining the impulsiveness of specific suicide attempts. We show that the general pattern of findings reveals inconsistent definitions of impulsive suicidal behavior, problematic measurements of planning, and a pattern of results incompatible with the notion that suicidal behavior frequently occurs without extensive planning. In the final section of the article, we provide a description of our alternative conceptualization of the association between impulsivity and suicidal behavior and the empirical evidence underlying that conceptualization.

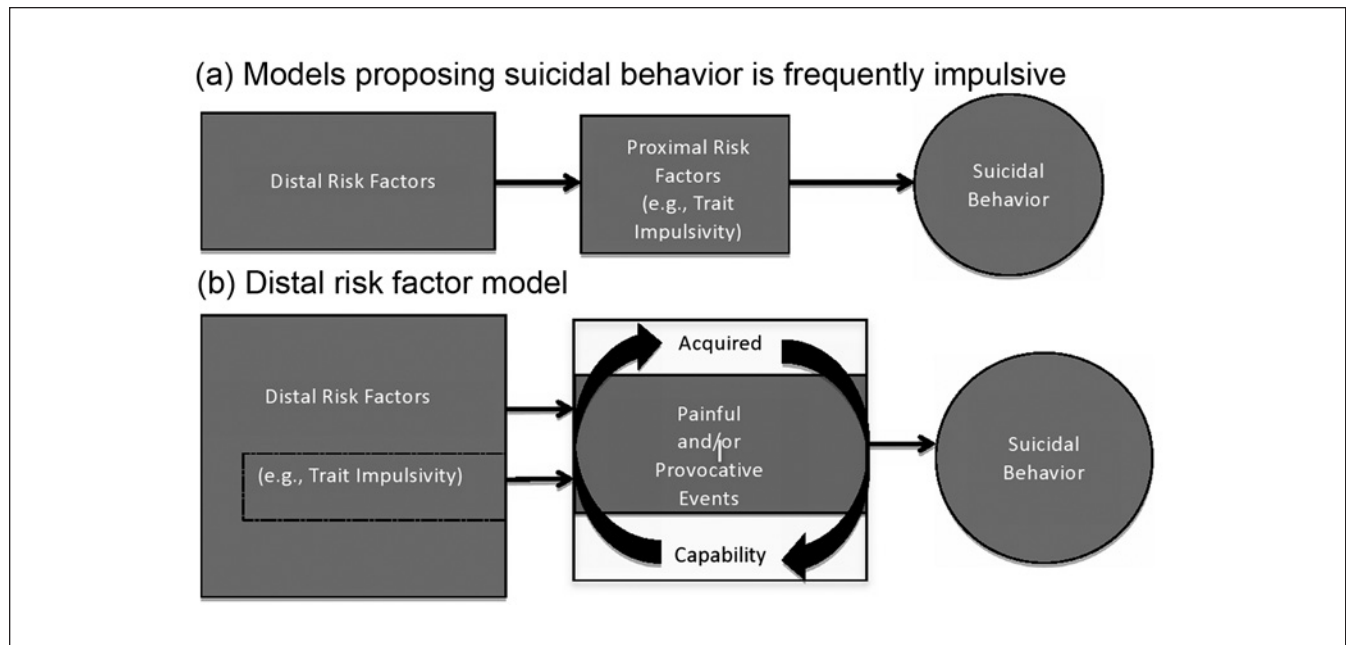


Figure 1. Two models of the relationship between impulsivity and suicidal behavior.

Note. In both models, impulsivity is defined as a tendency to act without forethought. Model a: In this more traditionally proposed model, impulsivity is a proximal risk factor, serving as a force or pressure and as such immediately precedes suicidal behavior in response to stress and/or aversive self-awareness (e.g., Baumeister, 1990; Mann, Waternaux, Haas, & Malone, 1999). In this model, there is a narrow window of opportunity and limited targets of opportunity (e.g., impulsivity immediately preceding suicidal behavior). This narrowness serves as an obstacle to clinical interventions aimed at reducing suicide risk and related behaviors. Model b: In this model, impulsivity is a trait that plays a facilitative role in other behaviors (i.e., painful or provocative events), which result in acquired capability. In this model, there is a larger window of opportunity and more targets for interventions aimed at reducing suicide risk and behaviors.

Meta-Analytic Review of Trait Impulsivity Findings

Study Selection

Trait impulsivity findings were reviewed meta-analytically. The inclusion criteria were the use of both a measure of suicidal behavior (e.g., non-lethal attempts; death by suicide) and impulsivity. Furthermore, results directly testing an association between impulsivity and suicidal behavior must have been included in the published manuscript. Studies that examined only suicidal ideation or suicide risk or which did not clearly differentiate suicidal behavior from other related variables (e.g., ideation, NSSI) were excluded. Using 53 databases (e.g., Pubmed, PsycInfo), we entered the search terms *suicide*, *suicidal behavior*, *impulsivity*, and *impulsive* (these same search terms were used to develop our systematic review). After examining the measures utilized in each study, we eliminated any that did not fit our criteria. At that point, we examined each study and excluded any that used our required measures (a measure of trait impulsivity and suicidal behavior) but did not provide results that tested an association between them. In an effort to ensure that our outcome variable was not overly broad, we restricted the studies in the meta-analysis to those that examined the presence/absence of suicidal behavior or frequency of suicidal behavior.

Studies examining characteristics of suicidal behavior (e.g., medical lethality) were excluded. (Results from these and all other trait impulsivity studies, including which measure(s) was used, the nature of the study sample, and the size of the effect(s), can be found in the online Appendix). See Figure 2 for a description of the study selection process.

Data Extraction

For each study, data relevant for our meta-analysis were retrieved from the original study and entered into the statistical software (described below). When available, the mean and standard deviation for trait impulsivity and sample size for each group (suicidal behavior vs. no suicidal behavior) was recorded for each effect in each study. When such data were not available, odds ratios with 95% confidence intervals, *p* values with total sample size, or Cohen's *d* with sample size were recorded and imputed into the meta-analysis software.

Statistical Analysis

Data were analyzed using Comprehensive Meta-Analysis (CMA) 2.0 statistical software (Borenstein, Hedges, Higgins, & Rothstein, 2005). Hedges *g* was utilized to calculate the standardized mean difference on suicidal behavior outcomes,

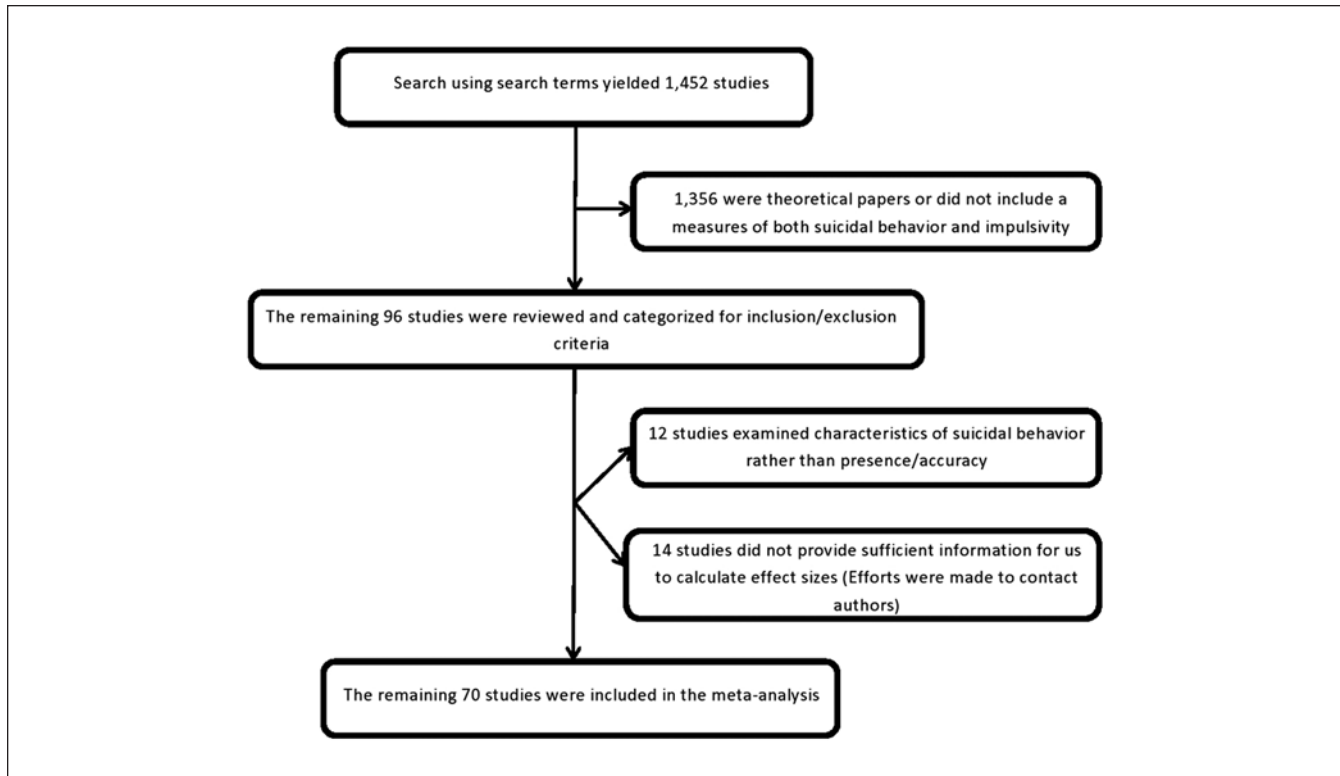


Figure 2. Flow chart for studies included and excluded from meta-analysis.

and we adhered to Cohen's (1988) description of small ($g = .2$), medium ($g = .5$), and large ($g = .8$) effects. Several studies included multiple effects based on different measures of impulsivity. Some meta-analysis experts have argued that, in such situations, the proper approach is to choose one representative effect from each study to avoid artificially inflating the weight of any study through consideration of inter-related effects (e.g., Cooper, 1998). Others, however, have argued that multiple effects from the same study can be included if authors believe or have evidence to support the possibility that the effects are entirely or almost entirely unrelated to one another (e.g., Gliner, Morgan, & Harmon, 2003). A third approach is to compute a mean effect size across effects within each study and then include only the grand mean value for each (e.g., Connor, Glatt, Lopez, Jackson, & Melloni, 2002). We opted to utilize one effect from each sample, as this appeared to be the most conservative approach and represented the most stringent challenge to our hypothesis (e.g., a single effect from a more psychometrically sound measure may yield a larger effect, which would contradict our hypothesis).¹ As a result, our findings represent analyses based on unique samples (e.g., participants were not represented multiple times across individual studies; see Table 1).

For studies in which one effect was selected from among several, we made an effort to select the effect that was most representative of the central tendency. In studies in which multiple self-report measures were utilized, we selected the

Barratt Impulsiveness Scale (BIS; Patton, Stanford, & Barratt, 1995). Although this might cause the analysis to only reflect one of several conceptualizations of impulsivity, the BIS is by far the most frequently utilized measure in such studies (see online Appendix) and, as such, the analysis would also be the most representative of the literature as it is. Furthermore, analyses focused on any other self-report measure would be underpowered, thereby raising questions regarding the validity of the findings. In studies in which multiple behavioral measures were utilized, we selected the Immediate Memory Task (IMT; Dougherty, Marsh, & Mathias, 2002), as it appeared to maintain the most consistent relationship with suicidal behavior. If these measures were not utilized, we selected the largest effect in an effort to ensure that selections did not artificially weigh results in a direction that might be perceived as consistent with our model (e.g., decreasing the magnitude of the effect across studies). In studies in which both self-report and behavioral measures were used, we selected a behavioral measure based on the assumption that performance on such tasks avoids the drawbacks of self-report (e.g., lack of insight), thereby offering greater construct validity. In addition, in studies in which multiple diagnostic groups were represented (e.g., bipolar disorder and depression), we selected what we deemed to be the more clinically severe diagnostic group (e.g., bipolar disorder). Finally, when one study reported multiple effects on the same measure from multiple comparisons (e.g., multiple

Table 1. Results From Meta-Analyses Examining the Magnitude of the Association Between Trait Impulsivity and Suicidal Behavior.

Analysis	Type of study	<i>g</i>	CI	<i>z</i>	<i>p</i>	<i>Q</i>	<i>I</i> ²	<i>k</i>	<i>df</i>	FSN	FS <i>Z</i>	FS <i>p</i>
RE	I effect per study	.34	[.24, .40]	9.75	<.001	684.82 ^a	89.78	71	70	6,022	18.16	.0000
RE	Cross-sectional	.37	[.29, .46]	8.89	<.001	500.89 ^a	88.82	57	56	4,031	16.60	.0000
RE	Prospective	.09	[.02, .17]	2.43	.015	9.50	36.83	7	6	17	3.59	.0003
RE	Psychological autopsy	.30	[-.13, .72]	1.36	.17	121.12 ^a	95.05	7	6	80	6.88	.0000

Note. *g* = Hedges *g*, CI = 95% confidence interval; FSN = fail safe *n*; FS *Z* = *Z* test for Classic Fail Safe Test; FS *p* = *p* value for Classic Fail Safe Test; RE = random effects model; I effect per study = one effect selected from any study with more than one effect reported.

^aDenotes heterogeneity test was significant.

attempters vs. single attempters vs. community controls), we used the suicidal and non-suicidal groups that were most similar to one another (e.g., single attempters vs. community controls) to compare groups that differ primarily on the outcome of interest (presence of suicidal behavior) as opposed to other potential confounding variables.

In an effort to assess the degree to which the magnitude of the relationship between trait impulsivity and suicidal behavior is consistent across type of study, we coded each effect as cross-sectional, prospective, or psychological autopsy. Follow-up meta-analyses were run to test the magnitude of the relationship between trait impulsivity and suicidal behavior within each of these groups.

Across each meta-analysis, effect sizes for each sample were weighted (for original effect sizes, see online Appendix), and we examined the significance of the *Q*-test to determine whether there was substantial heterogeneity of effect sizes. Because we anticipated that effect sizes would vary across studies, we opted to use a random effects (RE) model in each analysis. To test for publication bias, we examined funnel plots for each effect. In addition, we examined the significance of the fail safe test and reported the number of studies with non-significant effects that would be required to render the results non-significant.

Results

All meta-analytic results are presented in Table 1.

In our analysis, considering only one effect per study (*n* = 57), the *Q*-test was significant (684.82) and the *I*² value (89.78) indicated a substantial amount of that variability was due to heterogeneity rather than chance. The test of the null was significant, and the effect size was small (Hedges *g* = .34, 95% confidence interval [CI] = [.24, .40], *p* < .001). There was no evidence that publication bias significantly impacted our results.²

When considering only cross-sectional effects (*n* = 57), the *Q*-test was significant (500.89) and the *I*² value (88.82) indicated a substantial amount of that variability was due to heterogeneity rather than chance. For cross-sectional effects, the test of the null was significant and the effect size was small (Hedges *g* = .37, 95% CI = [.29, .46], *p* < .001). There was no evidence that publication bias significantly affected our results.

In the analysis including only prospective effects (*n* = 7), the *Q*-test was non-significant (9.50), indicating homogeneity across effect sizes. The test of the null was significant and the effect size was small (Hedges *g* = .09, 95% CI = [.02, .17], *p* = .015). There was no evidence that publication bias significantly affected our results.

In our analysis considering only psychological autopsy effects (*n* = 7), the *Q*-test was significant (121.12) and the *I*² value (95.05) indicated a substantial amount of that variability was due to heterogeneity rather than chance. The test of the null was non-significant (*p* = .17) and the effect size was small (Hedges *g* = .30, 95% CI = [-.13, .72], *p* = .42). There was no evidence that publication bias significantly affected our results.³

Discussion of the Meta-Analytic Review

The results indicate that, when considering trait impulsivity and suicidal behavior in general, the relationship is significant but small in magnitude. This result mirrors those from studies that specifically differentiated individuals who have and have not engaged in previous non-lethal suicidal behavior (cross-sectional) and studies that specifically differentiated between individuals who do or do not engage in suicidal behavior during a follow-up period (prospective). In psychological autopsy samples, however, where investigators attempt to differentiate between suicide decedents and living controls, the relationship is not statistically significant, indicating that trait impulsivity is not a reliable method by which to differentiate those who have and have not died by suicide. It is particularly difficult to reconcile this last point with models that conceptualize lethal self-harm as often being impulsive. To put such findings into context, other meta-analyses have found at least moderate effect sizes for the relationship between suicidal behavior and posttraumatic stress disorder, depressed mood, hopelessness, family history of suicide, and prior suicide attempts (e.g., Large, Smith, Sharma, Nielssen, & Singh, 2011; Panagioti, Gooding, & Tarrier, 2012). Other meta-analyses have found moderate effect sizes between components of impulsivity and pediatric weight status, bulimia nervosa, and problematic alcohol use (e.g., Stautz & Cooper, 2013; Thamotharan, Lange, Zale, Huffhines, & Fields, 2013). Exhibiting a less robust

relationship with suicidal behavior than the above-mentioned risk factors does not render the relationship between trait impulsivity and suicidal behavior meaningless, but it certainly calls into question its centrality. Indeed, our central thesis is not that trait impulsivity is irrelevant to suicidal behavior but rather that the relationship is indirect and distal.

Critical Review of Studies Examining Impulsivity of Attempts

In this section, we provide a critical review of findings from studies examining the impulsiveness of specific suicide attempts. We opted against using a meta-analysis in this section because such analyses measure the average strength of the relationship between two variables and the focus of this portion of the article was on the measurement and conceptualization of the impulsivity of attempts. In this sense, there was no second variable to which impulsivity of attempts was being compared. As noted earlier in the article, we anticipated that this review would yield an inconsistent definition of impulsivity of attempts, problematic measurement approaches, and a pattern of results that does not align well with the notion that suicidal behavior frequently occurs without extensive planning.

Study Selection

Inclusion criteria for studies examined in our critical review involved reporting of any results intended to measure the extent to which participants engaged in suicidal behavior that involved little to no planning. In some studies, the assessment approach involved the use of a measure designed to assess impulsiveness of attempts. In other cases, this included the interpretation of objective circumstances (e.g., distance of attempt from home) or involved one or more questions from within a broader measure. These criteria yielded 49 studies (see Table 2).

Summary of Results of Studies Examining the Impulsiveness of Specific Suicide Attempts

In studies that examined the impulsivity of specific suicide attempts, the general trend appears to indicate that attempts that involve less planning are associated with *less* severe outcomes. For instance, in a sample of individuals hospitalized for a suicide attempt, Baca-Garcia and colleagues (2001) found that impulsiveness of attempt was inversely associated with lethality of attempt. Similarly, in a sample of adult inpatients diagnosed with depression who had attempted suicide at least once, Nakagawa and colleagues (2009) found that less planning was associated with lower lethality. In addition, in a sample of 673 attempters, Conner and colleagues (2006) found that greater levels of planning were associated with

greater lethality. The inverse relationship between impulsiveness of attempt and lethality of attempt has also been replicated in a sample of adolescents (Witte et al., 2008).

Studies examining the association between impulsiveness of attempts and psychopathology also fail to support the view that suicidal behavior is frequently impulsive. Across a variety of samples, more impulsive attempts were associated with lower depression scores (e.g., Brown, Overholser, Spirito, & Fritz, 1991; Conner et al., 2006; Jeon et al., 2010; Nakagawa et al., 2009; Simon et al., 2001; Soloff, Lynch, Kelly, Malone, & Mann, 2000; Suominen, Isometsa, Henriksson, Ostamo, & Lonnqvist, 1997; Wojnar et al., 2009; Wyder & de Leo, 2007; see Conner et al., 2007 and Giegling et al., 2009 for null findings). Similarly, Wojnar et al. (2009) found that impulsive attempters were less likely to report a family history of suicide or having experienced childhood sexual abuse, and Conner et al. (2006) reported that impulsive attempters were less likely to meet diagnostic criteria for substance dependence. Given that depression (e.g., Bostwick & Pankratz, 2000), substance use (Bagge & Sher, 2008), and a history of childhood sexual abuse (e.g., Joiner et al., 2007) are associated with severe suicidal behavior, these findings are evidence that individuals in particularly high-risk groups are *less likely* to engage in impulsive attempts. When considered within the context of these findings, models claiming suicidal behavior frequently occurs impulsively are particularly problematic, as such perspectives seem to suggest that a large proportion of attempts involve individuals with lower levels of psychopathology and fewer risk factors for severe, repeated, and lethal suicidal behavior.

Conceptual Issues With Studies Examining the Impulsiveness of Specific Suicide Attempts

Studies that examine impulsiveness of attempts differ in many ways, including the method of measurement and the proportion of attempts considered impulsive. In studies that dichotomized attempts as impulsive or non-impulsive, the proportion of attempts considered impulsive has ranged from 13% (Houston, Hawton, & Sheppard, 2001) to 97% (Razin et al., 1991). As such, there does not appear to be a consensus as to whether impulsive suicidal behavior is a rare phenomenon or representative of the vast majority of attempts. As we argue in greater detail below, we believe the actual proportion of attempts that can accurately be described as impulsive to be at or very close to 0%.

One explanation for this large discrepancy is likely the inconsistent operationalization of the time frame during which an individual must report having thoughts about attempting suicide. In some studies, participants are asked if they contemplated their attempt for longer than 15 min prior to attempting (e.g., Hawton, Kingsbury, Steinhardt, James, & Fagg, 1999). In others, the time frame ranges from "none;

Table 2. Results From Studies Examining Impulsivity of Attempts.

Authors	Measure of impulsivity	Attempt sample	% Impulsive
Baca-Garcia et al. (2001)	2-item SIS	478 attempters	55.0
Baca-Garcia et al. (2005)	8-item SIS	242 attempters	76.0
Bagge, Glenn, and Lee (2013)	2-item SIS	110 attempters	46.0
Brown, Overholser, Spirito, and Fritz (1991)	2-item SIS	86 adolescent attempters	66.3
Chen et al. (2007)	8-item SIS	148 suicide decedents	—
Chesin, Jeglic, and Stanley (2010)	8-item SIS	40 BPD attempters	—
Conner et al. (2005)	7-item SIS	505 suicide decedents	32.0
Conner et al. (2006)	Unpublished interview	673 attempters	51.0
Conner et al. (2007)	7-item SIS	117 depressed attempters aged 50+	—
Conwell et al. (2002)	Presence of loaded and/or unlocked guns in home	50 suicide decedents aged 50+	—
de Leo, Cerin, Spathonis, and Burgis (2005)	Method unspecified	399 attempters	—
Deisenhammer et al. (2009)	Unnamed number of SIS items	82 attempters	47.6
Dombrowski et al. (2011)	7-item SIS	29 depressed attempters aged 60+	—
Fazaa and Page (2011)	2-item SIS	96 undergraduate attempters	—
Giegling, Hartmann, Moller, and Rujescu (2006)	Unnamed number of SIS items	203 attempters	59.1
Giegling et al. (2007)	Unnamed number of SIS items	167 attempters + 92 decedents	61.0
Giegling et al. (2008)	Unnamed number of SIS items	144 attempters	60.5
Giegling et al. (2009)	Unnamed number of SIS items	111 attempters	58.6
Hall, Platt, and Hall (1999)	Unstructured interview	100 "severe" attempters	—
Hawton, Kingsbury, Steinhardt, James, and Fagg (1999)	1 item SIS	45 adolescents hospitalized for intentional overdose	83.3 multiple attempters; 70.4 first time attempters
Houston, Hawton, and Sheppard (2001)	Inquest notes	27 suicide decedents	13.0
Huan et al. (2004)	2-item SIS	100 attempters	26.0
Jeon et al. (2010)	Unpublished interview	208 attempters	36.0
Langhinrichsen-Rohling and Lamis (2008)	"Suicide interview"	39 youth attempters	83.0
Mann and Malone (1997)	8-item SIS	22 depressed attempters	—
Mann et al. (1992)	"First part" of SIS	53 attempters	66.7
Mann et al. (1996)	8-item SIS	49 attempters	—
Miranda et al. (2008)	Adolescent suicide interview	79 attempters	—
Nakagawa et al. (2009)	8-item SIS	151 depressed attempters	—
Nock et al. (2008)	WHO: CIDI	5,017 attempters	—
O'Donnell, Farmer, and Catalan (1996)	Unnamed number of SIS items; proximity to home	20 attempters who had jumped in front of a train	—
Pearson, Phillips, He, and Ji (2002)	Unpublished interview	147 female attempters	—
Raja and Azzoni (2004)	Unpublished questionnaire	80 attempters	48.8
Razin et al. (1991)	Unstructured interview	33 female adolescent attempters	97.0
Serretti et al. (2007)	Unnamed number of SIS items	167 attempters	61.0
Simon et al. (2001)	Unpublished interview	153 "nearly lethal" attempters	24.0
Soloff, Lynch, Kelly, Malone, and Mann (2000)	8-item SIS	92 attempters	—
Spokas, Wenzel, Brown, and Beck (2012)	1-item SIS	143 attempters	43.3
Stanley, Gameroff, Michalsen, and Mann (2001)	Unnamed number of SIS items	53 attempters	—
Suominen, Isometsa, Henriksson, Ostamo, and Lonnqvist (1997)	2-item SIS	114 attempters	44.0
Verkes et al. (1998)	8-item SIS	144 attempters	—
Westheide et al. (2008)	8-item SIS	29 depressed attempters	—
Weyrauch, Roy-Byrne, Katon, and Wilson (2001)	3-item SIS	99 attempters	—
Williams, Davidson, and Montgomery (1980)	Unpublished interview	350 attempters	40.4
Witte et al. (2008)	Unpublished interview	5,979 attempters	20.0
Wojnar et al. (2008) and Wojnar et al. (2009)	Unpublished interview	154 alcohol dependent attempters	62.0
Wong and Phillips (2009)	Unpublished interview	353 female attempters	—
Wyder and de Leo (2007)	Unpublished interview	112 attempters	26.0

Note. — = Author(s) did not dichotomize suicide attempts as impulsive/non-impulsive; SIS has been utilized using 1 item (premeditation), 2 items (also includes active preparation), 3 items (also includes suicide note), 7 items (also includes, isolation, timing, precautions against discovery, final acts in anticipation of death), and 8 items (also includes discussions of thoughts/plans with others). SIS = Suicide Intent Scale; BPD = borderline personality disorder; WHO: CIDI = World Health Organization Composite International Diagnostic Interview.

impulsive" (e.g., Brown et al., 1991) to less than 30 min (e.g., Wojnar et al., 2008), to less than 7 consecutive days prior to the attempt (e.g., Conner et al., 2006). Others consider the use of easily accessible means or locations close to home as evidence of impulsivity (e.g., Conwell et al., 2002; O'Donnell, Farmer, & Catalan, 1996). The use of close proximity to home is an indicator of an impulsive attempt is particularly problematic. O'Donnell and colleagues (1996) noted that the vast majority of attempts in their sample of 20 attempters who survived jumping in front of a train occurred at the station nearest to the attempter's home and concluded that these attempts were thus impulsive. Inherent in this viewpoint is the notion that planning a suicide attempt is positively correlated with distance from home, a point that lacks a clear rationale.

We contend that the very nature of suicidal behavior is such that little to none of it can truly be conceptualized as impulsive. Although people engage in suicidal behavior for many reasons, they likely boil down to finding a solution to a very serious problem (e.g., ending unbearable psychological pain; Jobes, 2006), which requires effortful thought. Thus, for suicidal behavior to be impulsive, it must occur in the absence of prior planning outside the moments and hours immediately preceding the behavior (i.e., consideration of methods and selecting the one to use). Even if the bulk of the planning occurs sporadically over an extended period long before the attempt and minimally or not at all immediately prior to the attempt, then the behavior should not be labeled impulsive. We are proposing a distinction that accounts for the intention of the behavior. To inflict serious enough self-harm to risk death, people must give very careful thought to what they are going to do and how they are going to do it. A counter-argument could be made that picking up a gun, pointing it at the body, and pulling the trigger does not require much planning and has a high probability of resulting in death without causing pain. In this sense, the boundary typically presented by overcoming pain and a potentially lengthy experience of pain is removed. However, the prospect of shooting oneself nonetheless involves overcoming the fear of death and massive bodily harm and, as such, we believe an individual could impulsively decide to pick up a gun, but would be unable to pull the trigger without enough rehearsal (mental and/or physical) and planning to diminish those fears.

Obstacles in Studies Examining Impulsivity of Attempts

Further complicating the conceptualization of impulsivity as it applies to suicidal behavior is a tendency for studies to refer to some attempts as impulsive regardless of previous ideation or planning. For instance, 51% of attempts in a study by Conner and colleagues (2006) were considered impulsive despite the fact that 58% of attempters indicated that they

had developed a suicide plan prior to their attempt. This finding could indicate that some individuals spend extensive periods of time planning but experience intermittent periods of ideation. In this scenario, an extensively planned attempt may be preceded by a period of mild or even no ideation. In this sense, the findings would be driven by the fact that individuals are asked to consider only the moments immediately prior to an attempt, without noting the possibility that their thoughts developed over time and were episodic in nature. Indeed, de Leo et al. (2005) found that, in a sample of 11,572 participants responding to a telephone survey, only 20% of individuals with a prior history of suicidal behavior experienced risk as a phenomenon that developed consistently and without break, increasing in severity from the beginning to the end. In fact, 57.1% reported that their "suicidal process" fluctuated irregularly prior to their attempt, and only 0.8% reported experiencing no previous suicidal ideation or plan prior to their attempt. Furthermore, in a sample of 105 consecutive patients admitted to an Austrian hospital after a suicide attempt, Deisenhammer and colleagues (2009) reported that the "suicidal process" lasted less than 10 min for nearly 50% of their sample. However, when assessing suicidal process, they asked participants about the "first current emergence of suicidal thoughts," thereby precluding measurement of thoughts that developed episodically over time rather than building on one another increasingly over time. These methodological concerns raise an issue regarding the precise meaning of an impulsive attempt: Research that measures impulsivity of attempts often overlooks extensive periods of planning and consideration that do not immediately precede the behavior itself by (a) asking participants to specifically consider the period immediately preceding the attempt and (b) framing the time period in a manner that might spuriously influence respondents' answers (e.g., asking how many *minutes* were spent planning, thereby priming the individual to think only about a short time frame).

If a person already understands the consequences of engaging in a behavior and the steps required to engage in that behavior, he or she should not need to repeat this process immediately prior to the behavior for it to be considered planned and non-impulsive. For example, emergency surgeons spend countless hours developing expertise at specific components of particular surgical procedures and considering the contextual factors that could affect their decision to utilize one approach versus other options. Yet, when surgeons are involved in an actual emergency surgical procedure, their decisions often appear automatic, as if their decision to choose a particular option reflected a momentary, and perhaps impulsive, decision rather than the result of a deliberate process involving practice, prior experiences, and thoughtful planning. Here again, the clinical implications must be noted, as unplanned behaviors may not be preventable, but behaviors planned long before their enactment may well be.

Measurement Issues in Studies Examining Impulsiveness of Specific Suicide Attempts

The inconsistent operationalizations of impulsive attempts indicate a potential problem in the measurement of the construct. Therefore, we turn our attention to ways in which the impulsiveness of attempts is measured. The Planning subscale of Beck's Suicide Intent Scale (SIS; Beck, 1990; Beck, Schuyler, & Herman, 1974) is the most commonly used measure for the assessment of impulsiveness of attempts; however, there is little consistency in the number and selection of items to be used. Whereas some work has used only a single item from the measure, other permutations utilized include 2-, 3-, 7-, and 8-item versions (e.g., Brown et al., 1991; O'Donnell et al., 1996; Verkes et al., 1998; Weyrauch, Roy-Byrne, Katon, & Wilson, 2001; Wong & Phillips, 2009; see Table 2 for a summary). Furthermore, not all studies using 8-item versions of the SIS utilize the same items (e.g., Baca-Garcia et al., 2005; Mann & Malone, 1997). To our knowledge, no studies have been conducted comparing scores on this measure of planning to other such measures, thereby leaving the validity of the subscale without empirical support. Indeed, the lack of other established measures of this construct represents a significant obstacle in suicide research.

The shortcomings of the SIS in the assessment of impulsivity of attempts are not limited to inconsistency in item selection. The content of some of the items calls into question the validity of the measure in the assessment of the impulsivity of attempts. For instance, an item assessing the degree to which individuals who attempt suicide do so in isolation from others is often included in the SIS Planning subscale, with less isolation conceptualized as indicating greater impulsivity. This item seems problematic because many highly lethal methods (e.g., jumping from high places) often involve attempting suicide near other people and, if an individual decides that a particular public space (e.g., the Golden Gate Bridge) offers the greatest chance at death and plans extensively to utilize that location, the public nature of the event does not seem relevant to the planning that went into the action itself.

Another item utilized in various forms of the Planning subscale of the SIS assesses the degree to which an individual who attempts suicide makes an effort to get help during or after the attempt, with greater help-seeking behavior conceptualized as indicating greater impulsiveness of attempt. Here again, the relevance of this item to the impulsivity of the attempt is unclear. In fact, an argument could be made that, in this scenario, the only impulsive activity is the effort to contact others and preserve life in the face of imminent death. In other words, if an individual thoroughly plans an attempt, enacts the planned method, but feels a rush of fear during or immediately after this process (and this sequence of events does occur regularly), prompting an effort to obtain life-saving assistance, the attempt itself would not be impulsive. Instead, the person's efforts to preserve his or her life

would constitute the only impulsive action because this behavior had not been planned—an ironic possibility indicating that “whims to live” may exist whereas “whims to die” do not. The possibility that individuals who make well-planned high-lethality attempts lament their decision and “flinch” is supported by the stories of survivors who jump from the Golden Gate Bridge, who have reported that immediately after jumping, they felt a deep sense of regret regarding their actions but were obviously incapable of reversing their decision or contacting help (Bourke, Shapiro, Steel, & Wolfson, 2006).

Other items included in various forms of the Planning subscale assess whether individuals left a suicide note, took specific actions in anticipation of their death, or communicated to others about their desire to attempt suicide. Each of these items has significant problems with respect to the measurement of impulsivity as well. With respect to suicide notes, research has indicated that only 20% to 35% of suicide decedents leave notes (e.g., Shioiri et al., 2005). Assuming that a lack of a note indicates impulsivity is problematic because it increases the odds of an attempt being considered impulsive by requiring that a relatively rare behavior (note-leaving) occur for an attempt to be considered non-impulsive. With respect to taking preparatory actions, the item itself focuses purely on interpersonal actions (e.g., making changes to will, taking out insurance) that may not be relevant to some individuals (e.g., individuals without a will or the assets or the legal representation needed to develop one). Furthermore, the item overlooks the fact that individuals attempting suicide typically feel isolated from others and thus may be disinclined to take actions directly related to other people's well-being (although the construct of perceived burdensomeness entails a belief that the individual's death will be worth more than his or her life, implying an effort to help others through lethal self-harm; Joiner, 2005). With respect to overt communication, it is simply unclear conceptually how an individual's decision to discuss a thought with another person reflects the degree to which that thought has been developed over time and considered within the context of its short- and long-term affects on the world. Of course, overt communication days prior to an attempt would clearly indicate significant forethought and thus would contradict the notion of an impulsive attempt. Tellingly, Robins (1981) found that 70% of suicide decedents engaged in such communications in the days before their death, usually more than once.

Perhaps the most important limitation to the items in the various forms of the Planning subscale of the SIS is the item that most directly overlaps with other measures used to assess impulsiveness of attempts. Specifically, one item asks how much time was spent considering attempting suicide prior to the attempt, with the available answers being “impulsive; no premeditation,” “considered for <1 hr,” “considered for <1 day,” and “considered for >1 day.” Two primary issues render this item less valuable than it may first appear. First,

the response scale appears to exclude the possibility that an individual extensively considered and planned an attempt long before engaging in the behavior but did not think about it extensively immediately preceding the attempt. For instance, if an individual plans a suicide attempt with great detail during an episode of elevated suicide risk, recovers from that episode with or without attempting, and then attempts suicide in the early portion of a later episode in a manner entirely consistent with the earlier plan, would this be impulsive or simply reflect the enactment of a well thought-out plan? Second, by framing the answers such that three of the four response options involve less than 24 hr, the measure may push respondents to think about premeditation as something that happens only during the moments immediately preceding the behavior. This framework does not offer the possibility that premeditation follows an episodic course, increasing and decreasing (or even ceasing entirely) across different periods of time but still building on itself with each progressive episode of contemplation. Importantly, some studies (e.g., O'Donnell et al., 1996) have provided an even shorter time frame with this item, with answers restricted to 0 ("none"), 1 ("less than 3 hr"), and 2 ("more than 3 hr"), further priming individuals to conceptualize planning as something that occurs only in the moments directly leading up to an attempt (another ironic possibility, as non-impulsive attempts would thus still be considered events that were borne of minimal forethought).

Proposed Alternative Model of the Relationship Between Impulsivity and Suicidal Behavior

Trait Impulsivity

In contrast to models that conceptualize suicidal behavior as frequently impulsive and that view the relationship between trait impulsivity and suicidal behavior as direct (Figure 1a), we propose that trait impulsivity is best regarded as one of many distal risk factors for suicidal behavior (see Figure 1b). This proposition is presented through the lens of the interpersonal-psychological theory of suicidal behavior (IPTS; Joiner, 2005). The IPTS proposes that, in addition to desiring death by suicide and/or non-lethal suicidal behavior, an individual must acquire the capability for suicide—defined as habituation both to physiological pain and to the fear of death—through repeated exposure to painful and provocative events before he or she can engage in lethal or near-lethal suicidal behavior. In this sense, the capacity to engage in suicidal behavior does not typically develop rapidly but rather reflects a series of encounters with experiences that alter an individual's response to pain and impending death, with repeated exposures resulting in a dampening of the initial fear response (see A. R. Smith et al., 2012 for evidence that heritability of the acquired capability is approximately 65%).

Initial support for the construct validity of the acquired capability for suicide was reported in studies that did not directly consider the IPTS model. In a series of studies comparing the pain tolerance of individuals who were hospitalized in response to a suicide attempt and individuals admitted to the same emergency room due to accidental injury, Orbach and colleagues (1996) and Orbach, Mikulincer, King, Cohen, and Stein (1997) reported that attempters exhibited higher pain tolerance than did individuals admitted due to accidental injury and that individuals with multiple suicide attempts exhibited greater pain tolerance than did individuals with zero or one prior attempt. Such findings are consistent with the notion that intentionally inflicting harm on oneself has a greater impact on pain tolerance than does accidental injury (thereby providing initial support for the notion that individuals can gradually overcome the fear of discomfort and death through deliberate practice) and that a longer history of self-inflicted injury is more robustly related to increased pain tolerance (providing initial support for the notion that this process unfolds through habituation). Similarly, Nock and Prinstein (2005) reported that increased frequency of NSSI is associated with pain analgesia during NSSI episodes (evidence for habituation), and Nock et al. (2006) reported that pain analgesia during NSSI episodes is associated with a greater likelihood of having made a suicide attempt (evidence for the importance of pain tolerance in the capacity for suicidal behavior). None of these studies utilized longitudinal data demonstrating increases in pain tolerance following repeated engagement in painful and/or provocative experiences, leaving open the possibility that elevated levels of pain tolerance facilitate severe self-harming behaviors entirely different from any habituation process. As such, the research base on this point is not definitive.

Efforts to measure the acquired capability directly have centered on the Acquired Capability for Suicide Scale (ACSS; Bender, Gordon, Bresin, & Joiner, 2011). Using this measure, researchers have reported that men report higher mean levels of the acquired capability than do females and military personnel report higher mean levels of the acquired capability than do civilians (including civilians with multiple lifetime suicide attempts; Bryan, Morrow, Anestis, & Joiner, 2010; Van Orden, Witte, Gordon, Bender, & Joiner, 2008). Further supporting the construct validity of the acquired capability, men engage in significantly fewer non-lethal suicide attempts for every lethal attempt than do women, and military personnel engage in significantly fewer non-lethal suicide attempts for every lethal attempt than do civilians, even when considering attempts that do not involve self-inflicted gunshot wounds (Anestis & Bryan, 2013). Such findings indicate that certain individuals, potentially due to their life experiences (e.g., basic training, physical aggression, NSSI) in combination with a genetic predisposition toward greater pain tolerance and diminished fear, are more able to engage in lethal suicidal behavior than are others, who might need to repeatedly engage in low lethality means

before developing the capacity to implement a method more likely to result in death or to utilize a lower lethality means in a manner more likely to result in death.

Painful and provocative events represent a fairly broad range of encounters; however, not all impactful life experiences can be considered painful or provocative. Painful and provocative events are understood to involve the experience of physiological pain, bodily harm (or the threat of bodily harm), the threat of death, witnessing the injury or death of others (e.g., witnessing others injured in combat, working in an emergency room setting), or some combination of these factors (e.g., Joiner, 2005). Furthermore, some evidence suggests that mental rehearsal of painful and provocative events (e.g., Post-traumatic Stress Disorder [PTSD] re-experiencing symptoms, daydreaming about death) are associated with elevations in the acquired capability, providing preliminary support for the possibility that cognitions could affect an individual's capacity for lethal self-harm (e.g., Anestis, Tull, Bagge, & Gratz, 2012; Bryan & Anestis, 2011; Selby, Anestis, & Joiner, 2007). In this sense, the raw number of painful and provocative experiences might not explain the entirety of the acquired capability; however, studies examining the acquired capability have demonstrated that it is associated with a greater lifetime exposure to painful and provocative events, including previous suicide attempts and NSSI (e.g., P. N. Smith, Cukrowicz, Poindexter, Hobson, & Cohen, 2010; Van Orden et al., 2008). Furthermore, studies show that the relationship between suicidal desire and suicidal behavior is strongest among individuals with elevated acquired capability (e.g., Anestis & Joiner, 2011; Joiner et al., 2009), and multiple studies have demonstrated a robust and statistically significant association between lifetime number of suicide attempts and lifetime number of painful and provocative experiences (e.g., Van Orden et al., 2008). Here again, directionality is not definitive, as no study to date has demonstrated that the acquired capability increases over time in response to painful and provocative experiences; however, extant evidence is thus far consistent with the expectations of the theory.

The IPTS proposes that impulsive individuals become vulnerable to suicidal behavior over time due to the nature of the experiences they tend to encounter relative to the life experiences of non-impulsive individuals (Joiner, 2005). Furthermore, given empirical evidence that the relationship between trait impulsivity and suicidal behavior or death by suicide decreases with age (e.g., Dumais et al., 2005), empirical findings may be more supportive of this model than alternatives in that, over time, non-impulsive individuals could eventually accumulate enough painful and/or provocative experiences to acquire the capacity for suicide whereas, in younger individuals, a tendency toward impulsive behavior may be more important to encounter sufficient pain and/or provocation. In this context, at the ages at which impulsivity is highest (i.e., youth), rates of severe suicidal behavior (e.g., death) are low—a fact that is not consistent with a proximal,

direct role of impulsivity in serious suicidal behavior. Our alternative perspective points, rather, toward the cumulative effect of an impulsive lifestyle on suicide risk, noting that only youths who have experienced sufficiently painful and/or provocative events will have acquired sufficient capability for suicide to make a suicide attempt. In adults, on the other hand, the opportunities for non-impulsive individuals to engage in sufficient painful and/or provocative experiences will have increased over time, thereby leading to a decreased association between impulsivity and suicidal behavior.

Empirical Support for the Proposed Model

For a study to test the veracity of direct versus distal risk factor models adequately, a number of steps must be taken. With respect to trait impulsivity, mediation analyses must be utilized that consider not only the relationship between impulsivity and suicidal behavior but also the potential explanatory role of environmental experiences (e.g., painful and/or provocative experiences) in that relationship. Such data should be longitudinal to determine whether trait impulsivity prompts increases in painful and/or provocative experiences, which in turn predict future suicidal behavior. If impulsivity truly is a proximal risk factor for suicidal behavior, the cumulative experiences of an impulsive individual's life should not reduce the relationship between impulsivity and suicidal behavior to a negligible effect.

Research that tested the potential distal risk factor model of trait impulsivity as it relates to suicidal behavior has generally focused on the UPPS-P Impulsive Behavior Scale (UPPS-P; Cyders et al., 2007; Whiteside & Lynam, 2001). For instance, in a sample comprised of 2,011 U.S. military personnel, 1,296 undergraduates, and 399 high school students, Klonsky and May (2010) reported that negative urgency (the tendency to act rashly in an effort to reduce the intensity of negative affect; $d = .41$) and lack of premeditation (the tendency to act quickly without planning; $d = .29$) differentiated attempters from non-suicidal controls ($ds = .09-.19$ for lack of perseverance and sensation seeking). Between-group differences were of a smaller magnitude when comparing individuals with suicide attempts from individuals with ideation but no attempts ($ds = -.05-.26$). Furthermore, in a sample of nearly 500 patients in an outpatient community mental health clinic, Anestis and Joiner (2011) reported a four-way interaction of negative urgency and the three components of the IPTS (perceived burdensomeness, thwarted belongingness, acquired capability) in the prediction of lifetime number of suicide attempts, with the strength of the relationship between the IPTS constructs (elevated IPTS variables) and suicidal behavior increasing with negative urgency. Neither of these studies, however, utilized mediation analyses to test models that propose that suicidal behavior is frequently impulsive.

The relevance of this point is highlighted by further analyses of the data from Anestis and Joiner (2011), which revealed

that the positive associations between negative urgency and both the acquired capability and lifetime number of suicide attempts were mediated by participants' lifetime number of painful and/or provocative experiences (Anestis, Fink, et al., 2012). Prior work has demonstrated a positive association between negative urgency and desire for death but a negative association between negative urgency and the acquired capability (as measured through the ACSS and behaviorally indexed pain tolerance) in non-clinical samples (Anestis, Bagge, Tull, & Joiner, 2011). In other words, individuals with elevated levels of negative urgency appear, on average, to exhibit higher desire for death but may be less capable of acting on such desire due to an inability to tolerate the physiological and emotional discomfort associated with suicidal behavior. These follow-up analyses thus appear to offer an element of clarity: In clinical samples, people with higher negative urgency may be at risk for suicidal behavior not because of their impulsivity but rather because of the types of behaviors that impulsive individuals in clinical samples tend to engage in over time. In other words, in non-clinical samples, individuals with elevated negative urgency might engage in dysregulated and unhealthy behaviors that are neither painful nor provocative in a manner likely to directly affect their acquired capability (e.g., binge eating, impulsive shopping). In clinical samples, however, individuals with higher negative urgency might be at greater risk for engaging in painful and/or provocative behaviors (e.g., NSSI, physical aggression) that tend to result in elevations in the acquired capability. The difference between non-clinical and clinical samples would thus be the behaviors engaged in by impulsive individuals, not impulsivity itself, with the behaviors utilized by individuals in clinical samples more likely to result in enhanced pain tolerance and a reduced fear of death and bodily harm. Such findings directly support our proposed alternative model and are buffered by the findings of Bender et al. (2011), who also found that painful and provocative events mediated the relationship between impulsivity (BIS and UPPS) and acquired capability. In each case, bootstrapping analyses supported full mediation.

An important consideration, however, is that in each case, the mediation analyses were cross-sectional. As such, assumptions about temporal relationships and causal influences extend beyond the scope of the data. In this sense, although such findings represent substantial obstacles for models arguing a direct role for trait impulsivity in suicidal behavior, they provide only preliminary support for this alternative view of the nature of suicidal behavior. An alternative interpretation might be that some individuals are innately more capable of suicidal behavior and that both suicide attempts and other dysregulated behaviors stem from the same fearlessness and pain tolerance. Although this interpretation does not emphasize the need for the capability to be developed over time, it remains in line with the notion that suicidal behavior is fear-provoking and involves either pain or the threat of severe bodily harm. As such, the possibility

that suicidal behavior is distinct from behaviors engaged in after a suddenly emerging thought or emotion (e.g., NSSI) remains plausible and the centrality of impulsivity in suicidal behavior remains in question.

Proposed Model of Impulsiveness of Specific Suicide Attempts

We believe that people are motivated to preserve life and that the will to live does not exist alongside an impulse for death. Furthermore, we believe that individuals who develop suicidal desire contemplate, plan, and then eventually engage in suicidal behavior as a culmination of a process that requires planning and resolve and does not reflect a sudden, unforeseeable, emotion-laden impulse. Although the degree of planning varies across cases, we believe the floor of this range is higher than that considered in models that conceptualize suicidal behavior as impulsive and that the occurrence of attempts in the absence of substantial planning remains far below that predicted by such models. Furthermore, although the amount of time that elapses between a decision to enact self-harm and the actual behavior may be brief, the behavior is not necessarily impulsive as significant thought about suicide likely occurred in the hours, days, and weeks prior to the final decision. The fear and discomfort associated with suicide attempts require individuals to experience at least a momentary increase in negative affect and physiological discomfort to obtain a goal (death). Given that, for many individuals who are motivated to attempt suicide, a primary motivation for impulsive behaviors is an immediate escape from negative affect (e.g., Nock & Prinstein, 2005), suicidal behavior appears to require not only a delay in obtaining that outcome but in fact a momentary increase in the experience (negative affect) that the individual seeks to avoid.

We suggest that impulsive individuals engage in suicidal behavior at an elevated rate but that they do not do so impulsively. The nature of suicide is inconsistent with the motives that drive many of their impulsive actions, and the fear associated with facing imminent death serves as too great of an obstacle for an individual to overcome without significant thought and planning. One measure was recently developed in an effort to assess episodic planning of suicidal behavior (Measure of Episodic Planning of Suicide [MEPOS]; Anestis, Pennings, & Williams, 2014). The scale asks how long an individual planned his or her most recent attempt (with thoughts of using the specific method ultimately chosen for that attempt), even if periods of time passed between thoughts. The authors reported that, in a sample of 50 individuals with at least one prior attempt, no individuals whose most recent attempt involved clear intent to die reported engaging in suicidal behavior without any planning. Furthermore, among the full sample, the average time spent planning was between several days and several weeks and, for individuals whose most recent attempt involved clear intent to die, the average time spent planning was between several weeks and several

months. Despite these promising early results, more work is needed to test this conceptualization of suicidal behavior. That being said, we believe that acknowledging this perspective as a viable alternative to current conceptualizations that emphasize impulsivity will lead to future studies better able to address current ambiguities.

Future Directions

As scientists move toward a better understanding of the relationship between impulsivity and suicide, a number of steps can be taken to enhance the insight provided by the research findings. First, with respect to trait impulsivity, although we have already noted that any examination of traits will be unable to evaluate models proposing that suicidal behavior is frequently impulsive, greater methodological rigor can nonetheless result in more stringent theory-driven tests likely to reduce the amount of inconsistency across studies. Specifically, researchers should include covariates that assess the degree to which the experiences typically encountered by impulsive individuals might account for any significant relationship. Such methodological rigor would allow for a clearer test of the degree to which impulsivity exhibits a direct relationship with suicidal behavior. In addition, the field would benefit from a clearer delineation of the role of planning in impulsive behavior. Indeed, we anticipate that some readers may disagree with our contention that planning is incompatible with impulsivity (or at least certain subcomponents of impulsivity). Greater conceptual clarity would thus afford a greater opportunity for consensus building with respect to the role of impulsivity in suicidal behavior.

Changes in how trait impulsivity is studied will not completely address the issues mentioned in this review. Indeed, we believe an emphasis on trait impulsivity would be unlikely to yield definitive results either way. The study of impulsivity of attempts also needs significant adjustments. Specifically, new measures and/or methodologies that are more sensitive to the possibility that planning occurs in a non-linear, episodic manner need to be developed and validated. Such measures should be capable of assessing whether people have considered suicidal behavior to any degree in the past and, if so, when those thoughts occurred, what those thoughts entailed, and what changed across time prior to engagement in an attempt (e.g., diminishing fear of death, increased tolerance of physiological pain). The development of such measures would uncover the course of risk and the path toward deciding to enact lethal self-harm.

In summary, the evidence for models positing that suicidal behavior is frequently impulsive is problematic. Indeed, the mean effect size for the relationship between trait impulsivity and suicidal behavior is small in magnitude. Furthermore, work purporting to measure impulsivity of attempts has yielded valuable clinical information, but methodological obstacles (e.g., failure to assess for episodic planning) have prevented such studies from accurately assessing the construct.

Further work is needed to enhance confidence in our proposed model; however, we believe that an emerging line of research supports the view that people very rarely, or perhaps even never, attempt suicide without substantial forethought and planning.

Authors' Note

The views in this article are those of the authors and do not necessarily represent the official policy or position of the Department of Veterans Affairs, the Department of Defense, or the United States Government.

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Supplementary Material

The online supplementary appendix is available at <http://psp.sagepub.com/supplemental>.

Notes

1. We also ran additional meta-analyses in which (1) a grand mean effect was calculated for each effect and (2) multiple effects were all entered separately from the same sample. In each case, results mirrored the findings of our meta-analysis examining only a single representative effect from each sample (Hedges $g = .31-.34$).
2. To ensure that results were not spuriously impacted by differences in the constructs assessed in self-report versus behavioral measures of impulsivity, we ran an additional set of exploratory meta-analyses in which (1) only a single self-report effect was considered within each sample or (2) only a single behavioral effect was measured within each sample. Results from both samples indicated small effect sizes (Hedges $g = .33$, $k = 71$ for self-report; Hedges $g = .40$, $k = 6$ for behavioral measures). These results slightly favor behavioral measures; however, the small number of samples with behavioral data renders such results difficult to interpret.
3. To examine whether the strength of the relationship between trait impulsivity and suicidal behavior is dependent on other variables, we ran a series of exploratory analyses examining sex, age, and assessment type as potential moderators. Results from meta-regressions indicated that neither age ($z = -1.01$;

$p = .31$) nor the percentage of the sample that is male ($z = -.01$; $p = .98$) affects the strength of the relationship between trait impulsivity and suicidal behavior. Similarly, analyses considering measurement type (self-report vs. other) revealed no significant moderation effect.

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- References marked with an asterisk indicate studies utilized in meta-analysis but not referenced within the text.
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A Virtual Hope Box Smartphone App as an Accessory to Therapy: Proof-of-Concept in a Clinical Sample of Veterans

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A “Hope Box” is a therapeutic tool employed by clinicians with patients who are having difficulty coping with negative thoughts and stress, including patients who may be at risk of suicide or nonsuicidal self-harm. We conducted a proof-of-concept test of a “Virtual” Hope Box (VHB)—a smartphone app that delivers patient-tailored coping tools. Compared with a conventional hope box integrated into VA behavioral health treatment, high-risk patients and their clinicians used the VHB more regularly and found the VHB beneficial, useful, easy to set up, and said they were likely to use the VHB in the future and recommend the VHB to peers.

BACKGROUND

Military Suicides

Since the beginning of combat operations in Iraq (Operation Iraqi Freedom, OIF) and

Afghanistan (Operation Enduring Freedom, OEF), an upward trend of suicidal behavior among service members has emerged (Luxton et al., 2011). Psychologic disorders, including major depressive disorder and posttraumatic stress disorder (PTSD), have been widely related to suicidal behavior (Luxton et al., 2011; Oldham, 2008) as have deployments to war zones and exposure to combat (Fontana & Rosenheck, 1994; Selby et al., 2010). Traumatic brain injuries, often resulting from blast injuries occurring

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during deployment, are also of increasing concern for suicidal behavior (Brenner, Homaifar, Adler, Wolfman, & Kemp, 2009).

Treatment for Suicidality

Cognitive-behavioral-based therapeutic approaches, including cognitive therapy (CT; Beck, 2005) and dialectical behavior therapy (DBT; Linehan, 1993; Linehan, Comtois, Brown, Heard, & Wagner, 2006), have demonstrated utility in identifying and managing suicidal thoughts and related behaviors (Brenner et al., 2009; Brown et al., 2005). CT has been applied to the treatment of suicidal behavior by teaching patients cognitive and behavioral techniques designed to provide coping strategies for when they are experiencing suicidal ideation (Berk, Henriques, Warman, Brown, & Beck, 2004; Brown, Henriques, Ratto, & Beck, 2002; Brown et al., 2005). DBT therapeutic components include behavioral and problem-solving strategies and distress tolerance skills, as well as acceptance-based strategies.

Identifying Reasons for Living—The Hope Box

Improving emotional regulation and distress tolerance during episodes of significant distress is an important component of CT and DBT for suicidal patients. During such periods, suicidal patients are able to cite reasons for wanting to die, and often find it challenging to access reasons for living (Wenzel, Brown, & Beck, 2009). Through the identification and affirmation of reasons for living (e.g., children, pets, loved ones), suicidal patients are able to mitigate suicidal thoughts. Although skilled clinicians are able to elicit reasons for living from patients experiencing suicidal thoughts during treatment sessions, patients may find it difficult to recall reasons for living outside of treatment. To support face-to-face therapy away from the clinic, the CT or DBT clinician often will implement a physical “hope kit” or “hope box” with the

patient (Berk, Grosjean, & Warnick, 2009; Wenzel et al., 2009). This therapeutic intervention is not a standalone tool, but rather an integral component of CT and DBT, which has been shown to reduce suicidal thoughts and behaviors (Brown et al., 2005; Kliem, Kroger, & Kosfelder, 2010). A hope box is a physical representation of the patient’s reasons for living that the patient creates and customizes with provider guidance. Specific items included in an individual’s hope box necessarily vary from patient to patient but typically encompass a core of essential elements: reminders of previous successes, positive life experiences, existing coping resources, and current reasons for living (Ghahramanlou-Holloway, Cox, & Greene, 2012). For example, a patient might store in a designated hope box items such as a favorite music CD, a worry stone, family photographs, letters, or reminders of accomplishments, and future aspirations. The purpose of the hope box is to provide a means of recalling their reasons for living during periods of significant distress and discouragement when they may be susceptible to suicidal thinking. Certain elements of the hope box can also serve as resources to use for distraction with the goal of bolstering stress tolerance skills. The behavioral health provider supports the patient in constructing and customizing a hope box and encourages the patient to access it as needed to mitigate feelings of hopelessness.

“Virtual” Hope Box

While the conventional hope box has shown utility in clinical practice, it has limitations. A collection of personalized items in (for example) a shoe box or bag can be physically unwieldy and inconvenient and often not easily available or privately accessible when a patient needs it most during crises. Mobile devices, such as smartphones, are carried regularly by many service members (Bush, Fullerton, Crumpton, Metzger-Abamukong, & Fantelli, 2012), and the adoption of handheld technologies for use

in psychologic health care is rapidly on the rise (Ly, Carlbring, & Andersson, 2012). Elements of behavioral health care delivered via a patient's personal smartphone can expand the reach of traditional therapeutic interventions beyond the clinic. This is especially critical for individuals who can be emotionally sensitive and/or engaged in suicidal thinking because crises are most likely to emerge in the absence of health care providers. To improve portability and availability during distress, we developed a "Virtual Hope Box" (VHB) for service members and veterans, expanding the reach of the hope box modality to a smartphone app. In this article, we present our findings from a proof-of-concept evaluation of the prototype VHB in a large regional Veterans Administration (VA) behavioral health clinic. Our research questions were: (1) Can a smartphone app be developed that contains the essential elements of a hope box and associated elements of CT/DBT in a package acceptable to and usable by military service members and veterans? and (2) Is the VHB app as usable, acceptable, convenient, and ostensibly useful as a conventional hope box to a clinical sample of service veterans at high risk of self-harm and suicide, and their providers?

METHODS

Our study comprised two phases: (1) initial VHB design and development and (2) clinical field testing. All study procedures were approved by the local VA internal review board and the Army Human Research Protection Office.

Prototype Development

VHB concept, design, development, and initial testing were conducted by study team members from the Department of Defense National Center for Telehealth and Technology (T2; National Center for Telehealth & Technology, 2014). We first determined the content and functionality of the

prototype VHB by combining evidence from the literature with input from subject matter experts and mobile-technology specialists. We next translated our VHB design specifications into a working prototype application. During our minimal risk, "agile" development process (The Agile Alliance, 2014), we performed iterative and incremental usability tests of developing features and components. Lastly, we conducted formal in-depth usability testing of the prototype with 10 active duty soldiers drawn from a large military installation and made final changes to the VHB based on their feedback.

Clinical Field Testing

Setting and Sample. Clinical proof-of-concept testing was conducted by clinicians in the DBT program at a large VA medical center. At least 50 DBT patients are exposed to a conventional hope box (CHB) intervention per year at the clinic. Study participants were 18 high-risk-of-self-harm veterans enrolled in DBT who had borderline personality disorder, bipolar disorder, treatment refractory depression, or PTSD. Additional study eligibility criteria included (1) ownership and regular use of a personal iPhone or Android phone and (2) identified by their clinicians as clinically suitable for hope box utilization as part of treatment. Participating clinicians were six clinical social workers and one clinical psychologist, with a mean 7.9 years (range 1–16 years) in practice.

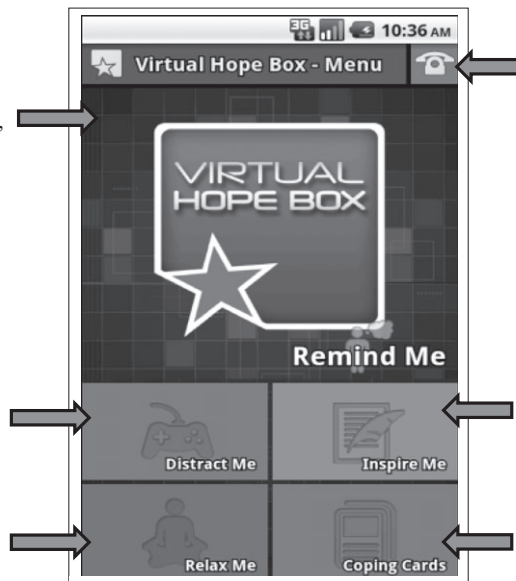
Design. Our study was primarily descriptive at the case level, within which we employed a cross-over, counterbalanced design, in which all selected patients tested both personalized CHBs and VHBs consecutively, with order of use randomized to a defined outcome of equal cell sizes.

Intervention—VHB. The prototype VHB smartphone app tested in this study contained six primary sections designed to collectively provide support, comfort, distraction, or relaxation by using audio, video, pictures, games, mindfulness exercises,

Remind Me focused the user on cherished memories and digital media reminders of the user's worth (photos, videos, recorded messages, music) selected from existing files on the phone or added using the phone audiovisual capabilities.

Distract Me offered distraction tools for the user, an activity planner, and puzzles/word search games built from existing user content.

Relax Me featured relaxation and stress-coping tools, such as diaphragmatic breathing coaching and progressive muscle relaxation.



Support Contacts allowed the users to insert links to chosen support contacts and hotline resources

Inspire Me: Preloaded inspirational quotes could be supplemented or replaced by favorite personal quotations, family aphorisms, biblical phrases, etc. that the user found to be personally comforting, supportive, or inspiring.

Coping Cards highlighted adaptive thoughts and behaviors when in crisis or managing problematic core beliefs.

Figure 1. Annotated schematic of VHB prototype screen layout and primary section content.

messages, inspirational quotes, coping statements, and other media content (see Figure 1). The intent was for a provider to work with a patient to populate the sections according to the patient's individual needs.

Procedures. Patients were referred by individual DBT providers. Each eligible and willing participant was consented and enrolled by the study research coordinator and then randomized to receive either the CHB or VHB first. For the CHB condition, participants met with their clinician for an instruction session in which the clinician guided them through the principles and methods of hope box construction. Patients were asked to begin to create their personal CHB. At their next scheduled clinic sessions, CHBs were reviewed by the clinicians and guidance for further development and use was offered. Patients used the CHB for 6 to 8 weeks and then returned to the clinic to evaluate their experience with the CHB. Procedures for the VHB condition were similar. The VHB app was introduced and downloaded to the patients'

smartphones, with instruction on hope box construction. Patients personalized their VHB at home and in the clinic with clinician guidance, used the app for 6 to 8 weeks with more personalization made by the patients if they chose, and then returned to the clinic to participate in an evaluation.

Measures

Pre-Testing (baseline). Immediately following enrollment in the clinic, patients completed a personal and service demographics background questionnaire followed by a technology use questionnaire, which indexed familiarity, experience, and proficiency with personal technology, computers, the Internet, and cellphone/smartphone/apps.

Testing (VHB-CHB use away from the clinic). During each of the home testing periods of the VHB and CHB, respectively, patients were contacted by phone every 2 weeks by study staff. Using a semistructured interview, staff inquired about fre-

quency of CHB or VHB use during the prior 2 weeks, how it was actually used (i.e., which components), purpose of use, and whether that goal was achieved.

Post-Testing. After testing each of the two types of hope boxes, patients returned to the clinic to evaluate that version by self-report questionnaire. Each patient was systematically queried on the layout, interface, display/appearance, and each key component of the respective hope boxes for (1) frequency of use; (2) ease of use; (3) functionality; (4) understandability; (5) overall impression; (6) recommendations for future modifications; (7) likelihood to use again; and (8) error and technical difficulties (VHB only), employing a combination of Likert-type rating scales (e.g., 1—*very difficult*, 2—*somewhat difficult*, “3—*neither difficult nor easy*, 4—*somewhat easy*, and 5—*very easy*) and open-ended questions. An additional post-testing evaluation asked patients to compare the CHB with the VHB for preferences.

Electronic Usage Logs. Detailed use of the VHB was recorded internally on patient smartphones as usage logs, which were downloaded during the post-test evaluation phase and transmitted to the T2 group in a manner that did not disclose personally identifying information.

Patient Debrief. At the end of data collection, we conducted semistructured interviews with study patients asking them to compare their experiences using the CHB and the VHB (e.g., Did patients have a preference? What were barriers or facilitators regarding one in comparison with the other?).

Clinician Debrief. Finally, we conducted semistructured interviews with participating clinicians asking them about their experiences and perceptions using the CHB and the VHB with their patients as part of clinical practice.

Analysis. We analyzed objective electronic VHB usage logs from patient smartphones and subjective quantitative survey data from Likert-type scales, and qualitative data from open-ended survey questions and

interviews. Our analyses were primarily descriptive.

RESULTS

Sample

We approached 23 DBT clinic patients to participate. Of 20 eligible candidates, one declined to participate and one dropped out (moved away) after enrollment.

Our final sample included 18 patients with a mean age of 41.4 years (range 28–56, $DS = 8.6$) and a broad array of educational levels (GED/HD = 2, some college = 8, AA/Tech degree = 4, bachelor's degree = 4). Fourteen patients identified as White/Caucasian, 10 patients were female, and 8 were male. Patients were veterans of Air Force ($n = 3$), Army ($n = 8$), Marine Corps ($n = 1$), Navy ($n = 5$), and Coast Guard ($n = 1$). All but one patient (O1–O5) were formerly of enlisted rank (E1–E4 $n = 11$, E5–E9 $n = 6$). Nine had no history of military deployment to a war zone; the remainder had served variously in Operation Desert Storm, Operation Iraqi Freedom, Operation Enduring Freedom (Afghanistan), Vietnam, and other locations. Diagnoses at the time of enrollment encompassed combinations of PTSD, depression, bipolar disorder, borderline personality disorder, and mood disorder, some with co-occurring alcohol or opioid dependency. Participants judged themselves to be relatively experienced smartphone users, with nearly 80% using a smartphone for six or more hours a week. Type of personal phone used for the VHB was divided evenly between iPhone and Android.

Electronic VHB Usage Logs

Electronic logs received from patients' phones were available for 17 of the 18 patients. Across 17 patients, VHB was used on an average of one or more times per day on more than 13 separate days away from

the clinic—ranging from a minimum of 4 different days to as many as 43 different days. Duration of VHB use amounted to an average of more than 1 hour of total individual use for 14 of 17 patients. The remaining three patients showed exceptional commitment to daily use of the VHB, averaging 26 total hours of VHB use. Almost all patients used the VHB either intermittently or regularly across several weeks away from the clinic (88% of patients >2 weeks, 76% >4 weeks, 59% >6 weeks). The most frequently used sections of the VHB over all patients were “Distract Me” (38% of total “hits”), “Remind Me” (28%), and “Inspire Me” (13%). After the initial VHB setup in the clinic, patients added a variety of personalized media to their VHBs to fit their needs over time, as was encouraged. Substantial numbers of photographs (483 among 17 patients), inspirational quotes (328), music files (184), and, to a lesser extent, contacts (74) were added by patients to their VHBs away from the clinic. Forty new coping cards also were created by patients after initial clinic setup with the provider.

Patient Self-Assessments

Figure 2 compares assessments of key postuse measures of the VHB and CHB. Although both VHB and CHB were popular across the board, patients used the VHB more and rated it more highly than the CHB. Furthermore, half the patients ($n = 9$) said they would prefer the VHB over the CHB for future use, while only four of the 18 preferred the CHB. Interestingly, the remaining four said they would choose to use both the VHB and CHB in combination (one patient had no preference). When asked which type of hope box they would recommend to a fellow veteran in need, none of the patients said they would recommend the CHB alone, while 7 (39%) would recommend the VHB alone. The majority ($n = 11$) would recommend the VHB and CHB in combination.

Patient Feedback about VHB

Answers to open-ended general questions about the VHB were voluminous and almost unanimously positive: Patients who

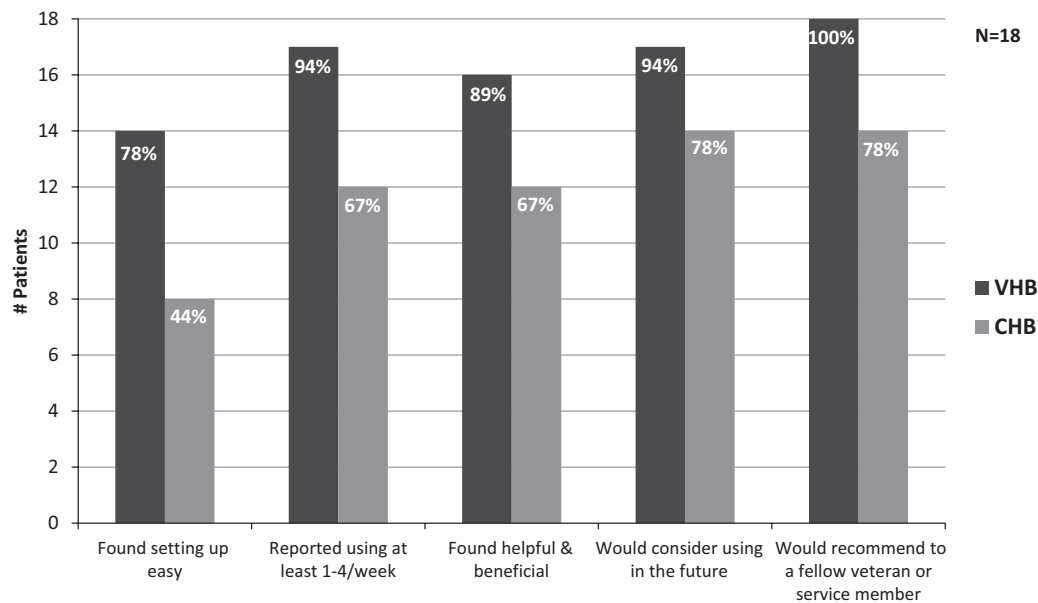


Figure 2. Post-use usability questionnaire patient self-report.

preferred the VHB commented that they found the VHB “more convenient,” “more private,” “more portable,” “more accessible and easier to put together,” “more options,” “easier to remember to use,” “with me all the time,” and “more effective.” The four patients who preferred the CHB said they found it “more tangible,” “more personalized,” “more options,” and “want to be able to physically touch.” Additional comments included:

- “Helped numb away from distress”;
- “[Inspirational] Quotes helped turn a negative self-image into a positive self-talk”;
- “Keeps me grounded, there are options at what to look at, made it very personal”;
- “Helped manage distress at work when having memory issues”;
- “Controlled breathing helps me to relax. Pictures remind me that I have a reason to stay on the earth”;
- “[Inspirational] Quotes keep me thinking about who I am and gave me positive messages”;
- “Coping cards reminded me that it is okay to not be perfect”;
- “Helped to soothe when thought about cutting”;
- “Was distracting until felt better”;
- “Helped manage PTSD symptoms like hyper-vigilance”;
- “Wouldn’t want to get rid of it”;
- “It is soothing and prevents me from doing things like yelling at people in line, used box instead to distract self.”

Clinician Feedback

Participating providers were also highly complementary about their experiences using the VHB in their clinical practices. The following were among many illustrative provider statements of VHB as an accessory to therapy.

- “I find the VHB to be a great tool for completing, working, collaborat-

ing with a client, actively, in session. When I find that the focus of a session turns to themes of I can’t do anything; nothing will work; I won’t do that, this tool enables collaboration to happen.”

- “[Patients] liked the accessibility, ability to use discretely—they might use in line when waiting or in anxiety provoking situations, [and] liked the privacy. VHB is easy to set up, also still very personalized too.”
- “In my experience in working with those in DBT, a lot of clients skip over the [conventional] hope box. They must think, ‘How would I use this at home?’ or ‘Would it be in my car?’ or ‘I can’t take this with me on the bus.’ Using the VHB became a part of every session: building Coping Cards, filling the app with photos and music, and [discussion of] utilizing the app—whether or not they used it and if they found it helpful. The two people I’m thinking of are still using the app, so it’s been part of every session—which, in my experience in DBT, I can’t say the same about the physical hope box. I haven’t found that to be as effective or interactive.”
- “I think it’s great, super easy to use. I show it to all the clients I work with, even the non-DBT clients, to show them the range of other apps they can use. There’s nothing I didn’t like. I found it to be really, really easy to use, remarkably so.”
- “The biggest thing I did [with patients] was Coping Cards. It was very powerful to observe and describe their negative statements which were hard to identify as beliefs because they seemed so true. That was a powerful intervention to have those discussions about beliefs vs. truths. Writing the challenges was easier then.”
- “I think VHB could be used both therapeutically or more generalized to other vets. I found it seemed

beneficial to those who used it and were engaged with it, not just those with suicidal ideation—good for distress tolerance in general.”

- “Lots of disorders could benefit, like PTSD, depression, anxiety—it could be generalizable therapeutically. It’s not so specific that it only works for certain disorders.”

Modifications to VHB Based on User Feedback

The bulk of our post-use assessment questionnaire and interview items were devoted to fine-detail review by patients of every specific component (e.g., “Remind Me” section) and subcomponent (e.g., separate reviews of “Remind Me” videos, photographs, recorded messages, and music) of the prototype VHB, including recommendations for modifications and improvement. We also administered equally comprehensive clinician reviews of the VHB in clinical use. In total, we compiled more than 80 pages of feedback that informed our subsequent modifications to the operational VHB app for release to the public marketplace. Detailed descriptions of these data are beyond the scope of this article, but beyond improving functional reliability and ease of use throughout, the most notable modification was our addition to the Relax Me section of three new guided imagery relaxation tools to supplement breathing and muscle relaxation tools. At the request of providers, we also created detailed downloadable user guides for clinicians and patients.

DISCUSSION

We believe the results of this study show the VHB to have great promise as a therapeutic tool for behavioral health providers. Compared with the conventional hope box, more patients (1) used the VHB regularly; (2) found the VHB beneficial and helpful; (3) found the VHB easy to set up; (4) said they were likely to use the VHB in the

future; and (5) would recommend the VHB to peers. Twice as many patients preferred the VHB for future use than the CHB. Written comments from patients further extolled the benefits of the app in its intended use; patients cited the helpfulness of VHB with managing distress, negativity, hopelessness, anger, and various other symptoms. We were especially encouraged by the positive experiences of behavioral health clinicians who were unanimous in their praise for the VHB as an eminently usable therapeutic tool.

While the VHB clearly was popular with patients and providers, a few limitations were evident. Perhaps most important was the inability of the electronic medium to offer a complete sensory experience. Patients highlighted the texture and smell of objects in their CHBs as especially tangible and evocative positive reinforcers and self-soothing aids. Ultimately, a majority of participants suggested (and we concur) that using the VHB and CHB in combination would provide the best of both worlds: that the palpably physical but unwieldy items in a CHB would ideally be complemented by the highly accessible and media-rich content of a VHB. More generally, as preliminary proof-of-concept of the VHB potential in a clinical population, this study was limited by small sample size and entirely descriptive analyses. We know that the VHB was used and liked, but we do not know whether measurable changes in coping and positive thinking resulted. The next step will be to conduct a larger-scale clinical trial comparing changes in outcomes of interest between the VHB and treatment as usual, and in fact, we have recently embarked on such a study.

CONCLUSION

Portable personal technologies already are ubiquitous and increasingly are being employed as part of behavioral health (Depp et al., 2010). While a smartphone app may not be a substitute for in-person care, it does have the advantage of 24/7 accessibility for when that care is not

available. We believe that the virtual hope box smartphone app offers clinicians and their patients a valuable tool to supplement

face-to-face treatment for stress and negative thinking.

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Suicide Risk among Lesbian, Gay, Bisexual, and Transgender Military Personnel and Veterans: What Does the Literature Tell Us?

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Research suggests that both the military and veteran and the lesbian, gay, bisexual, and transgender (LGBT) populations may be at increased risk for suicide. A literature review was conducted to identify research related to suicide risk in the LGBT military and veteran populations. Despite the paucity of research directly addressing this issue, themes are discussed evident in the literature on LGBT identity and suicide risk as well as LGBT military service members and veterans. Factors such as social support and victimization appear to be particularly relevant. Suggestions are made with respect to future research that is needed on this very important and timely topic.

While serving in the U.S. military has historically been regarded as a protective factor against mortality (Rothberg, Bartone, Holloway, & Marlowe, 1990; Kang & Bullman, 1996), recent evidence (e.g., Army Suicide Prevention Task Force, 2010) suggests this may no longer be accurate as it relates to death by suicide. Suicide has become a formidable problem among U.S. military personnel. Since the beginning of the conflicts in Iraq and Afghanistan, suicide rates have doubled among active-duty

military members (Army Suicide Prevention Task Force, 2010). In 2008, the prevalence of suicide in the Army and Marines surpassed that of the age-adjusted general population for the first time (Army Suicide Prevention Task Force, 2010; Frueh & Smith, 2012). Suicide is now second only to unintended injury as cause of death in the U.S. military (Department of Defense Task Force on Prevention of Suicide by Members of the Armed Forces, 2010; Ritchie,

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Keppler, & Rothberg, 2003). Although there is evidence to suggest that veteran suicide rates are decreasing in recent years, suicide among veterans continues to surpass rates of the general population, with males aged 30 to 64 at the highest risk (Blow et al., 2012). One reaction to this growing prevalence has been increased research on the risk factors for suicide, identification of at-risk subpopulations, and the development of suicide prevention interventions.

One population within the military that has the potential to be particularly vulnerable to suicide, but that has not been the focus of much research, is the lesbian, gay, bisexual, and transgender (LGBT) community.¹ For close to half a century, reports have documented the elevated risk for suicide among LGBT populations (Haas et al., 2011), and epidemiological studies have provided evidence that the LGBT community is at an increased risk for suicide and self-directed violent behaviors (Garofalo, Wolf, Wissow, Woods, & Goodman, 1999; King et al., 2008; Remafedi, French, Story, Resnick, & Blum, 1998). Nevertheless, there is no consistent and reliable way to determine the prevalence of suicide among this population because death records do not routinely record sexual orientation (Haas et al., 2011). Psychological autopsy has been used to capture death by suicide and sexual orientation, but increased death rates among LGBT populations were not found in these studies (McDaniel, Purcell, & D'Augelli, 2001; Renaud, Berlim, Begolli, McGirr, & Turecki, 2010; Shaffer, Fisher, Hicks, Pa-

rides, & Gould, 1995). The results should be regarded as tentative due to small sample sizes and underreporting by those interviewed. One study that used Danish registries to examine same-sex partnership and death by suicide did find that individuals with same-sex partnership were 3 to 4 times more likely to die by suicide than married heterosexual individuals (Qin, Agerbo, & Mortensen, 2003).

Although it cannot be determined unequivocally that death by suicide is higher among the LGBT community, the relationship between attempted suicide and sexual orientation has been established in population-based studies in the United States and worldwide (Cochran & Mays, 2000; Fergusson, Horwood, Ridder, & Beautrais, 2005; Mathy, 2002a). Discrepancies in prevalence vary, but among adults who reported same-sex behavior, rates of attempted suicide have been consistently found to be between three and five times higher than those who never reported same-sex behavior (Cochran & Mays, 2011; Paul et al., 2002). In addition, there have been reports that combine ideation and attempts, with important differences by gender. Gay and bisexual women have reported much higher rates of suicidal ideation, and gay and bisexual men have reported significantly higher suicide attempt rates (King et al., 2008).

Fewer data are available on death by suicide and suicidal ideation and behaviors among the transgender population (Mathy, 2002b). Some data exist that suggest death by suicide and suicide attempts are much higher in individuals who have had sex reassignment surgery (Dixen, Maddever, Van Maasdam, & Edwards, 1984; Pfäfflin & Junge, 1998). However, a review of consequences of sex reassignment in Europe found that suicide attempts and suicidal ideation may decrease from 20% before surgery to a much lower rate (0.5–1.9%) after (Michel, Ansseau, Legros, Pitchot, & Mormont, 2002). Factors associated with being at risk for suicidal thoughts and behavior in the transgender population

¹The terms *lesbian*, *gay*, and *bisexual* refer to one's sexual identity, whereas *transgender* refers to gender identity or expression. Of note, the authors use the term *LGBT community* to broadly refer to the heterogeneous group of individuals who identify as LGBT, knowing that there are many distinct communities within this larger group. Specifically, LGBT individuals are included in the same acronym when appropriate and at other times are differentiated (e.g., LGB) to accurately reflect the terminology used in the literature.

include common risk factors, such as substance abuse, depression, and anxiety (Clements-Nolle, Marx, & Katz, 2006; Xavier, Honnold, & Bradford, 2007), as well as job-related stressors (National Center for Transgender Equality & the National Gay & Lesbian Task Force, 2009). Evidence suggests that certain risk factors are specific to transgender individuals, including a history of forced sex, gender-based discrimination and victimization (Clements-Nolle et al., 2006), and rejection by their family of origin (Grossman & D'Augelli, 2008).

Given these findings, being a member of the U.S. military, as well as identifying as LGBT, could potentially constitute a double-edged risk for suicide. At the time of this writing, the authors of this paper were only able to identify two studies regarding suicide risk among LGBT military personnel. The paucity of research on the LGBT community within the U.S. military is understandable given the military's historical policies with respect to gays and lesbians serving in the military. The repeal in 2011 by President Obama of the Don't Ask Don't Tell policy (Policy Concerning Homosexuality in the Armed Forces, 2004) presents an opportunity to examine risk among sexual minority military personnel and explore ways to optimize their well-being and functioning. In this article we review the existing literature on the LGBT community and suicide as well as the LGBT community within the military. A conceptualization regarding the implications of these findings for military personnel is offered, gaps in the literature are identified, and recommendations for future research are discussed.

METHODS

Search Strategy for the Identification of Relevant Studies

A broad search strategy for potential articles was used. Electronic searches were

completed using PubMed, ERIC, Sociological Abstracts, Social Work Abstracts, and PsychInfo. Search terms were identified across three different content areas: LGBT identity, suicide, and the military. Combinations of the following terms were searched: gay, lesbian, bisexual, transgender, homosexual, transsexual, suicid*, military, and veteran. Terms related to LGBT identity, the military, and suicide were searched as a triad, terms related to LGBT identity and suicide were searched as a dyad, and terms related to LGBT identity and the military were also searched as a dyad. Each database was independently searched by two team members utilizing the entire search strategy. Any unique results yielded were included in an EndNote database.

Abstract and Full-Text Review

After duplicate articles were removed, team members reviewed all abstracts in the EndNote database. Articles were included if they were published in a peer-reviewed journal in the English language, the main focus of the article was on adults (the review only included studies in which participants' mean age was at least 18 years old), and content was related to either: LGBT identity, the military, and suicide; or LGBT identity and the military; or LGBT identity and suicide. Articles were excluded if they focused on nonsuicidal self-directed violence or did not report original research (e.g., literature reviews, opinion papers). The articles that met these criteria were divided among the team for full-text review. Articles were then removed if upon full-text review, they did not meet criteria as outlined above.

Synthesis of the Literature

Relevant information (e.g., abstract, results, recommendations) from each remaining original research article was entered into an Access database. Each research team member reviewed this information for each article to identify themes in

the literature. Team members met to discuss themes present in the literature and decided on the most common and relevant themes to the topic area.

RESULTS

The initial search yielded 3,810 abstracts. Following the removal of duplicate articles and those that did not meet inclusion or exclusion criteria, 187 abstracts remained. After the full-text review of these 187 articles, 117 original research articles were available for analysis. The primary reasons for exclusion were that the article did not report original research or that the primary content of the article was not related to the required content categories. The final 117 articles were classified into three groups based on content area: LGBT identity, suicide, and the military ($n = 1$); LGBT status and suicide ($n = 95$); and the military and LGBT status ($n = 21$). While searching for supporting literature, one additional original research article was identified after the initial search was conducted. This article was specifically related to LGBT identity, suicide, and military. Results from the body of literature are presented in narrative form. Information regarding prevalence data and risk and protective factors is described.

Prevalence of Suicidal Ideation and Behavior among the LGBT Population

Numerous articles reported the prevalence of suicidal thoughts and behaviors among LGBT individuals (see Table 1 for U.S. studies). These rates differed somewhat across samples and study methodologies, but all studies reported noteworthy rates of suicidal ideation and attempts among LGBT individuals. Two studies reported findings specifically related to sexual minority veterans and suicidal ideation and attempts. Blosnich, Bossarte, and Silenzio (2012) found that 11.48% of sexual minority veterans reported that they had

seriously considered attempting suicide within the past year, whereas only 3.48% of heterosexual veterans reported having seriously considered attempting suicide during the past year. Herrell et al. (1999) analyzed national data from the Vietnam Era Twin Registry and reported that among veterans who had at least one same-gendered sexual partner in their lifetime, 55.3% reported suicidal ideation compared to 25.2% of those with no reported same-gender partners. Among veterans with at least one same-gender partner, 14.7% reported that they had attempted suicide compared to 3.9% of veterans with no same-gender partner.

In addition to these two studies specifically focused on LGB veterans, the search yielded multiple studies related to LGBT samples that were not specified as military or veteran. Most U.S. studies found that approximately 40% of LGB participants reported a lifetime history of suicidal ideation. Lifetime suicidal ideation was reported by 41% to 43% of mixed LGBT participant samples (Garcia, Adams, Friedman, & East, 2002; McBee-Strayer & Rogers James, 2002); approximately 41% of gay males (Balsam, Beauchaine, Mickey, & Rothblum, 2005; Cochran & Mays, 2000); 38% to 57% of lesbian women (Balsam, Beauchaine, et al., 2005; Bradford, Ryan, & Rothblum, 1994); and 31% to 39% of bisexual individuals (Balsam, Beauchaine, et al., 2005). Fifty to 64% of transgender individuals reported a lifetime history of suicidal ideation (Imbimbo et al., 2009; Kenagy & Bostwick, 2005). In keeping with these high rates of suicidal ideation, when prevalence across studies was examined, a mean of approximately 17% of LGB participants reported having attempted suicide (e.g., Balsam, Beauchaine, et al., 2005; Balsam, Rothblum, & Beauchaine, 2005; Remafedi, 2002). Transgender individuals generally reported a higher prevalence of suicide attempts, with approximately 30% having attempted suicide (Clements-Nolle, Marx, Guzman, & Katz, 2001; Kenagy, 2005; Kenagy & Bostwick, 2005).

TABLE 1
Prevalence of Suicidal Thoughts and Behaviors among U.S. Samples

Study	Participants	Design	Prevalence
<i>Mixed samples</i>			
Balsam, Beauchaine, et al. (2005)	533 heterosexual, 558 lesbian or gay, and 163 bisexual individuals approximate <i>M</i> age = 35	LGB individuals were recruited via convenience sampling and then they recruited their siblings. Questionnaires completed via the mail.	History of suicidal ideation ($\geq$ age 18): 41.1% of gay men, 31.4% bisexual men, 38.4% lesbian women, and 39.3% bisexual women. History of suicide attempt ($\geq$ age 18): 10.5% of gay men, 11.4% bisexual men, 7.9% lesbian women, and 10.7% bisexual women.
Blosnich and Bossarte (2012)	11,046 LGB, unsure, and heterosexual college students ages 18–24; <i>M</i> = 20.1	Self-report, national college health assessment (NCHA)	History of suicidal ideation (past year): 15% gay or lesbian, 21% bisexual, and 5.5% heterosexual. History of suicide attempt (past year): 3.3% gay or lesbian, 4.6% bisexual, and 0.9% heterosexual.
Blosnich et al. (2012)	61 LGB veterans, 1,639 heterosexual veterans ages 18–64+	Statewide survey conducted in Massachusetts that contained questions about history of active-duty status, LGBT identity, and suicidal ideation	11.48% of LGB veterans reported serious suicidal ideation within past year. 3.48% of heterosexual veterans reported serious suicidal ideation within past year.
Bolton and Sareen (2011)	34,653 LGB, unsure, and heterosexual individuals age ranges by group: 20 to 39, 40 to 55, and 56 and older	Lay interviewers: National Epidemiologic Survey on Alcohol and Related Conditions	History of suicide attempt (lifetime): 9.8% gay men, 10% bisexual men, 8.5% unsure men, 2.1% heterosexual men; 10.9% lesbian women, 24.4% bisexual women, 9.9% unsure women, and 4.2% heterosexual women.
D’Augelli and Grossman (2001)	416 LGBT individuals ages 60–91; <i>M</i> = 68.5	Snowball sampling via LGB agencies and groups for older adults	13% reported a past suicide attempt (lifetime).

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TABLE 1
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Study	Participants	Design	Prevalence
Garcia et al. (2002)	138 LGBT college students, ages 18–30	Cross-sectional survey; college students	43% of respondents reported past SI, 11% reported a past suicide attempt (lifetime).
Hershberger et al. (1997)	194 lesbian or gay youth group members ages 15–21; $M = 18.86$	Survey; convenience sample Brief Symptom Inventory #9 asked about suicidal ideation	42% reported at least one lifetime suicide attempt. 39% reported suicidal thinking in the past week.
House, Van Horn, Coppeans, and Stepleman (2011)	1,126 LGBT individuals ages 18–80; $M = 37.6$	Internet-based survey	23.7% attempted suicide at least once (lifetime). 26.7% of female participants attempted suicide (lifetime). 34.8% of transgender participants attempted suicide (lifetime). 17.7% of male participants attempted suicide (lifetime).
McBee-Strayer and Rogers James (2002)	162 LGB individuals ages 18–64	Self-report surveys The Suicide Behavior Questionnaire	91% reported a history of suicidal ideation (lifetime). 37% reported a history of suicide attempt (lifetime).
Meyer, Dietrich, and Schwartz (2008)	388 LGB individuals ages 18–59	World Health Organization World Mental Health Survey Initiative of the Composite International Diagnostic Interview	7.9% of gay or lesbian participants made a lifetime suicide attempt. 10.0% of bisexual participants had made a lifetime suicide attempt.
Needham and Austin (2010)	11,153 LGB and heterosexual individuals ages 18–26	In-home interviews conducted in 2 waves with students as part of the Add Health Study	Suicidal ideation reported in the past year: 21% of lesbian women 17% of gay men 18% of bisexual females 13% of bisexual men

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Study	Participants	Design	Prevalence
Russell et al. (2011)	245 LGBT individuals ages 21–25	Participants recruited from 249 LGBT venues (e.g., organizations, bars, clubs). Young adult survey from The Family Acceptance Project composed of self-report scales.	41% reported history of lifetime suicide attempt. 22% needed medical attention after a suicide attempt.
<i>Gay and bisexual men</i> Berg, Mimiaga, and Safren (2008)	92 gay and bisexual men ages 18–58; $M = 35.6$	Chart review of intake procedures and assessments at an LGBT health clinic	18.5% reported suicidal ideation at time of intake.
Kipke et al. (2007)	526 gay, bisexual, and questioning men ages 18–24	Self-report surveys	10% reported they had seriously considered suicide (past 12 months). 4% reported that they had developed a plan (past 12 months). 4% reported that they had attempted suicide (past 12 months). 21% had made a suicide plan (lifetime). 12% had attempted suicide (lifetime). 27% reported suicidal ideation in the past 6 months.
Paul et al. (2002)	2,881 urban gay and bisexual men ages 18–86; $M = 37$	A probability sample was interviewed over the phone	
Schneider, Taylor, Hammen, Kemeny, and Dudley (1991)	778 bisexual and gay males M age = 36	Multicenter AIDS Cooperative Study; questionnaire received by mail and returned to study site	
<i>Gay men</i> Herrell et al. (1999)	4,774 male–male twin pairs of Vietnam Era veterans; those who had a same-gender partner and those who had not (No age reported)	Interview as part of the Harvard Twin Study of Substance Abuse, which included 4 questions from the Diagnostic Interview Schedule–III Revised	14.7% with any same-gender partners (whose twin did not have any same-gender partners) attempted suicide (lifetime). 55.3% reported suicidal ideation (lifetime).

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Study	Participants	Design	Prevalence
Remafedi (2002)	255 gay men ages 16–25; <i>M</i> = 20	Structured clinical interview in popular venues	34% reported a history of lifetime suicide attempt. 4.7% reported an attempt in the past year. 19% reported suicidal ideation in the past month.
<i>Lesbian or bisexual women</i> Bradford et al.(1994)	1,925 lesbian women ages 17–80; 80% were between 25 and 44 years of age	Surveys were sent to lesbian and gay health and mental health organizations and practitioners across the country. Snow-ball sampling was also used.	43% indicated they never had thought about suicide, 35% reported rarely, 19% sometimes, 2% reported often having suicidal thoughts; 18% had attempted suicide (lifetime).
Corliss et al. (2009)	1,253 lesbian or bisexual women <i>M</i> age = 40	Surveys completed by women who identified as lesbian, bisexual, or reported being sexually active or attracted to other women. Multiple-participant recruitment methods were used (e.g., outreach at gay community events).	10.2% reported a history of suicide attempt prior to age 18.
Matthews, Hughes, Johnson, Razzano, and Cassidy (2002)	550 lesbian women <i>M</i> age = 43	Surveys were sent to participants as part of the Chicago Lesbian Community Cancer Project. Questionnaire contained questions related to mental and physical health.	51% had seriously considered suicide (lifetime). 22% reported a lifetime suicide attempt.
Morris et al. (2001)	2,401 lesbian women ages 15–83; <i>M</i> age = 36	National Lesbian Wellness Survey data	21.5% reported a lifetime suicide attempt. 46% reported lifetime suicidal ideation.
<i>Transgender individuals</i>			

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Study	Participants	Design	Prevalence
Clements-Nolle et al.(2001)	523 transgender individuals, male to female and female to male median age: 34 for male to female (range 18–67), 36 for female to male (range 19–61)	Recruitment conducted in neighborhoods identified to have a high concentration of transgender persons. Trained transgender interviewers, included physical and mental health measures.	32% of both male to female and female to male individuals reported a lifetime history of suicide attempt.
Imbimbo et al. (2009)	139 transgender (male to female) individuals who had undergone sex reassignment surgery M age = 31.36	Questionnaire 12–18 months after surgery	50% contemplated suicide (lifetime). 2% attempted suicide (pre-surgery). 0.7% attempted suicide (postsurgery).
Kenagy (2005)	182 transgender individuals male to female and female to male age 17–68	Face-to-face interview and self-report	30.1% had attempted suicide (lifetime). 2 or 3 said they attempted due to being transgender.
Kenagy and Bostwick (2005)	111 transgender individuals male to female and female to male ages 19–70	Self-report, structured interview	64% had thought about suicide (lifetime). 60% reported having these thoughts due to being transgender. 27% had attempted suicide (lifetime). 52% reported attempting suicide due to being transgender.
Nuttbrock et al. (2010)	571 transgender individuals male to female ages 19–59	Recruited from streets, clubs, organizations, and advertising. Self-report, structured interview.	For ages 19–39 (lifetime): 53.0% had thought about suicide 34.9% had planned for suicide 31.2% had attempted suicide For ages 39–59 (lifetime): 53.5% had thought about suicide 34.9% had planned for suicide 28.0% had attempted suicide

L = lesbian, G = gay, B = bisexual, T = transgender, M = mean.

Many studies also compared the prevalence of suicidal thoughts and behaviors between LGBT and heterosexual populations. The research shows that LGBT populations are at elevated risk of suicide relative to heterosexual populations. Blosnich and Bossarte (2012) analyzed a representative sample of 11,046 college-attending 18- to 24-year-olds and found significantly more LGB students reported suicidal ideation (gay or lesbian = 15%, bisexual = 21%) and suicide attempts (gay or lesbian = 3.3%, bisexual = 4.6%) within the past year than heterosexual students (ideation = 5.5%, attempts = 0.9%). Needham and Austin (2010) analyzed follow-up data from 11,153 participants (18–26 years old) initially recruited in a nationally representative U.S. school-based study. They also found significantly greater rates of suicidal ideation among LGB participants. Approximately 21% of lesbians, 17% of gay males, 18% of bisexual females, and 13% of bisexual males endorsed seriously considering suicide within the past year, whereas only 6.3% of heterosexual females and 5.7% of heterosexual males reported seriously considering suicide. Finally, Bolton and Sareen (2011) analyzed data from 34,653 respondents to the National Epidemiologic Survey on Alcohol and Related Conditions, a representative probability survey of U.S. civilians. Gay and bisexual men had approximately a fourfold increase in suicide attempts after controlling for demographic variables. Similarly, lesbian women evidenced a nearly threefold increase in risk and bisexual women had approximately a sixfold greater risk. No studies comparing prevalence of suicidal ideation or behavior within the transgender population to the general population were identified.

Some evidence suggests that bisexual individuals may be particularly at risk for suicide. After controlling for mental disorders, Bolton and Sareen (2011) found that bisexual men and women still demonstrated a threefold increase in risk and were the only groups that significantly differed from heterosexuals. Steele, Ross, Dobinson, Vel-

dhuizen, and Tinmouth (2009) analyzed data from a Canadian national population-based survey including 354 lesbian, 424 bisexual, and 60,937 heterosexual women. Bisexual women were significantly more likely than lesbian and heterosexual women to report lifetime suicidal ideation.

Suicide Risk and Protective Factors Identified in the Literature

The present literature review identified one study related to suicide risk factors specific to LGB individuals who have served in the military. Blosnich et al. (2012) found that sexual minority veterans had significantly less social and emotional support and higher rates of suicidal ideation than heterosexual veterans. Although this literature search only identified one study specific to the LGB military or veteran populations, there are numerous studies that identify risk factors associated with LGBT identity and self-directed violence in the general population. A summary of these studies is provided as well as an elaboration on two specific factors that are well documented in the literature identified for this article: victimization and social support.

Results of some international studies suggest that sexual minority identity is a greater risk factor for men than women (Fergusson et al., 2005; de Graaf, Sandfort, & Have, 2006). For example, de Graaf et al. (2006) found a stronger association between suicidality (i.e., ideation and behavior) and sexual orientation among men than women, particularly after controlling for psychiatric conditions. However, results regarding the potential moderating effect of gender have not been entirely consistent (Van Heeringen & Vincke, 2000).

In addition to gender, trauma, mental health disorders, and substance use have all been associated with suicide. Although these risk factors are shared both by LGBT individuals and those who identify as heterosexual, the prevalence of these risk factors is elevated among the LGBT community. With regard to mental health disorders, mul-

multiple large scale surveys found elevated rates of mental disorders, including substance use disorders, among the LGBT community (Conron, Mimiaga, & Landers, 2010; Fergusson et al., 2005; Gilman et al., 2001). For example, King et al. (2008) reported that depression, anxiety, and substance use disorders are 1.5 times more common in the LGBT community. There is also a large body of evidence suggesting that members of the LGBT population who have experienced physical, sexual, and emotional trauma are at increased risk for suicide (Balsam, Rothblum, et al., 2005; Botnick et al., 2002; Paul et al., 2002). Literature providing evidence of the relationship between victimization and suicide risk is elaborated on below.

The current literature search yielded no studies exploring protective factors among the LGBT military or veteran populations. In fact, little research has been conducted in the general LGBT population on factors that protect this community from suicide. One study found that social norms, high levels of support, identification with role models, and high self-esteem help protect gay men from suicide (Fenaughty & Harre, 2003). Another study reports that support within the lesbian community is considered a protective factor (Bradford et al., 1994). Literature related to the construct of social support and its impact on suicide risk is also more fully discussed.

Victimization and Suicide Risk. Twenty-six articles retrieved discussed the relationship between victimization and suicide risk within the LGBT community. For example, Rivers and Cowie (2006) reported that 53% of their LGB sample reported suicidal or self-harm ideation as a direct result of victimization related to sexual orientation and 40% had attempted suicide or self-harm for the same reason. Some researchers suggest that sexual minority identity is not an independent risk factor for suicide; rather, the outcomes of socially based stressors such as bullying strengthen the risk (Blosnich & Bossarte, 2012). Russell, Ryan, Toomey, Diaz, and Sanchez (2011) found that LGBT young adults who reported a high

level of victimization during adolescence were 5.6 times more likely to have attempted suicide than those who reported a low level of victimization. Additional research found that higher rates of gender abuse among male-to-female transgender individuals were significantly associated with suicidality. This relationship varied across the life span such that it declined postadolescence and strengthened again in middle age. Importantly, gender abuse significantly decreased over the life span, but continued to be associated with significant levels of suicidality (Nuttbrock et al., 2010). Other research showed that lesbian and bisexual women reporting antigay harassment and maltreatment were more likely than those without these experiences to report that they had attempted suicide before 18 years of age (Corliss, Cochran, Mays, Greenland, & Seeman, 2009). However, victimization does not always lead to psychological distress. Reduction in self-esteem may impact this relationship such that if self-esteem is not reduced as a result of bullying, psychological distress and suicidal thoughts and/or behaviors may not occur (Waldo, Hesson-McInnis, & D'Augelli, 1998). Research suggests, however, that low self-esteem often occurs in the context of social discrimination (e.g., Huebner, Rebhook, & Kegeles, 2004), perhaps making this relationship likely. The majority of these studies focused on verbal abuse. However, it is important to note that other research also found that a history of suicide attempt was reported more frequently among adults who were physically attacked than those who were verbally victimized because of their sexual orientation (D'Augelli & Grossman, 2001).

Victimization in the LGBT Military Community. Our literature review also yielded studies that specifically relate to victimization of LGBT individuals who served in the military. The experience of LGBT individuals in the military is likely not well documented in the literature because of past regulations (e.g., the Don't Ask Don't Tell policy; Policy Concerning Homosexuality

in the Armed Forces, 2004), but a study exploring the experiences of lesbians being removed from the Canadian military showed psychological distress upon being sought out, which was likened to a “witch hunt” (Poulin, Gouliquer, & Moore, 2009; p. 498). High rates of LGBT harassment are also reported in the U.S. armed forces (Bowling, Firestone, & Harris, 2005). Not surprisingly, LGBT military members reported the negative impact of sexual orientation-based harassment. Moradi (2009) found that sexual orientation-based harassment is significantly associated with decreased social cohesion and task cohesion among U.S. military veterans (Moradi, 2009). Another study conducted by Moradi and Miller (2010) reported that a main reason why veterans of the wars in Iraq and Afghanistan supported policy banning openly gay or lesbian military personnel was because the veterans feared that this group would face harassment and bullying from other military personnel.

Social Support and Suicide Risk. The present review of the literature yielded one study that discussed social support and suicide risk in the LGB veteran population and 15 in the general LGBT population. Results presented provide evidence that factors related to social support are associated with risk for suicidal ideation and attempts. Blossnich et al. (2012) found that increased rates of suicidal ideation among sexual minority veterans were explained by poor mental health and decreased social and emotional support. With respect to the non-military or veteran population, Botnick et al. (2002) found that among a sample of gay and bisexual men, those who had attempted suicide reported significantly lower levels of social support than those who had not attempted suicide. Van Heeringen and Vincke (2000) reported that rating of homosexual friendships as unsatisfactory was associated with a history of suicide attempt.

The literature also provided evidence that factors related to the experience of coming out to family and friends appear to

impact suicide risk. Research provides evidence that disclosing sexual orientation can be protective. In a study of lesbian and bisexual women, being “out” was negatively related to psychological distress, which was positively related to suicidal ideation and attempts (Morris, Waldo, & Rothblum, 2001). Moradi (2009) found that veterans who had disclosed their sexual orientation while in the military perceived higher social cohesion within their units. While this study did not assess suicide risk per se, increased social cohesion may be protective against self-directed violence as social support has been found to be protective (Botnick et al., 2002). While coming out in general may be protective, the reactions of friends impact suicide risk as well. In a study of gay youth, those who had lost friends due to disclosing their sexual orientation were three times more likely to report a suicide attempt than those who had not lost a friend in the coming out process (Hershberger, Pilkington, & D’Augelli, 1997).

DISCUSSION

In this review we aimed to identify literature related to suicide within the LGBT military and veteran populations. Research suggests that active-duty service members (Army Suicide Prevention Task Force, 2010) and veterans receiving care through the Veterans Health Administration (VHA; e.g., Blow et al., 2012; McCarthy et al., 2009) are at increased risk for suicide. The literature search conducted for the present review confirmed that the LGBT community is at increased risk for suicide as well, with rates of suicidal thoughts and behaviors generally exceeding those of the heterosexual community. Additionally, two articles were identified that provided data suggesting increased prevalence of suicidal ideation and attempts in LGB veterans. No studies related to transgender veterans and suicide risk were found.

This literature begs the question, *Why are LGBT military personnel and veterans potentially at increased risk for suicide?* The results of the literature search provide evidence with respect to risk and protective factors within the general LGBT community that help shed light on this question. Evidence suggests that risk factors, such as mental health disorders and substance abuse, are important for both the general population and LGBT communities. The body of literature identified focused on two risk factors that appear to be particularly relevant to suicide risk in the LGBT population: victimization and decreased social support. Decreased social support and worse mental health were specifically identified as risk factors for LGB veterans (Blosnich & Bossarte, 2012). Importantly, these factors explained the relationship between LGB identity and suicide risk such that LGB identity alone was not shown to be a risk factor.

Joiner's (2005) Interpersonal-Psychological Theory of Suicidal Behavior (IPTS) offers a framework from which to understand how the two important risk factors identified in the LGBT literature (i.e., victimization and social support) may help further explain suicide risk in the LGBT military and veteran populations. This theory purports that a person is at increased risk for suicide if they have acquired the capability to kill themselves and have the desire to die. Acquired capability is described as habituation that can occur in the context of past self-injury, pain, and/or other injury (Joiner, 2005). The theory holds that the presence of two constructs, perceived burdensomeness and failed belongingness, results in the desire for death. Perceived burdensomeness exists when one sees themselves as a permanent burden to others. One has a sense of failed belongingness when they do not feel that they belong to any community or have connections with others (Joiner, 2005).

The research identified in this review relates to two of the three constructs that comprise Joiner's (2005) theory. Data dem-

onstrating that a history of victimization places LGBT individuals at increased risk for suicide can be understood with respect to acquired capability for lethal self-harm. People who identify as members of sexual minority communities report experiencing more abuse than their heterosexual counterparts because of the societal stigma they experience. This can result in increased exposure, and potentially habituation to, physical and psychological pain. Furthermore, research findings suggest that veterans with experiences in combat are at increased risk for suicide as compared to those who have not served in combat, which may relate to acquired capability gained from combat (Kleespies et al., 2011). Thus, LGBT military service members and veterans may already be at increased risk of acquired capability related to military combat and/or training and further habituation to pain via experiences of victimization.

Additionally, research supports that another important suicide risk factor for LGBT individuals, and LGB veterans specifically, is decreased social support. In the context of Joiner's (2005) theory, decreased social support can be understood as a manifestation of a crucial ingredient for the desire for death (i.e., failed belongingness). Thus, the literature provides some indirect support for the applicability of this component of the IPTS. Belongingness is a particularly important consideration for the LGBT military and veteran populations as unit cohesion is such an important component of military service. Lesbian, gay, bisexual, and transgender military service members' sense of belongingness may be impacted by their experience of coming out in the military. It is unknown how this experience may or may not be impacted by the recent repeal of the Don't Ask Don't Tell policy. It is recommended that future research explores the impact that coming out in the military has on suicide risk.

The literature identified in this review does not, however, provide information regarding perceived burdensomeness, the other factor that contributes to the

desire for death, in the LGBT military and veteran populations specifically or the broader LGBT population. Perceived burdensomeness was found to be positively correlated with suicidal ideation among a sample of military personnel who had been deployed (Bryan, Ray-Sannerud, Morrow, & Etienne, 2012) and thus may be a construct of interest to those trying to understand suicide risk among the LGBT military and veteran populations. An important step for researchers is to explore whether LGBT military service members or veterans who are at risk for suicide also have higher rates of perceived burdensomeness. This can be assessed via the Interpersonal Needs Questionnaire (Van Orden, Witte, Gordon, Bender, & Joiner, 2008). Thus, the IPTS offers a conceptualization of the research reported in this article, but no empirical evidence supports this understanding.

In addition to conducting future research to explore the applicability of IPTS to this population, the field would benefit greatly from more research regarding the prevalence of suicidal ideation and attempts in the LGBT military and veteran populations. Specifically, research focused on suicide risk among transgender service members and veterans is needed. Additionally, no research was identified that reports data related to suicide death among the LGBT military or veteran communities. Along with prevalence research, it would be beneficial to assess when suicide attempts occur with respect to military service (i.e., before, during, or after) as most studies have only collected data on lifetime history of suicide attempts. Research regarding the lethality of attempts and nature of suicidal ideation is also of interest. These data might provide the field with information regarding the impact of military service on suicide risk in this population. Additionally, researchers should work to identify risk and protective factors that may be unique to the LGBT military and veteran populations. Research in this area may be facilitated by the repeal of Don't Ask Don't Tell as ser-

vice members and veterans may feel more comfortable to disclose their LGB identity. Research with transgender individuals who serve in the military, however, may continue to be challenged as the repeal of Don't Ask Don't Tell does not address this group. These are important first steps with respect to learning more about increased or unique risk associated with this population.

The research presented here should be considered with respect to some important limitations. For example, inconsistencies exist within the reviewed articles in regard to the methods of investigating suicidal behavior. The research assesses suicidal ideation and behavior with methods ranging from one to a few questions on each, with little consistency in the assessment methods or questions used. The time periods assessed vary between studies, with both recent and lifetime suicidal behavior explored, while rarely addressing persistent thoughts of suicide. Other methodological issues should be considered as well. Many studies employed biased sampling techniques that may limit the generalizability of the findings. For example, some studies only recruited from LGBT organizations and therefore may not be assessing individuals who choose to not affiliate with such groups. Inconsistent terminology regarding suicidal ideation and behavior and LGBT status is used throughout the research as well, which impacts the ability to accurately synthesize this body of literature. The literature reviewed utilized samples that included a wide range of ages. While an advantage of this is that many different age groups are represented, our methods employed do not allow for differentiation to be made as to how suicide risk may vary across age groups. Additionally, the definition of *sexual orientation* (e.g., behavior versus attraction) varies across studies, confounding our ability to compare between groups. Perhaps most importantly, it is entirely unclear how well research on the general LGBT population applies to experiences of the LGBT military or veteran populations. The expansion of research in this area is recommended and encouraged.

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Cross-cultural adaptation of the Window to Hope: A psychological intervention to reduce hopelessness among US Veterans with traumatic brain injury

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Abstract

Primary objective: To conduct a cross-cultural adaptation of Window to Hope (WtoH), a treatment to reduce hopelessness after traumatic brain injury (TBI), from the Australian civilian context to that of US Veterans.

Research design: Three-stage mixed-methods approach.

Methods: Stage 1: Consensus conference with stakeholders to revise the manual. Stage 2: Pilot study of the revised manual with US Veterans to examine acceptability, feasibility and fidelity. Stage 3: Review of results with consensus conference attendees and further revisions.

Results: Stage 1: Conference attendees reached 100% consensus regarding changes made to the manual. Stage 2: Qualitative results yielded themes that suggest that participants benefitted from the intervention and that multiple factors contributed to successful implementation (Narrative Evaluation of Intervention Interview, User Feedback Survey-Modified, Post-Treatment Interviews). Therapists achieved 100% treatment fidelity. Quantitative results from the Client Satisfaction Questionnaire-8 suggest that the intervention was acceptable. Stage 3: The culturally adapted manual was finalized.

Conclusions: Results of this study suggest that the revised WtoH manual is acceptable and feasible. US therapists exhibited adherence to the protocol. The three-stage methodology was successfully employed to cross-culturally adapt an intervention that is well-suited for a Phase II randomized controlled trial among US military Veterans.

Keywords

Cognitive behaviour therapy, mental health, suicide prevention

History

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Introduction

Since the commencement of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), suicide rates have risen among all branches of the US military [1], with more than 1100 members of the Armed Forces dying by suicide between 2005–2009 [2]. Moreover, the suicide rate has more than doubled among active duty Army personnel during this same period of time [3].

In addition, OEF/OIF military personnel are sustaining traumatic brain injuries (TBI) secondary to combat exposure [4]. TBI is often described as a ‘signature injury’ of the OEF/OIF conflicts, with estimates suggesting that 8–20% of those who served have sustained a TBI [5]. Research also suggests that TBIs are common among Veterans from previous conflicts (e.g. Vietnam [6]).

Suicides after TBI have been documented among Veterans from successive armed conflicts since the First World War [7–9]. Current reports continue to support that history of TBI is a risk factor for future suicidal behaviour [10, 11]. Seminal work by Teasdale and Engberg [11] suggested that civilian patients with a history of TBI were 2.7–4-times more likely to die by suicide when compared to members of the general population [11]. Similarly, growing evidence among the Veteran population confirms that there is a greater risk of death by suicide after TBI. In a large study of 7850472 Veterans receiving Veterans Health Administration (VHA) services, 49626 Veterans were diagnosed with mild and moderate-to-severe TBI. Among this sub-set, death by suicide occurred at 1.98- (mild TBI) and 1.34- (moderate-to-severe TBI) times the rate of the general VHA population [10]. This significantly increased risk across all levels of TBI severity was identified after controlling for important confounding factors such as psychiatric diagnoses and demographics [10]. Despite the clinical seriousness of this problem, there are scarce evidence-based psychological or pharmacological interventions for mental health problems [12] or for suicide [13] among Veterans with TBI.

In the general population, hopelessness is an important and modifiable risk factor for suicide [14]. Specifically, research has found that hopelessness is a stronger predictor of suicide than depression itself [15, 16]. Among people with TBI, hopelessness is a strong predictor of suicidal ideation, with suicidal ideation a strong predictor of post-injury suicide attempts [17].

Window to Hope (WtoH), a cognitive-behavioural treatment programme, was devised to reduce hopelessness among people with severe TBI in the chronic phase of their injury (i.e. greater than 1 year). The programme was evaluated by means of a randomized controlled trial (RCT) [18]. The results of the trial were promising. The treatment group reported a significant reduction in hopelessness compared to a comparison group receiving standard care ($p=0.002$). There was a strong treatment effect ($d=1$), with the majority of participants maintaining or experiencing a further decrease in hopelessness at 3 months follow-up [18]. The trial was well designed, rated as at eight out of 10 on the PEDRO scale by the PsycBITE database [19]. As the only validated treatment that specifically targeted suicide risk after TBI [13], testing the efficacy of WtoH within the US Veteran context was considered an important priority.

There is broad international consensus for the importance of implementing evidence-based interventions to treat mental health problems after TBI [20]. However, there has been limited discussion about how this might be achieved at a country-by-country level. In most hierarchies of evidence, a single well-designed RCT is not sufficient grounds for establishing a 'practice standard' [21]. In the current replication process with US Veterans there were additional considerations. The original trial was conducted on a modest sample ($n=17$), and among civilians recruited from a single rehabilitation service from another country. Therefore, the investigators deemed that a Phase II replication trial was an important intermediate step to broader implementation of WtoH within the US Veteran context.

Preliminary to the conduct of any such trial, the cross-cultural adaptation of the programme was crucial. Research suggests that mental health interventions may be more effective when they are adapted for a specific cultural group [22]. The current adaptation process involved two cross-cultural transitions, from a civilian to a military context and at a national cultural level, from an Australian to a US context.

Awareness and appreciation of military culture has been identified as critical to delivering mental health services to Veterans [23]. Specifically, those working with Veterans should be aware of how factors such as shared language, norms, values and training experiences may impact care [23, 24]. For example, skills taught within military culture tend to be 'specific, concrete and action oriented' ([25], p. 104). Bryan et al. [25] suggested that, similarly, suicide prevention-related strategies for this population should have the same characteristics and that patients should be taught not only what to do and when to do it, but also shown *how* to do it.

In terms of national cultural factors, Australian and US cultures have many *et*ics (common factors) that facilitate cross-cultural adaptation. This is supported by their similar ratings on the United Nations Human Development Index

(HDI) [26], one index of cultural proximity. Despite these common factors, there may be important *em*ics (aspects unique to each culture) which could impact the successful implementation of the WtoH intervention. Thus, national cultural differences were also incorporated into the adaptation process.

To the best of the authors' knowledge, Gan et al. [27] provided the first detailed account of the adaptation of a psychological/psychosocial intervention programme across client groups (i.e. from adults to adolescents) in the field of acquired brain injury. The procedures devised by Gan et al. [27] provided the model for the current study.

Design

The cross-cultural adaptation of the WtoH intervention utilized a mixed-methods approach which was implemented across three distinct stages, as outlined in Figure 1. The first stage involved hosting a consensus conference, utilizing Nominal Group Technique (NGT) procedures (e.g. Larkins et al. [28]), in which key community stakeholders learned about the intervention and worked together to reach consensus regarding necessary modifications to the original WtoH treatment manual. The second stage of the cross-cultural adaptation included conducting four pilot groups with US therapists and Veterans and collecting baseline and follow-up data to assess the feasibility and acceptability of the revised WtoH intervention, as well as therapist adherence to the protocol (i.e. fidelity). Feasibility refers to the ease with which the intervention can be implemented, whereas acceptability refers to the sustainability of intervention [29]. Fidelity is the extent to which the intervention can be delivered as intended [29]. The pilot groups also provided the opportunity to fine tune the content and format of the adapted WtoH intervention [29]. During the third stage of the adaptation process, the authors re-convened by phone with the participants who attended the original consensus conference to review the results from Stages 1 and 2. During this stage, participants were also provided the opportunity to offer final feedback regarding the WtoH cross-cultural adaptation.

Stage 1: Expert consensus conference and revision of the original WtoH manual

Participants

In order to recruit diverse stakeholders to attend the consensus conference, the authors sought professionals familiar with Veterans, mental health and recovery models, rehabilitation and/or TBI. As suggested by Hussler et al. [30], members of the Veteran community were also included as participants. Ten individuals were invited and nine attended. Characteristics of the consensus conference attendees are presented in Table I. The developer of the original WtoH intervention (GKS) and the Veterans Integrated Service Network 19 Mental Illness Research, Education and Clinical Center (VISN 19 MIRECC) research staff (four psychologists and one research assistant) were also in attendance and one of the study psychologists (BBM) served as the moderator of the conference.

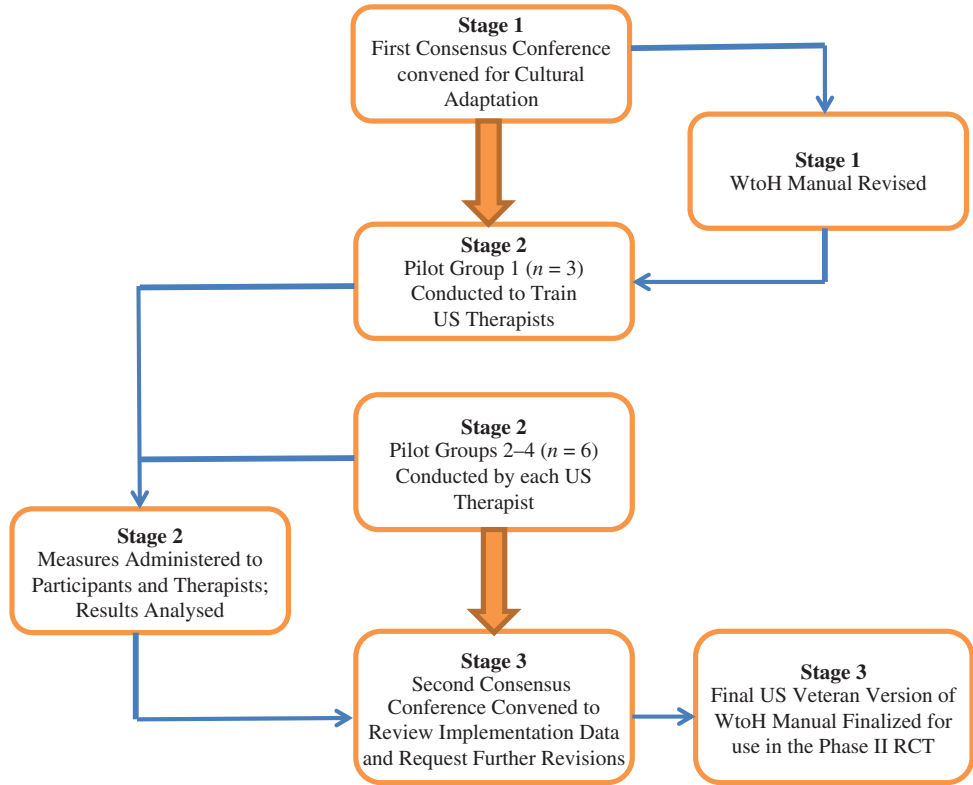


Figure 1. Three-stage study design.

Table I. Consensus conference participant characteristics.

Primary Expertise	VA Medical Center Service	Gender	Veteran status
Peer Support Specialist ^a , TBI Survivor	Mental Health	Male	Veteran
Peer Support Specialist ^a , Parent of TBI Survivor	Mental Health	Female	Veteran
Clinical Psychology	Mental Health	Female	Civilian
Clinical Psychology	VISN 19 MIRECC ^b	Female	Civilian
Rehabilitation Psychology	Spinal Cord Injury	Female	Civilian
Neuropsychology	Patient Focused Care	Female	Civilian
Neuropsychiatry	VISN 19 MIRECC ^b	Male	Civilian
Social Work	VISN 19 MIRECC ^b	Female	Civilian
Post-deployment Needs ^c	OEF/OIF/OND ^c Clinic	Male	Veteran

^aPeer Support Specialist: A Veteran with a mental health and/or co-occurring condition who has real-world experience in helping other Veterans cope and identify recovery-related tools and resources.

^bVISN 19 MIRECC: Veterans Integrated Service Network 19 Mental Illness Research, Education and Clinical Center.

^cThe OEF/OIF/OND (Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn) Clinic specializes in providing case management services to Veterans who were deployed to OEF/OIF/OND and focuses on post-deployment and transition-related issues.

Procedures

Attendees participated in a day-long consensus conference to adapt the WtoH treatment manual for the US Veteran population. Prior to the consensus conference, local Institutional Review Board (IRB) approval was obtained and each attendee was provided with relevant journal articles, the meeting agenda, charge for the day, a copy of the original WtoH manual and an initial list of suggested changes (described below) to the manual, as identified by research staff. To begin the consensus conference, attendees were introduced to one another and reminded of the day’s agenda and the purpose of the meeting.

The following conference procedures were consistent with the NGT for conducting consensus conferences (e.g. Larkins et al. [28]). The moderator provided the attendees with a list

of the 10 sessions included in the original WtoH intervention, which covers seven different topics (see Table II). Attendees were then asked, ‘From your perspective as a provider, Veteran and/or family member, what topics related to Veterans with a history of TBI would be important to cover in the WtoH treatment?’ Conference attendees were given time to individually brainstorm regarding any topics in addition to the original seven they thought may be important to include in the revised manual. Attendees ranked up to 10 topics that they felt were important to include in the adapted version of the manual. They were told that this list could include the original WtoH topics and/or any new topics they identified during brainstorming. Attendees wrote down desired topics on separate index cards, which were numbered 1–10, and did not include any identifying information on the cards in order to preserve anonymity.

Table II. Window to Hope session topics.

Session	Therapeutic principle	Goals
1. Getting started	Group formation	Group participants meet, introduce programme theme
2. Living a positive lifestyle	Behavioural activation	Examine relationship between affect and lifestyle factors
3. Thoughts and feelings	Socialization to CBT	Learn about the relationship between thoughts and feelings
4, 5. Take another look	Cognitive restructuring	Learn how cognitive restructuring can ameliorate distress
6, 7. Problem-solving	Problem-solving	Develop a systematic approach to solving problems
8. Problem-solving and recovery	Compensatory techniques	Develop skills to facilitate adjustment to the extent of post-injury recovery
9. Building hope	Relapse prevention: Post Traumatic Growth	Identify means of building hope after TBI, self-esteem
10. Building hope	Relapse prevention: Post Traumatic Growth	Making meaning of TBI, positive expectancy and building connections

Table III. Key changes made to the US veteran version of WtoH.

Australian Civilian Version	US Veteran Version
National Cultural Changes	
European spelling (e.g. realise)	American spelling (e.g. realize)
Australian food pyramid	US Department of Agriculture ‘My Healthy Plate’
Australian Quit Line	US Smoking Cessation Hotline
Australian activities (e.g. netball)	American activities (e.g. football)
Australian phrases (e.g. ‘having a good mortgage’)	American phrases (e.g. ‘being able to purchase a home’)
Civilian to Veteran Cultural Changes	
Australian Civilian Version	US Veteran Version
Standard brief relaxation breathing exercises	Include common military experiences when teaching skills (e.g. refer to tactical breathing when teaching deep breathing)
‘Hero’ refers generally to people facing physical danger or taking on major social challenges (e.g. facing down discrimination)	Consider Veteran culture with word choice (e.g. how using the word ‘hero’ may impact Veterans)

Research staff collected all of the cards, then read aloud and recorded all #1 ranking responses, then all #2 responses and so on until all responses were read and recorded. The moderator then facilitated attendee discussion and clarification of the topics. Similar items were grouped together through this collaborative process. Prior to finalizing grouped response topics, the moderator checked with attendees to ensure that the wording of the topic accurately reflected the responses provided.

After the topics to include were agreed upon, the attendees discussed the order in which they should be presented within the manual. Finally, research staff reviewed and requested feedback regarding the suggested changes to the manual that were identified by the research team prior to the consensus meeting. These changes were related to word choice and images used in the manual and were based on identified differences between both military and civilian and Australian and US cultures. Attendees were then given the opportunity to suggest additional changes.

Results

Among the attendees, there was 100% consensus that all seven original WtoH topics should continue to be included in the cross-cultural adaptation of the intervention and that the topics should remain in the original order. Attendees also identified 12 additional topics for consideration. After discussing these topics, the attendees grouped them into the following six domains: psychoeducation, resources, family relationships, vocational assistance, distress tolerance and the role of medications. The attendees continued discussing each of these potential new topics for inclusion in the revised

manual. To facilitate this discussion, additional information about the specific content of the WtoH sessions was provided (GKS). With this information, attendees reached 100% consensus that the suggested six domains should not be added to the revised WtoH treatment manual. Attendees agreed that the topics of psychoeducation and distress tolerance were adequately addressed in the manual; resources, vocational assistance and family relationships could easily be discussed in the context of the group if these topics arose; and the role of medications was beyond the scope of the intervention.

Following completion of the NGT procedures, research staff and conference attendees reviewed suggested changes to the treatment manual. Attendees concurred with the 10 idiosyncratic changes to wording and images suggested by the research staff. Attendees also identified 22 additional changes to be made that accounted for differences between both Australian and US culture and military and civilian culture. The key changes are provided in Table III. In summary, the changes reflected the replacement of idiosyncratic language with broad, inclusive wording that was more relevant to the US Veteran population. Of note, because the salience of the Veteran-specific changes will vary with respect to a participant’s military experiences, they were not explicitly added to the worksheets in the participant manual, but will be suggested to the provider in the therapist manual.

Revision of the treatment manual

In preparation for Stage 2 of this study, the WtoH treatment manual was revised by the research team. Minutes taken from

the consensus conference were utilized to ensure that changes made reflected the consensus obtained during the initial conference.

Stage 2: Pilot groups: Examining feasibility, acceptability and fidelity

Participants

Prior to commencing recruitment, local IRB approval was obtained. Potential participants were recruited through the use of flyers that were distributed throughout the Department of Veterans Affairs Medical Center (VAMC) where the study took place and in the community. Presentations were also made to clinical staff at the VAMC for recruitment purposes. Screening procedures were utilized to determine eligibility status of potential participants based on the following criteria: age between 18–89; positive history of moderate and/or severe TBI per the Ohio State University TBI-Identification Method [31]; and no history of alcohol abuse within 7 days or non-alcohol substance abuse within 30 days of baseline assessment as identified on the MINI International Neuropsychiatric Interview (MINI) [32].

Thirty-two potential participants expressed interest in the study and were screened for the pilot groups. Twenty did not meet eligibility criteria. Of the 12 who met inclusion criteria, nine were consented (see Figure 2). The nine enrolled participants were all male with an average age of 54.4 years (range = 28–67 years). Eligible participants were enrolled in the study into groups of two or three Veterans each. These small groups were consistent with delivery of the original WtoH intervention and were conducted in such a manner to

manage participants’ potential difficulties with attention and cognitive fatigue. Limiting the group size also provided time to pace the rate at which new concepts were introduced and to ensure that each participant was able to understand key ideas.

Procedures

Four pilot groups were conducted utilizing the revised WtoH treatment manual. Prior to the commencement of each group, participants were screened and baseline data were collected. Pilot Group 1 was facilitated by GKS and provided training for the three US therapists, all Psychologists (BBM, TAC, GMS), who would deliver WtoH in the Phase II trial. Pilot Group 1 was delivered over 10 consecutive working days.

Pilot Groups 2–4 were facilitated individually by each study therapist who had been trained during Pilot Group 1. These groups were held twice a week for 5 weeks, for ~2 hours per session. Thus, all pilot group participants were offered the full 20 hours of the intervention. Pilot Group 1 was audio and video recorded for training purposes and Pilot Groups 2–4 were audio recorded for treatment fidelity purposes. Due to the condensed delivery adding to participant burden, Pilot Group 1 participants were also compensated for their time and travel to each session. Attendance logs were maintained to collect data regarding the feasibility of the intervention. Treatment fidelity was assessed for each session of Pilot Groups 2–4 through use of a Fidelity Rating Checklist created for the WtoH intervention by an independent rater (LAB). To further facilitate training and fidelity, LAB facilitated discussion and feedback as it related to the checklist.

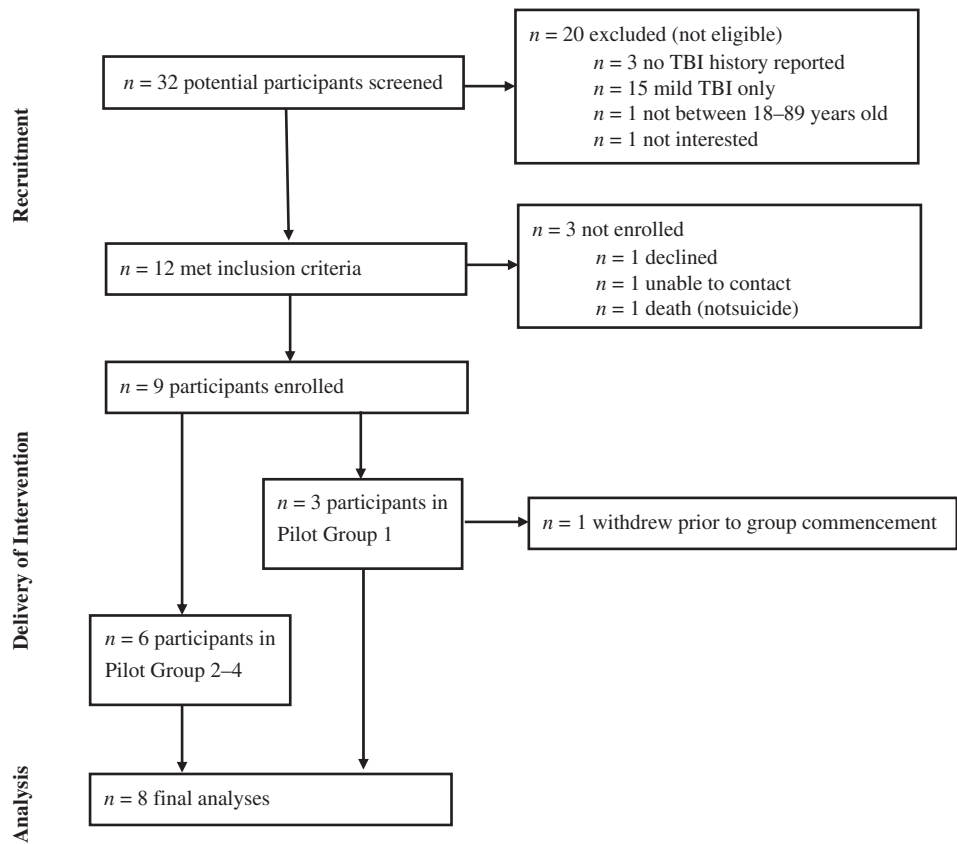


Figure 2. Stage 2 participant flow diagram.

Within 2 weeks of completion of the pilot groups, participants completed follow-up assessments related to the acceptability and feasibility of the intervention. Additionally, study therapists completed measures (i.e. User-Feedback Survey-Modified and Post-Treatment Interviews) also related to acceptability and feasibility. The results from one of the Post-Treatment Interviews was not correctly electronically saved and, thus, these data are missing from the results presented below.

Measures

Participant measures

Client Satisfaction Questionnaire-8 (CSQ-8 [33]). The CSQ-8 is an eight-item questionnaire that was used to assess participants’ satisfaction with therapy at the post-treatment follow-up visit. Data from the CSQ-8 were used to inform the acceptability of the intervention to the participants as well as feasibility. This measure has been used frequently for evaluating standard community mental healthcare [33–35].

Narrative Evaluation of Intervention Interview (NEII [36]). The NEII, administered at the follow-up visit by research staff, is a 16-item semi-structured interview that is designed to help participants evaluate and describe the process and outcome of an intervention [36]. These data informed the acceptability of the intervention to participants in addition to feasibility. The NEII has been used to evaluate treatments for seriously mentally ill adults and has been shown to elicit participant responses regarding an intervention without referring to any expected outcome [37].

Therapist measures

User Feedback Survey–Modified (UFS-M [38]). A modified version of an existing user feedback survey [38] was used to obtain therapists’ feedback regarding implementation of WtoH following Pilot Groups 2–4. These data were used to inform acceptability of the intervention to the therapists as well as feasibility. The study therapists responded to closed- and open-ended questions regarding their experience implementing WtoH.

Post-treatment interviews. Post-treatment interviews were conducted and transcribed by LAB at the end of Pilot Groups 2–4 to inform acceptability of the intervention to the therapists as well as feasibility. Study therapists were interviewed individually and asked about: (1) their general perception of WtoH; (2) barriers and facilitators to

implementation; and (3) recommendations regarding possible revisions.

Fidelity rating checklist. The checklist was developed for the purpose of this study and was adapted from other commonly used fidelity rating scales, such as the Cognitive Therapy Scale [39]. The checklist was designed to capture therapists’ adherence to two components of the intervention, content and process. Content refers to the topics and information included in the manual. Process was defined as facilitation of group discussion, participant learning and meaning making.

Analyses

Quantitative data was analysed descriptively. Responses to qualitative measures were reviewed by LAB. The responses were coded and universal themes were identified until the point of saturation was reached [40], such that no new themes were identified [41]. The identified themes are presented below.

Results

Acceptability

The data regarding the CSQ-8 is displayed in Table IV. Total scores can range from 8–32. The mean score from WtoH participants was 26.5 (SD = 4.44, Range = 17–30).

Responses on the NEII were typically brief in nature (e.g. a few words to one or two sentences). Analysis identified two primary themes in Veterans’ responses to questions posed on the NEII, which suggested that they benefitted from the programme and were able to identify specific changes they made in response to treatment participation. One Veteran spoke about how he benefitted from the intervention’s focus on hopelessness, noting that participating in the group gave him a ‘better understanding of how to deal with hopelessness and that you just should not give up. That there is hope out there’. Another participant mentioned the following specific changes as a result of his experience of participating in the group, ‘Change in my outlook of hopefulness, it make me more hopeful’. A third Veteran highlighted changes stating,

It definitely helped me. It got me thinking on whole different levels. Before I started, I was all wound up and looking at things really one way. This programme you know I have been looking at things from a whole different perspective . . . I helped myself. That is the only way I can put it. I just look at myself differently. It made me feel better about myself.

Table IV. Client satisfaction questionnaire-8 results.

Item	Anchors	Range	Mean
Quality of Services	Excellent (4) to Poor (1)	3–4	3.75
Kind of Service	Yes, Definitely (4) to Definitely Not (1)	2–4	3.13
Needs Met	Almost All (4) to None (1)	1–3	2.63
Recommend to Friend	Yes, Definitely (4) to Definitely Not (1)	3–4	3.75
Help Satisfaction	Very Satisfied (4) to Quite Dissatisfied (1)	2–4	3.38
Deal with Problems	Great Deal (4) to Make Things Worse (1)	2–4	3.50
Overall Satisfaction	Very Satisfied (4) to Quite Dissatisfied (1)	2–4	3.13
Return to Program	Yes, Definitely (4) to Definitely Not (1)	2–4	3.25

Moreover, 'other than [one Veteran] remembering unpleasant situations' none of the programme elements were identified by the participants as being undesirable. No themes were identified with respect to Veterans not benefitting from the intervention.

The positive impact of WtoH was also noted by therapists on the UFS-M. The primary theme identified via analysis of the UFS-M responses reflected therapists' impressions that Veterans benefitted from the intervention and no contradictory themes were identified. For example, one therapist stated, 'Veterans appeared to benefit from problem-solving about their specific job situations. They appeared to experience relief and hope as a result'. Another therapist wrote,

The participants seemed energized by the programme—one a generalized increase in hopefulness, the second more acceptance and normalizing that the memory difficulties he was experiencing were not a personal failing but a sequelae of the injury that he could start learning to live with.

Feasibility

During post-treatment interviews therapists noted a number of factors facilitating successful implementation and delivery of the programme, including the detailed manual, small group sizes and group interactions. Barriers included group members with differences in injury severity, inconsistent participant attendance; and some topic areas that were more abstract and existential in nature (e.g. overarching life goals and finding purpose in life) and seemingly difficult for participants to understand. One therapist also suggested that the order of the final two sessions should be switched to facilitate delivery of the intervention.

Themes identified on the UFS-M suggested that the therapists felt ease in delivering the intervention and no themes with respect to difficulty with delivery were discovered. For example, one of the therapists noted, 'Fairly easy treatment to administer once the therapist has gone through the protocol at least once'. Another wrote, 'I appreciate the structure of the model. I think it gives therapists clear objectives and guidance while also providing opportunities for therapists to respond to the group as needed'.

Participant responses to the NEII overwhelmingly indicated that they would recommend the programme to other Veterans. For example, one Veteran stated, 'If they have a head injury, I would surely recommend it [WtoH] because like I said the tools and the information that you get through the programme is really helpful'. Additionally, one item on the CSQ-8 asked participants if they would recommend the service to a friend if they were in need of similar help. The average response on this item was 3.75, with 3 indicating 'Yes, I think so' and 4 indicating 'Yes, Definitely'.

In terms of group attendance, nine participants initially enrolled in the pilot groups (three in Pilot Group 1 and two each in Pilot Groups 2–4; see Figure 1). One participant (from Pilot Group 1) withdrew from the study prior to the pilot group starting and, thus, did not complete the follow-up assessment. One participant (from Pilot Group 4) stopped

attending group after three sessions, but did complete the follow-up assessment. The remaining seven participants had an attendance rate of 90% or higher across the 10 treatment sessions.

Fidelity

To assess adherence for Pilot Groups 2–4, each therapist's audio-taped sessions were reviewed by at least one other study therapist who completed the Fidelity Rating Checklist. Additionally, LAB also reviewed 30% of randomly sampled sessions. To achieve fidelity in a given session, the therapist was required to present each content-related item and exhibit each process-related behaviour listed on the checklist. Each therapist achieved 100% fidelity for each session of Pilot Groups 2–4. Finally, LAB and study therapists met weekly to discuss delivery of the intervention to ensure fidelity.

Stage 3: Final development of US Veteran version of WtoH treatment manual

Participants and procedures

Following completion of the pilot groups and collection of post-treatment data, a follow-up meeting to the original consensus conference was convened by phone to review the results from the pilot groups. All attendees from the consensus conference held during Stage 1 were invited to attend by phone. Three attendees from the initial consensus conference, plus six members of the WtoH research team attended the follow-up conference. During this meeting, previously agreed upon edits to the manual were presented along with pilot group acceptability, feasibility and fidelity results. Additionally, attendees were provided with the opportunity to suggest additional revisions to the treatment manual.

Results

One attendee suggested an additional modification to the treatment manual. Both the original and revised manual contained an Australian media story that was used by the therapist to facilitate a discussion on hope and self-esteem. The attendee suggested replacing the Australian media story with a US Veteran's story and specifically recommended utilizing the Department of Veteran's Affairs (VA) online resource, *Make the Connection* [42], which contains a video featuring a Veteran TBI survivor, for this purpose. Attendees reported 100% concurrence regarding the decision to replace the original media story and also agreed with all previous changes that had been made to content and formatting of the manual. The research team received permission to incorporate content from the *Make the Connection* website into the revised WtoH intervention manual.

Two additional modifications were made to the programme based on feedback provided by the therapists. First, the original WtoH manual utilized the saying, 'Stop, Revive, Survive' to teach participants how to increase positive self-talk (Session 4). Although this saying is well-known in Australia, it is not a saying that is familiar within US culture. Study therapists proposed that the saying, 'Stop, Drop and Roll' (a more culturally relevant US saying) be utilized

instead and all study team members agreed to make this modification for the RCT. Second, a key image utilized as a didactic device for Sessions 9–10 was upgraded. These accepted changes yielded a final version of the treatment manual to be implemented during the RCT with US Veterans.

Discussion

The present study utilized a rigorous mixed-methods approach to achieve the goal of developing a cross-cultural adaptation of the WtoH treatment. The findings suggest that the US Veteran adapted version of the WtoH intervention is acceptable and feasible to both US Veterans and VA treatment providers. Additionally, no significant cultural barriers with respect to the content of the treatment were identified. While the overall content of the programme remained the same, important idiosyncratic changes were made to increase the cultural relevance of the treatment to the US Veteran population. Results regarding fidelity to the treatment model suggest that the WtoH intervention can be successfully implemented by a variety of therapists in the VA setting, not just the developer of the intervention.

The implementation data obtained in this study suggested that the three-stage methodology employed was an effective procedure not only for culturally adapting the intervention, but also for providing data regarding implementation of the adaptation. Multiple stakeholders were included in the adaptation, which likely contributed to the success of the methodology. It has been suggested that, in conducting cross-cultural adaptations, researchers achieve a balance between meeting the needs of the population being served and the maintenance of scientific integrity through the inclusion of key stakeholders [43]. Of note, Veteran stakeholder input was obtained throughout the adaptation process. Veterans were involved as community stakeholders in the development of the adaptation and also as participants in the pilot groups.

The types of modifications that were made to the WtoH intervention also likely contributed to the success of the adaptation. The changes made were consistent with the need to include culturally relevant content while preserving the active components of the treatment, two aspects of cross-cultural adaptation highlighted in the literature. Research suggests that interventions adapted for specific populations are 4-times more effective than interventions that are provided to patients from a multitude of cultural backgrounds [22]. Cardemil et al. [44] highlight the importance of including culturally relevant content in mental health interventions. The authors note that, with CBT-based interventions, such as WtoH, this can be done through the inclusion of examples that are culturally relevant, rather than altering any of the key components of the intervention. Similarly, Zayas et al. [43] state that, when conducting cross-cultural adaptations, it is critical to maintain the active ingredients of the intervention that contribute to the mechanism of change. This study's focus on culturally relevant content in a manner that preserves the active treatment components has led to an adapted intervention that is believed to be well-suited for examining its efficacy in future trials to promote hope

among US Veterans with a history of TBI. Despite that further changes were made to the manual during Stage 3 (after implementation data was collected), these changes do not alter the active components of the treatment and, thus, it is not expected that this would alter the implementation data.

The current study is not without limitations. Despite the inclusion of multiple stakeholder groups, not all stakeholders attended Stage 3 of the adaptation process. Importantly, the two Veteran stakeholders that attended the initial consensus conference were unable to attend the final meeting and, thus, were unable to provide feedback regarding the intervention modifications and pilot group results. Additionally, two factors may limit the generalizability of the results to the broader Veteran TBI population. First, the sample size of the pilot groups was small. Only 12 out of 32 potential participants met inclusion criteria, however the majority ($n=18$) were excluded because they had no history of moderate or severe TBI. While this excludes potential participants representative of the broader TBI Veteran population, it includes those with moderate-to-severe TBI, whom the intervention was specifically developed for. Furthermore, the demographic composition of those included was similar to that of the general US Veteran population [45]. Second, the structure of the pilot groups with respect to the number and frequency of sessions varied across pilot groups and is different than how the intervention was originally designed to be delivered. The overall dose of treatment (i.e. 20 hours), however, was consistent across the original intervention, for all pilot groups. The Phase II RCT will provide the opportunity to address both of these factors as the sample size will be much larger and the number and frequency of sessions will be more consistent.

The results of this study encourage future research regarding the three-stage mixed methods procedure employed. Further data regarding the effectiveness of the methodology could be obtained by utilizing it in the cross-cultural adaptation of other interventions. Factors such as the type of intervention, the level of cultural proximity and type of implementation data obtained could all be explored. Additionally, the acquisition of data regarding the utility of the various components of the methodology (e.g. Nominal Group Technique, multiple stakeholders, anonymity, etc.) would facilitate further refinement of the methodology.

Having completed the cross-cultural process, the Phase II replication trial has commenced. To the best of the authors' knowledge, this will be the first time that a psychological intervention for a mental health issue after TBI will be replicated in a second trial. Given that the structure of the intervention was confirmed during the cross-cultural adaptation process and the evaluation protocol is almost identical, it provides a unique opportunity to pool the results from both studies once the current trial is completed. In addition to testing the efficacy of the intervention, the research team is continuing to administer implementation measures to gather more data regarding the feasibility, acceptability and fidelity of this revised intervention. These data will provide more evidence regarding this promising intervention aimed at reducing hopelessness in the high risk population of US Veterans with a history of TBI.

Declaration of interest

The views in this paper are those of the authors and do not necessarily represent the official policy or position of the Department of Veterans Affairs or the United States Government. This work was in part supported by the Military Suicide Research Consortium (MSRC), an effort supported by the Office of the Assistant Secretary of Defense for Health Affairs under Award No. (W81XWH-10-2-0178). Opinions, interpretations, conclusions and recommendations are those of the authors and are not necessarily endorsed by the MSRC or the Department of Defense.

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Research report

Sleep problems outperform depression and hopelessness as cross-sectional and longitudinal predictors of suicidal ideation and behavior in young adults in the military[☆]

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ABSTRACT

Background: Sleep problems appear to represent an underappreciated and important warning sign and risk factor for suicidal behaviors. Given past research indicating that disturbed sleep may confer such risk independent of depressed mood, in the present report we compared self-reported insomnia symptoms to several more traditional, well-established suicide risk factors: depression severity, hopelessness, PTSD diagnosis, as well as anxiety, drug abuse, and alcohol abuse symptoms.

Methods: Using multiple regression, we examined the cross-sectional and longitudinal relationships between insomnia symptoms and suicidal ideation and behavior, controlling for depressive symptom severity, hopelessness, PTSD diagnosis, anxiety symptoms, and drug and alcohol abuse symptoms in a sample of military personnel (N = 311).

Results: In support of a priori hypotheses, self-reported insomnia symptoms were cross-sectionally associated with suicidal ideation, even after accounting for symptoms of depression, hopelessness, PTSD diagnosis, anxiety symptoms and drug and alcohol abuse. Self-reported insomnia symptoms also predicted suicide attempts prospectively at one-month follow up at the level of a non-significant trend, when controlling for baseline self-reported insomnia symptoms, depression, hopelessness, PTSD diagnosis and anxiety, drug and alcohol abuse symptoms. Insomnia symptoms were unique predictors of suicide attempt longitudinally when only baseline self-reported insomnia symptoms, depressive symptoms and hopelessness were controlled.

Limitations: The assessment of insomnia symptoms consisted of only three self-report items. Findings may not generalize outside of populations at severe suicide risk.

Conclusions: These findings suggest that insomnia symptoms may be an important target for suicide risk assessment and the treatment development of interventions to prevent suicide.

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"In the states of depression in spite of great need for sleep, it is for the most part sensibly encroached upon; the patients lie for hours, sleepless in bed, ... although even in bed they find no refreshment." Emil Kraepelin (1921)

1. Introduction

If asked to list the top few warning signs for imminent suicidal behavior, relatively few mental health professionals – even experienced ones; indeed even specialists – would list insomnia. But perhaps should, as mounting evidence makes clear (Ağargün and Cartwright, 2003; Bernert et al., 2005; Fawcett et al., 1990; Krakow et al., 2011; Turvey et al., 2002; Wojnar et al., 2009). Here, we extend this evidence by documenting robust links between sleep problems and suicidality, both cross-sectionally and longitudinally, and both with regard to suicidal ideation and suicidal behavior. Crucially, in all cases, we show that the links between sleep problems and suicidality exist beyond the involvement of factors mental health professionals would list as among the top few clinical risk indices for suicidality—namely, depression, hopelessness, PTSD, anxiety, and drug and alcohol abuse (Beck et al., 1990; Nock et al., 2010; Oquendo et al., 2002, 2004).

2. Why would sleep problems be involved in suicidality?

In the moments before their deaths, suicide decedents are almost never described by others as “sluggish” or “slowed down” – a perhaps surprising fact given the well-known association between depression – which can certainly slow people down – and suicidality. How are they usually described then? Descriptors of severe anxiety and terms such as “agitated,” “on edge,” and “keyed up” come up quite regularly (Busch and Fawcett, 2004; Hall et al., 1999). If others are queried about the days and nights preceding the death, another term is likely to surface: “sleepless” (Hall et al., 1999; McGirr et al., 2007; Tanskanen et al., 2001).

Suicide is inherently difficult because it requires overcoming basic self-preservation instincts (Joiner, 2005). This may be one factor that contributes to why decedents, in the moments before death, are rarely viewed as “sluggish” and are frequently viewed as “keyed up.” Those whose death by suicide is imminent are physiologically aroused (Busch and Fawcett, 2004; Busch et al., 2003; Hall et al., 1999); were they not, something as daunting as death would likely be too difficult to enact. Indeed, many of them are physiologically overaroused (Busch and Fawcett, 2004; Busch et al., 2003; Kovaszny et al., 2004).

This state of overarousal appears to be a higher-order, underlying substrate with several manifest indicators, including various aspects of agitation and sleep disturbance. The focus in the current study is insomnia, which, for the purposes of this investigation, refers to a difficulty initiating or maintaining sleep that results in daytime consequences (e.g., fatigue). In this context, insomnia may be understood as one indicator of a psychological overarousal, which in turn may be associated with elevated risk for acute death by suicide. The emphasis of the current project is placed on insomnia not only because it is believed to be a key indicator of the overarousal, but also because it may be a clinically modifiable risk factor

(Fawcett et al., 1990); furthermore, it is a topic many patients may be more likely to discuss with clinicians, in contradistinction to topics like suicidality and depression (Britt et al., 2008; Green-Shortridge et al., 2007; Hoge et al., 2004).

It is important to emphasize that the mechanisms underlying the relationship between insomnia symptoms and suicide remain unclear and under-researched. The overarousal hypothesis is offered as one potential explanation; however, there are a number of other possible explanatory pathways that might account for the link. Of note, there is some evidence to suggest that insomnia symptoms may impair decision making (Killgore et al., 2006), impulsivity (Schmidt et al., 2010), and exacerbate mood symptoms (Baglioni et al., 2010)—all of which may serve to mediate the relationship between insomnia symptoms and suicidal ideation and behavior.

3. Past research on sleep problems and suicidality

Despite the lack of theoretical research on why sleep would be associated with suicide risk, a growing body of evidence suggests that disturbed sleep may constitute an important, modifiable risk factor for suicide. Multiple sleep problems appear to predict elevated risk for suicide including insomnia, poor sleep quality, and nightmares (Ağargün and Cartwright, 2003; Ağargün et al., 1998; Bernert et al., 2005; Fawcett et al., 1990; Tanskanen et al., 2001). Supporting the construct validity of this association, this effect has been demonstrated controlling for depression, across diverse populations (*clinical, nonclinical*; Bernert et al., 2005, 2008), designs (*longitudinal, cross-sectional; epidemiologic, psychological autopsy studies*; Bernert et al., 2005; Bernert et al., 2007; Goldstein et al., 2008; Sabo et al., 1991), assessment techniques (*objective, subjective sleep indices*; Bernert et al., 2005; Goldstein et al., 2008; Sabo et al., 1991) and outcome measures (*suicide ideation, suicide death*; Ağargün et al., 1997a; Barraclough and Pallis, 1975; Bernert et al., 2007).

Of specific sleep disturbances that may increase suicidality, insomnia and its attendant fatigue have received the most research attention, but even so, there remain important research questions to address. Cross-sectionally, insomnia has repeatedly been linked to greater levels of suicidal ideation (Ağargün et al., 1997a; Barraclough and Pallis, 1975) even after controlling for depressive symptoms (Bernert et al., 2005, 2009; Chellappa and Araújo, 2007), and suicidal behavior (Goldstein et al., 2008; Sjöström et al., 2007). Longitudinal studies (though few) provide even more compelling evidence, indicating that insomnia emerges as a significant predictor of later suicidal ideation (McCall et al., 2010) and death by suicide (Fawcett et al., 1990; Fujino et al., 2005; Turvey et al., 2002).

4. The present study

In the current study, the literature on insomnia and suicidality is built upon. As can be discerned in Table 1, studies conducted to date vary considerably in terms of whether they examine suicidal ideation, behavior, or death by suicide as outcomes, whether they consider depression or other covariates, whether their assessment approach included multi-method features, and whether their designs incorporated cross-sectional or longitudinal elements. As Table 1 shows, no study did all of these. The present study is the first to do

Table 1

Past research on insomnia and suicidality.

	Dependent variable			Control variable		Design	
	Ideation	Behavior	Assessment method	Depression	Other	Cross-sectional	Longitudinal
BarracloUGH and Pallis (1975)		X	Suicide death			X	
Fawcett et al. (1990)		X	Suicide death				X
Ağargün et al. (1997a)	X		Schedule for Affective Disorders and Schizophrenia (SADS) Suicide Subscale			X	
Ağargün et al. (1997b)	X		SADS Suicide Subscale			X	
Turvey et al. (2002)		X	Suicide death				X
Smith et al. (2004)	X		Beck Depression Inventory (BDI)—Item 9	X		X	
Bernert et al. (2005)	X		Beck Scale for Suicidal Ideation (BSS)	X		X	
Fujino et al. (2005)		X	Suicide death				X
Ağargün et al. (2007)		X	Suicide attempt			X	
Chellappa and Araújo (2007)	X	X	Scale for Suicide Ideation (SSI)		X _a	X	
Sjöström et al. (2007)		X	Suicide Assessment Scale (SAS)			X	
Bernert et al. (2009)	X		BSS	X	X _b	X	
Wojnar et al. (2009)	X	X	The World Health Organization (WHO) Composite International Diagnostic Interview (CIDI)	X	X _c	X	
McCall et al. (2010)	X		SSI		X _d		X
Krakow et al., (2011)	X		Depressive Symptoms Inventory—Suicide Subscale (DSI-SS)	X		X	
Current study	X	X	Modified Scale for Suicidal Ideation (MSSI)	X	X	X	X

Note. a—controlled for antidepressant and hypnotic medication use; b—controlled for presence vs. absence of mental disorder and symptom severity; c—controlled for presence vs. absence of mental disorder, chronic health problems, and demographics; d—controlled for age, gender, treatment status, and baseline suicidality.

so. In addition, it is the first study to our knowledge that evaluates sleep disturbance in association with suicide risk in a military population.

Using archival data of a sample of young adults in the military referred for suicidality, the cross-sectional associations at baseline between insomnia symptoms and interviewer-assessed suicidal ideation are examined, controlling for hopelessness, depression, PTSD diagnosis, anxiety, drug abuse and alcohol abuse. A substantial subset of the participants was assessed one month later, allowing for the examination of longitudinal associations, between insomnia symptoms and suicidal ideation and behavior.

5. Method

5.1. Participants

Participants for this study included 311 individuals (255 men [82%]; 56 women), evaluated as they entered a study on the efficacy of treatments for suicidal young adults (Rudd et al., 1996). All participants were referred for severe suicidality from two outpatient clinics, an inpatient facility, and an emergency room. All facilities were affiliated with a major U.S. Army Medical Center. Approximately 40% had a diagnosis of major depressive disorder, 15% had a bipolar spectrum diagnosis (i.e. Bipolar I Disorder, Bipolar II Disorder, Cyclothymic Disorder, and Bipolar Disorder-Not Otherwise Specified), 13% had anxiety disorders, 5% had been diagnosed with a schizophrenia spectrum disorder, 20% had co-morbid post-traumatic stress disorder (PTSD), and about 20% had a co-morbid substance use disorder. The total number of diagnoses averaged approximately three. Diagnoses were assigned using a computerized version of the Diagnostic Interview Schedule (Blouin et al., 1988). Average age was 22.19 (SD = 2.77). Sixty percent was Non-Hispanic White; 25.3% was African-American; 10.5% was Hispanic; 1.5% was Native American; 1.2% was Asian-American or Pacific

Islander; ethnicity was not classified for the remaining 1%. Forty-four percent was single; 37% was married; 10% was separated; 7% was divorced; 1% was widowed. Further details regarding the military experience of the sample (e.g., length of service, active duty status) are unavailable. Given the alarming increase in death by suicide in the military with close to 300 suicide deaths in active-duty military in 2009 alone (Luxton et al., 2009), the relevance and importance of the topic of the current study are difficult to overstate.

Of the 311 participants evaluated upon entry to the study, 239 were re-evaluated one month later. There were no differences on study variables between those who did and did not return except that those who did not return had slightly more suicidal ideation at baseline than those who did return (correlation between return/not and suicidal ideation was .12, $p < .05$).

5.2. Procedures

All participants provided full, informed, and written consent for research participation and were thoroughly clinically evaluated at pre-treatment (i.e., “baseline” assessment). All patients were offered rigorous treatment and were randomly-assigned to a problem-solving treatment or treatment-as-usual (as described by Rudd et al., 2000). A follow-up assessment was conducted post-treatment, one month after baseline. Interviews and administration of measures were conducted by clinical staff. Refer to Rudd et al., 1996 for more detailed information on procedures.

5.3. Measures

5.3.1. Insomnia symptoms

Assessed at both baseline and follow-up, the insomnia symptom index consisted of three items: Beck Depression Inventory (BDI; Beck et al., 1961) Items 16 (sleeplessness) and 17 (fatigue), as well as Suicide Probability Scale (SPS; Cull

and Gill, 1982) Item 33 (fatigue and listlessness). The BDI and SPS items are rated on a 0-to-3 rating scale. Scores on the insomnia symptom index could range from 0 to 9, with higher scores indicating greater symptom severity. Of note, BDI items 16 and 17 have been used in past literature as an index of sleep symptom severity (e.g., Perlis et al., 1997). Moreover, the use of a brief index has precedence in the literature on suicide risk. For example, the four-item Suicide Behaviors Questionnaire-Revised (SBQ-R; Osman et al., 2001) is psychometrically sound. The same can be said of the four-item Depressive Symptom Index-Suicidality Subscale (Metalsky and Joiner, 1997) and of the four-item P4 screener (Dube et al., 2010).

At baseline, the coefficient alpha of these three items was adequate at .71 and at follow-up was .76. As would be expected for a phenomenon that has episodic and state-like qualities (Buyse et al., 2010; Perlis et al., 1997; Vallières et al., 2005), the test-retest coefficient for the insomnia symptom index was in the moderate range ($r = .44, p < .01$). Test-retest coefficients in the moderate range are the norm for validated indices of insomnia, when the test-retest interval is three weeks or longer (as in the present study). For instance, in a sample of 50 undergraduates selected into a separate study for the presence of suicidal ideation, test-retest of the Insomnia Severity Index (Morin, 1993) over the course of three weeks was .41, $p < .05$ (Bernert and Joiner, in preparation).

Regarding validity, in approximately 200 undergraduates who completed the BDI and the Insomnia Severity Index for a separate study (Ribeiro et al., in press), the correlation between the composite of BDI Items 16 and 17 and ISI scores was .60, $p < .01$ (the SPS was not available in this particular sample)—substantial considering that the reliability ceiling of the three-item index is in the range of .71–.76, and the ceiling for the composite of the two BDI items is lower. Similarly, in the undergraduate sample alluded to above, the average correlation across the three week study between the composite of the two BDI items and the Insomnia Severity Index was .61, $p < .05$.

The insomnia symptom index at baseline served as the main independent variable of interest in the prediction of suicidal ideation cross-sectionally and of both suicidal ideation and suicide attempt longitudinally. Also, analyses were conducted in which the insomnia symptom index at follow-up served as the dependent variable and suicidal ideation served as a predictor, which allowed for examination of directionality of effects.

5.3.2. Modified Scale for Suicidal Ideation (MSSI; Miller, Norman, Bishop, & Dow, 1986)

The MSSI is an 18-item scale that is designed to assess several aspects of suicidality. Each MSSI item was rated on a 0 to 3 scale; a total score of 11 or greater indicates clinical significance. Miller et al. (1986) have reported reliability coefficients and construct validity data for this measure (see also Clum and Yang, 1995).

5.3.3. Psychosocial history

This interviewer-rated form assessed demographic information and relevant personal history. The form administered at follow-up included a question on whether a suicide attempt had occurred since baseline. Of the 239 participants

who returned for follow-up, ten reported suicide attempts between baseline and follow-up. We thus created a dichotomous variable (i.e. reflecting whether or not a suicide attempt occurred between baseline and follow-up), which served as a dependent variable in our longitudinal analysis predicting follow-up attempt status using the baseline insomnia symptom index, controlling for baseline suicidal ideation, depression, and hopelessness.

5.3.4. Millon Clinical Multiaxial Inventory (MCMI; Millon and Davis, 1997)

The original MCMI is a 175-item, true-false inventory. For the present purposes, the major depression, anxiety, alcohol abuse, and drug abuse subscales were used as covariates. The scales' reliability and validity appear to be adequate (Millon and Davis, 1997). The congruence of various versions of the MCMI scales has also been adequate (Marlowe et al., 1998). We use the depression subscale as measure of depression instead of the BDI to avoid contamination between predictor and dependent variables.

5.3.5. Beck Hopelessness Scale (BHS; Beck et al., 1974)

The BHS includes 20 true-false items that assess hopeless cognitions. The scale's reliability and validity have been supported (Metalsky et al., 1993). The BHS was used as a covariate; given that the BHS and the BDI share content and were developed by the same investigator, its use as a covariate in analyses involving our insomnia symptom index, also based in part on the BDI, may be considered a reasonably stringent data-analytic approach.

5.4. Data-analytic strategy

For cross-sectional analyses, we used multiple regression analyses, predicting MSSSI suicidal ideation. The insomnia symptom index, BHS hopelessness scores, and MCMI depression scores were entered simultaneously as predictors. Recognizing viable covariates beyond depression and hopelessness, we also entered PTSD diagnosis, baseline MCMI anxiety scores, substance abuse, and alcohol abuse scores as control variables.

Regarding longitudinal analyses, a similar approach was used to evaluate whether the insomnia symptom index at baseline predicted MSSSI suicidal ideation at follow-up, controlling for baseline MSSSI, BHS, PTSD, and MCMI scores. To evaluate directionality, we conducted a similar analysis in which the insomnia symptom index and MSSSI “switched places.” The dependent variable was the insomnia symptom index at follow-up, and predictors included baseline insomnia symptom index, MSSSI, BHS, PTSD, and MCMI scores. Additional analyses involved a logistic regression examining the relation of baseline insomnia symptom index to a variable reflecting whether or not participants reported a suicide attempt occurring between baseline and follow-up. Baseline MSSSI, BHS, MCMI anxiety, MCMI substance abuse, and MCMI alcohol abuse scores as well as PTSD diagnosis were controlled in these analyses.

6. Results

Means, standard deviations, and intercorrelations for all variables are presented in Table 2. Notably, symptom scores

Table 2

Means, standard deviations, and intercorrelations between all measures for study (N = 311 at Time 1, N = 239 at Time 2).

	1	2	3	4	5	6	7	8	9	10	11
1. Sleep—initial	—										
2. MSSI total—initial	.394**	—									
3. BHS total—initial	.553**	.488**	—								
4. MCMI major depression—initial	.338**	.297**	.375**	—							
5. MCMI anxiety—initial	.258**	.299**	.379**	.708**	—						
6. MCMI alcohol abuse—initial	.106	.154**	.060	.408**	.477**	—					
7. MCMI substance abuse—initial	.036	.027	-.226**	-.011	-.001	.544**	—				
8. PTSD	.231**	.200**	.131*	.131*	.204**	.184**	.096	—			
9. Sleep—1 month	.435**	.143*	.205**	.157*	.258**	.106	.036	.231**	—		
10. MSSI total—1 month	.274**	.315**	.225**	.142*	.119	.057	-.011	.148**	.303**	—	
11. Addtl suicide attempt—1 month	.135*	-.002	-.017	.022	.236	-.089	.001	.176**	.079	.264**	—
Mean	4.42	23.30	8.73	66.53	87.77	59.66	62.55	.23	2.83	5.98	.04
SD	2.67	10.42	6.36	13.43	20.35	17.63	19.34	.42	2.30	9.77	.20

** Correlation is significant at the .01 level (2-tailed).

* Correlation is significant at the .05 level (2-tailed).

are elevated at baseline. For the insomnia symptom index, the mean score was 4.42 ($SD = 2.67$). Mean MSSI scores were also elevated ($M = 23.30$, $SD = 10.42$), as expected. Participants reported an average score of 8.73 ($SD = 6.36$) on the BHS, 66.53 ($SD = 13.43$) on the MCMI depression subscale, 87.77 ($SD = 20.35$) on the MCMI anxiety subscale at baseline, 59.66 ($SD = 17.63$) on the MCMI alcohol abuse subscale, and 62.55 ($SD = 19.34$) on the MCMI drug abuse subscale (scores above 65 are in the clinical range). Further, all symptom scores were significantly intercorrelated at baseline, and with the insomnia symptom index ($M = 2.83$, $SD = 2.30$) and MSSI ($M = 5.98$, $SD = 9.77$) at one-month follow-up, as anticipated. Additional suicide attempts at one month follow-up were positively correlated with sleep score at baseline ($r = .14$, $p < .05$), with MSSI total score at follow-up ($r = .26$, $p < .01$), as well as with PTSD diagnosis ($r = .18$, $p < .01$).

6.1. Cross-sectional analyses: does the insomnia symptom index predict MSSI suicidal ideation controlling for hopelessness, depression, PTSD, anxiety, and drug and alcohol abuse?

The answer to this question is yes. For this analysis, the insomnia symptom index, BHS, MCMI depression, anxiety, alcohol abuse and drug abuse scores, and PTSD diagnosis were entered simultaneously as predictors into a multiple regression equation, predicting MSSI. The insomnia symptom index emerged as a significant predictor of suicidal ideation, beyond the effects of hopelessness, depression, PTSD, anxiety, alcohol and drug abuse ($pr = .12$, $t [307] = 2.11$, $p < .05$). Hopelessness ($pr = .34$, $t [307] = 6.35$, $p < .001$) also emerged as a significant predictor of suicidal ideation, beyond the effects of the other rival covariates.

6.2. Longitudinal analyses: 1) Does the insomnia symptom index at baseline predict MSSI suicidal ideation at follow-up, controlling for baseline MSSI, and for hopelessness depression, PTSD, anxiety, and drug and alcohol abuse?

Here, too, the answer to this question is yes. A similar multiple regression approach as outlined above was used to evaluate whether the insomnia symptom index at baseline predicted MSSI scores at follow-up, controlling for baseline MSSI, BHS, PTSD, and MCMI depression, anxiety, drug abuse,

and alcohol abuse scores. As would be expected, MSSI scores at baseline predicted MSSI scores at one-month follow-up ($pr = .19$, $t [234] = 2.97$, $p < .01$). Of the remaining predictors, only the insomnia symptom index evinced a significant longitudinal relationship to increased suicidal ideation at follow-up ($pr = .14$, $t [234] = 2.13$, $p < .05$). Hopelessness ($pr = .01$, $t [234] = 0.21$, $p = ns$), depression ($pr = .03$, $t [234] = .39$, $p = ns$), PTSD ($pr = .09$, $t [234] = .131$, $p = ns$), anxiety ($pr = .12$, $t [234] = -.69$, $p = ns$), drug abuse ($pr = -.01$, $t [234] = -.07$, $p = ns$), and alcohol abuse ($pr = -.03$, $t [234] = -.38$, $p = ns$) failed to do so.

6.3. Longitudinal analyses: 2) The question of directionality: Does MSSI suicidal ideation at baseline predict the insomnia symptom index at follow-up, controlling for baseline insomnia symptoms, and for hopelessness, depression, PTSD, anxiety, and drug and alcohol abuse?

No. To evaluate directionality, analyses were conducted in which the dependent variable was the insomnia symptom index at follow-up, and predictors included the insomnia symptom index at baseline, and baseline MSSI, BHS, PTSD diagnosis, MCMI depression, anxiety, drug abuse, and alcohol abuse scores.

Baseline suicidal ideation did not predict insomnia symptom scores at follow-up, controlling for baseline insomnia symptom scores ($pr = -.07$, $t [234] = -1.09$, $p = ns$). This suggests that the longitudinal association between insomnia symptoms and suicidal ideation flows from insomnia symptoms to suicidal ideation.

6.4. Longitudinal analyses: 3) does the insomnia symptom index at baseline predict suicide attempts occurring between baseline and follow-up, controlling for baseline MSSI, and for hopelessness, depression, PTSD, anxiety, and drug and alcohol abuse?

Not quite. In a logistic regression equation controlling for baseline MSSI, BHS, PTSD MCMI depression, anxiety, drug and alcohol abuse scores, baseline insomnia symptom index scores were used as a predictor of suicide attempt status at follow-up. The insomnia symptom index emerged as a non-significant trend predicting a suicide attempt at follow-up (exponentiated beta [Exp(B)], which is an index of effect

size, was 1.33; Wald coefficient = 2.68, $p = .10$). Only PTSD ($\text{Exp}(B) = 6.71$; Wald coefficient = 5.83, $p < .05$) and MCMI alcohol abuse ($\text{Exp}(B) = .92$; Wald coefficient = 6.22, $p < .05$) emerged as significant predictors of subsequent suicide attempt. Although the effect of insomnia was not significant in this analysis, it is important to highlight that this was within the context of controlling for very robust predictors of suicidal behavior and, even then, the effect approached significance.

Of note, in a separate logistic regression when baseline insomnia symptom index scores were entered as a predictor of later suicide attempt, controlling for MCMI depression and BHS hopelessness scores, insomnia symptom index showed a significant longitudinal relationship to suicide attempt at follow-up (exponentiated beta [$\text{Exp}(B)$] = 1.45; Wald coefficient = 6.28, $p < .01$). Neither baseline suicidal ideation ($\text{Exp}(B) = 0.98$; Wald coefficient = 0.19, $p = \text{ns}$), hopelessness ($\text{Exp}(B) = 0.91$; Wald coefficient = 1.64, $p = \text{ns}$), nor depression ($\text{Exp}(B) = 1.00$; Wald coefficient = 0.01, $p = \text{ns}$) performed similarly.

7. Discussion

The current study's findings converge with a growing body of research, indicating a relationship between sleep disturbance and suicidality (Goldstein et al., 2008; Goodwin and Marusic, 2008; Keshavan et al., 1994; Liu, 2004; Sabo et al., 1991; Sjöström et al., 2007). This link has been reported in both clinical (Ağargün and Cartwright, 2003; Bernert et al., 2005; Sabo et al., 1991) and nonclinical population-based samples (Fujino et al., 2005; Goodwin and Marusic, 2008; Turvey et al., 2002) regarding suicidal ideation, suicide attempt, and death by suicide.

This investigation builds upon past findings by evaluating sleep problems as cross-sectional and longitudinal predictors of interviewer-assessed suicidal ideation and attempts, in direct comparison with depression, hopelessness, PTSD diagnosis, anxiety, drug and alcohol abuse, in a military sample. The present study revealed that insomnia symptoms served as a unique predictor of suicidal ideation assessed cross-sectionally, and for suicidal ideation and suicide attempt longitudinally (though the latter only held when controlling for only depression, hopelessness and baseline suicidal ideation, which are still strong predictors of death by suicide). This is a stringent test, given that depression is among the strongest predictors of suicide risk, and considering that insomnia and suicidality are symptoms of depression and highly associated with PTSD. An additional strength of this study was use of interviewer-assessed suicidal ideation and behavior. With a few exceptions (Bernert et al., 2005, 2009), the majority of past reports used single-item measures of suicidal ideation (Ağargün et al., 1997a, 1997b; Fawcett et al., 1990; Roberts et al., 2001).

This is also the first examination to our knowledge of such relationships in a military sample. There is some evidence that military status is associated with increased risk for suicide across cultures (Kim et al., 2006), and rates of suicide in the U.S. military have surged to record numbers in recent years (Kuehn, 2009; Lorge, 2011; US Army, 2011). The prevalence of sleep complaints appears significantly increased among military personnel when compared to civilians (Hoge et al., 2004; Neylan et al., 1998; Seeliger et al., 2010),

which does not appear to be explained by a PTSD diagnosis (Lewis et al., 2009).

The current study included limitations, which should be considered in interpreting the findings. The approach to the assessment of insomnia can be improved upon. One particular concern may be the construct validity of the insomnia symptom index as a measure of insomnia, as only one item indexes insomnia directly and the other two are assessments of fatigue. Although fatigue is highly associated with insomnia, it is also related to many other constructs as well (e.g., depression, physical illness, and eating disorders). Given the strong evidence base on sleep problems and suicidality, it would be reasonable to hypothesize that sleep problems are likely accounting for the effects. It is also important to note that analyses controlled for another strong potential confounding variable that is associated with fatigue, insomnia, and suicidality—namely, depressive symptoms. Therefore, future research using comprehensive self-report and objective measures of sleep problems is needed. In addition, findings involved relatively small effect sizes and did not examine potential variables (e.g., rumination, physiological effects of sleeplessness) that might mediate the results. Nevertheless, it should be emphasized that results conformed to stringent, a priori hypotheses, persisted after controlling for relevant variables, emerged within a multi-method assessment strategy, and were similar to – and in some cases exceeded – effects for variables with traditionally strong effects. It should also be acknowledged that the current findings may not be generalizable outside of a severe risk sample. However, studying a severe sample will likely serve to highlight the highly salient risk factors.

Importantly, the results do not diminish the importance of depression and hopelessness as indicators of increased suicide risk as much as they underscore the importance of sleep problems. Based on the present findings, incorporating sleep problems into suicide risk assessment may be clinically important and potentially enhance detection of at-risk military members as sleep disturbances are often easily detectable (Goldstein et al., 2008), in contrast to many other suicide risk factors (e.g., past suicide attempt history). Information regarding more traditional suicide risk factors provides a context for determining how much weight to place on sleep problems, which likely informs on-going risk assessment and treatment (Gutierrez et al., 2009).

Overarousal may be an overarching factor underlying the association between insomnia and suicidality, as absence of sleep may be an indicator of agitation. Though limited, there is an emerging body of literature that suggests agitation or overarousal is an acute risk factor for suicide (Busch and Fawcett, 2004; Busch et al., 2003; Kovasznay et al., 2004). In addition to literature directly examining the role of agitation per se, research on agitated-related constructs also provides some support for this hypothesis. Anxiety disorders, for instance, appear to confer additional risk to suicidal ideation and behavior in individuals with bipolar disorder as compared to both depressed patients and individuals who do not have a mood disorder (Dilsaver et al., 2006). Further research is needed to clarify how insomnia is related to suicidality and whether overarousal is the higher-order factor accounting for the relationship between sleep disturbance and suicide.

Impaired emotional processing is another possible explanatory pathway. Sleep restriction is associated with mood decrements and emotional volatility (Dinges et al., 1997; Leotta et al., 1997; Zohar et al., 2005). Dysregulated sleep has been found to predict mood lability and elevated suicidality (Bernert and Joiner, 2010)—and mood lability predicts suicidality when controlling for depression severity (Bronisch, 1992; Zlotnick et al., 1997). Future research should focus on examining whether overarousal, mood dysregulation, or their interaction may explain the relationship between disturbed sleep and suicidality.

In combination with the past literature on sleep disturbance and suicide, the present findings also suggest that evaluating the efficacy of sleep-focused interventions on suicidal symptoms may be promising. If found to be effective, sleep-focused interventions may be particularly important to consider in military populations, where stigma is well-documented and an obstacle to successful treatment implementation and mental health care utilization (Hoge et al., 2004). In stark contrast to mental health concerns, soldiers appear willing to seek help for sleep-related problems. Sleep problems are also common among active-duty military, especially while deployed (Peterson et al., 2008). The current findings converge with recent treatment trials showing that brief behavioral interventions for insomnia are associated with decreased depressive symptoms and suicidality post-treatment (Buyse et al., 2011; Manber et al., 2008, in submission; Morin et al., 2006, 2009; NIH Consensus Science Statements). The current findings combine with that of others to affirm the restorative power of sleep, and the potentially disastrous effects of its absence.

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Conflict of interest

All authors denied any possible conflict of interest with other people or organizations within 3 years of beginning the submitted work that could inappropriately influence the present research study.

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