WARRIOR EXPEDITIONS RESEARCH SUMMARY

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In our line of wilderness research, we currently primarily work with the Warrior Expeditions (*www.warriorexpeditions.org*) "Walk Off The War" Program, which is designed to support combat veterans transitioning from their military service by thru-hiking, biking, or paddling America's National Scenic Trails. Our role is to coordinate research on the program to determine the benefits of long-distance hiking, biking, and paddling. We interview hikers before and after their journey, send psychoeducational messages throughout their time on their trails, and sometimes travel with hikers during the first and last few days of their journey. We are always available for hikers to contact us with any specific concerns.

Warrior Expeditions, which is a non-profit organization directed by Sean Gobin, seeks to aid combat veterans with their transition back into civilian life based on three key features aimed at facilitating change and improved mental health among the participants:

1. *Physical demands.* Veterans in the program have schedules to which they must adhere for their two- to six-month journey that, for the most part, consist of hiking, biking, or paddling for eight hours a day. This expenditure of energy on a daily basis is believed to help alleviate nervous energy and promote better sleep.
2. *Establishing bonds with other combat veterans*. The program aims to have 5-10 hikers on each trail each year. The hypothesis is that the experience of the trail supports the building of strong friendships and deep bonding between hikers. Furthermore, as part of this philosophy, events are hosted by Veterans of Foreign War posts and American Legions posts in towns that are close proximity to the different trails. Dinners and social opportunities give veterans from different generations the opportunity to share their stories and struggles as well as model successful reintegration into civilian life.
3. *Gradual re-socialization.*

    - *Time alone for processing and reflection.* Most of the trails are largely isolated and offer veterans a significant amount of time to be alone in the wilderness. This gives them long periods of time to be alone with their thoughts. We send psychoeducational messages aimed at normalizing their post-combat reactions and helping them to re-integrate back into society. Most messages are based on a Cognitive Behavioral Therapy (CBT) framework. The theory behind CBT is that dysfunctional or maladaptive emotions, thoughts, and behaviors can be recognized and altered to increase mental health. CBT is a problem-focused and action-oriented approach with substantial research support. The CBT framework we use does not directly focus on processing trauma, though this often happens as a natural result of long periods of isolation broken up by encountering other hikers.

- *Time with others.* Contact with other veterans (on and off the trail) as well as other non-veteran hikers/bikers/paddlers affords a gradual re-entry into social settings as compared with going straight into the workforce after combat. This is accomplished by social interactions with a variety of individuals from diverse backgrounds. The hypothesis is that veterans will gradually become re-socialized to civilian interaction. As one veteran told us:

  > *"There is this thing called trail magic… It's people you've never met and they will set up on intersections of main roads. One day I ran across five little old cute ladies that were grilling us hamburgers and hotdogs and giving us cold sodas and doughnuts and stuff. Stuff like that… it instills in you a sense of what we really fought for. There's a reason we go to war, and it's to fight for these people and this country. It just instills that reason why you did what you did…for these wonderful people. There's wonderful people in this country, and hiking the Appalachian Trail truly shows you who these wonderful people are."*

The idea behind sending messages to veterans engaged in some sort of wilderness experience is that they are able to actually think through the messages. In traditional therapy, it is possible that individuals only spend one hour each week actually engaged in treatment, if that. After a session with a therapist, the individual has to return to his/her [possibly hectic] schedule of working, caring for family, or dealing with other daily challenges. Although long-term wilderness experiences certainly have daily challenges as well, the veterans with whom we worked reported that they had "nothing but time to think" on the trail. When we interviewed them after their hikes were over, veterans often report that they thought about the messages and how the idea/skill presented in the message might apply to their own experiences. One person said:

> *"I like the way you went about the messages and that you met with us briefly…to check-in, but [you] didn't push us…. We all used them at some point in time, but it was up to us. That was good."*

Research Summary to Date

2013 Cohort Study

In September of 2013, we interviewed 6 of the 7 hikers who completed at least half of the Appalachian Trail. We analyzed narratives of the interviews and found four themes: social reconnection, life-improving change, inner peace and psychological healing, and processing and reflection. In addition, hikers responded by rating their experiences from 0-10, with 0 being *strongly disagree* with the statement and 10 being *strongly agree*. Hikers agreed that the experience was enjoyable ($M = 9.83$, $SD = .41$), that it would have lasting effects ($M = 10.00$, $SD = 0$), that their fellow hikers were important ($M = 9.83$, $SD = .41$), that the environment was important ($M = 9.00$, $SD = 1.67$), and that the duration of the hike was important ($M = 8.83$, $SD = 1.94$).

Dietrich, Z. C., Joye, S. W., & Garcia, J. A. (2015). Natural medicine: Wilderness experience outcomes for combat veterans. *Journal of Experiential Education, 38*(4), 394-406. doi 10.1177/1053825915596431

2014 Cohort Study

For the 2014 study, we tracked 9 veterans on the Appalachian Trail and Pacific Crest Trail. We were also able to meet and hike with the Appalachian Trail hikers at the beginning, middle, and end of their journey as well as send psychoeducational messages. In addition to interviews, we gave hikers measures of anxiety, depression, and post-traumatic stress disorder (PTSD). Qualitative themes in 2014 were: prolonged periods of reflection, social reconnection, focus on the self, and "taking it one step at a time."

Five hikers completed pre- and post-hike qualitative measures. A small sample size, to be sure, but still something that had not been done before. We found that depressive symptoms decreased significantly over time, with all hikers above the clinical cutoff for depression at pre-hike and only two above it at post-hike. For measures of anxiety and PTSD, reduction in symptoms approached significance. On the anxiety measure, 3 of the 5 individuals scored above the cutoff for anxiety at pre-hike and none scored above it at post-hike. Perhaps most importantly, since the program was designed to address problems with PTSD and related behaviors, although 4 of the 5 hikers were above the clinical cutoff during pre-hike assessment on the measure of PTSD, all hikers scores below that cutoff at post-hike assessment.

Data from this study will be combined with data from the 2015 cohort and submitted as one paper.

	Time of Assessment						
	Time 1		Time 2		*Test Statistics*		
Measure	Mean	(*SD*)	Mean	(*SD*)	*t*	*p*	Cohen's *d*
PCL-5	32.40	26.03	16.00	6.50	2.36	.08	1.01
CES-D	31.00	13.17	15.20	9.39	4.69	.01	1.40
BAI	10.20	8.20	3.00	2.24	2.51	.07	1.38

Note. PCL-5 = Posttraumatic Stress Disorder Checklist 5, CES-D = Center for Epidemiological Studies Depression Scale, BAI = Beck Anxiety Inventory.

2015 Cohort Study

In 2015, with the help of the Peter Hackett-Paul Auerbach Young Investigator Grant from the Wilderness Medical Society, we were able to not only follow 19 hikers/paddlers on multiple trails over time, we also tracked 13 combat veterans on the waiting list for the program during the same timeframe. Using the same methodology from 2014, Results indicated significant differences in sleep quality, experience and expression of positive and negative emotions, PTSD, anxiety, depression, obsessive-compulsiveness, phobic anxiety, and psychotic behaviors as well as marginally significant changes in hostility, interpersonal sensitivity, and paranoid ideation. Somatic complaints and insomnia did not differ across the groups. Effect sizes ranged from small to moderate.

Joye, S. W., & Dietrich, Z. C. (2017). *Promoting mental health among combat veterans using wilderness therapy.* Manuscript in preparation; target journal: *Wilderness and Environmental Medicine*.

	Group						
	Warrior Expeditions		Control				
	Mean		Mean		*Test Statistics*		
Measure/Item	Change	(*SD*)	Change	(*SD*)	*t*	*p*	Cohen's *d*
Sleep Quality	.79	(.92)	-.23	(.73)	11.23	<.01	.27
Insomnia	.05	(1.31)	-.15	(.69)	.27	.61	.01
SEQ positive	1.26	(1.42)	-.77	(1.70)	13.36	<.01	.31
SEQ negative	-1.82	(1.88)	1.02	(1.59)	19.86	<.01	.40
PCL-5	-11.16	(18.39)	1.54	(12.23)	4.74	.04	.14
SA-45 anxiety	-2.32	(4.36)	1.54	(5.01)	5.35	.03	.15
SA-45 depression	-1.53	(4.98)	1.92	(3.59)	4.58	.04	.13
SA-45 obsessive-compulsive	-1.68	(3.22)	1.23	(4.95)	4.10	.05	.12
SA-45 somatization	-.42	(4.49)	.92	(4.09)	.74	.40	.02
SA-45 phobic anxiety	-1.63	(3.53)	1.77	(5.73)	4.33	.05	.13
SA-45 hostility	-1.74	(4.24)	1.08	(5.19)	2.84	.10	.09
SA-45 interpersonal sensitivity	-2.05	(4.56)	1.23	(5.18)	3.58	.07	.11
SA-45 paranoid ideation	-1.32	(3.56)	1.15	(4.56)	2.96	.10	.09
SA-45 psychoticism	-1.63	(2.27)	-1.63	(2.27)	5.23	.03	.15

Note. SEQ = State Emotions Questionnaire; PCL-5 = Posttraumatic Stress Disorder Checklist 5, SA-45 = Symptom Assessment-45.

2016 Cohort Study

In 2016, with the help of a Herbert N. Hultgren Grant from the Wilderness Medical Society, we added two layers for hikers on the Triple Crown" Trails (AT, CDT, PCT). First, we were able to begin all three hikes with the veterans, which allowed time for building rapport with hikers, explaining the role of the researchers, and more importantly for the hikers, answering questions they had about their symptoms. We also provided hikers on these three trails FitBits, which allowed us to monitor physiological measures (e.g., heart-rate, sleep) over time.

For the Triple Crown hikers, qualitative data gathered from exit interviews suggested the additional time with hikers did indeed facilitate stronger rapport and allowed hikers freedom to seek more psychoeducational information about their symptoms and strategies to employ while in the field. FitBit data analysis is still underway; preliminary physiological data obtained while hikers were on their respective trails seem to show that increase in sleep quality while on the trail is a predictor of decreases in PTSD symptomology.

A paired-samples design compared individual differences pre- and post- hike across all trails (N = 11). Results indicated significant differences in experience and expression of negative emotions, PTSD, depression, obsessive-compulsiveness, phobic anxiety, psychotic behaviors, hostility, interpersonal sensitivity, and paranoid ideation. Effect sizes ranged from moderate to large. Although we only had 11 people who completed both pre- and post-hike measures, we had 26 veterans and 16 veterans complete pre- and post-hike measures, respectively. Means for these groups were similar to means for the 11 people who completed both.

Joye, S. W., & Dietrich, Z. D. (2017). *Book in Preparation.*

	Pre-Hike		Post-Hike		*Test Statistics*		
Measure/Item	Mean	(*SD*)	Mean	(*SD*)	*t*	*p*	Cohen's *d*
Sleep Quality	3.27	(1.10)	3.45	(.82)	-.39	.70	.12
Insomnia	2.64	(.81)	3.09	(1.30)	-1.08	.32	.32
SEQ positive	6.27	(2.53)	6.36	(1.86)	-.16	.88	.05
SEQ negative	7.18	(1.72)	5.27	(2.05)	3.49	.01	1.05
PCL-5	47.18	(18.26)	33.55	(12.56)	2.81	.02	.85
SA-45 anxiety	9.64	(3.85)	8.00	(2.90)	1.71	.12	.52
SA-45 depression	12.45	(5.18)	7.72	(3.32)	4.16	<.05	1.25
SA-45 obsessive-compulsive	12.82	(5.27)	9.27	(3.38)	3.26	.01	.98
SA-45 somatization	8.82	(3.37)	7.64	(2.42)	1.14	.28	.34
SA-45 phobic anxiety	9.00	(3.59)	5.91	(1.22)	2.50	.03	.75
SA-45 hostility	11.36	(3.93)	7.27	(2.83)	2.69	.02	.81
SA-45 interpersonal sensitivity	13.09	(5.30)	9.27	(4.47)	3.39	.01	1.02
SA-45 paranoid ideation	12.91	(5.45)	8.81	(3.63)	3.59	.01	1.08
SA-45 psychoticism	7.46	(2.94)	5.73	(1.56)	3.30	.01	.99

Note. SEQ = State Emotions Questionnaire; PCL-5 = Posttraumatic Stress Disorder Checklist 5, SA-45 = Symptom Assessment-45.

Description of Measures

Posttraumatic Stress Disorder Check-List 5 (PCL-5). The PCL-5 is aligned with the DSM-5 diagnostic criteria for PTSD. Authors of the PCL-5 suggest an obtained score of 38 or higher as the clinical cut-off.

Center for Epidemiological Studies Depression Scale (CES-D). A total score of 16 or higher suggests significant distress associated with symptoms of depression.

Beck Anxiety Inventory (BAI). Scores above 7 are considered above the minimal level and warrant further investigation in clinical practice.

State Emotions Questionnaire (SEQ). With permission, we modified items from Hoge's book *Once a Warrior, Always a Warrior* to assess veterans' experience and expression of positive and negative emotions.

Symptom Assessment-45 (SA-45). The SA-45 assesses 9 domains of general psychiatric symptomology (see list in the table above).

If you would like more information about our research, such as references, measures used, sample messages, or copies of publications, please contact either Shauna Joye or Zachary Dietrich at the email addresses listed on the first page of this summary. Thank you.