GAMES FOR HEALTH JOURNAL: Research, Development, and Clinical Applications
Volume 2, Number 4, 2013

DOI: 10.1089/g4h.2013.0014

Minigames for Mental Health: Improving Warfighters' Coping Skills and Awareness of Mental Health Resources

Katelyn Procci, MS,[1] Clint Bowers, PhD,[1] Christopher Wong, MS,[1] and Anya Andrews, PhD[2]

Abstract

Objective: Providing resources and stress management techniques is vital to the improvement of mental health outcomes of deploying warfighters. Despite the large amount of resources available, they are largely ineffective owing in part to lack of familiarity and knowledge of the resources themselves. This may be ameliorated through game-based practice environments. The objective of this study was to develop and evaluate a serious game to teach deploying military personnel about available mental health resources and coping skills, as well as to determine whether the inclusion of minigames improved learning outcomes.
Materials and Methods: Participants played the serious game "Walk in My Shoes" (Novonics Corp., Orlando, FL) to learn about mental health resources and coping skills. Half of the participants applied this knowledge during the game by playing minigames, whereas the other half played minigames featuring irrelevant content. This study was conducted both in-person and online.
Results: Participants who practiced the content by playing relevant minigames had positive learning gains, whereas those who played minigames with irrelevant content did not improve from baseline. There were no differences with respect to whether the game was played in the laboratory or in a more naturalistic environment.
Conclusions: Web-based serious games can be effective in providing information about resources and skills to deploying warfighters. Including minigames to provide practice in a game-based training environment such as a serious game improves learning outcomes. Such a serious game, regardless of the inclusion of minigames, also increases self-reports of deployment self-efficacy.

Introduction

IT HAS RECENTLY BEEN REPORTED that the number of suicides among deployed military personnel actually *exceeded* the number of combat casualties.[1] The incidence of suicide, combined with diseases such as posttraumatic stress disorder, family problems, substance abuse, and other psychological problems, has led to the development of a tremendous number of resources to assist warfighters and their families in coping with the stresses of deployment.[2] However, although these programs may exist in sufficient numbers, it appears that they are not used to their fullest extent. Hoge et al.[3] reported that only 23–40 percent of military personnel with a diagnosable psychological disorder actually sought assistance from a mental health professional. Simple lack of knowledge about what mental health resources are available is a key factor in their underutilization.[3–5] Furthermore, compared with normative values from previous research, one study found that those in the military used fewer functional coping strategies when faced with trauma and stress.[6] Therefore, when providing recommendations to improve military mental health, a recent American Psychological Association Task Force recommended that a comprehensive mental health education program be deployed to assist service members.[7]

A common approach is to provide more information about available resources and/or coping techniques. This is likely to include checklists of predeployment activities, or a description of relaxation exercises for use in the field. This information is usually provided in the form of command briefings, newsletters, pamphlets, and visits from local mental health providers. In one study, providing pamphlets about stress reduction was not effective in increasing knowledge about stress or for reducing stress symptoms.[8] Another study investigating the effectiveness of mental health briefings indicated no improvement.[9] Furthermore, a recent study reports that the effectiveness of mental health

[1]RETRO Lab, Department of Psychology, University of Central Florida, Orlando, Florida.
[2]Institute for Simulation and Training, Orlando, Florida.

briefings may be mediated by the perceived quality of the briefings.[10] Given these mixed results, there may be some benefit to exploring other approaches to communication about mental health resources, especially those designed to increase understanding about not just *what* is available, but *when to use it* through practice.

Researchers have demonstrated that practice is an essential factor in long-term learning.[11] However, simple repetition of material, while perhaps effective, is often unpalatable to the learner. One method that appears to hold some promise is to use game-based learning environments. According to Garris et al.,[12] a simulation is a representation of a real-world system that abides by rules and strategies, and consequences for the user's actions are carried out in the simulated world. Games are similar to simulations, except that games do not necessarily take place in a realistic context. They also feature several key elements, including a sense of "fantasy, rules/goals, sensory stimuli, challenge, mystery, and control."[12] The premise of this approach is that the entertainment provided by the game will motivate the learner to invest greater time in the learning task.[13] Furthermore, a well-designed game might also demonstrate the relevance and importance of the learning material and can be used for the practice of newly learned coping skills.[14] Finally, it is important to note that game-based training can also be delivered at the necessary scale in a cost-effective manner. With hundreds of thousands of warfighter trainees needing information, it is necessary that the training approach be delivered in an effective, but inexpensive, manner, such as online.

Given the above, the researchers sought to develop and evaluate a high-quality, engaging game-based training environment delivered online to teach deploying military personnel about mental health resources and coping skills and to provide an opportunity to practice with this new knowledge set.

Materials and Methods

"Walk in My Shoes" is a Web browser-based serious game developed by the Novonics Corporation (Orlando, FL) with the assistance of the University of Central Florida's RETRO Lab (Orlando). It provides information on mental health resources available to military personnel as well as cognitive restructuring coping strategies. Rather than constructing a new pamphlet, a game was developed in the hopes that the interactivity made it more engaging and seem to be of high quality, thus potentially helping it to be effective. "Walk in My Shoes" is divided into two modules: Pre-Deployment and Post-Deployment. Each module has several submodules that comprise different chapters of the game. Generally, each submodule begins with a computer-generated video featuring the game's characters that provides narrative and context. The issues that arise in these videos are then addressed by granting the player instructional content via eZines, which feature interactive menus and videos, that the player can work through at his or her own pace. The player is then given the opportunity to apply what he or she has learned in minigames, such as games that require players to determine what mental health resource should be used for specific problems. "Walk in My Shoes" takes between 2 and 3 hours to play in its entirety.

Of particular interest was how minigames could improve the overall learning experience. Without minigames, "Walk in My Shoes" is largely a narrative, simulation-based experience that supplies instructional content in a real-world context. Providing engaging practice of that content through the use of minigames had the potential to transform it into an effective serious game. These minigames are considered games rather than simulations because they are somewhat fantastical. Also, the player must meet a certain goal and is presented with challenges he or she must overcome by applying his or her knowledge of the game's rules. Minigames are helpful in particular because, although they are often simpler than full-fledged games, they provide targeted practice environments for specific concepts that allows for repetition of the knowledge in an engaging, motivating, and brief way.[15] Seven minigames for "Walk in my Shoes" were developed using ActionScript 3 by the University of Central Florida's RETRO Lab. Game play was designed to rely heavily on information learned in "Walk in My Shoes," and some games were designed as sequels to scaffold the instructional material. For example, "Devil's Advocate" is a minigame for practicing the cognitive restructuring method. Players take control of Judith, a supernatural being whose job it is to help repair the broken thoughts of soldiers. It is a stealth-based game, so players must place Judith behind the unsuspecting soldier without being seen. From there, the player can enter the brain of the soldier and must identify the specific type of negative automatic thought that he or she is experiencing. Identification is only the first step, so in the game's sequel, "Devil's Advocate 2," the player must not only sneak up on the solider, but also analyze the automatic thought and replace it with a functional thought. Figure 1 gives a comparison of the two "Devil's Advocate" games, and Table 1 gives a complete list of the "Walk in My Shoes" minigames.

The following hypotheses were evaluated:

H_1: All those who play the game will have learned more about deployment, resources, and resilience skills compared with a baseline assessment.

- H_{1a}: Those who play the game featuring relevant minigames as a form of practice will learn more than those who play the game with irrelevant minigames.
- H_{1b}: There will be no difference in learning gains between those who played the game in person or online.

H_2: All those who play the game will have increased their deployment self-efficacy compared with a baseline assessment.

Participants

This research was conducted in an ethical manner and with the approval of the University of Central Florida Institutional Review Board. The final sample included 125 undergraduate students from the University of Central Florida, who were recruited to complete the study both in-person ($n = 51$) and online ($n = 74$). There were no significant baseline differences between the two delivery methods pertaining to demographics and pre-test scores by condition, so the data were analyzed together as a complete set, although the effect of conducting the study online on performance was checked. Table 2 gives demographic information. Initial analyses

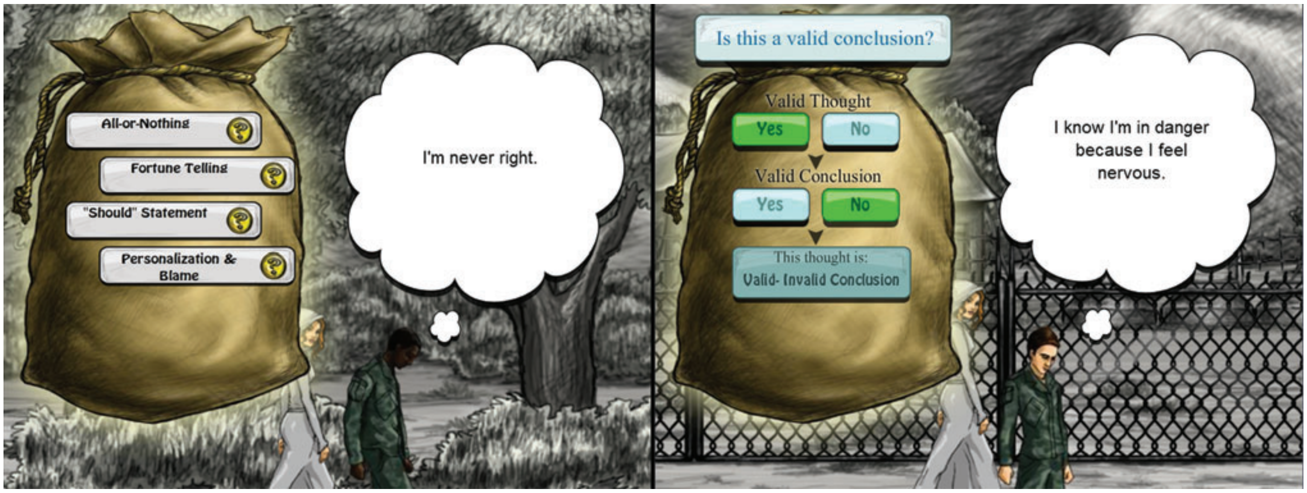

FIG. 1. **(Left)** "Devil's Advocate" and **(right)** "Devil's Advocate 2" minigames. Color images available online at www.liebertonline.com/g4h

revealed that there were no significant differences between conditions for gender, hours spent gaming each week, the baseline knowledge assessment score, or the baseline deployment self-efficacy score. None of the participants in this sample had previous military experience.

Procedures

Participants chose to either sign up for the online or in-person study through the University's participant pool in which studies are completed by students for course credit. All participants played through both the Pre-Deployment and Post-Deployment modules of "Walk in My Shoes." In order to determine if the practice provided by the minigames improved learning, participants were randomly assigned to one of two conditions. Those in the relevant condition played the serious game with all of minigames that featured information germane to what was learned in "Walk in My Shoes." Those in the irrelevant condition played a version of "Walk in My Shoes" in which the content featured in the minigames was edited to be about the University of Central Florida. Because all of the minigames' instructional content was controlled by an external XML file, all versions of the minigames were identical with respect to the mechanism of play and art. The only difference between conditions was the text displayed on the screen. Figure 2 gives a comparison of the same minigame between conditions. All minigames were comparable in this way. After verbal informed consent was obtained, participants completed a declarative knowledge quiz as well as a deployment self-efficacy survey both before and after playing

Table 1. Description of Minigames

Minigame	*Content addressed*	*Game play*
"Phone Dash"	Mental health resources	A timed game where players have to sort problems into the correct resource
"To-Do List"	Pre-deployment tasking	A driving game where players must travel the map completing tasks
"Devil's Advocate"	Cognitive restructuring	Stealth game to practice labeling negative automatic thoughts
"Devil's Advocate 2"	Cognitive restructuring	Stealth game to practice analyzing and replacing negative automatic thoughts
"Conflict Management"	Conflict management	A conversation-based game to practice conflict management skills
"Conflict 2: Fear Fighter"	Conflict management	A conversation-based game to practice handling difficult post-deployment situations
"Garden Defense"	Capstone review	A tower defense game similar to "Plants vs. Zombies" for assessment

Table 2. Demographics of Study Participants

	Relevant condition (n = 65) *(68% online)*	*Irrelevant condition* (n = 69) *(57% online)*
Sex		
Female	72.5%	75%
Male	26.1%	25%
No response	1.4%	0%
Mean age (years)	20.70 (7.43)	20.40 (5.37)
Race/ethnicity		
White non-Hispanic	59.4%	53.6%
Hispanic	17.4%	33.9%
Black	10.1%	5.4%
Asian	8.7%	1.8%
Other/mixed	4.3%	3.6%
Hours of games played per week	5.32 (11.84)	5.15 (8.41)
Baseline deployment self-efficacy	27.44 (5.49)	28.38 (5.36)

Standard deviation is given in parentheses.

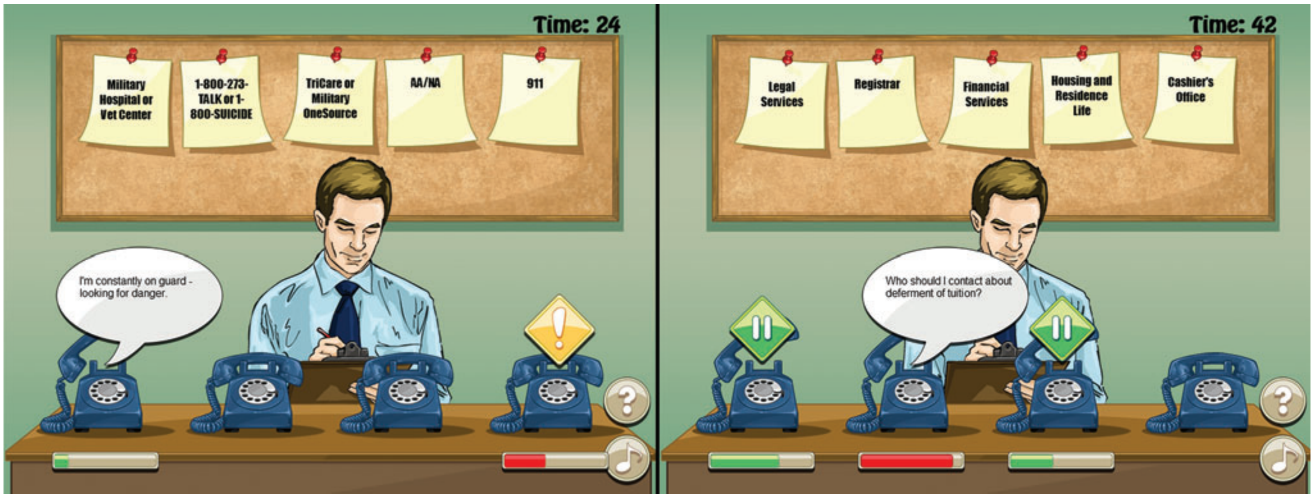

FIG. 2. "Phone Dash "minigame from the **(left)** relevant and **(right)** irrelevant conditions. Color images available online at www.liebertonline.com/g4h

"Walk in My Shoes." The entire study took approximately 3 hours to complete.

The only difference between completing the study in-person or online was the presence of the research assistant in the controlled laboratory environment. The serious game is accessed via a Web browser, and all survey responses were collected online using Survey Monkey. "Walk in My Shoes" may eventually be deployed for at-home use; thus it was of interest whether there were any differences in learning between completing the study on a computer in a laboratory environment versus a naturalistic setting, which was at home on participants' personal computers.

Measures

Instructional effectiveness. Two declarative knowledge quizzes were constructed by creating a bank of questions about the content in "Walk in My Shoes." These quizzes did not feature any information from the irrelevant condition. Items from the question bank were randomized to either the pre-test or the post-test. Each quiz covered the exact same content areas, often only replacing one key word for another between versions (e.g., what is the definition of "thought empathy" versus what is the definition of "I-feel statements," where both concepts are derived from the same lesson and are of equal difficulty), and included topics such as what mental health resource should be used to address particular problems and how to apply coping skills to a given situation. Participants were scored on a 20-point scale, from which a total percentage score was calculated. Five possible points could be earned by selecting the correct resource for a given problem. Fifteen possible points could be earned by selecting the correct answers in a series of fill-in-the blank and multiple choice items to identify different automatic negative thoughts and multiple-choice scenarios. Balancing of points reflected the distribution of the content in "Walk in My Shoes." Participants took one version of the quiz before playing "Walk in My Shoes" to establish the baseline knowledge level and another, comparable version immediately afterward to assess learning.

Deployment self-efficacy. To gauge the potential helpfulness of "Walk in My Shoes," it was of interest whether the serious game could make its players more confident in their abilities to handle the psychological challenges associated with deployment. Deployment self-efficacy was measured using a version of the generalized self-efficacy scale,[16] which was adapted for the purposes of this study. Participants were asked to rate 10 items (Cronbach's $\alpha = 0.93$) on a 4-point Likert scale how they felt about "your abilities with respect to dealing with the psychological challenges of deployment (e.g., anxiety, isolation, anger, stress, depression, acute post-traumatic stress disorder)." All participants, regardless of whether they were in the relevant or irrelevant conditions, responded to these items pertaining to deployment. A total

Table 3. Results from the Two-Way Mixed-Model Analysis of Variance for Comparing Condition and Delivery on Pre-Test to Post-Test Score Change

	F	P *value*	η^2	*Observed power*
Total score	24.977	< 0.001[a]	0.171	0.999
× condition	7.498	0.007[a]	0.058	0.775
× delivery	0.010	0.921	0.000	0.051
× condition × delivery	1.129	0.290	0.009	0.184
Resource score	7.132	0.009[a]	0.056	0.755
× condition	8.787	0.004[a]	0.068	0.837
× delivery	0.788	0.376	0.006	0.142
× condition × delivery	0.018	0.895	0.000	0.052
Coping score	39.651	< 0.001[a]	0.247	1.00
× condition	0.250	0.618	0.002	0.079
× delivery	0.572	0.451	0.005	0.117
× condition × delivery	0.065	0.799	0.001	0.057

The within-groups factor was score (pre-test to post-test change for the total score as well as the resource and coping subscales), and the two between-subject factors were condition (relevant or irrelevant) and delivery (online or in-person).

[a]$P < 0.05$ was a significant difference.

Table 4. Means for Pre- and Post-Test Scores, Before and After Playing "Walk in My Shoes"

	t *value*	*Score* Pre-test	Post-test	*Δ score*
Total score[a]				
Relevant	$t_{69} = -5.169$	50.18 (8.78)	58.91 (12.45)	+8.73%[b]
Irrelevant	$t_{56} = -1.891$	50.67 (10.05)	53.41 (11.56)	+2.74%
Resource score[a]				
Relevant	$t_{68} = -0.376$	89.28 (15.93)	90.14 (14.80)	+0.86%
Irrelevant	$t_{55} = 3.946$	89.29 (19.06)	79.64 (15.49)	−9.65%[b]
Coping score				
Relevant	$t_{68} = -5.252$	37.67 (10.39)	47.70 (16.09)	+10.03%[b]
Irrelevant	$t_{55} = -4.109$	37.16 (10.56)	45.65 (13.01)	+8.49%[b]

Standard deviations are given in parentheses.
[a]Indicates that the difference was also significant between conditions.
[b]Significantly different from baseline, $P < 0.025$ based on the Bonferroni correction.

score out of 40 possible points was calculated, with higher scores indicating greater deployment self-efficacy.

Results

The variables of interest were the pre-/post-test declarative knowledge quiz scores and pre-/post-deployment self-efficacy scores. The data were scanned for outliers, and the distributions were checked for normality by condition. Three cases of outliers, one on the pre-test score and two on the deployment self-efficacy post-test score, were identified. Further examination of those cases did not indicate any theoretical reason as to why they should be excluded, so those outliers were replaced with a value that was 1 unit above the last observed value in the acceptable range, in accordance with suggestions from Tabachnick and Fidell.[17] Given the large sample size, a value of 3.3 was selected to assess for skew and kurtosis. The pre-test score for those in the irrelevant condition was somewhat leptokurtic; however, the post-test scores were not. It is important to note that skew and kurtosis have less of an effect on large sample sizes such as these, so no transformation was performed. No assumptions for using both analysis of variance and analysis of covariance were violated. All analyses were performed using IBM (New York, NY) SPSS Statistics version 20 at the 0.05 significance level.

Hypothesis 1: instructional effectiveness

Using the pre-test scores as a covariate, a two-way mixed model analysis of covariance was conducted to determine if performance on the declarative knowledge quiz for total score, resource score, and coping score was affected by condition or delivery method (i.e., in-person or online). Table 3 gives reported *F* scores, significance levels, and effect sizes.

There was not a significant interaction effect of delivery method and score, nor was there a significant interaction among condition, delivery method, and score. Thus, Hypothesis 1_b was supported as these results indicated that participants performed similarly regardless of whether they completed the study in-person or online. There were significant interactions between total score and condition and between resource score and condition, as well as a main effect for coping score.

To determine how individuals in each condition differed significantly, multiple within-groups *t* tests were conducted with the Bonferroni correction applied ($\alpha = 0.025$) (Table 4). Those in the relevant condition significantly improved their scores overall, whereas those in the irrelevant condition did not change from baseline. Examining the resource and coping scores, it seems that those in both conditions improved their coping scores equally, whereas those in the Irrelevant

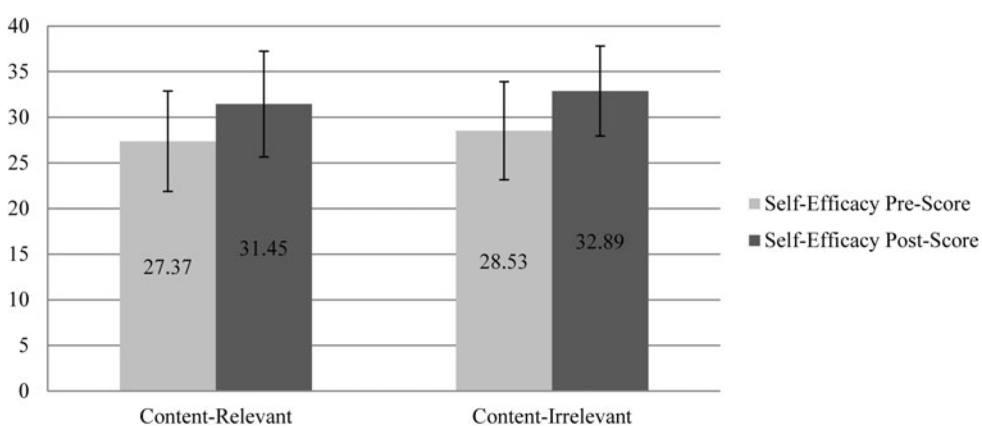

FIG. 3. Deployment self-efficacy scores before and after playing "Walk in My Shoes" by condition.

condition performed significantly worse with respect to resource knowledge. Because only those in the relevant condition consistently improved their baseline knowledge scores, Hypothesis 1 was only partially supported. Hypothesis 1_a was fully supported because those in the relevant condition learned more than those in the irrelevant condition.

Taken together, these results suggest that although both groups of players learned more about coping, the inclusion of relevant minigames was beneficial as those who played irrelevant minigames performed worse on the resource assessment. This occurred regardless of whether the participants completed the experiment in-person or online. This result has very important implications as not only does this suggest that the implementation of practice through the inclusion of minigames is beneficial and worth further investigation, but it also suggests this particular serious game can be deployed online as a stand-alone experience and still be effective.

Hypothesis 2: deployment self-efficacy

A one-way repeated-measures analysis of variance was conducted to determine if deployment self-efficacy was affected by condition. The interaction was not significant: $F_{1,116}=0.070$, $P=0.792$, observed power$=0.058$. However, the main effect for self-efficacy was significant: $F_{1,116}=62.68$, $P<0.001$, observed power$=1.00$, $\eta^2=.351$, a strong effect where simply experiencing "Walk in My Shoes" accounted for 35.10 percent of the variance in the change in score (Fig. 3).

These results suggest that deployment self-efficacy did not change depending on which condition the player was in; however, deployment self-efficacy did increase overall. Those who played "Walk in my Shoes," regardless of the type of minigames they played, felt more confident in their abilities to handle the stressors and psychological challenges associated with deployment.

In summary, the first hypothesis was partially supported in that only those who played "Walk in My Shoes" with the content-relevant minigames had a positive learning gain. The other two hypotheses were supported in that there was no difference between those who participated in the study in-person or online with respect to learning and that playing "Walk in My Shoes" increased deployment self-efficacy.

Discussion

Taken as a whole, these results converge to support the hypothesis that a game-based training approach can be effective in teaching individuals about psychological health resources and coping behaviors. Although playing a serious game can increase subjective feelings (e.g., increased self-efficacy regarding deployment), the experience can be further improved by providing minigames as a form of practice. Participants who played minigames as part of the serious game that featured relevant information demonstrated an improvement in declarative knowledge about mental health resources, whereas those who received irrelevant information did not. Thus, the inclusion of minigames was indeed helpful. This suggests that the gains are not simply a consequence of simply playing a game, but of playing a game that delivers appropriate information and provides opportunities for practice. Furthermore, there was no difference in learning attributable to whether the game was played in the laboratory or online. This suggests that the game may be effective if deployed on a large scale over the Internet.

Exposure to "Walk in My Shoes" resulted in both increased knowledge regarding coping skills and an increase in the participants' reported level of deployment self-efficacy. Perhaps simply learning about coping skills in the context of the serious game, even without relevant practice provided by minigames, resulted in the self-efficacy gains. Again, the results support the hypothesis that the game-based training program is effective. Participants who experienced the game reported increased self-efficacy for the trained material. This is a positive result because self-efficacy for coping has been associated with positive mental health outcomes.[18]

Although the results largely supported the hypotheses, there are shortcomings to the present design that require the data to be interpreted with caution. The most obvious shortcoming is that actual military personnel were not used. Although it would be optimal to generalize to warfighters, the present data were collected on a sample of college students who did not have military experience or similar levels of academic ability, which may limit the applicability of the results. The researchers had planned on recruiting from the local university's Army ROTC program; however, the students were unavailable at the time of data collection, which could not be changed because of external constraints. It should be noted that game-based training has been shown to be an effective approach in training other knowledge and skills.[19] Thus, paired with the groundwork laid by this study, it should be easier to secure an agreement to replicate this study in the target population in order to determine whether these results generalize.

It should also be noted that the present study used a control group that received a version of the game with irrelevant learning content. Conclusions are unable to be drawn about the effectiveness of the game compared with traditional forms of training. Using other comparison groups, such as including a condition that did not have minigames, a condition where participants viewed pamphlets and/or deployment briefings, or a condition that featured an alternative format for practice such as live classroom exercises, might provide greater insight into the use and effectiveness of this game and explicitly examine the added benefit of minigames. Finally, work is also needed to validate and refine the declarative knowledge measure overall, making sure that the content is well represented and that ceiling effects are avoided. Counterbalancing the test administration may be a step forward in ensuring that the two forms were equivalent.

With that said, these data suggest that a Web-based psychological health game can be an effective way to provide important training to deploying military personnel. It is the researchers' hope this report sparks greater interest in this approach.

Acknowledgments

This research was funded by the Novonics Corporation, which was sponsored by the U.S. Department of Defense/ Office of the Secretary of Defense Small Business Innovation Research contract number W81XWH-09-C-0074. The authors would like to thank Stephen Scanlon, Charles Frye, Heather Reynolds, and Alex Segal from the Novonics Corporation for their support and their role in the development of "Walk in

My Shoes." The authors would also like to acknowledge Rod Velezmoro, Brandon Kopkin, and Arun George for their assistance in collecting data.

Author Disclosure Statement

No competing financial interests exist.

References

1. Burns R. Suicides in military rise, even as combat lessens. Associated Press; January 15, 2013.
2. Hoge CW, Auchterlonie JL, Milliken CS. Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. JAMA 2006; 295:1023–1032.
3. Hoge CW, Castro CA, Messer SC, et al. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. N Engl J Med 2004; 351:13–22.
4. U.S. Army. Operation Iraqi Freedom (OIF) Mental Health Advisory Team (MHAT) report. 2003. www.armymedicine.army.mil/reports/mhat/mhat/mhat_report.pdf (accessed January 31, 2013).
5. U.S. Army. Operation Iraqi Freedom (OIF-II) Mental Health Advisory Team (MHAT-II) report. 2005. www.armymedicine.army.mil/reports/mhat/mhat_ii/OIF-II_REPORT.pdf (accessed January 31, 2013).
6. Riolli L, Savicki V. Coping effectiveness and coping diversity under traumatic stress. Int J Stress Manag 2010; 17:97–113.
7. Johnson SJ, Sherman MD, Hoffman JS, et al. The psychological needs of U.S. military service members and their families: A preliminary report. American Psychological Association. 2007. www.ptsd.ne.gov/publications/military-deployment-task-force-report.pdf (accessed January 31, 2013).
8. Turpin G, Downs M, Mason S. Effectiveness of providing self-help information following acute traumatic injury: Randomised controlled trial. Br J Psychiatry 2005; 187:76–82.
9. Sharpley JG, Fear NT, Greenberg N, et al. Pre-deployment stress briefing: Does it have an effect? Occup Med (Lond) 2008; 58:30–34.
10. Greenberg N, Langston V, Fear NT, et al. An evaluation of stress education in the Royal Navy. Occup Med (Lond) 2009; 59:20–24.
11. Zimmerman BJ. Self-regulated learning and academic achievement: An overview. Educ Psychol 1990; 25:3–17.
12. Garris R, Ahlers R, Driskell JE. Games, motivation, and learning: A research and practice model. Simul Gaming 2002; 33:441–467.
13. Sanchez A, Cannon-Bowers JA, Bowers C. Establishing a science of game based learning. In: *Serious Game Design and Development: Technologies for Training and Learning*. Hershey, PA: Information Science Reference; 2010: 290–304.
14. Verduin ML, LaRowe SD, Myrick H, et al. Computer simulation games as an adjunct for treatment in male veterans with alcohol use disorder. J Subst Abuse Treat 2012; 44: 316–322.
15. Smith PA, Sanchez, A. Bite sized gaming: Using mini-games for full sized learning. I/ITSEC No. 9470. Arlington, VA: NTSA; 2009.
16. Schwarzer R, Jerusalem M. Generalized self-efficacy scale. In: *Measures in Health Psychology: A User's Portfolio—Causal and Control Beliefs*. Windsor, UK: Nelson; 1995: 35–37.
17. Tabachnick BG, Fidell LS. *Using Multivariate Statistics*, 5th ed. Boston: Pearson; 2007.
18. Benight CC, Bandura A. Social cognitive theory of posttraumatic recovery: The role of perceived self-efficacy. Behav Res Ther 2004; 42:1129–1148.
19. Bowers C, Procci K, Joyce R, et al. Serious games for therapy: A training perspective. J Cyber Ther Rehabil 2011; 4:447–453.

Address correspondence to:
Katelyn Procci, MS
Department of Psychology
University of Central Florida
4000 Central Florida Boulevard
Orlando, FL 32816

E-mail: kprocci@knights.ucf.edu