

FINAL REPORT
(CONFIDENTIAL; NOT FOR RELEASE)

EVALUATION OF WARRIOR OPTIMIZATION SYSTEM
(WAROPS®) TRAINING
AT FT. CARSON, COLORADO

PHASES:

- **PRE-DEPLOYMENT TRAINING OF THE 4-4 (April 2009)**
- **POST-DEPLOYMENT TRAINING OF THE 3-4 (June 2009)**
- **MID-DEPLOYMENT SURVEY OF THE 4-4 (January 2010)**
- **POST-DEPLOYMENT TRAINING OF THE 4-4 (August 2010)**

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Introduction and Specific Aims:

The Warrior Optimization Systems (WAROPS®) training program, developed by the Magis Group, provides stress management information and self-regulating skills to Service Members to manage their operational and combat stress, enhance resilience, maximize performance, and facilitate re-integration throughout the deployment cycle. The rationale of this training program is that by teaching Service Members how to recognize and manage their stress, it will lessen the negative impact of the war on individual warriors, thereby building resilience among troops. The Magis Group is a for-profit business established in 2002 that provides stress education and personal mastery training in military settings.

The Samueli Institute conducted a systematic Program Evaluation of the WAROPS® training program that assessed the program's structure, process, and outcomes to generate information about its merit, worth, and significance. The Specific Aims of this project were to: (1) evaluate the feasibility and acceptability of the WAROPS® training program in both pre- and post-deployment military training environments; (2) assess the educational effectiveness of WAROPS® through quantitative measures and qualitative focus groups and interviews; and (3) investigate changes in stress-related outcomes (i.e., somatic, behavioral, and psychosocial) in Service Members from Fort Carson, CO after undergoing WAROPS® training prior to and after return from deployment. The study was initially approved by the Brooke Army Medical Center (BAMC) IRB and U.S. Army Medical Research and Materiel Command's Human Research Protection Office (HRPO). Oversight of this project later shifted to the Madigan Army Medical Center (MAMC) IRB due to base realignment.

This study included 3,160 soldiers from the 4th Brigade Combat Team (BCT), 4th Infantry Division (ID) (4-4) at Fort Carson, CO who were Command-directed to receive the WAROPS® training at two time points: prior to and after return from deployment. Additionally, a single time evaluation was conducted with 1,926 soldiers from the 3rd BCT 4th ID (3-4) who were Command-directed to receive the WAROPS® training post-deployment.

Hypotheses

The following hypotheses were addressed in this program evaluation:

1. The WAROPS® skills training program can be effectively incorporated into the training cycle of troops throughout the deployment cycle (feasibility and acceptability).
2. A basic, elementary education on neurological and biophysical responses to stress coupled with skills training to control and optimize these responses, provided by the WAROPS® model will increase knowledge of how to recognize and manage stress.
3. Service members trained in the WAROPS® model will demonstrate fewer symptoms and less dysfunction related to combat deployment, and better reintegration into family and community compared to a comparison group of service members that does not receive the training. This hypothesis will be tested using validated instruments and will include outcomes such as depression, anxiety/stress, general health status, resilience, sleep, alcohol use, anger, interpersonal conflict, unit support/cohesion, and work performance/productivity.

4. Service members trained in the WAROPS® model both pre- and post-deployment will demonstrate fewer symptoms and less dysfunction related to combat deployment, and better reintegration into family and community compared to a group of service members trained in the WAROPS® model only at post-deployment.

Background and Rationale

The mental health impact of the wars in Iraq and Afghanistan (OIF/OEF) is staggering, with returning Service members manifesting the spectrum of acute stress-related symptoms on post-deployment mental health screens to post-traumatic stress disorder (PTSD) and its associated comorbidities (1). Anxiety and distress symptoms that may manifest during the initial months following trauma include reduced environmental awareness, depersonalization, dissociative amnesia, intrusive thoughts, avoidance behaviors, insomnia and disordered sleep, cognitive deficits, irritability, and autonomic arousal (2-13). Combat-related PTSD commonly co-occurs with other psychiatric disorders, such as depression, (14-15) suicide, (16-18) substance abuse disorders (19) anxiety disorders (20), and chronic pain (21-24). Comorbid diagnoses, including alcohol and other substance abuse, complicate the treatment of PTSD and worsen the prognosis for recovery (25-26). Multiple sustained combat deployments not only takes its toll on individual Service members and their families, but also has far-reaching societal impacts, resulting in increased use of health care services, a substantial socio-economic burden to society, and decreased mission-readiness and performance. In short, the wars are producing a new generation of soldiers and veterans at risk for a range of chronic mental health problems that result from the sustained hardship of war zone trauma (5).

The current standard of care for post-deployment stress disorders, PTSD and related conditions is not maximally effective, nor does it fully address the biopsychosocial aspects characteristic of PTSD (27). Evidence suggests that soldiers most at risk for chronic PTSD, and thus most in need of effective early mental health intervention, are among the least likely to seek care; in fact, Service members diagnosed with PTSD with the greatest distress and symptoms at the time of return from the war zone report mistrust of mental health professionals, concerns about being stigmatized, and doubts about the effectiveness of mental health treatments (5). Thus, there is a need to develop interventions based upon new integrated care models (i.e. patient education and adjunctive problem-focused services) that address the whole person experience of stress and PTSD and seek to enhance the inherent healing capacities of the individual (28).

Supportive education and training to individuals prior to and subsequent to combat deployment that may involve exposure to traumatic events may prove beneficial (29). Early intervention may pre-empt the further development of long-term psychiatric disorders (30); however, it may be problematic to reliably identify those individuals who are at risk for developing these disorders and who would benefit from intervention. It may be additionally challenging to ensure that they actually seek and obtain needed treatment, particularly in environments, such as the military, where getting such care is associated with stigma (3-5). Therefore, programs that provide anticipatory training to all combat-deploying troops may be an effective strategy for mitigating stress-related issues.

One promising approach to combat stress management may be the pre-emptive, widespread training of troops in skills training techniques to down-regulate the overly active sympathetic nervous system in both the pre- and post-deployment period. This Preset/Reset model posits that all soldiers who engage in combat, like all equipment that is deployed in combat, should undergo a process of tune-up prior to

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deployment and a systems check post-deployment to restore them to their baseline. In a Preset/Reset model, each individual is presumed to be at risk for exposure to events that may affect functioning in any number of spheres, and each taught how to maintain and restore function in biopsychosocial domains. The fact that the training is provided to all soldiers, and that the precipitating event is the return from combat deployment, rather than identification through screening or the emergence of somatic or psychological symptoms, reduces the stigma that may otherwise impede seeking care. The Preset/Reset model recognizes that there are bound to be some changes in daily function as a result of the combat deployment, and it uses non-medical personnel in a training environment to provide self-management skills to optimize performance and restore and reintegrate the individual to family and community life.

When soldiers are provided with specific behavioral and mindfulness skills beyond what their basic training provides, they may be able to perform better in such highly stressful circumstances. Such skills can result in increased decision making ability; increased physical performance (31), improved mental functioning, including greater acuity and attention to detail (32-33) greater ability to remain calm under stressful situations, which may decrease injury; and increased physical and mental stamina (32-33). The long term implications of such behavioral, emotional, and mental exercises could prove to be beneficial for individuals who must perform at high levels while under such emotional and physical duress.

WAROPS Program Overview

The Magis Group, LLC provided the Samueli Institute with several institutional documents with content on the WAROPS® program: a six page synopsis of the Warrior Optimization Systems (WAROPS®) Training Program; a 1-page summary of the program; and two hand-outs to be disseminated to trainees (a 21 page WAROPS® Warrior Optimization Systems Core Training Manual printed as a spiral-bound booklet and a two-page bulleted summary printed as a two-sided laminated hand-out).

Based on these training materials, the WAROPS® Core training program has two major foci, depending on its placement in the deployment cycle. The BASE Performance model, utilized pre- and mid-mission, has as its goal to create an “Optimal Performance State (OPS)”. The BASE-R Recovery model, implemented post-mission, seeks to create an “Optimal Recovery State (ORS)”. In both programs, the BASE skills include Breath, Attention, Visualization, and Energy. The Recovery module consists of CORE™ exercises, stretches, and information about hydration, nutrition, rest, and sleep.

Intended Outcomes

According to the WAROPS® Summary from the Magis Group, the desired deployment outcomes of the program are to:

- Increase combat effectiveness and enhance mission performance
- Identify and sustain an optimal performance state throughout deployment
- Reduce debilitating impacts of chronic and acute stress
- Support strength and resilience in the individual and unit

WAROPS Core Training Program Structure:

The 4-hour Core Training is divided into four 50-minute blocks of instruction:

- Block 1: Performance, Brain and Body

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- This block establishes the performance model and the neurophysiology of warrior adaptation and physical/mental regulation.
- Block 2: Skills A (Breath, Attention)
 - This block teaches physical and mental skills for effective mission performance and baseline resilience.
- Block 3: Skills B (Visualization, Energy Management)
 - This block teaches performance enhancing skills and introduces an optimal recovery process.
- Block 4: Restoration (CORE™ exercises, Recovery)
 - This block teaches restorative skills and methods to maintain resilience and performance throughout the deployment.

Leader and Sustainer Training Modules:

In addition to the Core Training Program designed for all soldiers, the Magis Group created two specialized training modules for leaders and sustainers.

The Leader Training is a 3-hour tailored block of instruction designed to give senior leaders a more in-depth understanding of the performance model and its connection to effective mission accomplishment. It includes additional skills to support their own performance, strategies to support performance sustainers, and how to promote a command climate that fulfills the training intent. It is anticipated that most leader participants will have completed the Core Training block.

The Sustainer Training is a 4-hour tailored block of instruction designed to build on the Core Training and provide deeper skills and understanding of the “Warrior Optimization” process. It includes more in-depth performance methodology, how to support the strength and self-regulation of subordinate Soldiers, and the hand-off process to behavioral-health or medical personnel when needed. This training is intended to develop the sustainment personnel as centers of strength within the unit and give them both the skills and awareness to apply the model in any setting. It is anticipated that all soldiers participating as sustainers in this training will have completed the Core Training block.

Informed Consent Process, Data Collection and Management Methodology

Initially, we developed a scripted introduction extracted from IRB-approved documents (i.e., informed consent and Q&A sheets) that explained who we are, what the purpose of this program evaluation was, and that participation in this study was voluntary, clearly stating that each individual could decide whether or not to consent to become a research participant. The introduction also explained what involvement in this study entailed; if they signed the informed consent form, they were providing their consent to complete several paper-based surveys before and after the WAROPS® training program about their impressions and satisfaction with the program and permit the research team to access limited amounts of de-identified health-related data from the PDHA, PDHRA, PDP, and the HERMES systems.

Prior to each training session, members of the Samueli Institute research team requested that trainers and officers leave the room for the duration of the consent process to ensure that there was no real or perceived coercion for the soldiers to participate. We then disseminated packets to each trainee that contained an informed consent/HIPAA, pre-training (T0) packet with outcome measures, and post-

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training (T1) packet. Each packet was stamped with a unique study identification number and contained only one sheet with identifying information. We then verbally recited the scripted introduction (as described above), provided the opportunity for trainees to review the single summary Q&A page and read the informed consent document, and ask any questions. Ample time was provided to answer any questions. We also explained that a second voluntary part of the study was to participate in a 15-20 minute focus group after the training session to tell us in their own words what they thought of the program (e.g., what skills/information were useful, what were not useful).

We then asked trainees to make a decision; those who elected to participate in the research were asked to sign the informed consent and HIPAA documents, those who did not wish to participate were asked not to sign. We also asked them to decide whether or not they would like to participate in a focus group afterwards; if so, we requested that they check a box in the consent document. We then requested for those who had agreed to participate to complete the pre-training (T0) outcome packet. We then collected all informed consent and pre-training packets, to be later organized and collated. We requested that trainees keep the post-training (T1) packet on their person to be completed at the end of the training session. After the training session was finished we requested that all consenters complete the post-training (T1) packet and these were collected by Samueli Institute research staff as participants exited the classroom. This same methodology was followed at the post-deployment time point; the only difference was that we coded them differently (i.e., pre-training packets T3; post-training packets T4). With this process, we were able to consent large numbers of trainees in such a way that it was not evident who had decided to participate and who had not.

After collecting all packets, members of the research team reviewed all informed consent documents and divided them into ones with signatures ("consenters") and ones without ("non-consenters"). Research team members who participated in and witnessed the informed consent process co-signed the documents. We then sub-divided the consent documents into piles with those who had tentatively agreed to participate in focus groups so that we could stratify groups by rank and assign groups to the Samueli Institute research staff members. A separate focus group informed consent was then individually administered to individuals prior to beginning focus groups and interviews. We also removed the single identifier sheet, entered the data into a double password-protected database, and tagged those documents to be destroyed as this is the single document that linked the individuals' PHI with their study ID number.

Data Collection Summary

4th BCT 4th ID (4-4)

- Pre-Deployment Training of the 4-4 (14APR-11MAY09)

Over this four week period of time, we collected outcomes data from a total of 1764 soldiers from the 4-4 who attended the pre-deployment WAROPS® training sessions. We collected only KBAS data without personal identifiers from 1076 "training group" attendees and KBAS and outcomes data from 688 "research group" attendees who signed the study informed consent and HIPAA forms. Additionally, we conducted 32 focus groups and interviews with a total of 173 soldiers.

- Mid-Deployment Survey of the 4-4 (December 2009/January 2010)

We sent an IRB-approved mid-deployment survey to theater and received 203 completed surveys from soldiers in the 4-4 during their deployment in Afghanistan. The survey inquired if

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soldiers were using any of the WAROPS® skills in theatre, and if so, how often, in what situations, and whether any are being implemented at the unit/company/platoon level. We received 203 completed surveys.

- Post-Deployment Training of the 4-4 (16AUG-09SEPT10, week of 15NOV10)

We collected KBAS and outcomes data from a total of 2273 soldiers from the 4-4. Of these, 300 had attended the pre-deployment WAROPS® training session and had signed written informed consent, whereas 1456 were newly consented to participate in the study. The research team conducted 60 focus groups and 26 individual interviews with a total of 221 soldiers.

3rd BCT 4th ID (3-4):

- Post-Deployment Training of the 3-4 (08JUN-01JUL09)

During this period of time, we collected survey data from 1926 soldiers from the 3-4 who attended the WAROPS® training sessions. Of these, 1604 participated as “Research subjects” (e.g., by signing IC/HIPAA, completing KBAS and outcomes data) and 322 were “Non-research subjects” (e.g., did not sign IC but completed KBAS surveys). Additionally, a total of 226 soldiers participated in 39 focus groups and 35 individuals interviewed with a member of the research team following the training sessions.

RESULTS

Results will be listed by hypothesis except for results of the mid-deployment survey which will be described in a separate section.

Demographics

Age	Pre-Deployment(4-4)		Mid-Deployment		Post-Deployment (4-4)		Post-Deployment (3-4)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	25.2	5.8	27.5	6.1	26.4	5.9	25.7	5.9

		Pre-Deployment (4-4) (N=1566)		Mid- Deployment (N=203)		Post- Deployment (4-4) (N=2175)		Post- Deployment (3- 4) (N=1911)	
		N	%	N	%	N	%	N	%
Gender	Male	1470	94.7	184	92	1958	90.4	1720	90.2
	Female	83	5.3	17	8	208	9.6	186	9.8
Marital Status	Single	481	31	53	26	570	26.4	602	31.6
	Married/In a relationship	953	61.4	134	66	1365	63.2	1114	58.4
Education	High School	862	55.6	NA	NA	1044	48.3	1042	54.9
	Trade	547	35.3	NA	NA	877	40.6	663	35

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	School/Some college								
	BA/BS and up	140	8.5	NA	NA	240	10.7	194	10
Pay Grade	E1 - E4	948	61.1	91	45	1293	59.8	1140	60.2
	E5 - E9	440	28.3	90	45	702	32.4	530	28
	W1 - W5	4	0.2	3	1	16	0.7	13	0.7
	O1 - O6	160	10.3	18	9	153	7	211	11.1
Times Deployed	0	435	34	NA	NA	186	8.6	275	16
	1	487	38.1	71	35	1055	48.8	782	45.6
	2 or more	356	27.8	131	65	922	42.6	657	38.3
Deployment Length	<12 months	180	14.1	65	32	276	12.7	277	16.2
	12 - 23 months	431	33.7	34	17	998	46.1	678	39.7
	24+ months	234	18.3	103	51	724	33.4	485	28.4

Hypothesis 1 – Feasibility and acceptability (including Satisfaction and Use of skills)

The WAROPS® skills training program can be effectively incorporated into the training cycle of troops throughout the deployment cycle (feasibility and acceptability).

Outcome Measures

Feasibility and acceptability were measured by changes in satisfaction with the training and use of skills during and after deployment (see also the section on the mid-deployment survey). Knowledge, beliefs, attitudes, satisfaction surveys (KBAS) were administered to soldiers before and after they received the WAROPS® training at pre- and post-deployment time points.

- Satisfaction Questions: 15 Likert-type questions about overall satisfaction, content (interesting, useful), trainers (knowledgeable, prepared), and expected use of skills in future
- Use of Skills (Post-deployment only): During and after deployment how they use the skills

Feasibility is also measured by throughput. At each of the 3 training time points (4-4 pre-deployment, 4-4 post-deployment, 3-4 post-deployment) between 1764 and 2273 soldiers were trained over approximately 4 weeks. See Table 1.

Table 1. Throughput of soldiers trained at each time point

	4-4 pre-deployment	4-4 Post-deployment	3-4 post-deployment	Total
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Number of soldiers trained	1764	2273	1926	5,963
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Results:

Satisfaction with training – Pre and Post Deployment

Satisfaction with the training was high with 88% of participants selecting satisfied or very satisfied when asked about their overall satisfaction with the training. With the 4-4, this was consistent at pre- and post-deployment and in the 3-4, 92% of participants were very satisfied or satisfied overall. In general, participants were satisfied with the training material and the quality of instruction and felt that the training was well organized and provided useful information. There was an increase in satisfaction from 4-4 pre deployment to the 4-4 and 3-4 post-deployment training. This can likely be attributed to changes made to the training format after the initial training (e.g. fewer PowerPoint slides, smaller group sizes, more interactive modules, more changing of rooms). See Table 2 for a listing of satisfaction scores for all three training time points. These satisfaction results are consistent with qualitative interview and focus group data.

Table 2. Satisfaction with Training

	4-4 Pre-Deployment (N = 1443)	4-4 Post-Deployment (N = 1900)	3-4 Post-Deployment (N = 1728)
	<i>All Participants</i>	<i>All Participants</i>	<i>All Participants</i>
% Very Satisfied/Satisfied			
1. Overall satisfaction	88	88	92
2. Training materials	89	87	90
3. Instruction quality	91	90	94
% Strongly Agree/Agree			
4. Well-organized	93	92	96
5. Maintained interest	78	87	90
6. Provided useful information	85	86	91
7. Instructors were prepared	92	93	97
8. Instructors were well-organized	93	93	97

Expected use of Skills – Pre and Post Deployment

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Results obtained from all three time-points (4-4 Pre and Post, 3-4 Post-deployment) indicate a majority of participants agreed the training will enhance their stress control skills, improve performance and stimulate thinking of what do to differently (see Table 3). A majority of participants also strongly agree or agree that they expect to use what they learned and would recommend the training to others. A large majority of first time WAROPS® trainees felt the training was much more effective or more effective than other trainings they have had (77% and 85% respectively for the 4-4 and 3-4). We expect that the aforementioned changes made to the training format account for the increase. Just over half of the 4-4 post-deployment participants felt the training was better than the previous WAROPS® training/better than trainings they have had in the past. Interview and focus groups data revealed that some participants felt the post-deployment version of the training was not different enough to state that it was more effective.

Table 3. Expected Use of Skills

	4-4 Pre- Deployment (N = 1443)	4-4 Post- Deployment (N = 1900)	3-4 Post Deployment (N = 1728)
	All Participants	All Participants	All Participants
% Strongly Agree/Agree			
9. Will enhance stress control skills	85	86	90
10. Will improve performance	81	83	86
11. Stimulated thinking of what to do differently	84	85	89
12. Expect to use information	84	83	89
13. Change practice	80	79	84
14. Recommend to others	85	85	89
% Much More Effective/More Effective			
15. Comparison to other/previous WAROPS® training	77	55	85

Satisfaction with training – Previous/No previous WAROPS® experience

Although satisfaction with training was generally quite high at the post-deployment training, participants who had no previous WAROPS® experience were more satisfied than those who had previous WAROPS® experience (see Table 4). In general, satisfaction for first-time WAROPS® participants at post-deployment was higher than at pre-deployment, indicating the changes made by the WAROPS® team from pre- to post-deployment were well received. Lower satisfaction scores for previous WAROPS® participants at post-deployment were likely attributable to the relative similarity of the two trainings. Although in focus groups and interviews many participants reported benefitting from participating in the training more than once.

Table 4. Satisfaction based on previous WAROPS® experience

	4-4 Post-Deployment (N = 1900)				
	No Previous WAROPS (N = 726)		Previous WAROPS (N = 1042)		
% Very Satisfied/Satisfied					
	N	%	N	%	p value
1. Overall satisfaction	635	93	847	85	<.0001
2. Training materials	629	91	845	84	<.0001
3. Instruction quality	640	94	883	88	<.0001
% Strongly Agree/Agree					
4. Well-organized	654	95	912	91	0.003
5. Maintained interest	619	90	861	86	0.001
6. Provided useful information	622	91	825	82	<.0001
7. Instructors were prepared	653	95	916	91	<.0001
8. Instructors were well-organized	648	94	925	92	0.0001

Expected Application of Skills – Previous/No previous WAROPS® experience

A majority of participants strongly agreed or agreed that the training will enhance stress control skills, stimulate thinking, and that they would recommend training to others. Results indicate higher percentages among participants with no previous WAROPS® training. Again, this is likely due to the similarity of the trainings. Participants generally found value in having the additional training.

Table 5. Expected use of Skills based on previous WAROPS experience

	4-4 Post-Deployment (N = 1900)				
	No Previous WAROPS (N = 726)		Previous WAROPS (N = 1042)		
% Strongly Agree/Agree					
	N	%	N	%	p value
9. Will enhance stress control skills	621	90	831	83	<.0001
10. Will improve performance	600	87	803	80	<.0001
11. Stimulated thinking of what to do differently	612	89	828	83	<.0001
12. Expect to use information	605	88	811	81	<.0001
13. Change practice	566	82	772	77	<.0001
14. Recommend to others	613	90	817	82	<.0001

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Satisfaction by Number of times deployed

Soldiers with more deployments were more likely to strongly agree/agree that the training maintained their interest and that the instructors were prepared and well-organized compared to soldiers with fewer deployments.

Table 6. Satisfaction by Times Deployed at Pre-deployment (N = 1357)				
	<i>Never</i>	<i>1 Time</i>	<i>2 or more times</i>	<i>p value</i>
% Very Satisfied/Satisfied				
1. Overall satisfaction	85	91	90	NS
2. Training materials	85	90	93	NS
3. Instruction quality	89	93	92	NS
% Strongly Agree/Agree				
4. Well-organized	89	94	96	NS
5. Maintained interest	74	77	83	0.02
6. Provided useful information	81	86	87	NS
7. Instructors were prepared	90	92	97	0.002
8. Instructors were well-organized	92	92	98	0.02

Expected use of Skills by Number of times deployed

Soldiers with more deployments were more likely to rate the WAROPS® training as much more effective/more effective than other trainings they have had compared to those with fewer deployments. There were no significant differences in any of the expected use categories. There was high expected use across the board.

Table 7. Expected Application of Skills by Times Deployed at Pre-Deployment (N = 1357)				
	<i>Never</i>	<i>1 Time</i>	<i>2 or more times</i>	<i>p value</i>
% Strongly Agree/Agree				
9. Will enhance stress control skills	85	84	86	NS
10. Will improve performance	80	78	82	NS

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11. Stimulated thinking of what to do differently	83	83	88	NS
12. Expect to use information	83	82	88	NS
13. Change practice	77	78	82	NS
14. Recommend to others	82	84	87	NS
% Much More Effective/More Effective				
15. Comparison to other training	69	79	82	0.0004

Satisfaction by Training Time (early vs. later weeks)

At both pre- and post-deployment training, soldiers in the 4-4 who attended training during the last weeks of the training schedule were more satisfied than those who attended during the earlier weeks (first 2 weeks). Possible explanations for this include the ongoing revisions to the training made by the trainers after soliciting informal feedback from participants and increased comfort and facility with the training material on the part of the trainers.

Table 8. Satisfaction by training time (Early vs. later weeks)

	4-4 Pre-Deployment (N = 1443)			4-4 Post-Deployment (N = 1900)		
	Early (N=890)	Later (N=553)	Row Mean Scores Differ	Early (N=984)	Later (N=916) (Nov included)	p value
	% Very Satisfied/Satisfied			% Very Satisfied/Satisfied		
1. Overall satisfaction	86	92	0.0004	88	88	NS
2. Training materials	88	90	NS	86	88	0.02
3. Instruction quality	90	92	0.04	89	92	0.002
	% Strongly Agree/Agree			% Strongly Agree/Agree		
4. Well-organized	92	94	NS	91	94	0.007
5. Maintained interest	74	83	0.0002	85	90	0.0008
6. Provided useful information	83	89	0.009	85	87	NS
7. Instructors were prepared	91	94	0.01	91	94	0.001
8. Instructors were well-organized	93	95	0.02	92	94	0.002

Expected use of Skills by Period of training

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Soldiers trained in later weeks of training (after weeks 1 and 2) at post- pre-and post-deployment were more like to strongly agree or agree that they expect to use the information learned in the training and would recommend it to others (see Table 9 below).

Table 9. Expected Application of skills by training time (Early vs. later weeks)

	4-4 Pre-Deployment (N = 1443)			4-4 Post-Deployment (N = 1900)		
	Early (N=890)	Later (N=553)	Row Mean Scores Differ	Early (N=984)	Later (N=916) (Nov included)	p value
	% Strongly Agree/Agree			% Strongly Agree/Agree		
9. Will enhance stress control skills	84	88	0.001	85	86	0.05
10. Will improve performance	79	84	0.03	83	83	NS
11. Stimulated thinking of what to do differently	83	87	NS	83	87	0.02
12. Expect to use information	83	87	0.03	82	85	0.05
13. Change practice	79	82	NS	79	79	NS
14. Recommend to others	83	88	0.04	83	86	0.01
	% Much More Effective/More Effective			% Much More Effective/More Effective		
15. Comparison to other/previous WAROPS® training	74	83	0.0003	56	53	NS

Use of Skills – During deployment and since redeployment

Table 10 lists the frequency of use of individual WAROPS® skills. Recovery skills were the most used skills during deployment—75% of participants used them at some point during deployment and 49% reported using the skills at least weekly.

Table 10. Reported Use of Skills during Deployment

	N	At Least 1x/Day (%)	At Least 1x/Week (%)	At Least 1x/Month (%)	Rarely (%)	Never/Not at all (%)	Any Use (%)
Breathing	1021	14	17	8	29	30	68

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Attention	1020	15	17	12	25	31	69
Visualization	1018	14	17	14	25	29	70
Energy Management	1018	11	17	12	27	32	67
Recovery	1018	30	19	8	18	26	75
At least one skill	1043	38	56	62	77	23	NA

Recovery skills were also the most used skills since redeployment—66% of participants have used them at some point with 39% reporting using the Recovery skills at least weekly.

Table 11. Reported Use of Skills since Redeployment

	N	At Least 1x/Day (%)	At Least 1x/Week (%)	At Least 1x/Month (%)	Rarely (%)	Never/Not at all (%)	Any Use (%)
Breathing	1015	10	13	10	27	40	60
Attention	1017	8	13	12	27	40	60
Visualization	1013	8	12	12	28	39	60
Energy Management	1015	8	12	11	27	41	58
Recovery	1015	23	16	8	19	34	66
At least one skill	1043	28	43	51	68	32	NA

Situational use of Skills – During deployment and since redeployment

The most commonly reported situations in which WAROPS® skills were used during deployment are preparing for a mission (30%), downtime (27%) and help to get to sleep (27%) (See Table 12.)

Table 12. Situational Use of Skills during Deployment (N = 1043)

	Frequency (N)	Percentage (%)
Preparing for a mission	312	30
Downtime	285	27
Help sleep	278	27
During mission	277	26
After mission	253	24
Job stress	247	24
After a traumatic event	176	17
Deal with conflict	154	15
Family stress	147	14
Help other soldiers	86	8
Other	16	1
None	299	29

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Since redeployment, the most commonly reported situations Top in which WAROPS® skills were used are job stress (23%), help to get to sleep (22%) and family stress (19%) (See Table 13.)

Table 13. Situational Use of Skills since Redeployment (N = 1043)		
	Frequency (N)	Percentage (%)
Job stress	242	23
Help sleep	230	22
Family stress	196	19
Downtime	175	17
Deal with conflict	162	15
Preparing for a mission	64	6
Help other soldiers	52	5
During mission	43	4
After mission	35	3
After a traumatic event	32	3
Other	28	3
None	439	42

Hypothesis 2 – Knowledge, Beliefs, and Attitudes

A basic, elementary education on neurological and biophysical responses to stress coupled with skills training to control and optimize these responses, provided by the WAROPS® model will increase knowledge of how to recognize and manage stress.

Outcome Measures

KBAS questionnaires were administered to soldiers before and after they received the WAROPS® training at pre- and post-deployment time points.

- Knowledge Questions: 10 multiple choice questions pre-and post-training based on training materials designed to measure relationship between brain and effects of stress on the body and understanding and application of stress-control skills.
- Beliefs /Attitudes Questions: 10 statements of perceived ability to perform in stressful situations based on program objectives (i.e., I can stay centered and focused...)

Results:

Knowledge – Pre-to post-training change

Knowledge questions included 10 multiple choice questions with content related to the stress response and specific stress control skills. The questions were administered immediately prior to and after completion of the WAROPS® training session. Total mean knowledge scores (out of a possible 10)

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increased from pre- to post-deployment for all three training sessions (4-4 Pre- and Post-deployment, and 3-4 Post-deployment).

Table 14. Mean Total Knowledge Scores - Pre and Post Deployment						
	4-4 Pre Deployment					
	Pre-Training(T0)		Post-Training(T1)		Mean Difference	p value
	Mean	SD	Mean	SD		
Number Correct	5.8	2	6.6	2.2	0.8	<.0001
	4-4 Post Deployment					
	Pre-Training(T3)		Post-Training(T4)		Mean Difference	p value
	Mean	SD	Mean	SD		
Number Correct	6.5	1.9	6.8	2.1	0.3	<.0001
	3-4 Post Deployment					
	Pre-Training(T3)		Post-Training(T4)		Mean Difference	p value
	Mean	SD	Mean	SD		
Number Correct	6.5	1.9	7.3	1.9	0.8	<.0001

Knowledge Questions – 4-4 Pre-deployment

See Table 15 for a list of individual questions that showed significant improvement from pre-training to post-training at pre-deployment for the 4-4. Significant improvements were seen in 5 of the 10 questions. However, for 2 of the questions, there was a significant decrease in scores.

Table 15. 4-4 Pre Deployment - Percentage correct							
Question	Topic	Pre-Training (N=1566)		Post-Training (N=1443)		Mean Difference	P-value
		N	%	N	%		
1	Breathing	1262	87	1274	92	0.05	<.0001
2	Resilience	894	63	783	57	-0.06	0.0008

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3	Breathing	590	42	571	42	0	NS
4	Breathing	464	33	841	61	0.28	<.0001
5	Attention	1047	75	908	66	-0.09	<.0001
6	Attention	888	64	886	65	0.01	NS
7	Visualization	615	44	912	67	0.23	<.0001
8	Energy	748	53	768	57	0.04	0.05
9	Recovery	1086	76	1072	79	0.03	NS
10	Physiology	972	69	1064	79	0.1	<.0001

Knowledge Questions – 4-4 Post-deployment

See Tables 16 and 17 below for a list of individual questions that showed significant improvement from pre-training to post-training at post-deployment for the 4-4. Data were analyzed separately for previous WAROPS® attendees. Participants with previous WAROPS® experience showed significant improvement on 3 of 10 questions while participants without previous WAROPS® experience improved on 5 of the 10 questions. For both groups, correct responses were lower on questions 5 and 6 after the training. Both of these questions used a negative (e.g. which of the following is NOT true about breathing) which may have been confusing to participants who are not strong test-takers. We also note a significant education effect. Those with less than a college degree were more likely to score lower after the training.

Table 16. 4-4 Post Deployment - Percentage correct by question – Previous WAROPS®

Question	Topic	Previous WAROPS®					
		Pre-Training (N=1043)		Post-Training (N=895)		Mean Difference	P-value
		N	%	N	%		
1	Breathing	953	92	809	92	0	NS
2	Breathing	282	27	334	38	0.11	<.0001
3	Visualization	714	69	649	74	0.05	0.01
4	Visualization	639	62	710	82	0.2	<.0001
5	Recovery	887	86	712	82	-0.04	0.009
6	Breathing	712	69	553	64	-0.05	0.013
7	Recovery	822	80	678	78	-0.02	NS
8	Physiology	813	79	663	77	-0.02	NS
9	Attention	474	46	427	49	0.03	NS
10	Visualization	535	53	466	54	0.01	NS

Table 17. 4-4 Post Deployment - Percentage correct by question - No Previous WAROPS®

No Previous WAROPS®			

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Question	Topic	Pre-Training (N=1043)		Post-Training (N=895)		Mean Difference	P-value
		N	%	N	%		
1	Breathing	751	93	647	92	-0.01	NS
2	Breathing	281	35	281	40	0.05	0.05
3	Visualization	545	68	532	75	0.07	0.0007
4	Visualization	508	63	582	83	0.2	<.0001
5	Recovery	677	84	566	80	-0.04	0.05
6	Breathing	548	68	439	62	-0.06	0.0137
7	Recovery	662	83	573	82	-0.01	NS
8	Physiology	620	78	564	81	0.03	NS
9	Attention	332	41	353	50	0.09	0.0005
10	Visualization	389	49	397	57	0.08	0.0014

Knowledge Questions – 3-4 Post-deployment

Results indicate scores improved from pre-training to post-training for 8 of the 10 knowledge questions. See Table 18 below.

Table 18. 3-4 Post Deployment - Percentage correct by question							
Question	Topic	Pre-Training (N=1911)		Post-Training (N=1728)		Mean Difference	P-value
		N	%	N	%		
1	Breathing	1739	91	1615	95	0.04	0.0001
2	Breathing	803	42	811	47	0.05	0.001
3	Visualization	1241	65	1334	78	0.13	<.0001
4	Visualization	1281	68	1432	84	0.16	<.0001
5	Recovery	1531	81	1381	81	0	NS
6	Breathing	1252	66	1301	76	0.1	<.0001
7	Recovery	1562	83	1442	85	0.02	NS
8	Physiology	1372	73	1399	83	0.1	<.0001
9	Attention	724	38	788	47	0.09	<.0001
10	Visualization	840	45	963	57	0.12	<.0001

Beliefs and Attitudes – Percent Strongly agree and Agree

In general, self-efficacy improves at all three training time points from before to after training. Soldiers feel more confident that they could perform well, adapt, and maintain their health in stressful situations. There is a significant increase in scores from pre-training to post-training during 4-4 Pre/Post deployments and 3-4 Post-deployment.

Table 19. Beliefs and Attitudes – Self-efficacy statements (% Strongly Agree and Agree at all # training points)

	4-4 Pre-Deployment					4-4 Post-Deployment					3-4 Post-Deployment				
	Pre-Training (N=1566)		Post-Training (N=1443)		P-value	Pre-Training (N=2175)		Post-Training (N=1900)		P-value	Pre-Training (N=1911)		Post-Training (N=1728)		P-value
<i>In stressful situations, I am confident that...</i>	N	%	N	%		N	%	N	%		N	%	N	%	
1. I can stay centered and focused	1056	73	1155	85	<.0001	1556	72	1529	83	<.0001	1347	71	1481	88	<.0001
2. I can maintain mission focus and capability	1213	84	1165	86	NS	1848	85	1574	86	NS	1587	84	1515	90	<.0001
3. I can maintain my confidence to succeed	1185	82	1161	86	0.002	1804	84	1561	85	NS	1570	83	1493	90	<.0001
4. I can adapt easily to challenges	1142	79	1148	85	0.0001	1737	80	1545	84	0.001	1548	82	1482	88	<.0001
5. I can manage my nervous systems' reactions	748	52	1072	79	<.0001	1107	52	1425	78	<.0001	1027	54	1373	82	<.0001
6. I can support my peak performance	987	68	1129	83	<.0001	1463	68	1514	82	<.0001	1368	72	1460	87	<.0001
7. I have the resilience to get through stressful situations	1167	81	1139	84	0.007	1748	81	1553	85	0.006	1564	83	1487	89	<.0001
8. I can maintain my health	1159	80	1161	86	0.0001	1748	81	1557	85	0.001	1564	82	1495	89	<.0001
9. I can effectively discharge tension and excess energy	895	62	1133	83	<.0001	1322	61	1520	83	<.0001	1225	65	1455	87	<.0001
10. I can reset and restore my balance	887	62	1138	84	<.0001	1315	61	1519	83	<.0001	1220	64	1443	86	<.0001

Sustainers and Leaders:

Demographics

Sustainer demographics are listed in Table 20 below.

Table 20. Sustainer Demographics					
	Pre-Deployment		Post-Deployment		
Age	Mean	SD	Mean	SD	
	32.2	6	28.8	7.1	
		Pre-Deployment (N=33)		Post-Deployment (N=80)	
		N	%	N	%
Gender	Male	29	90.6	60	76.9
	Female	3	9.4	18	23.1
Marital Status	Single	4	12.1	14	17.9
	Married/In a relationship	25	75.8	54	69.2
Education	High School	3	9.1	27	34.6
	Trade School/Some college	18	54.5	46	59
	BA/BS and up	11	33.3	5	6.4
Pay Grade	E1 - E4	0	0	27	34.6
	E5 - E9	23	69.7	51	65.4
	W1 - W5	2	6.1	0	0
	O1 - O6	8	24.2	0	0
Times Deployed	0	5	16.7	7	9
	1	6	20	24	30.8
	2 or more	19	63.3	47	60.2
Deployment Length	<12 months	4	14.3	6	7.7
	12 - 23 months	6	21.4	24	30.8
	24+ months	13	46.4	41	52.6

Beliefs and Attitudes

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This table presents Beliefs and Attitudes questions and percentages for responses, “Strongly agree” and “Agree” during 4-4 Pre-deployment. Self-efficacy improves for trainers in all areas from pre- to post-training. Leaders did not complete pre-training questionnaires.

Table 21. Beliefs and Attitudes - % Strongly Agree and Agree - Sustainers

	4-4 Pre-Deployment(N = 33)			
	Pre-Training		Post-Training	
<i>In stressful situations, I am confident that...</i>	N	%	N	%
1. I can stay centered and focused	26	81	32	97
2. I can maintain mission focus and capability	30	91	31	94
3. I can maintain my confidence to succeed	30	91	32	97
4. I can adapt easily to challenges	30	91	31	97
5. I can manage my nervous systems' reactions	22	67	28	85
6. I can support my peak performance	23	70	28	85
7. I have the resilience to get through stressful situations	31	94	32	97
8. I can maintain my health	28	85	32	97
9. I can effectively discharge tension and excess energy	22	67	30	91
10. I can reset and restore my balance	20	61	29	88

Table 22. Beliefs and Attitudes - % Strongly Agree and Agree - Leaders

	4-4 Pre-Deployment(N = 35)			
	Pre-Training		Post-Training	
<i>In stressful situations, I am confident that...</i>	N	%	N	%
1. I can stay centered and focused	NA	NA	32	91
2. I can maintain mission focus and capability	NA	NA	34	97
3. I can maintain my confidence to succeed	NA	NA	32	94
4. I can adapt easily to challenges	NA	NA	32	91
5. I can manage my nervous systems' reactions	NA	NA	26	74
6. I can support my peak performance	NA	NA	30	86
7. I have the resilience to get through stressful situations	NA	NA	32	91
8. I can maintain my health	NA	NA	31	88
9. I can effectively discharge tension and excess energy	NA	NA	29	83
10. I can reset and restore my balance	NA	NA	26	74

Satisfaction with Training

Overall satisfaction rate was 97% for both Sustainers and Leaders at pre-deployment and 93% for Sustainers during post-deployment. Leaders did not receive training during post-deployment. All sustainers and leaders (100% of each) strongly agreed/agreed that instructors were prepared and well-organized. Satisfaction was quite high in every category.

Table 23. Sustainer and Leader Satisfaction with Training									
	4-4 Pre-Deployment				4-4 Post-Deployment				
	<i>Sustainers(N = 33)</i>		<i>Leaders(N = 35)</i>		<i>Sustainers(N = 80)</i>		<i>Leaders</i>		
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
% Very Satisfied/Satisfied									
1. Overall satisfaction	32	97	34	97	73	93	NA	NA	
2. Training materials	31	94	32	91	71	92	NA	NA	
3. Instruction quality	32	97	34	97	75	97	NA	NA	
% Strongly Agree/Agree									
4. Well-organized	31	94	35	100	76	97	NA	NA	
5. Maintained interest	29	88	33	94	71	91	NA	NA	
6. Provided useful information	26	81	34	96	73	93	NA	NA	
7. Instructors were prepared	32	100	35	100	77	99	NA	NA	
8. Instructors were well-organized	31	97	35	100	77	99	NA	NA	

Expected Application of Skills

A majority of participants during pre- and post-deployment agreed that the training will enhance their stress control skills and that they expect to use the information and apply the skills to stimulate their thinking. A large majority of participants would recommend the WAROPS® training to others.

Table 24. Sustainer and Leader Expected Application of Skills									
	4-4 Pre-Deployment				4-4 Post-Deployment				
	<i>Sustainers(N = 33)</i>		<i>Leaders(N = 35)</i>		<i>Sustainers(N = 80)</i>		<i>Leaders</i>		
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
% Strongly Agree/Agree									
9. Will enhance stress control skills	31	94	33	97	65	83	NA	NA	
10. Will improve performance	28	85	29	83	64	82	NA	NA	
11. Stimulated thinking of what to do differently	32	97	34	97	72	92	NA	NA	
12. Expect to use information	28	85	34	97	71	91	NA	NA	
13. Change practice	25	76	30	88	60	77	NA	NA	
14. Recommend to others	30	91	33	97	71	91	NA	NA	
% Much More Effective/More Effective									

15. Comparison to other/previous WAROPS® training	28	85	33	94	49	63	NA	NA
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Hypothesis 3 – Health outcomes (Training pre-deployment vs. no training pre-deployment)

Service members trained in the WAROPS® model will demonstrate fewer symptoms and less dysfunction related to combat deployment, and better reintegration into family and community compared to a comparison group of service members that does not receive the training. This hypothesis will be tested using validated instruments and will include outcomes such as depression, anxiety/stress, general health status, resilience, sleep, alcohol use, anger, interpersonal conflict, unit support/cohesion, and work performance/productivity.

We compared pre-deployment (T0) and post-deployment (T3) stress-related health outcomes such as depression, anxiety/stress, general health status, resilience, sleep, alcohol use, anger, interpersonal conflict, unit support/cohesion, and work performance/productivity. These outcome measures were drawn from existing data provided by the Army (HERMES health Risk Assessment 2, PDHA and PDHRA) as well as measured added by the research team and collected at pre- and post-deployment WAROPS® trainings. All hypothesis 3 analyses are conducted with soldiers from the 4-4. Below are simple descriptions of these health related outcomes:

Outcome Measures

PCL-M

The PTSD Checklist Military version (PCL-M) is a self-report rating scale for assessing post-traumatic stress disorder (PTSD). The PCL consists of 17 items. Examinees are instructed to indicate how much they have been bothered by each symptom in the past month using a 5 point (1-5) scale. A cutoff score is 50 is typically used to assess PTSD. A higher score represents worse symptom of PTSD. There are three subscales:

- Re-experiencing (Intrusive Memories, Nightmares, Flashbacks, Psychological Distress and Psychological Reactivity),
- Avoidance/Numbing (Thoughts/Feelings, Activities/Places/People, Trauma-Related Amnesia, Diminished Interest, Detachment, Restricted Affect and Foreshortened Future)
- Hyperarousal (Sleep Difficulty, Irritability/Anger, Difficulty Concentrating, Hypervigilance, and Exaggerated Startle).

CD-RISC

Connor–Davidson Resilience Scale (CD-RISC) is a 10-item unidimensional scale. Scoring of the 10 item scale is based on summing the total of each item, which is scored from 0-4. The full range is therefore from 0 to 40, with higher scores reflecting greater resilience.

SF36

SF-36 is a set of generic, coherent, and easily administered quality-of-life measures. To score SF36 version 1 we followed RAND's method with the 1998 population norm. It can be aggregated into two component summary measures: physical and mental summary scores. There are 8 health concepts: physical functioning, bodily pain, role limitations due to physical health problems, role limitation due to personal or emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions. A higher value represents the better result.

PDRI

Post-Deployment Readjustment Inventory (PDRI) has a total score and following levels of readjustment difficulties: Career, Health, Intimate relationships, Social relationships, Concerns of deployment, and PTSD symptoms. A greater value indicates the more serious readjustment difficulties.

HERMES

HERMES includes following subscales:

- Weight
- Perception of Unit Support (DRRI-US): 7 items with score range from 0-41. The greater value reflects better unit support.
- Anxiety (PHQ-Anxiety): 4 items with score range from 0-12. Greater values represent greater anxiety.
- Panic (PHQ-Panic): 4 screening question, will be positive if all answered yes
- PTSD (PC-PTSD): Current research suggests that the results of the PC-PTSD should be considered "positive" if a patient answers "yes" to any three items
- Depression (PHQ-9): 9 items, score range from 9-27, the greater value indicates greater depression symptoms
- Anger (DAR): Anger and combat-related posttraumatic stress disorder. The greater value indicates worse result.
- Suicide Risk
- Alcohol Use (including AUDIT): the greater value represents the worse result.
- Violence & Safety: 5 questions related to feeling unsafe, having angry outbursts, physical altercations, and law enforcement involvement - greater values reflect situations with less safety and more violence.
- Behavioral Health Treatment History: 0/1 screening question, is 1 if a subject answered yes to any of following three questions: Received Past Counseling, ever been on any medication for emotional problems, and Receiving Counseling.
- Seeking Services: 0/1 screening question, is 1 if subjects answered yes to any of following questions: Request Help Deployment Mental, Request Help Not Deployment Mental, Request Help Alcohol Drug, Request Help Family Relations, Request Help Family Assault, Request Help Legal, Request Help Financial.

PDHA/PDHRA

Includes following subscales:

- **PHQ2-Depression:** Respondents were considered at risk for depression if they positively answered either or both of the following questions:

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- “Little interest or pleasure in doing things” (More than half the days, a lot, or Nearly every-day are positive answers)
- “Feeling down, depressed, or hopeless” (more than half the days, a lot, or nearly every day were considered positive responses)
- **PCPTSD:** 0/1 PTSD screening question: PCPTSD is considered “positive” if a patient answers “yes” to all four items
- **Loss of Control score:** Domestic Violence item. “Over the PAST MONTH, have you had thoughts or concerns that you might hurt or lose control with someone”
- **Alcohol screening:** screening question: number of positive responses to 2-item screen questions: “Use Alcohol more than meant to” and “Felt or wanted to cut down alcohol consumption”, the higher the score the serious alcohol problem
- **Health assessment score:** Answer of question “How would you rate your health during the past month”: Excellent, very good, and good are scored as 1, Fair and Poor are scored as 0. The higher score indicates better health.
- **Hospitalized score:** The answer of hospitalization question: “Did you have to spend one or more nights in a hospital as a patient during this deployment?” in PDHA and “Since you returned from deployment, have you been hospitalized?” in PDHRA.

Definitions

In this section:

- “WAROPS® User” refers to soldiers who attended WAROPS® training pre-deployment and used at least one skill daily while deployed.
- “WAROPS® Non-user” refers to soldiers who attended WAROPS training pre-deployment but did not use at least one skill at least monthly while deployed.
- “WAROPS® Taker” refers to soldiers who attended WAROPS® training at pre-deployment
- “WAROPS® Non-taker” refers to soldiers who did not attend WAROPS® training pre-deployment but then consented to be in the study post-deployment and attended the post-deployment training.

Results

Pre-deployment HERMES health-related outcomes

We were able to recruit approximately 700 new subjects at post deployment training (T3). Among them, there were about 300 soldiers who did not take WAROPS pre-deployment. This provided us an opportunity to compare pre-deployment (T0) taker/non-taker differences. Two-sample Wilcoxon rank sum test was used to test whether there are differences between two distributions in pre-deployment health outcomes. No significant differences were found.

Pre- to Post-Deployment Health Outcome Differences for WAROPS Takers

In this section we answer the question:

- Are there differences in health outcomes from pre- to post-deployment for WAROPS® Takers (soldiers who attended WAROPS® training pre-deployment)?

For those soldiers who took WAROPS® pre-deployment we found the following significant improvements in health outcomes from pre- to post-deployment:

- WAROPS® Takers have lower PCL-M subscale 'Avoidance/Numbing' scores after deployment ($p=.0117$)
- WAROPS® Takers report improved Resilience after deployment: CD-RISC ($p=.0176$)
- WAROPS® Takers have improved SF36 health and well-being scores from pre- to post-deployment: SF36 Mental Health summary score ($p<.0001$) and subscale scores 'bodily pain' ($p=.0028$), 'emotional well-being' ($p<.0001$), 'social functioning' ($p<.0001$), and 'energy/fatigue' ($p<.0001$).
- Reported alcohol use decreased from pre- to post-deployment ($p=.0330$)

For the following HERMES screeners, WAROPS® Takers were more likely to screen positive after deployment:

- Anxiety: 'PHQ-Anxiety' ($p=.0336$),
- PTSD: 'PC-PTSD' ($p=.0002$)
- Depression: 'PHQ-9 Depression' ($p<.0001$)
- Violence and Safety concerns: 'Violence & Safety' ($p=.0130$)

WAROPS® takers were also more likely to report having received Behavioral Health Treatment at post-deployment than at pre-deployment ($p=.0202$).

Health outcomes differences at Post-deployment for WAROPS® Takers vs. Non-takers

In this section we answer the question:

- Are there health outcome differences at T3 (post-deployment) between those soldiers who were trained in WAROPS® at pre-deployment (Takers) and those who were not (Non-takers)?

We found that WAROPS® Takers had significantly better health-related outcomes than Non-takers in the following areas at post-deployment:

- PCL-M subscale 'Re-experiencing' ($p=.0353$)
- SF36 subscales 'social functioning' ($p=.0328$)
- Post-deployment readjustment: PDRI subscales 'Career' ($p=.0114$), 'Intimate relationships' ($p=.0056$), 'Social relationships' (.0284)

WAROPS® Takers did report greater alcohol use than Non-takers at post-deployment: HERMES subscale 'Alcohol' ($p=.0149$).

WAROPS® Takers were also less likely to seek mental health and other service than Non-Takers: HERMES 'Seeking Service' ($p=.0012$).

Pre-Deployment-related Health Outcome Differences—User/Non-user/Non-taker

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In this section we answer the questions:

- At T0, are there health related outcomes different for WAROPS® skill users and non-users?
- At T0, are there health outcome difference between WAROPS® skill users and WAROPS® non-takers?

Comparing WAROPS® users and non-users at pre-deployment we found the following significant differences:

- Users had higher 'Perception of Unit Support (DRRI-US)' ($p=.0005$)
- Users have lower 'PHQ-Anxiety' ($p=.003$), 'PHQ-9 Depression' ($p=.0226$), and report more violence/safety concerns ($p=.0284$).

Health Outcome Differences at post-deployment between WAROPS® Users /Non-users/Non-takers

In this section we answer the questions:

- At post-deployment, are there health-related outcome difference between WAROPS® skill users and non-users?
- At post-deployment, are there health-related outcome difference between WAROPS® skill users and WAROPS® non-takers?

Comparing WAROPS® Users and Non-users at post-deployment we found the following significant differences:

- WAROPS® Users have lower PCL-M total ($p=.0127$) and 'Hypervigilance' ($p=.0154$) subscale scores than Non-users
- WAROPS® Users are more resilient (have higher CD-RISC scores) than Non-users ($p=.0014$)
- WAROPS® Users have higher SF36 mental health summary score ($p=.0053$), 'emotional well-being' ($p=.0039$) and 'energy/fatigue' ($p=.0019$) subscale scores than non-users.
- WAROPS® Users have better post-deployment readjustment than non-users; PDRI subscales 'Career' ($p=.0011$), 'Health' ($p=.0481$)
- On HERMES measures, WAROPS® Users have better 'Perception of Unit Support (DRRI-US)' ($p<.0001$) and lower 'PHQ-Anxiety' ($p=.0160$), 'PHQ-9 Depression' ($p=.0032$), 'Anger (DAR)' ($p=.0355$) and 'Violence & Safety' concerns ($p=.0291$) than Non-users.

Comparing WAROPS® Users and Non-takers at post-deployment we found the following significant differences:

- WAROPS® User had Fewer PCL-M symptoms than Non-takers: total score ($p=.0215$), 'Re-experiencing' subscale ($p=.0085$) and 'Avoidance/Numbing' subscale ($p=.0333$)
- WAROPS® Users were more resilient than Non-Takers: CDRISC ($p=.0018$)
- WAROPS® Users had better SF36 health scores than Non-takers: Mental Health summary score ($p=.0044$) and 'emotional well-being' subscale ($p=.0396$) and 'energy/fatigue' subscale ($p=.0039$)

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- WAROPS® Users have better post-deployment readjustment than non-takers: PDRI total score ($p=.0109$) and subscale scores 'Career' ($p=.0001$), 'Intimate relationships' ($p=.0057$) and 'Social relationships' ($p=.0196$).
- On HERMES measures, WAROPS® Users have better 'Perception of Unit Support (DRRI-US)' ($p=.0009$), 'PHQ-Anxiety' ($p=.0390$), 'PHQ-9 Depression' ($p=.0030$), 'Anger (DAR)' ($p=.01.07$)' and were less likely to 'Seek Services' ($p=.0007$) than Non-takers.
- WAROPS® Users were less depressed than Non-takers: PDHA PHQ2-Depression screening ($p=.0313$).

Health-related Outcomes at post-deployment—Breathing Skill Users vs. Non-skill users and Non-Takers

In this section we answer the questions:

- At Post-deployment, are there health related outcome differences for WAROPS® breathing skill users and non-users?
- Are there health outcome differences between WAROPS® skill users and Non-takers (no training pre-deployment)?

Skill users are defined as soldiers who use a particular WAROPS® skill daily, in this case Breathing. Two sample Wilcoxon rank sum tests were used to test whether there are differences between the two distributions. Mantel-Haenszel Chi-square tests were used for binary variables.

All significant (at 5% significant level) results are shown with their p-values.

At T3 when comparing WAROPS® Breathing skills users to non-users we found the following significant health outcomes differences:

- WAROPS® Breathing skill users have fewer PTSD symptoms: PCL-M total score ($p=.0490$)
- WAROPS® Breathing skill users are more resilient: CD-RISC ($p=.0048$)
- WAROPS® Breathing skill users report better health and well-being: SF36 mental health summary score ($p=.0314$) and subscales 'emotional well-being' ($p=.0374$) and 'energy/fatigue' ($p=.0013$).
- WAROPS® Breathing skill users have better job related reintegration and health: PDRI subscale 'Career' ($p=.0374$) and 'Health' ($p=.0186$).
- WAROPS® Breathing skill users are less likely to screen positive for depression: HERMES PHQ-9 Depression' ($p=.0008$) and report better unit support/cohesiveness: HERMES 'Perception of Unit Support (DRRI-US)' ($p=.0166$)

At T3 when comparing WAROPS® Breathing skills users to Non-takers we found the following significant health outcomes differences:

- WAROPS® Breathing skill users have fewer PTSD symptoms related to re-experiencing traumatic events and avoidance: PCL-M subscales 'Re-experiencing' ($p=.0125$) and 'Avoidance/Numbing' ($p=.0370$)
- WAROPS® Breathing skill users are more resilient: CD-RISC ($p=.0037$)
- WAROPS® Breathing skill users report better health and well-being: SF36 mental health summary score ($p=.0288$) and subscale 'energy/fatigue' ($p=.0021$).

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- WAROPS® Breathing skill users report better overall and job related reintegration: PDRI total score ($p=.0241$) and subscale 'Career' ($p=.0081$).
- WAROPS® Breathing skill users are less likely to screen positive for depression: HERMES PHQ-9 Depression' ($p=.0125$) and Anger ($p=.0346$) and report better unit support/cohesiveness: HERMES 'Perception of Unit Support (DRRI-US)' ($p=.0066$) and are less likely to seek a variety of health and other services: 'Seeking Service' ($p=.0048$)

Health-related Outcomes at post-deployment—Attention Skill Users vs. Non-skill users and Non-Takers

In this section we answer the questions:

- At Post-deployment, are there health related outcome differences for WAROPS® attention skill users and non-users?
- Are there health outcome differences between WAROPS® attention skill users and Non-takers (no training pre-deployment)?

Skill users are defined as soldiers who use a particular WAROPS® skill daily, in this case Attention. Two sample Wilcoxon rank sum tests were used to test whether there are differences between the two distributions. Mantel-Haenszel Chi-square tests were used for binary variables.

All significant (at 5% significant level) results are shown with their p-values.

At T3 when comparing WAROPS® Attention skills users to non-users we found the following significant health outcomes differences:

- WAROPS® Attention skill users have fewer PTSD symptoms: PCL-M total score ($p=.0034$) and subscales 'Avoidance/Numbing' ($p=.0397$) and 'Hyperarousal' ($p=.0046$)
- WAROPS® Attention skill users are more resilient: CD-RISC ($p=.0017$)
- WAROPS® Attention skill users report better health and well-being: SF36 mental health summary score ($p=.0221$) and subscales 'emotional well-being' ($p=.0033$) and 'energy/fatigue' ($p=.0008$).
- WAROPS® Attention skill users have better overall post deployment reintegration as well as job related reintegration, health, and PTSD symptoms: PDRI total score ($p=.0115$), and subscales 'Career' ($p=.0260$), 'Health' ($p=.0246$), and 'PTSD' ($p=.0382$)
- WAROPS® Attention skill users are less likely to screen positive for depression, anger, and PTSD, use less alcohol and report better perceived unit support/cohesiveness: HERMES PHQ-9 Depression' ($p=.0033$), 'Anger (DAR)' ($p=.0227$), 'PTSD' ($p=.0465$) and 'Alcohol' ($p=.0237$). HERMES 'Perception of Unit Support (DRRI-US)' ($p=.0025$)

At T3 when comparing WAROPS® Attention skills users to Non-takers we found the following significant health outcomes differences:

- WAROPS® Attention skill users report fewer PTSD symptoms and have significantly lower PCL-M total scores as well as all the PCL-M subscales: PCL-M total score ($p=.0067$) and PCL-M subscales 'Re-experiencing' ($p=.0163$), 'Avoidance/Numbing' ($p=.0165$), and 'Hyperarousal' ($p=.0395$).
- WAROPS® Attention skill users are more resilient: CD-RISC ($p=.0012$)

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- WAROPS® Attention skill users report better health and well-being: SF36 mental health summary score ($p=.0169$) and subscales 'emotional well-being' ($p=.0188$) and 'energy/fatigue' ($p=.0013$).
- WAROPS® Attention skill users report better overall and job related reintegration, fewer PTSD symptoms, better intimate and social relationships, and few concerns regarding deployment: PDRI total score ($p=.0025$) and subscales 'Career' ($p=.0053$), 'Intimate relationships' ($p=.0138$), 'PTSD symptoms' ($p=.0200$), 'Concerns of deployment' ($p=.0370$) and 'Social relationships' ($p=.0161$).
- WAROPS® Attention skill users are less likely to screen positive for depression, PTSD, and anger, and report better unit support/cohesiveness, and are less likely to seek a variety of health and other services: HERMES PHQ-9 Depression' ($p=.0025$), 'PTSD' ($p=.0075$), Anger ($p=.0071$), HERMES 'Perception of Unit Support (DRRI-US)' ($p=.0166$) and 'Seeking Service' ($p=.0098$)

Health-related Outcomes at post-deployment—Visualization Skill Users vs. Non-skill users and Non-Takers

In this section we answer the questions:

- At Post-deployment, are there health related outcome differences for WAROPS® visualization skill users and non-users?
- Are there health outcome differences between WAROPS® visualization skill users and Non-takers (no training pre-deployment)?

Skill users are defined as soldiers who use a particular WAROPS® skill daily, in this case visualization. Two sample Wilcoxon rank sum tests were used to test whether there are differences between the two distributions. Mantel-Haenszel Chi-square tests were used for binary variables.

All significant (at 5% significant level) results are shown with their p-values.

At T3 when comparing WAROPS® Visualization skills users to non-users we found the following significant health outcomes differences:

- WAROPS® Visualization skill users have fewer PTSD symptoms: PCL-M total score ($p=.0071$) and subscale 'Hyperarousal' ($p=.0053$)
- WAROPS® Visualization skill users are more resilient: CD-RISC ($p=.0003$)
- WAROPS® Visualization skill users report better health and well-being: SF36 mental health summary score ($p=.0112$) and subscales 'emotional well-being' ($p=.0013$) and 'energy/fatigue' ($p=.0044$).
- WAROPS® Visualization skill users have better job and health-related reintegration: PDRI subscales 'Career' ($p=.0003$), and 'Health' ($p=.0378$)
- WAROPS® Visualization skill users are less likely to screen positive for depression and anger, use less alcohol and report better perceived unit support/cohesiveness: HERMES PHQ-9 Depression' ($p=.0147$), 'Anger (DAR)' ($p=.0067$), and 'Alcohol' ($p=.0328$), HERMES 'Perception of Unit Support (DRRI-US)' ($p<.0001$)

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At T3 when comparing WAROPS® Visualization skills users to Non-takers we found the following significant health outcomes differences:

- WAROPS® Visualization skill users report fewer PTSD symptoms and have significantly lower PCL-M total scores as well as all the PCL-M subscales: PCL-M total score ($p=.0139$) and PCL-M subscales 'Re-experiencing' ($p=.0122$), 'Avoidance/Numbing' ($p=.0403$), and 'Hyperarousal' ($p=.0487$).
- WAROPS® Visualization skill users are more resilient: CD-RISC ($p=.0003$)
- WAROPS® Visualization skill users report better health and well-being: SF36 mental health summary score ($p=.0095$) and subscales 'emotional well-being' ($p=.0108$) and 'energy/fatigue' ($p=.0073$).
- WAROPS® Visualization skill users report better overall and job related reintegration and better intimate relationships: PDRI total score ($p=.0293$) and subscales 'Career' ($p<.001$), 'Intimate relationships' ($p=.0301$).
- WAROPS® Visualization skill users are less likely to screen positive for depression, and anger, and report better unit support/cohesiveness, and are less likely to seek a variety of health and other services: HERMES PHQ-9 Depression' ($p=.0114$), 'Anger' ($p=.0021$), HERMES 'Perception of Unit Support (DRRI-US)' ($p=.0004$) and 'Seeking Service' ($p=.0283$)

Health-related Outcomes at post-deployment—Energy Management Skill Users vs. Non-skill users and Non-Takers

In this section we answer the questions:

- At Post-deployment, are there health related outcome differences for WAROPS® Energy Management skill users and non-users?
- Are there health outcome differences between WAROPS® Energy Management skill users and Non-takers (no training pre-deployment)?

Skill users are defined as soldiers who use a particular WAROPS® skill daily, in this case Energy Management. Two sample Wilcoxon rank sum tests were used to test whether there are differences between the two distributions. Mantel-Haenszel Chi-square tests were used for binary variables.

All significant (at 5% significant level) results are shown with their p-values.

At T3 when comparing WAROPS® Energy Management skills users to non-users we found the following significant health outcomes differences:

- WAROPS® Energy Management skill users have fewer PTSD symptoms: PCL-M total score ($p=.0228$) and subscale 'Hyperarousal' ($p=.0324$)
- WAROPS® Energy Management skill users are more resilient: CD-RISC ($p=.0004$)
- WAROPS® Energy Management skill users report better health and well-being: SF36 mental health summary score ($p=.0250$) and subscales 'emotional well-being' ($p=.0040$), 'General health perceptions' ($p=.0299$) and 'energy/fatigue' ($p=.0012$).
- WAROPS® Energy Management skill users are less likely to screen positive for depression and anger, use less alcohol and report better perceived unit support/cohesiveness: HERMES PHQ-9 Depression' ($p=.0487$), 'Anger (DAR)' ($p=.0185$), and 'Alcohol' ($p=.0248$). HERMES 'Perception of Unit Support (DRRI-US)' ($p=.0003$)

At T3 when comparing WAROPS® Energy Management skills users to Non-takers we found the following significant health outcomes differences:

- WAROPS® Energy Management skill users report fewer PTSD symptoms and have significantly lower PCL-M total scores: PCL-M total score ($p=.0318$)
- WAROPS® Energy Management skill users are more resilient: CD-RISC ($p=.0003$)
- WAROPS® Energy Management skill users report better health and well-being: SF36 mental health summary score ($p=.0200$) and subscales 'emotional well-being' ($p=.0178$) and 'energy/fatigue' ($p=.0019$).
- WAROPS® Energy Management skill users report better overall and job related reintegration: PDRI total score ($p=.0295$) and subscale 'Career' ($p=.0010$)
- WAROPS® Energy Management skill users are less likely to screen positive for depression and anger, and report better unit support/cohesiveness, and are less likely to seek a variety of health and other services: HERMES PHQ-9 Depression' ($p=.0335$), 'DAR Anger' ($p=.0080$), HERMES 'Perception of Unit Support (DRRI-US)' ($p=.0020$) and 'Seeking Service' ($p=.0199$)

Health-related Outcomes at post-deployment—Recovery Skill Users vs. Non-skill users and Non-Takers

In this section we answer the questions:

- At Post-deployment, are there health related outcome differences for WAROPS® Recovery skill users and non-users?
- Are there health outcome differences between WAROPS® Recovery skill users and Non-takers (no training pre-deployment)?

Skill users are defined as soldiers who use a particular WAROPS® skill daily, in this case Recovery. Two sample Wilcoxon rank sum tests were used to test whether there are differences between the two distributions. Mantel-Haenszel Chi-square tests were used for binary variables.

All significant (at 5% significant level) results are shown with their p-values.

At T3 when comparing WAROPS® Recovery skills users to non-users we found the following significant health outcomes differences:

- WAROPS® Recovery skill users report fewer PTSD symptoms and have significantly lower PCL-M total scores as well as all the PCL-M subscales: PCL-M total score ($p=.0033$) and PCL-M subscales 'Re-experiencing' ($p=.0227$), 'Avoidance/Numbing' ($p=.0159$), and 'Hyperarousal' ($p=.0062$).
- WAROPS® Recovery skill users are more resilient: CD-RISC ($p=.0016$)
- WAROPS® Recovery skill users report better health and well-being: SF36 mental health summary score ($p=.0011$) and subscales 'emotional well-being' ($p=.0006$) 'General health' ($p=.0279$), and 'energy/fatigue' ($p=.0004$).
- WAROPS® Recovery skill users have better overall post deployment reintegration as well as job related reintegration and health: PDRI total score ($p=.0174$), and subscales 'Career' ($p=.0004$), and 'Health' ($p=.0334$)

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- WAROPS® Recovery skill users are less likely to screen positive for depression, anger, anxiety, and violence/safety issues. They report better perceived unit support/cohesiveness and are less likely to have had previous or current Behavioral Health Treatment: HERMES PHQ-9 Depression' (p=.0006), 'Anger (DAR)' (p=.0146), 'PHQAnx' (p=.0031), 'Violence & Safety' (p=.0100), HERMES 'Perception of Unit Support (DRRI-US)' (p<.0001), and 'Behavioral Health Treatment History' (p=.0467).

At T3 when comparing WAROPS® Recovery skills users to Non-takers we found the following significant health outcomes differences:

- WAROPS® Recovery skill users report fewer PTSD symptoms and have significantly lower PCL-M total scores as well as all the PCL-M re-experiencing and avoidance/numbing subscales: PCL-M total score (p=.0077) and PCL-M subscales 'Re-experiencing' (p=.0026), 'Avoidance/Numbing' (p=.0060).
- WAROPS® Recovery skill users are more resilient: CD-RISC (p=.0021)
- WAROPS® Recovery skill users report better health and well-being: SF36 mental health summary score (p=.0013) and subscales 'emotional well-being' (p=.0118), 'social functioning' (p=.0337), and 'energy/fatigue' (p=.0011).
- WAROPS® Recovery skill users report better overall and job related reintegration, fewer PTSD symptoms, and better intimate and social relationships: PDR total score (p=.0030) and subscales 'Career' (p<.0001), 'Intimate relationships' (p=.0024), 'PTSD symptoms' (p=.0325), and 'Social relationships' (p=.0044).
- WAROPS® Recovery skill users are less likely to screen positive for depression, anger, anxiety, violence/safety issues and report better unit support/cohesiveness, are less likely to seek a variety of health and other services, and are less likely to have had previous or current Behavioral Health Treatment: HERMES PHQ-9 Depression' (p=.0008), Anger (p=.0048), 'PHQ-Anxiety' (p=.0111), 'Violence & Safety' (p=.0235), HERMES 'Perception of Unit Support (DRRI-US)' (p=.0004), 'Behavioral Health Treatment History' (p=.0404), and 'Seeking Service' (p=.0004).

Changes in Health-related Outcomes from Pre- to Post Deployment: Connected consenters (i.e. within-subject changes)

Connected consenters are those soldiers who were trained and consented at pre-deployment and for whom we have HERMES data at both pre- and post-deployment. In this section we answer the following question:

- Are there differences in health outcomes from pre- to post-deployment for soldiers who took the WAROPS® training at both time points (within-subject changes from pre- to post-deployment)?

All significant (at 5% significant level) results are shown with their p-values. We found the following significant results:

- These soldiers report better health and well-being from pre- to post-deployment: SF36 mental health summary score (p=.0031) and subscales 'emotional well-being' (p=.0134) and 'energy/fatigue' (p<.001).

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- Soldiers also reported drinking less alcohol from pre- to post-deployment: HERMES subscale 'Alcohol' ($p < .0001$).
- After deployment, soldiers were more likely to screen positive for depression, anxiety, PTSD, violence/safety issues than before deployment. They also reported lower unit support/cohesiveness, and were more likely to seek a variety of health and other services, and more likely to have had previous or current Behavioral Health Treatment: HERMES PHQ-9 Depression' ($p < .0001$), 'PCPTSD' ($p < .0001$), 'PHQ-Anxiety' ($p = .0008$), 'Violence & Safety' ($p = .0001$), HERMES 'Perception of Unit Support (DRRI-US)' ($p < .0001$), 'Behavioral Health Treatment History' ($p < .0001$), and 'Seeking Service' ($p = .0202$).

Changes in Health-related Outcomes from pre- to post-deployment: Users/Non-users/Non-takers (within subjects)

In this section we answer the questions:

- Are there differences in health-related outcomes from pre- to post-deployment between WAROPS® skill users and non-users?
- Are there differences in health-related outcomes from pre- to post-deployment between WAROPS® skill users and non-takers?

Skill users are defined as soldiers who use at least one WAROPS® skill daily. All significant (at 5% significant level) between and within group p-values are shown in the table.

When comparing changes in health-related outcomes from pre- to post-deployment for non-users we found the following significant health outcomes differences:

- WAROPS® non-skill users report decreased physical functioning but improved energy/fatigue and less alcohol use: SF36 subscale 'physical functioning' ($p = .0498$), 'energy/fatigue' ($p = .0145$) and HERMES 'Alcohol' ($p = .0041$).
- WAROPS® non-skill users are more likely to screen positive for depression, PTSD, and violence/safety issues. They report decreased unit support/cohesiveness, are more likely to have had previous or current Behavioral Health Treatment, and are more likely to seek a variety of health and other services: HERMES PHQ-9 Depression' ($p < .0001$), 'PCPTSD' ($p < .0001$) 'PHQAnx' ($p = .0144$), 'Violence & Safety' ($p = .0006$), HERMES 'Perception of Unit Support (DRRI-US)' ($p < .0001$), and 'Behavioral Health Treatment History' ($p < .0001$), and 'Seeking Service' ($p = .0025$).

When comparing changes in health-related outcomes from pre- to post-deployment for Skill users we found the following significant health outcomes differences:

- WAROPS® skill users report improved health on a number of SF36 subscales: SF36 subscale 'physical functioning' ($p = .0240$), 'energy/fatigue' ($p = .0003$), 'emotional well-being' ($p = .0190$), and 'pain' ($p = .0207$).
- WAROPS® skill users are more likely to screen positive for anxiety and depression and are more likely to have had previous or current Behavioral Health Treatment: HERMES PHQ-9 Depression' ($p = .0037$), 'PHQAnx' ($p = .0158$), and 'Behavioral Health Treatment History' ($p = .0006$).

So in comparing WAROPS® skills user to non-users, we found the group have similar results. WAROPS® skill users report more positive within-group changes in measures of health and well-being (SF36) and fewer negative changes in HERMES subscales. In making direct between group comparison of the changes over time we find that only two significant changes: The Users have a better changes in physical functioning and unlike the non-users, they decreased their likelihood of seeking a variety of health and other services: SF36 'physical functioning' ($p=.0326$) and HERMES 'Seeking Service' ($p=.0477$).

When comparing changes in health-related outcomes from pre- to post-deployment for Non-takers we found the following significant health outcomes differences:

- Non-takers are more likely to screen positive for depression, PTSD, and violence/safety issues. They report decreased unit support/cohesiveness, are more likely to have had previous or current Behavioral Health Treatment, and are more likely to seek a variety of health and other services: HERMES PHQ-9 Depression' ($p=.0005$), 'PCPTSD' ($p=.0078$), 'Violence & Safety' ($p=.0283$), HERMES 'Perception of Unit Support (DRRI-US)' ($p=.0052$), and 'Behavioral Health Treatment History' ($p=.0490$), and 'Seeking Service' ($p=.0042$).

In comparing WAROPS® skills user to soldiers who did not attend WAROPS® pre-deployment, we can only look at HERMES data. WAROPS® skills users report fewer negative within-subject changes in HERMES subscales than non-takers. For the between group comparison, WAROPS® skill users are significantly better than non-users in the changes of Hermes subscale 'Seeking Service'. This is, unlike the non-takers, they decreased their likelihood of seeking a variety of health and other services from pre- to post-deployment: 'Seeking Service' ($p=.0090$).

Changes in Health-related outcomes over time for Breathing skill users vs. Non-users and Non-takers

In this section we will answer the following questions:

- Are there differences in health-related outcomes pre- to post-deployment changes between WAROPS® Breathing skill users and non-users?
- Are there differences in health-related outcomes from pre- to post-deployment between WAROPS® Breathing skill users and non-takers?

Skill users are defined as soldiers who use one WAROPS® skill daily, in this case Breathing. We compared the difference scores for the skill users to the difference scores of non-users and non-takers. Two sample Wilcoxon rank sum tests were used to test whether there are differences between two distributions.

All significant (at 5% significant level) results are shown with their p-values.

When comparing differences in pre-post change scores of WAROPS® Breathing skills users to those of non-users we found the following significant health outcomes differences:

- WAROPS® Breathing skill users report better health and well-being change scores over time: SF36 physical health summary score ($p=.0447$) and subscales 'Physical functioning' ($p=.0369$), 'pain' ($p=.0067$), and 'energy/fatigue' ($p=.0359$).

When comparing differences in pre-post change scores of WAROPS® Breathing skills users to those of non-takers we found no significant health outcomes results.

Changes in Health-related outcomes over time for Attention skill users vs. Non-users and Non-takers

In this section we will answer the following questions:

- Are there differences in health-related outcomes pre- to post-deployment changes between WAROPS® Attention skill users and non-users?
- Are there differences in health-related outcomes from pre- to post-deployment between WAROPS® Attention skill users and non-takers?

Skill users are defined as soldiers who use one WAROPS® skill daily, in this case Attention. We compared the difference scores for the skill users to the difference scores of non-users and non-takers. Two sample Wilcoxon rank sum tests were used to test whether there are differences between two distributions.

All significant (at 5% significant level) results are shown with their p-values.

When comparing differences in pre-post change scores of WAROPS® Attention skills users to those of non-users we found the following significant health outcomes differences:

- WAROPS® Attention skill users report significant decreases in the PCL-M scale for re-experiencing traumatic events compared to non-users: 'Re-experiencing' (p=.0157).

When comparing differences in pre-post change scores of WAROPS® Attention skill users to those of non-takers we found the following significant results:

- Attention skill users had no change in depression scores over time while the non-takers were more likely to screen positive for PTSD from pre- to post-deployment. In addition, Attention skill users were less likely to seek a variety of health and other services after deployment and opposite was found for non-takers: HERMES 'PCPTSD' (p=.0075) and 'Seeking Service' (p=.0142).

Changes in Health-related outcomes over time for Visualization skill users vs. Non-users and Non-takers

In this section we will answer the following questions:

- Are there differences in health-related outcomes pre- to post-deployment changes between WAROPS® Visualization skill users and non-users?
- Are there differences in health-related outcomes from pre- to post-deployment between WAROPS® Visualization skill users and non-takers?

Skill users are defined as soldiers who use one WAROPS® skill daily, in this case Visualization. We compared the difference scores for the skill users to the difference scores of non-users and non-takers. Two sample Wilcoxon rank sum tests were used to test whether there are differences between two distributions.

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When comparing differences in pre-post health outcomes change scores of WAROPS® Visualization skills users to those of non-users and non-takers we found no significant results.

Changes in Health-related outcomes over time for Energy Management skill users vs. Non-users and Non-takers

In this section we will answer the following questions:

- Are there differences in health-related outcomes pre- to post-deployment changes between WAROPS® Energy Management skill users and non-users?
- Are there differences in health-related outcomes from pre- to post-deployment between WAROPS® Energy Management skill users and non-takers?

Skill users are defined as soldiers who use one WAROPS® skill daily, in this case Energy Management. We compared the difference scores for the skill users to the difference scores of non-users and non-takers. Two sample Wilcoxon rank sum tests were used to test whether there are differences between two distributions.

When comparing differences in pre-post health outcomes change scores of WAROPS® Energy Management skills users to those of non-users and non-takers we found no significant results.

Changes in Health-related outcomes over time for Recovery skill users vs. Non-users and Non-takers

In this section we will answer the following questions:

- Are there differences in health-related outcomes pre- to post-deployment changes between WAROPS® Recovery skill users and non-users?
- Are there differences in health-related outcomes from pre- to post-deployment between WAROPS® Recovery skill users and non-takers?

Skill users are defined as soldiers who use one WAROPS® skill daily, in this case Recovery. We compared the difference scores for the skill users to the difference scores of non-users and non-takers.

All significant (at 5% significant level) results are shown with their p-values.

When comparing differences in pre-post change scores of WAROPS® Recovery skills users to those of non-users we found the following significant health outcomes differences:

- WAROPS® Recovery skill users were less likely to seek a variety of health and other services after deployment and opposite was found for non-users: HERMES 'Seeking Service' (p=.0337).

When comparing differences in pre-post change scores of WAROPS® Recovery skills users to those of non-takers we found the following significant health outcomes differences:

- WAROPS® Recovery skill users were less likely to seek a variety of health and other services after deployment compared with before deployment and the opposite was found for non-takers: HERMES 'Seeking Service' (p=.0035).

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Hypothesis 4 – Health outcomes (Training pre-deployment and post-deployment vs. training pre-deployment only)

Service members trained in the WAROPS® model both pre- and post-deployment will demonstrate fewer symptoms and less dysfunction related to combat deployment, and better reintegration into family and community compared to a group of service members trained in the WAROPS® model only at post-deployment.

Comparisons of outcomes from the Post Deployment Health Assessment (PDHA) and the Post Deployment Health Reassessment (PDHRA) between the 3-4 and 4-4 were conducted. It was of interest to look at differences on these screening instruments between soldiers who had WAROPS® training both pre- and post- deployment and soldiers who had the training only post-deployment. We will compare soldiers within the 4-4 and between those in the 4-4 who had training pre- and post and in the 3-4 who received training only upon redeployment.

Outcome Measures

PDHA/PDHRA

Includes following subscales:

- **PHQ2-Depression:** Respondents were considered at risk for depression if they positively answered either or both of the following questions:
 - “Little interest or pleasure in doing things” (More than half the days, a lot, or nearly every-day are positive answers)
 - “Feeling down, depressed, or hopeless” (more than half the days, a lot, or nearly every day were considered positive responses)
- **PCPTSD:** 0/1 PTSD screening question: PCPTSD is considered "positive" if a patient answers "yes" to all four items
- **Loss of Control score:** Domestic Violence item. “Over the PAST MONTH, have you had thoughts or concerns that you might hurt or lose control with someone”
- **Alcohol screening:** screening question: number of positive responses to 2-item screening questions: “Use Alcohol more than meant to” and “Felt or wanted to cut down alcohol consumption”, the higher the score the serious alcohol problem
- **Health assessment score:** Answer of question “How would you rate your health during the past month”: Excellent, very good, and good are scored as 1, Fair and Poor are scored as 0. The higher score indicates better health.
- **Hospitalized score:** The answer of hospitalization question: “Did you have to spend one or more nights in a hospital as a patient during this deployment?” in PDHA and “Since you returned from deployment, have you been hospitalized?” in PDHRA.

PDHA comparison for 3-4 (trained post-deployment) and 4-4 (trained pre- and post-deployment)

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Results indicate soldiers in the 3-4 were more likely to screen positive for depression and for “hurt someone or lose control” compared to soldiers in the 4-4 who had training at both pre-and post-deployment. See Table 25 for means and significance levels.

Table 25. PDHA comparison for 3-4 (pre- only) vs. 4-4 (pre- and post-)

BCT	Variable	N	Mean	Std Dev	BCT	N	Mean	Std Dev	p-value
3-4	PHQ2Depress_Screen	1024	0.075	0.264	4-4	1072	0.049	0.215	0.0138
3-4	PCPTSD_Screen	1026	0.022	0.148	4-4	1070	0.035	0.183	NS
3-4	LOSE_CONTROL_score	1028	0.017	0.128	4-4	1068	0.007	0.075	0.0200
3-4	Alcohol_screen	1029	0.043	0.246	4-4	1072	0.047	0.266	NS
3-4	health_assessment_score	1043	0.907	0.291	4-4	1079	0.918	0.275	NS
3-4	HOSPITALIZED_score	1042	0.048	0.214	4-4	1075	0.057	0.231	NS

PDHRA comparison for 3-4 (trained post-deployment) and 4-4 (trained pre- and post-deployment)

Results indicate soldiers in the 4-4 had higher health self-assessment ratings compared to soldiers in the 3-4. See Table 26 for means and significance levels.

Table 26. PDHRA comparison for 3-4 (pre- only) vs. 4-4 (pre- and post-)

BCT	Variable	N	Mean	Std Dev	BCT	N	Mean	Std Dev	p-value
3-4	PHQ2Depress_Screen	980	0.085	0.276	4-4	978	0.076	0.265	NS
3-4	PCPTSD_Screen	967	0.029	0.168	4-4	978	0.032	0.175	NS
3-4	LOSE_CONTROL_score	1011	0.012	0.108	4-4	961	0.018	0.132	NS
3-4	Alcohol_screen	969	0.097	0.371	4-4	978	0.134	0.440	NS
3-4	health_assessment_score	991	0.823	0.382	4-4	978	0.860	0.347	0.0267
3-4	HOSPITALIZED_score	978	0.045	0.207	4-4	973	0.044	0.206	NS

PDHA-PDHRA change comparison for 3-4 and 4-4

This analysis compares the changes in screening results from the PDHA to the PDHRA. The 3-4 had a decrease in percent of soldiers screening positive for “hurt someone or lose control” compared to the 4-4 who increased from the PDHA to the PDHRA. See Table 27 for means and significance levels.

Table 27. PDHRA comparison for 3-4 (pre- only) vs. 4-4 (pre- and post-)

BCT	Variable	N	Mean	Std Dev	BCT	N	Mean	Std	p-value
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								Dev	
3-4	PHQ2Depress_Screen	942	0.005	0.324	4-4	937	0.023	0.306	
3-4	PCPTSD_Screen	931	0.004	0.185	4-4	935	-0.003	0.199	
3-4	LOSE_CONTROL_score	974	-0.004	0.128	4-4	920	0.012	0.143	0.0102
3-4	Alcohol_screen	936	0.052	0.382	4-4	937	0.084	0.49	
3-4	health_assessment_score	969	-0.08	0.377	4-4	943	-0.048	0.361	
3-4	HOSPITALIZED_score	956	-0.006	0.267	4-4	934	-0.021	0.269	

PDHA comparison for 4-4 (trained post-deployment) and 4-4 (trained pre- and post-deployment)

This analysis compares the PDHA screening results between the two separate groups in the 4-4, those that took both training and those that had only pre-deployment training. There were no differences between the two groups regarding PDHA screening scores. See Table 28 for results.

Table 28. PDHA comparison for 4-4 (pre- only) vs. 4-4 (pre- and post-)

BCT Post Only	Variable	N	Mean	Std Dev	BCT Both	N	Mean	Std Dev	p-value
4-4	PHQ2Depress_Screen	293	0.061	0.241	4-4	1072	0.049	0.215	NS
4-4	PCPTSD_Screen	293	0.051	0.221	4-4	1070	0.035	0.183	NS
4-4	LOSE_CONTROL_score	293	0.099	0.299	4-4	1070	0.086	0.280	NS
4-4	Alcohol_screen	293	0.007	0.082	4-4	1068	0.006	0.075	NS
4-4	health_assessment_score	291	0.058	0.311	4-4	1072	0.047	0.266	NS
4-4	HOSPITALIZED_score	295	0.922	0.269	4-4	1079	0.918	0.275	NS

PDHRA comparison for 4-4 (trained post-deployment) and 4-4 (trained pre- and post-deployment)

This analysis compares the PDHRA screening results between the two separate groups in the 4-4, those that took both trainings and those that had only pre-deployment training. There were no differences between the two groups regarding PDHRA screening scores. See Table 29 for results.

Table 29. PDHRA comparison for 4-4 (pre- only) vs. 4-4 (pre- and post-)

BCT Post Only	Variable	N	Mean	Std Dev	BCT Both	N	Mean	Std Dev	p-value
4-4	PHQ2Depress_Screen	294	0.088	0.284	4-4	978	0.076	0.265	NS
4-4	PCPTSD_Screen	294	0.051	0.22	4-4	978	0.032	0.175	NS
4-4	LOSE_CONTROL_score	287	0.024	0.155	4-4	961	0.018	0.132	NS
4-4	Alcohol_screen	294	0.146	0.455	4-4	978	0.134	0.440	NS
4-4	health_assessment_score	293	0.874	0.333	4-4	978	0.86	0.347	NS
4-4	HOSPITALIZED_score	293	0.031	0.173	4-4	973	0.044	0.206	NS

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PDHA-PDHRA change comparison for 4-4 (post-deployment only) and 4-4 (both pre- and post-)

This analysis compares the changes in screening results from the PDHA to the PDHRA. There were no differences between the two groups regarding change in percent of soldiers screening positive from the PDHA to the PDHRA. See Table 30 for means and significance levels.

Table 30. PDHRA comparison for 4-4 (pre- only) vs. 4-4 (pre- and post-)

BCT Post only	Variable	N	Mean	Std Dev	BCT Both	N	Mean	Std Dev	p-value
4-4	PHQ2Depress_Screen	276	0.029	0.294	4-4	937	0.023	0.306	NS
4-4	PCPTSD_Screen	276	-0.004	0.263	4-4	935	-0.003	0.199	NS
4-4	LOSE_CONTROL_score	269	0.011	0.161	4-4	920	0.012	0.143	NS
4-4	Alcohol_screen	274	0.077	0.466	4-4	937	0.084	0.49	NS
4-4	health_assessment_score	277	-0.043	0.369	4-4	943	-0.048	0.361	NS
4-4	HOSPITALIZED_score	276	-0.043	0.252	4-4	934	-0.021	0.269	NS

Mid Deployment

As part of this two-year evaluation to assess the impact and effectiveness of the WAROPS® training program, a mid-deployment questionnaire was completed by a convenience sample of the trained soldiers in theatre (N=203). The survey addressed the use of skills during deployment, soldiers' self-perception of their ability to recognize and manage stress, and soldiers' perception of the impact of the WAROPS® training.

Demographics (N=203)

- Age: the mean age of participants was 28 years
- Gender: 92% of participants were male
- Pay grade range: E1 through O6
 - E1 through E4: 45%
 - E5 through E9: 45%
 - W1 through W5: 2%
 - O1 through O6: 9%
- MOS Role: 46% of participants were in a Combat Role
- Times Deployed
 - 1 time: 35%
 - 2 times: 32%
 - More than 2 times: 33%

Skill Use

Table 31 shows the frequency of use of the 5 major WAROPS® skills used for the 203 soldiers surveyed in Afghanistan in January/February 2010. It also displays use of at least one skill by frequency categories. Regular use (at least monthly) of at least one WAROPS® skill was reported by 51% of respondents, while 46% of respondents reported using at least one skill at least weekly. The Recovery skills which include the Trauma Releasing Exercises (TREs) were used most frequently with 38% of respondents using them at least weekly. See Table 31.

Table 31. Report Use of Skills at Mid-deployment (N=203)

	At least 1 time/day		At least 1 time/week		At least 1 time/month		Rarely		Never/Not at all	
Skills	N	%	N	%	N	%	N	%	N	%
Breathing	25	12	22	11	12	6	66	33	78	38
Attention Control	25	12	24	12	22	11	55	27	76	38
Visualization	22	11	27	13	22	11	51	25	79	39

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Energy Management	19	9	31	15	13	6	52	26	88	43
Recovery	52	26	24	12	14	7	41	20	72	35
At least one skill	64	32	94	46	103	51	142	70	61	30

Situations in Which WAROPS® Skills Were Used

The most commonly used reported situations in which WAROPS® skills were used were preparing for a mission (24.1%), during down time (24.1%), to help to get to sleep (22.7%), for job stress (22.2%), and after a mission (20.7%).

WAROPS® Skills Usage Based on Frequency of Enemy Confrontations

The use of WAROPS® skills is related to the frequency of enemy encounters. Soldiers with a higher frequency of enemy encounters were more likely to use WAROPS® skills on a more frequent basis ($p < .05$ for all 5 skills).

WAROPS® Skills Usage Based on Stress Level

Use of certain WAROPS® skills is related to self-reported stress: breathing ($p = .009$); attention control ($p = .04$), and visualization ($p = .03$). Soldiers with higher levels of self-reported stress were more likely to use these skills on a more frequent basis. Consistent trends were seen for the other skills but they did not reach statistical significance.

Impact of WAROPS® Training Program on Deployment Related Issues

The majority of participants agree that WAROPS® training has a positive impact on discipline (67.2%), interpersonal relationships among soldiers (65.6%), mission readiness (72.8%), performance (73.7%), relationships between soldiers and their family members (66.2%), and unit cohesiveness (62.8%).

Impact of WAROPS® Training Based on Stress Level

Participants who have higher self-reported levels of stress are more likely to agree that the WAROPS® program had an impact on discipline ($p = .02$) and interpersonal relationships among soldiers ($p = .04$). For all other impact areas, results were similar but not statistically significant (mission readiness ($p = .07$); unit cohesiveness ($p = .08$); performance ($p = .07$); and relationships between soldiers and family members ($p = .09$)).

Qualitative Report

I. INTRODUCTION

To test the hypothesis that the Warrior Optimization System (WAROPS®) training program is feasible, acceptable, and effective we utilize a mixed methods program evaluation approach. The rigorous technique includes analyses of quantitative measures (functional/clinical measures, health status outcomes, etc.) and qualitative data (interviews with participants, observational data, and administrative data).

Quantitative outcomes evaluation results are strengthened with the identification of potential mechanisms that account for success or failure of a program. The program structure, logistics, replicability, and quality can only be evaluated through qualitative inquiry. Implementation issues can be gleaned through observational data collected by evaluation staff. Further, soldier acceptability and satisfaction with a program, their attitudes, beliefs, and opinions can be captured through interviews with participants. By using mixed methods, our program evaluation adopts a combination of qualitative and quantitative approaches, which allow statistically reliable information obtained from numerical measurement to be backed up and enriched by information about the program participants' explanations.

In this report we present results from the qualitative analysis of the soldier interview data at pre- and post-deployment following the WAROPS® as well as data from interviews with the program staff trainers. The analysis focused on structure and implementation issues through the review of interviews/focus group data. We collected data on the feasibility and replicability of the program, on the organization, training program content, staffing, usefulness of the program to the soldiers during deployed and reintegration, and comparisons to other resilience programs they received.

A short section offers a description of the soldiers who were given the “sustainer” module which was intended to offer skills so medics could support the use of the training tools during deployment.

The last section in this report offers themes from the trainers' perspective. Issues around logistics, implementation, and feasibility are of particular interest in the analysis of the trainer interviews.

The fidelity of the training program was very low due to continuous program improvement making the program delivery a moving target for the evaluation staff. The constant changes to the program warranted that data collection continue during the course of the training cycle and justifies the large number of interviews that were conducted. It should also be noted that in the post-deployment group only 54% had received the training prior to deployment. So among the post deployment group there was also a large group who were receiving the training for the first time i.e. only post-deployment. See Appendix X. for a complete description of Qualitative results with exemplar quotations.

II. METHODS

We developed a semi-structured interview questionnaire based on the outcomes developed from the program theory-driven logic model (Alkin, 2004; Donaldson, 2007; McDavid & Hawthorn, 2006; Patton,

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2002). Within the model a key data element is process implementation, as opposed to context/structure or outcomes. Process refers to what actually happens in the real world as opposed to what is planned on paper. Process data are obtained by asking participants about their experiences and by observation. These data are qualitative in nature. To analyze these qualitative data we utilized a grounded-theory approach (Glaser & Strauss, 1967). This technique was selected rather than other qualitative methods because our goal was to discover key processes within the WAROPS® program implementation as seen from the perspective of the participants rather than testing an *a priori* hypothesis. These qualitative data supplement the health outcomes quantitative data that maps to the logic model short, medium, and long term impacts. The qualitative data allow us to explore in depth and in the words of the soldiers the meanings they attach to their evaluations. Rich descriptions like those elicited from interviews are not possible to collect with quantitative methods.

We conducted in-depth interviews using focus groups and individual interviews with the participants during three periods: early in the training cycle (April 2009), during the middle of the training cycle (July 2009) and at the end of the training cycle (September 2010). Small focus group interviews were conducted with the use of stratification based on rank in order to maximize participant response variance and to limit halo effects (Bauman & Adair, 1992). Further, this technique allowed for the lower ranks (E1-E4) to speak their minds more freely and not defer to or be influenced by the higher ranks (E5-O2) during interviews. Interviewees were chosen by who volunteered to participate.

We used a semi-structured questionnaire for interviews with probes that could help to guide the participant and the interview and provide us with the most relevant information on given topics. This also insured some uniformity in the data collected about set topics across the many interviews and focus groups. The questionnaire was designed to collect information about knowledge, behaviors, attitudes, and satisfaction from a perspective of the soldiers immediately after they received the training. Some of the questions covered specific topics such as: Prior expectations for the training and if the expectations were met; Overall comments about the training; Was there information presented during the training that could be helpful or useful; How does the training compare to other trainings that they had received; and What did they think of the trainers, content and handouts.

III. DATA ANALYSIS

At the end of the data collection all recorded interviews were assigned to individual transcribers who conducted the interviews. The transcribers followed a template that organized the responses by thematic content based on the program theory driven logic model. Then all transcriptions were uploaded into qualitative text analysis software (Atlas.ti) and tagged with the relevant marker code that indicated which interview question it answered. This process successfully allowed us to search for keywords, concepts and ideas in the data that will help outline the analysis *before* any analysis took place (Namey, et al., 2007). Simultaneously a code book was developed in Atlas.ti. Once all responses were coded according to the interview questions, they were printed out by topic (i.e. overall comments about the training) and disseminated to a group of 5-7 people for sub-code development. These sub-codes are the basis for the analysis.

Since the sub-themes needed to be coded in Atlas.ti, the team conducted inter-rater reliability exercises using University of Pittsburgh Coding Analysis Tool (CAT) with teams of two coders double-coding interviews. The CAT produced Fleiss' Kappas (Fleiss 1981) which were reviewed by the team. The final

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overall Kappa score was 0.76 which is considered substantial and acceptable for reliability (Landis & Koch, 1977).

IV. SAMPLE CHARACTERISTICS

a. Soldiers

There were three rounds of qualitative data collected on soldiers for this evaluation. First the 3-4 received *post-deployment* training in the spring of 2009, second the 4-4 received *pre-deployment* training in the summer of 2009 and third the 4-4 received *post-deployment* training in fall of 2010.

The total number of interviews that were conducted in 2009 consisted of data from two Brigades, the 3rd Brigade 4th Infantry Division and the 4th Brigade 4th Infantry Division, during April and May of 2009. The 3-4 were in the post-deployment phase and the 4-4 was preparing to deploy. There were 73 interviews from the 3-4 and 29 interviews from the 4-4. 83% of focus group interviews were conducted with only males, while 5% were females and 12% were mixed male and female. Of the 102 interviews 36 were individual interviews and 66 were focus groups that consisted of 2-8 soldiers. There were 173 soldiers interviewed from the 4-4 and 226 from the 3-4. The rank of participants ranged from E1 to O5. The majority of interviews were with E1-E4 (51%), then E5-E9 (33%) and the least was O1-O5 (16%). The participants were also asked if they had been deployed before and 69% had been previously deployed at least once.

The total number of interviews conducted in 2010 consisted of one Brigade, 4th Brigade 4th Infantry Division in their post-deployment/reintegration phase. Of the 83 interviews 25 were individual interviews and 58 were focus groups. There were 226 soldiers interviewed. The rank of participants ranged from E1 to O5. The majority of interviews were with E1-E4 (57%), followed by E5-E9 (34%), Officers O1-O5 (8%) and Warrant Officers (1%). 66% had been previously deployed which was not surprising since soldiers move and separate after deployment and new recruits will have joined up.

We conducted a sensitivity analysis to test whether we could combine the data collected in 2009 from the 3-4 with the 4-4. There were so few codes that showed any differences between the brigades which supported combining these data for analysis.

b. Sustainers

We spoke with a small sub-group of soldier who comprised what the WAROPS® trainers called the "sustainer group." There were 18 soldiers who volunteered to speak with researchers after the sustainer training. We divided them into four focus groups based on their rank. We interviewed one E-3, three E-4's, four E-5's, nine E-6's, and one E7.

c. Trainers

We conducted interviews with seven staff members as follows: one CEO/Director, Three Lead Trainers, two Assistant Trainers, and one Logistics Coordinator. All but one of the seven staff interviewed have military backgrounds.

V. SUMMARY AND CONCLUSIONS OF SOLDIER ANALYSIS

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The great strength of qualitative data is that it not only provides data about the evaluation of the program but also tells you what the meaning of the data is to service members. Through their own words you are able to see the various ways in which they respond to the same program and the ways in which they incorporate the training into a whole range of activities in their own lives. One conclusion we can draw from the data is that the majority of the soldiers responded positively to WAROPS® and in comparison to other programs they had had in their training, much more positively.

Two factors seem to contribute most to this response. The first was the trainers. As ex-military, and as ex-elite soldiers, Seals etc., and because of their age, recent combat experience of the trainers, the soldiers felt they were being taught by persons who understood what they are going through. To that extent the trainers can “walk a mile in their shoes”. This gave the trainers credibility in the eyes of the soldiers.

Secondly the training provides very pragmatic exercises that the soldiers can use in a wide range of situations from combat to road rage to domestic disputes. As a means of reducing stress the soldiers could see that many of the exercises worked. They could also see the usefulness of the techniques for their family members. This is probably quite unique among the various programs like this that are geared for the warrior or for battle.

Another conclusion is that this program gets much higher ratings from the soldiers than do the other programs such as Battlemind. The comments about the latter were very negative. A major difference seems to be that WAROPS® is not just PowerPoint slides and explanations, but involves physical exercises which the participants can master and can see the usefulness of immediately. The very physicality of the program might be a large part of its attractiveness. It fits in very well with the physical nature of their training generally.

Despite being well received, the soldiers did make suggestions about improvements. The first had to do with when the program is given. They felt it should occur earlier in their training. But that it should also be done both pre and post-deployment. The second had to do with making it army wide and mandatory. They felt it should be an integral part of their overall training and to be truly effective should be mandated. The soldiers also felt it should be repetitive both to enhance the learning but also to reinforce its importance. Other suggestions included breaking the program up into shorter sessions with smaller groups. The material distributed was seen as a bit impractical and should either be redesigned for easy carrying on the person or should be on line or video.

Comparing pre- and post-deployment did not show large differences in opinion. Those who had it prior to deployment rated it positively; those who had it both pre and post did so as well, as did those who only had it post. The conclusion from this would be that it is useful no matter when you give it.

Soldiers reported using skills they learned from the training during their recent deployment. They most often cited breathing skills but also used the visualization and recovery skills (core exercises). They used to the skills most often to prepare for missions but also for back and other pain, and for relaxation. Those who didn't use the skills said they forgot the skills and needed more training or did not have enough space or privacy to do them (core exercises).

Many soldiers felt the skills they learned have been helpful during their reintegration, particularly the core exercises and breathing techniques. A majority felt that they handled stress differently since having

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the WAROPS® training. Many use the skills they learned while driving to prevent road rage and when they are stressed at home.

If we conclude that this program was highly rated by the soldiers and that they would recommend it be continued then implementation becomes crucial. The soldiers identified this training has to happen at three levels. The first is at the system level where command has to decide it is part of the Physical Training (PT) and system wide and mandatory. The second level is at the local level where squad leaders must implement it. The last is the personal level where the soldiers must do not only for themselves but in collaboration with their buddies and/or families. They also noted that it has applicability for all soldiers in all functions not just for combat.

VI. SUSTAINER-SOLDIER BACKGROUND

One of the strategies outlined in the training program was the reinforcement of WAROPS® skills by a group of soldiers referred to as “sustainers”. This group was given an additional and different training tailored to teach soldiers how to support others in the utilization of the WAROPS® skill set. This group was hand-picked by commanders based on their Military Occupational Specialty (MOS). Most were medics. The observed training offered some skill reinforcement, but it also introduced new topics not covered in the core training such as the concept of periodization in exercise training and the memorization of the nine classes of supply for the medics. Our sample was comprised of 18 soldiers who volunteered to speak with researchers after the sustainer training. We divided them into four focus groups based on their rank. We interviewed one E-3, three E-4’s, four E-5’s, nine E-6’s, and one E7. The focus group probes are in Appendix A.

VII. SUMMARY AND CONCLUSIONS FOR SUSTAINER ANALYSIS

The WAROPS Sustainer’s “train the trainer” module was designed to teach a specially designated group of soldiers how to reinforce and maintain the use of the WAROPS® skills with their fellow soldiers. Although the sample size was relatively small (n=18), some common themes arose in the course of these focus groups. Similar to the core WAROPS® program, there was overall high satisfaction with the training module and expertise of the trainers. They suggested specific areas for improvement of the training module, including smaller group size, shorter duration of the module, and participation should have been on a volunteer basis rather than Command-directed. Some commented that the content of this module is not ideal for classroom setting. Sustainer participants also offered critique about the inadequacy of the training module to sustain the use of skills; some said that they needed more training and background on the science to help convey how the skills worked, some mentioned that it would be helpful to have additional materials to reinforce the content, and still others saw the training as more appropriate for self-help rather than teaching others. They thought that personally implementing these types of skills would be challenging for them, particularly during deployment because of the high op-tempo in theatre and that there would need to be leadership buy-in in order for these skills to be implemented at a wider level.

VIII. TRAINER BACKGROUND

In this phase of the WAROPS® program evaluation we focused on structure and implementation by gathering data via interviews from the Magis Group staff. Structure evaluation was used as a framework to collect data on the intervention components to assess feasibility of proposed activities and to provide

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recommendations for improving intervention structures and processes. We collected data on the organization, training program, and staff. Process evaluation was used as a framework to assess the extent to which the intervention components are implemented as planned, assess fidelity and variability, and program refinement in terms of feedback loops.

We chose staff using purposive sampling to ensure that we included the full range of staff (Crabtree & Miller, 1999). Interviewees were chosen who reflected different levels of staff categories: CEO, Lead Trainers, Assistant Trainers, Logistics Coordinator.

a. Methods

We developed a semi-structured interview guide based on the logic model topics from program evaluation (Alkin, 2004; Donaldson, 2007; McDavid & Hawthorn, 2006; Patton, 2002). The questionnaire was designed to collect information about structure, development, and implementation of the WAROPS® training from the perspective of the trainers. Our interview protocol consisted of a list of questions that assessed perceptions of training staff about (1) the organizational structure of the training company; (2) the background, qualifications, and training of staff; (3) the program itself: what worked well, what did not work well; (4) refinement of the program, feedback loops, and mid-course corrections; and (5) whether the program met its goals and expected outcomes/impacts.

To identify key concepts important to the structure and implementation of the training program, we used an exploratory technique described by Lincoln and Guba (1985). This technique is similar to free pile sorting methods used by cognitive anthropologists (Weller & Romney, 1988). First, we read each set of transcription field notes and grouped the similar comments together into piles and named them with overarching domains. Next we created themes that emerged from the text which represented smaller groups of comments within the overarching domains. Outlier comments were set aside for further analysis in case they were found to have tangential importance to the evaluation.

b. Semi-Structured Interviews

We conducted interviews with seven staff members as follows: one CEO/Director, Three Lead Trainers, two Assistant Trainers, and one Logistics Coordinator. All but one of the seven staff interviewed have military backgrounds. All interviews were audio taped and transcribed into field notes by independent transcribers. The mean duration of each interview was 25 minutes (range 14–33 minutes). Interviews were conducted using a standard interview guide, consisting of open-ended questions with probes for clarification and additional detail (Bernard, 2005). The interview questions can be found in Appendix B.

IX. SUMMARY AND CONCLUSIONS FOR TRAINER ANALYSIS

The dominant themes from the trainer data were those of trainer commitment, dedication, and motivation. They live to serve the soldier and believe deeply in the information they seek to impart of the service members. Their military backgrounds put them in a unique position to be accepted by soldiers and to understand what the experience of being “down range”. These are essential elements that Magis Group brought to resilience training in the Army.

Because they are experienced professional trainers, they clearly understood and implemented feedback loops for program improvement. They built this process into their daily schedule and would debrief

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trainings to act in real time in response to participant soldiers' suggestions. They offered a high level of flexibility in delivery. The continuous performance improvement was value-added for the Army, but made it difficult to assess this training program because there was no fidelity between each day, week, and month of training sessions.

Logistics problems were a major issue for implementation of the large-scale training program and trainers had to be extremely flexible. The space was often inadequate for the experiential elements of the training (exercises in a small room with up to 200 soldiers). The timing was changeable. The attendance numbers were erratic. These resource and communications issues are beyond the scope of this evaluation but it should be noted that the trainers responded in profession manner, were very flexible, and continued to exhibit positive attitudes throughout any adversities that they experienced.

The feasibility and replicability of this type of training model which employs a professional trainer/soldier staff is dependent upon the funding the Army is willing to put forth for stand up. As the trainers said, there is a special type of personnel that this group would need to find, hire, and train to get the kinds of high energy, highly motivated trainers that we observed in 2009 and 2010. It was clear that the rigorous training and practice the staff undergoes is not trivial. Soldier buy-in, satisfaction, and acceptability were very high in direct response to this model.

Summary and Conclusions

Introduction

The Warrior Optimization Systems (WAROPS®) training program, developed by the Magis Group, provides stress management information and self-regulating skills to Service Members to manage their operational and combat stress, enhance resilience, maximize performance, and facilitate re-integration throughout the deployment cycle. Samueli Institute and its partner, the RAND Corporation, conducted a systematic Program Evaluation of the WAROPS® training program that assessed the program's structure, process, and outcomes to generate information about its merit, worth, and significance. The specific aims of this project were to: (1) evaluate the feasibility and acceptability of the WAROPS® training program in both pre- and post-deployment military training environments; (2) assess the educational effectiveness of WAROPS® through quantitative measures and qualitative focus groups and interviews; and (3) investigate changes in stress-related outcomes (i.e., somatic, behavioral, and psychosocial) in Service Members from Fort Carson, CO after undergoing WAROPS® training prior to and after return from deployment.

This study included 3,160 soldiers from the 4th Brigade Combat Team (BCT), 4th Infantry Division (ID) (4-4) at Fort Carson, CO who were Command-directed to receive the WAROPS® training at two time points: prior to and after return from deployment. Additionally, a single time evaluation was conducted with 1,926 soldiers from the 3rd BCT 4th ID (3-4) who were Command-directed to receive the WAROPS® training post-deployment. In addition, 118 qualitative focus groups and interviews were conducted with 404 participants.

Results

Results indicate that the plan to deliver this 4-hour block of training to an entire BCT of soldiers over a four week period was feasible. On three separate occasions, the Magis Group trainers conducted the WAROPS training with all available soldiers from an entire BCT for a total throughput of 5,963 soldiers. They were able to train up to 120 soldiers at a time with two training groups per day. It was not possible to track fidelity of the training over time because the trainers made changes to the program on an ongoing basis based on informal feedback they received from soldiers after training sessions.

Satisfaction with the training was extremely high as evidenced by survey and interview data, with many soldiers commenting that WAROPS was better than other trainings they had received previously. At pre-deployment, there was significantly higher satisfaction and expected use among soldiers who had previously deployed, suggesting that experienced soldiers seemed to be able to grasp the relevance and applicability of skills much better than those who had never deployed. At all training time points, there was higher satisfaction and expected use in later training weeks as compared to initial training sessions. Possible reasons for this are that (1) trainers were better prepared to conduct the trainings as the weeks

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progressed and (2) the changes they implemented based on feedback from soldiers had a positive impact. At post-deployment, satisfaction, although quite high for all participants, was higher for soldiers with no previous WAROPS® training, possibly indicating that the post-deployment training was not different enough from the pre-deployment training to be useful to some soldiers.

Overall, there was high expected use and application of skills with a large majority of participants indicating that they would recommend this training to others. Soldiers often commented that were planning to go home and teach their spouse or buddy the skills they just learned. There was a shift toward greater perceived self-efficacy immediately post-training and a statistically significant improvement in knowledge scores from pre- to post-training at all three training time points.

After pre-deployment training, soldiers most often mentioned the Recovery skills (i.e. Core exercises or Trauma Releasing Exercises (TREs)) when asked which they liked and planned to use. After deployment, they reported that breathing and recovery skills were used most often. When asked why they did not use skills during deployment, some soldiers felt they did not have enough time to practice and master the skills before deploying or in the case of the TREs, they didn't enough physical space or privacy to do the exercises in theatre.

Overall, the reported use of the skills was high especially given that this training was a single four-hour session. Each WAROPS® skill was used by at least 65% of participants during deployment with 56% of participants using at least one skill at least weekly. The most common situations for skill use during deployment included: preparing for a mission, during downtime, during mission, or to help get to sleep. Since redeployment, each WAROPS® skill was used by at least 55% of participants, mostly commonly to help with job stress, sleep, and family stress. More than half of the soldiers surveyed agree that WAROPS® had an impact on mission readiness and other performance-related factors.

Although not a randomized controlled trial, the design of the study allowed us to make some comparisons between soldiers from the same BCT who received WAROPS training pre-deployment and those who did not. These comparisons were mainly done with soldiers in the 4th BCT 4th ID. All soldiers in this BCT were command-directed to receive this training and the Magis Group was prepared to train the entire group. Because the training occurred just a few weeks prior to deployment, many soldiers in this BCT were busy with other trainings, leave time, or other responsibilities. As a result, a large group of soldiers did not attend the pre-deployment training. Of this group, more than 700 did attend the post-deployment training and about 300 allowed us retroactively to access their pre-deployment HERMES data. In this way, we were able to look at pre-post changes in health outcomes for soldiers who received the training and compare them to soldiers who did not. We compared pre-deployment HERMES health-related outcomes for soldiers who attended WAROPS and those who didn't and found no significant differences. We recommend that these results be regarded cautiously since soldiers were not randomized to these groups and it is not possible to determine exactly why certain soldiers attended the training and others did not.

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Given the above caveat, we found that soldiers who were trained at pre-deployment had small but statistically significantly better health outcomes in multiple areas, including resilience, PTSD symptoms, post-deployment reintegration, and general health and well-being than the comparison group of soldiers who were not trained. Additionally, soldiers who used the skills regularly during deployment (i.e., used at least one skill daily) had better health outcomes than soldiers who attended the training but did not use the skills. These skill-users were also less likely to screen positive for depression and anger, reported better perceived unit support/cohesiveness, and were less likely to seek health-related and a variety of other services at post-deployment. Some of these differences among the groups were not apparent when comparisons were made of within-group changes over time. Although there were no differences found in HERMES health outcomes at pre-deployment between soldiers who attended the pre-deployment training and those who did not, soldiers who were trained and used the WAROPS skills during deployment were less likely to screen positive for anxiety, depression, and violence/safety concerns on the HERMES than their counterparts who took the training but did not use the skills during deployment. These WAROPS skill users also had higher perceived unit support at pre-deployment.

Conclusions and Recommendations

The WAROPS® program appears to be feasible to implement in military settings, with large numbers of Service Members able to be trained in a short period of time. Satisfaction with the training was high and soldiers' knowledge and self-efficacy increased from immediately pre- to post-training. Skill use was relatively high during deployment considering the single 4-hour block of training. There is some preliminary evidence of health-related benefit; participation in the training and regular use of skills may have a protective factor against the effects of trauma-related stress. As a result of our analysis of the quantitative and qualitative data, we offer the following recommendations:

Training delivery: Magis trainers made a number of format and content changes over the course of the three training time points including splitting the soldiers into smaller group and thereby increasing the trainer to trainee ratio, decreasing the number of PowerPoint slides, increasing the proportion of experiential/interactive activities, and refinement of the content to increase soldier interest. We suggest splitting the training over more than one time period and planning for refresher sessions. Participants seemed to respond well to the former military trainers. If possible, this aspect should be maintained in subsequent training sessions. Soldiers with previous deployments seemed to grasp the importance and relevance of the training better than those soldiers who have not previously deployed. We recommend finding ways to grab the attention of the less experienced soldiers from the beginning.

Leader buy-in: A number of participants reported in interviews that their platoon Sergeants or unit commanders were not supportive of the training and so they were less likely to take it seriously. Attempts were made by the Magis Group to have separate trainings for both leaders and sustainers and also to include them in the core training. Leaders were underrepresented, which seemed to be related to the Command's lack of enforcement of attendance. It is recommended that buy-in at all levels of leadership occur before the training is planned.

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Sustainer Module (Train-the-trainer): The Magis training model included a sustainer piece intended to train a cadre of combat medics and unit leaders to assist soldiers in sustaining the use of WAROPS skills once deployed. Due to a number of logistical and communication problems, about half of the sustainer participants had not attended the core WAROPS training and so the Sustainer training was not as effective as intended. Future implementations should address these problems so that the crucial sustainer component can succeed.

Communication and Flow Coordination: Although many soldiers were trained in a short period of time, at times there was a lack of effective coordination between the brigade leadership and the trainers and research team. It was not uncommon for many more or many fewer trainees to show up for a given session than communicated to the trainers and evaluators beforehand. Another issue that may have hindered the training process was that soldiers were not given accurate information about the nature of the training and did not know long it would last. It is recommended that communication with the brigade leadership and communication to the soldiers about the training be improved.

Post-deployment training: Although a number of soldiers appreciated learning the WAROPS skills again after redeployment, a number of soldiers complained that their skills were the same and they were not getting new information. A possible solution would be offer a refresher of previous skills learned, with an emphasis on reintegration with family and adjustment back to life in garrison at post-deployment training.

Timing in training cycle: Many soldiers, leaders, and Magis Group trainers felt the training should have occurred earlier in the deployment cycle. Soldiers wanted the chance to use the skills during other training and field exercises so they could practice in more realistic scenarios. Ideally, training could occur in smaller blocks and spread out over time and interspersed with regular field training.

Mandatory practice of skills: A few unit leaders reported that they instituted a group practice of some of the skills even while deployed. Suggestions were made to incorporate some skills into PT and have them led and supported by a unit leader. This would potentially eliminate barriers to implementation that some soldiers mentioned when practicing the TREs during deployment.

Recommendations for future research: Include further study of the WAROPS model in a randomized design with a control group receiving comparable training activities.

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