



**An Evaluation of the Wave Academy Approach to Reducing  
Post-Traumatic Stress Disorder**

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## **Background**

The Wave Academy is a nonprofit organization dedicated to communicating the physical and mental benefits of warm water therapy, and to enlarging the circle of individuals and communities that benefit from this therapy. The initial community on which their efforts are focused is the veterans who have returned from wars in Iraq and Afghanistan who suffer from Post-Traumatic Stress Disorder (PTSD). Wave Academy is also committed to bringing the same treatment and benefits to family members and other caregivers involved in their recovery.

The Wave Academy implemented and developed a new testing protocol for the first time in 2013. This is the second evaluation of that protocol. This evaluation is intended to both capture results of whether water therapy reduces the symptoms of PTSD in clinically diagnosed veterans and inform program staff about the contextual variables surrounding full implementation of such an intervention. This research, including data collection, was undertaken by internal researchers, while researchers at the Johns Hopkins University, School of Education, Center for Research and Reform in Education (CRRE) analyzed the data provided. Data presented in the Appendix were collected and analyzed by internal researchers.

## **Method**

### **Intervention**

The Wave Academy implemented a testing protocol starting with a detailed intake session followed by a 1-hour water therapy session per week over a period of 8 weeks for each client. Fifteen clients completed the therapy. The therapy uses the properties of water—including warmth, buoyancy, and fluid movements—to help clients heal from physical, mental, and other traumas and medical conditions. In the Academy’s treatment modality, the recipient is immersed in 96-degree water, in which a licensed aquatic therapist supports and gently guides him or her through graceful, fluid movements while applying pressure to specific points on the body and lightly massaging muscles. This application thoroughly stretches, expands, and supports the spine and body while promoting a sense of peace and relaxation so complete that the recipient tends to “surrender” and release tensions that enable the

body and mind to move beyond the limitations that gravity or fear would otherwise impose.

### **Inclusion and Exclusion Criteria**

Clients were recruited via the organization's website, video, flyers, or health care professionals. Case managers conducted preliminary assessments via phone to determine whether potential clients met predetermined inclusion and exclusion criteria. The criteria used were as follows:

#### **Inclusion Criteria:**

- 18 years of age and older
- Read and write English fluently;
- Experienced a traumatic event related to military duty, including combat, military training accidents, and military sexual trauma; or is a support person for someone who has experienced such a trauma
- Transportation to individual meetings and available to complete study
- Residence within the greater San Diego Metropolitan Area
- Stable in treatment for PTSD for at least 6 weeks
- Willing to track medication changes during the study
- Willing to not join another intervention during the 8-week study

#### **Exclusion Criteria:**

- Inability to give informed consent
- Cognitive impairment sufficient to cause inability to complete the protocol
- Psychotic symptoms, dementia, or other organic mental disorders causing inability to complete the protocol
- Severe osteoporosis, recent cerebral hemorrhage, acute ligamentous instability (following traumatic injury), significant hypersensitivity to vestibular stimulation, deep vein thrombosis, severely compromised cardiovascular

system, unpredictable bowel incontinence, perforated eardrums, uncapped tracheostomy, open wound, high fever, or other medical condition adversely affected by movement or submergence in warm water as supported by primary care provider clearance

- Significant documented alcohol/substance abuse
- Presence of severe suicidal/homicidal urges or intent assessed at intake
- Other participant circumstances that would interfere with the safety of participant or therapist

### Participants

Table 1 shows the age distribution of participants. The average age of participants was 35.20 ( $SD = 7.35$ ) years old. Table 2 shows the distribution of participants by gender, service, duty status, combat location, living status, social support, and employment status. There were 13 males and two female in the group. Table 3 shows the distribution of participants by ethnicity and race. The sample included the following ethnic classifications: White/Caucasian ( $N = 11$ ); African American ( $N = 1$ ); Asian Eastern Asia/Pacific Islander ( $N = 2$ ); Mixed ( $N = 1$ ). Five clients identified as Hispanic. Table 4 shows the distribution of participants by preliminary assessments and gender. Preliminary assessments confirmed that 12 clients were clinically diagnosed with depression; 14 clients were diagnosed with anxiety; and 13 were diagnosed with chronic pain. Clients self-reported the following: depressive symptoms (Yes;  $Y = 14$ , No;  $N = 1$ ); prescribed antidepressant ( $Y = 10$ , No;  $N = 5$ ); other prescribed medication ( $Y = 9$ , No;  $N = 6$ ).

Table 1:

#### *Distribution of Sample by Age*

	N		Mean	Std. Deviation	Minimum	Maximum
	Valid	Missing				
Age (In years)	15	0	35.20	7.350	27	48

Table 2:

*Distribution of Sample by Gender, Service, Duty Status, Combat Location, Living Status, Social Support, and Employment Status*

Measure		Count	Column N %
Gender	1 Male	13	86.67
	2 Female	2	13.33
	Total	15	100
Service	1 Army	4	26.67
	2 Navy	5	33.33
	3 Marine	5	33.33
	4 Air Force	1	6.67
	5 Coast Guard	0	0
Total	15	100	
Duty status	1 Active	0	0
	2 Veteran	15	100
	Total	15	100
Combat location	1 Afghanistan	0	0.
	2 Iraq	15	100
	3 Other	0	0
	Total	15	100
Living status	1 Stable	12	80
	2 Unstable	3	20
	Total	15	100
Social support	1 Good	13	86.67
	2 Questionable	2	13.33
	Total	15	100
Employment status	1 Full time	3	20
	2 Part time	2	13.33
	3 Unemployed	10	66.67
	Total	15	100

Table 3:

*Distribution of Sample by Ethnicity and Race*

		Hispanic or Non-Hispanic Ethnicity Classification					
		0 Not Hispanic		1 Hispanic		Total	
		Count	Column N %	Count	Column N %	Count	Column N %
Race	1 Caucasian	6	60	5	100	11	73.33
	2 African American	1	10	0	0	1	6.67
	3 Asian	1	10	0	0	1	6.67
	4 Pacific Islander	1	10	0	0	1	6.67
	5 Mixed	1	10	0	0	1	6.67
	Total	10	100	5	100	15	100

Table 4:

*Distribution of Sample by Preliminary Assessments and Gender*

		Gender		Total Count	%
		1 Male Count	2 Female Count		
Depression diagnosis	1 Yes	10	2	12	80
	2 No	3	0	3	20
	3 Unknown	0	0	0	0
	Total	13	2	15	100
Anxiety diagnosis	1 Yes	12	2	14	93.3
	2 No	1	0	1	6.7
	3 Unknown	0	0	0	0
	Total	13	2	15	100
Traumatic brain injury diagnosis	1 Yes	6	0	6	40
	2 No	7	2	9	60
	3 Unknown	0	0	0	0
	Total	13	2	15	100
Chronic pain diagnosis	1 Yes	13	0	13	86.7
	2 No	0	2	2	13.3
	3 Unknown	0	0	0	0
	Total	13	2	15	100
Prescribed antidepressant	1 Yes	9	1	10	66.7
	2 No	4	1	5	33.3
	3 Unknown	0	0	0	0
	Total	13	2	15	100
Using alcohol	1 Yes	5	0	5	50
	2 No	3	2	5	50
	Missing	5	0	5	
	Total	8	2	10	100
Other prescribed medication	1 Yes	8	1	9	60
	2 No	5	1	6	40
	3 Unknown	0	0	0	0
	Total	13	2	15	100
Self-reported depressive symptoms	1 Yes	12	2	14	93.3
	2 No	1	0	1	6.7
	3 Unknown	0	0	0	0
	Total	13	2	15	100

**Measures**

To monitor changes in the level of PTSD symptoms, a panel of assessments were administered including the following: Life Events Check List (LEC; Weathers, Blake, Schnurr, Kaloupek, Marx, & Keane, 2013) administered at one time point: pretherapy, Post Traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996)

administered at four time points: pretherapy, week two, week four, and week eight, PTSD Checklist–Military (PCL–M; Weathers, Litz, Herman, Huska, & Keane, 1994) administered at four time points: pretherapy, week two, week four, and week eight, Functional Assessment Chronic Illness Therapy–Spiritual (FACIT–Sp; Cella, 2007) administered at four time points: pretherapy, week two, week four, and week eight, and Profile of Mood States (POMS; Shacham, 1983) administered at four time points: pretherapy, week two, week four, and week eight.

### Statistical Analyses and Reporting

Statistics were selected to answer a range of research questions of interest. Quantitative data from the clients' assessments were analyzed using nonparametric tests. Nonparametric tests make fewer assumptions about the distribution of data on which they can be used. Most nonparametric tests work on the principle that we do not know if our data are distributed normally or if there are outliers. To deal with this unknown, nonparametric tests rely on the ranking of the data. That is, taking the raw data and putting each sample in rank order. These ranks are then used to create test statistics. These tests do not require a mean and standard deviation. Because a mean can be easily influenced by outliers and therefore potentially skewed—and we are not assuming normality—a mean may no longer make sense. The median is another judge of location; it is the center of a distribution, which makes more sense to use with a nonparametric test. Some advantages of using nonparametric tests include:

- They can be used with all scales
- Easier to compute
- Make fewer assumptions
- Need not involve population parameters
- Results may be as exact as parametric procedures

Our analyses produced *p* values. A basic description of *p* values follows<sup>1</sup>:

The *p* value is very important because it gives the evaluator a gauge of how confident one can be that the result is not due simply to chance. Specifically, it tells what the probability is that one would get a similar result (a result with an absolute value as large as—or larger than—the one observed) if, in fact, there were no effect. Roughly

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<sup>1</sup> Descriptions are borrowed from the Empirical Education Research Report on Cognitive Tutor (2007).



speaking, the  $p$  value reveals the risk of concluding that the treatment had an effect, when, in fact, it did not. Thus, a  $p$  value of 0.1 means that there is a 10% probability or risk that the treatment had an effect when, in fact, it did not. Although ultimately depending on the risk tolerance of the user of the research, CRRE suggests the following guidelines for interpreting  $p$  values:

1. We have a high level of confidence when  $p \leq 0.05$ . This is the level of confidence conventionally referred to as statistical significance. We have a very high level of confidence when  $p \leq 0.01$  or  $p \leq 0.001$ .
2. We have some confidence when  $0.05 \leq p \leq 0.15$ .
3. We have no confidence when  $p \leq 0.20$ .

## Results

### Question 1. Does warm water therapy reduce the symptoms of PTSD in clinically diagnosed veterans?

The sample statistics for each of the measures used are reported in Tables 5–9. The Friedman test was used to investigate whether water therapy reduces the symptoms of PTSD in clinically diagnosed veterans. Results indicate the following:

- PTSD symptoms, as measured by the Post Traumatic Growth Inventory (PTGI), did not significantly change over the 8 weeks of the water therapy,  $\chi^2(3) = .625, p = .891$ .
- PTSD symptoms, as measured by PTSD Checklist–Military (PCL-M), significantly changed at the  $p \leq 0.1$  level over the 8 weeks of the water therapy,  $\chi^2(3) = 7.4, p = .060$ .
- PTSD symptoms, as measured by the Functional Assessment Chronic Illness Therapy–Spiritual (FACIT-Sp), did not significantly change over the 8 weeks of the water therapy,  $\chi^2(3) = 2.593, p = .459$ .
- Clients’ reported Profile of Mood States (POMS) did not significantly change over the 8 weeks of the water therapy,  $\chi^2(3) = 5.692, p = .128$ .

Further analysis of the data revealed some interesting nuances that are lost in this analysis. Wilcoxon tests were used to follow up these findings. It appeared that there were significant decreases in PCL-M from the baseline (Mdn = 67) to week eight (Mdn = 53),  $z = -2.504, p = .012$ ; from week two (Mdn = 63) to week eight,  $z = -2.207, p = .027$ ; and also from week four (Mdn = 57) to week eight,  $z = -2.383, p = .017$ . Interestingly, there were significant decreases in clients’ reported POMS from baseline (Mdn = 84) to week eight (Mdn = 60.5),  $z = -2.293, p = .022$ , and from week four (Mdn = 69) to week eight,  $z = -2.073, p = .038$ . PTGI and FACIT-Sp did not significantly change from baseline to week two, from baseline to week four, from baseline to week eight, or week two to week four, or week two to week eight, or week four to week eight.

Table 5:

*Descriptive Statistics*

	N	Mean	S.D.	Min	Max	Percentiles		
						25th	50th Median	75th
<b>PGTI</b>								
Post Traumatic Growth Inventory Week 1	15	53.40	20.73	21	100	35.00	60.00	64.00
Post Traumatic Growth Inventory Week 2	8	51.88	25.69	16	100	33.75	52.50	62.75
Post Traumatic Growth Inventory Week 4	10	58.30	22.26	14	94	45.50	58.00	76.00
Post Traumatic Growth Inventory Week 8	9	62.56	26.44	3	96	56.50	63.00	80.00
<b>PCL-M</b>								
PCL-M Week 1	15	64.80	11.50	44	82	53.00	67.00	73.00
PCL-M Week 2	9	59.89	10.89	48	81	49.00	63.00	65.50
PCL-M Week 4	11	56.00	11.75	40	72	45.00	57.00	68.00
PCL-M Week 8	10	47.30	17.01	20	68	28.00	53.00	60.50
<b>FACIT-sp</b>								
FACIT Spiritual Well-Being Week 1	15	38.00	21.42	10	82	24.00	29.00	52.00
FACIT Spiritual Well-Being Week 2	9	44.00	19.72	19	86	30.00	39.00	54.50
FACIT Spiritual Well-Being Week 4	11	46.91	18.23	19	78	28.00	51.00	58.00
FACIT Spiritual Well-Being Week 8	10	52.30	19.64	13	89	42.25	54.00	61.25
<b>POMS</b>								
Profile of Mood States (sf) Week 1	15	79.20	28.17	31	125	53.00	84.00	100.00
Profile of Mood States (sf) Week 2	12	72.50	30.51	38	121	44.75	65.50	103.25
Profile of Mood States (sf) Week 4	11	63.82	29.21	10	101	40.00	69.00	87.00
Profile of Mood States (sf) Week 8	10	52.50	29.45	3	87	27.00	60.50	77.25
<b>LECL</b>								
Life Events Checklist Week 1	15	14.13	2.90	8	17	11.00	15.00	17.00

**Question 2. Which assessment or combination of assessments has the highest predictive value in demonstrating the reduction of symptoms?**

Trend analyses are used to address this question in part; a larger sample size would be needed to address this question fully. The PTGI trajectories of 15 participants are illustrated in Figure 1. The scores of five clients were recorded for all four time points (weeks 1, 2, 4, and 8); thus five trajectories are illustrated as follows:

- Trajectory Client 06: Remains approximately stable for 2 weeks; however, a sharp decrease from weeks two to four, and then an increase from weeks four to eight to a similar magnitude as week two.
- Trajectory Client 08: Experiences steady increases from baseline to week eight.
- Trajectory Client 10: Attains comparatively high scores among participants and remains approximately stable over time, with a slight decrease from weeks two to eight.
- Trajectory Client 12: Starts with comparative low score, keeps decreasing across 8 weeks, and attains the lowest score among participants.
- Trajectory Client 14: Experiences decreases in the first 2 weeks of the study, and then increases consistently from weeks two to eight and attains a value higher than baseline in week eight.

Client 10, with scores as high as 100 at baseline, remains stable and displays a slight drop to 90 in week eight. Client 12, who attains a low score of 35 at baseline, decreases to a very low score of 3 in week eight. Apart from these two clients, clients who responded for all four time points score above 40 decrease either in week two or week four and experience increases over the second half of study and attain score range from 60 to 70, while the client who has baseline scores below 40 experiences a steady growth over the study period. Further research would be needed to investigate the trajectory for Client 12, who attains extreme low score in week eight.

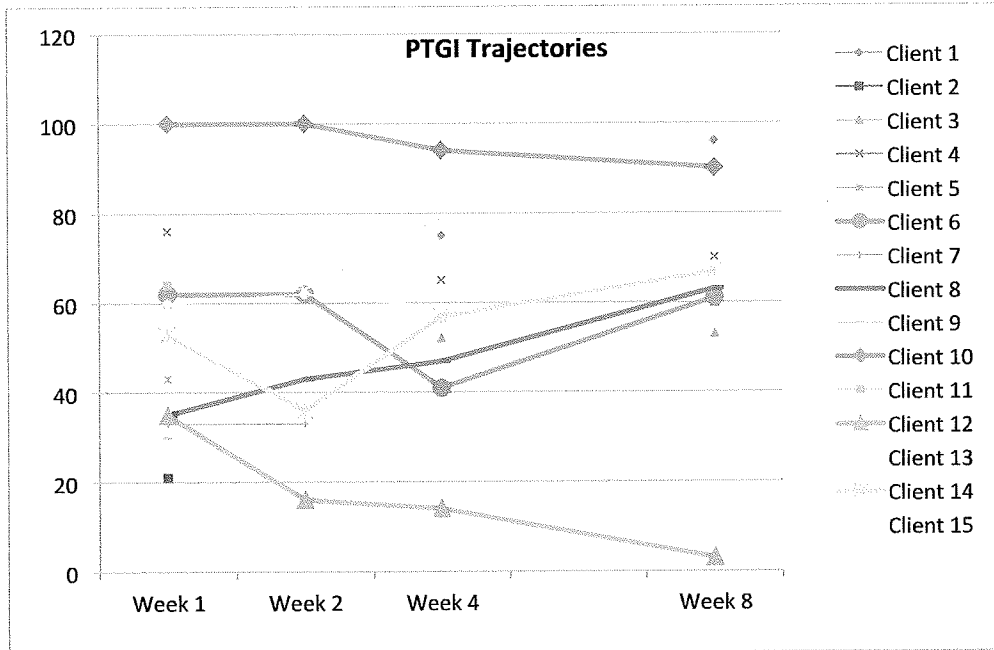


Figure 1. PTGI trajectories.

The FACTI-SP trajectories of 15 participants are illustrated in Figure 2. Six clients completed the score for all four time points (weeks 1, 2, 4, and 8); thus, six trajectories are illustrated as follows:

- Trajectory Client 05: Experiences a consistent increase over time.
- Trajectory Client 06: Experiences a slight increase in first 2 weeks, and decreases from weeks two to four, and then bounces back from weeks four to eight with a score the same as week two.
- Trajectory Client 08: Experiences increases in the first 2 weeks of the study, and then decreases slightly from weeks two to four, and then experiences an increase from weeks four to eight.
- Trajectory Client 10: Experiences a slight increase in the first 2 weeks of the study, but then decreases consistently from weeks two to eight.
- Trajectory Client 12: Remains approximately stable in first 2 weeks, but consistently decreases across the weeks of the rest of the study.
- Trajectory Client 14: Experiences a slight decrease in the first 2 weeks and a steady increase from weeks two to eight.

Client 10, who starts with a very high score, and Client 12, who attains low score, show a decreasing trend over the study period. Apart from Clients 10 and 12, clients

who responded in all four time points and those with a score  $> 40$  at baseline show an overall increase in the first 4 weeks and remain stable or experience a slight increase over the second half of the study. If the client has baseline scores under 40, then they show an increase in the first 2 weeks, but then decrease from weeks two to four; then the scores increase again for the remaining study period. Further research would be needed to investigate the trajectory for Clients 10 and 12, who appear to be an anomaly.

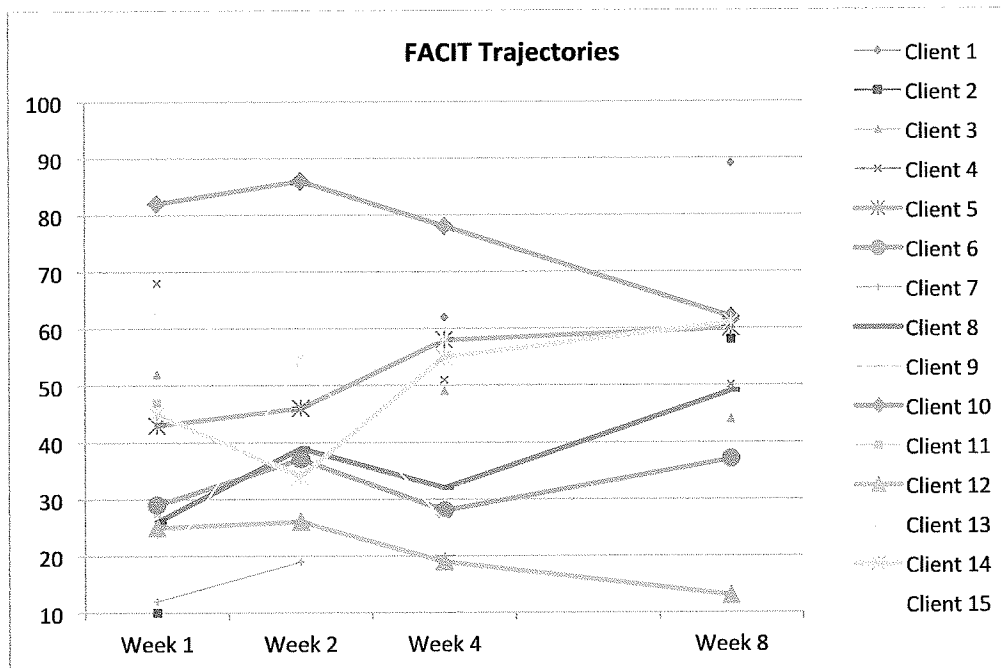


Figure 2. FACIT-SP trajectories.

The PCL-M trajectories of 15 participants are illustrated in Figure 3. Six clients completed the score for all four time points (weeks 1, 2, 4, and 8); thus, five trajectories are illustrated as follows:

- Trajectory Client 5: Experiences a continuity of symptoms decreasing over time.
- Trajectory Client 6: Remains approximately stable over time.
- Trajectory Client 8: Decreases during the first 2 weeks of the study, and then increases slightly from weeks two to four, but does not return to baseline levels, and decreases again from week four to week eight.
- Trajectory Client 10: Remains approximately stable over time.

- Trajectory Client 12: Experiences a continuity of symptoms decreasing moderately over time.
- Trajectory Client 14: Decreases during the first 2 weeks of the study, and then remains stable from weeks two to four, and decreases sharply from weeks four to eight.

For clients with scores collected in all four time points, the trends appear to suggest that they either remain approximate stable (Client 6, 10) in the 8 weeks of study or exhibit symptoms decreasing over time (range of 17 to 42 points)—except some clients show a slight increase of scores in the first half of the study

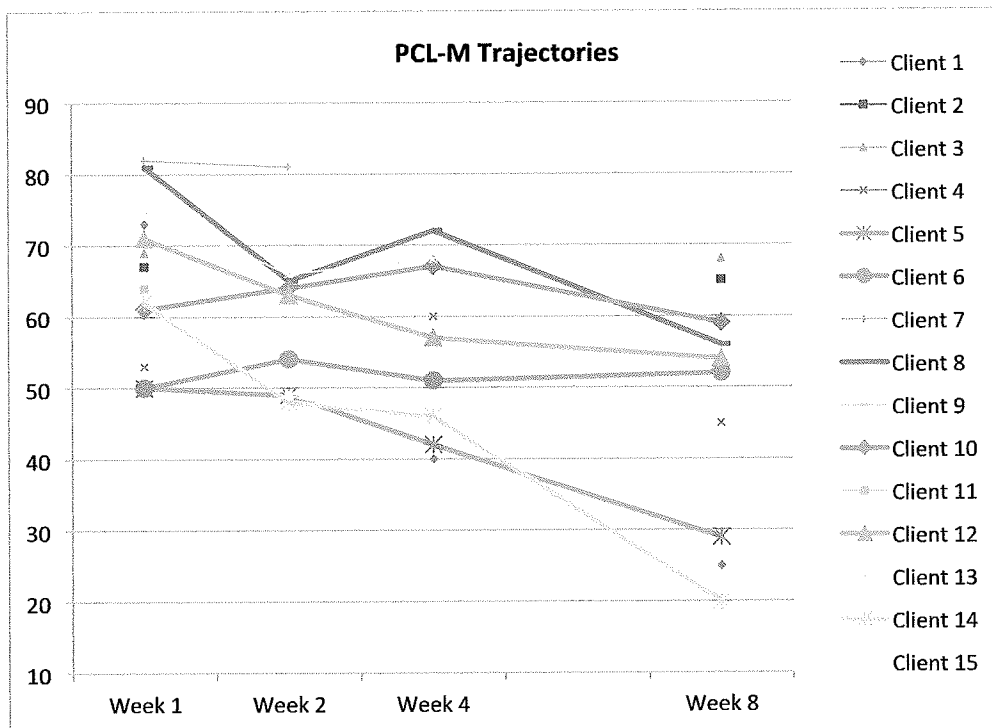


Figure 3. PCL-M trajectories.

The POMS trajectories of 15 participants are illustrated in Figure 4. Eight clients completed the score for all four time points (weeks 1, 2, 4, and 8); thus, eight trajectories are described. There is a general downward trend across the 8-week study. Only two out of those eight participants (Clients 4 and 6) showed a moderate increase across the time of study with a drop in week two. Three clients (1, 5, 14) exhibited a continuity of decrease from baseline to week eight. Three clients (3, 10, 12) showed an increase either in week two or week four, followed by a continued decrease

through the remainder of the study. Further research would be needed to investigate the trajectory for Client 1, who appears to be an anomaly with a score of 3 in week eight.

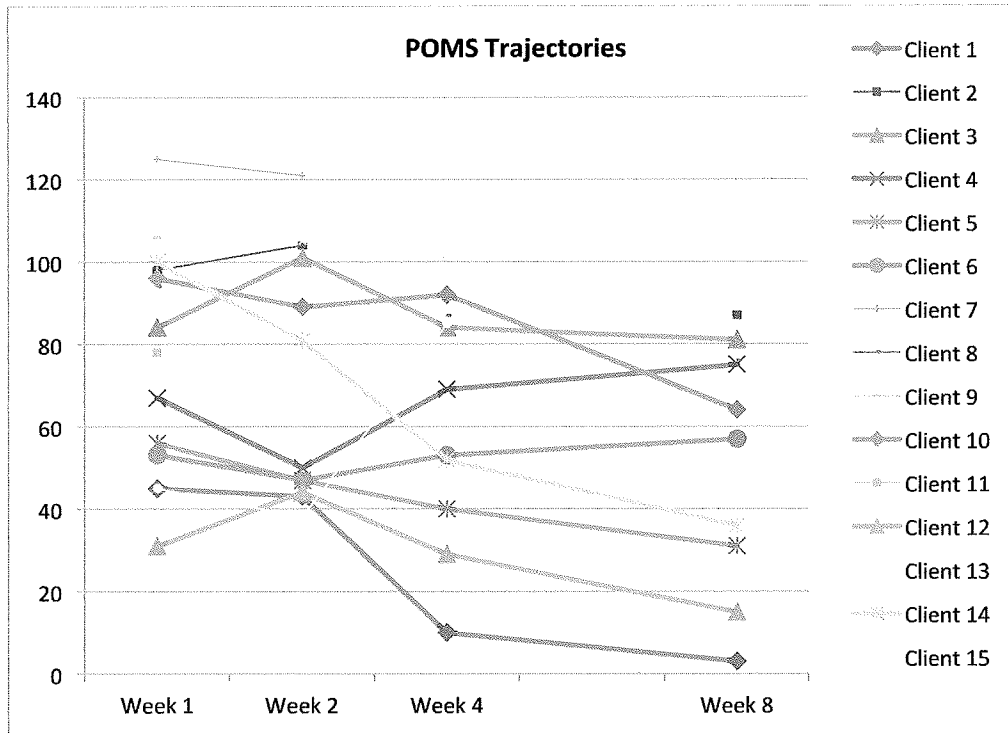


Figure 4. POMS trajectories.



**Question 3. Is there evidence of symptoms reduction at four or eight weeks?**

To answer this question, new variables were computed to calculate the change between time points for each measure. See Table 6. A one sample median test allows us to test whether a sample median differs significantly from a hypothesized value. Therefore, one sample median tests are used to calculate whether that change is significantly different from zero or significantly changing. The results indicate that there are statistically significant differences in PCL-M from week one to week eight ( $p = .012$ ), from week two to week eight ( $p = .027$ ), and from week four to week eight ( $p = .017$ ). In other words, the decrease in PCL-M from week one to week eight, from week two to week eight, and from week four to week eight in this sample significantly differs from the hypothesized value of 0. In addition, the results report that there are statistically significant differences in clients' reported POMS from week one to week eight ( $p = .022$ ), and from week four to week eight ( $p = .038$ ). The decrease of clients' reported POMS significantly differs from the hypothesized value of 0 from week one to week eight, and from week four to week eight. See the hypothesis test summary.

Table 6:

*Statistics of Difference Between Time Points*

Test	N	Mean	S.D.	Min	MAX	Percentiles		
						25th	50th Median	75th
1 PTGI_2_1	8	-3.75	9.42	-19.00	8.00	-13.75	0.00	1.50
2 PTGI_4_1	10	-2.70	12.93	-21.00	13.00	-13.50	-3.50	12.00
3 PTGI_8_1	9	6.56	23.66	-32.00	39.00	-8.50	-1.00	31.00
4 PTGI_4_2	7	1.29	14.09	-21.00	21.00	-6.00	-2.00	16.00
5 PTGI_8_2	5	5.40	19.27	-13.00	31.00	-11.50	-1.00	25.50
6 PTGI_8_4	8	7.25	11.59	-11.00	21.00	-2.75	7.50	19.00
7 PCLM_2_1	9	-4.11	7.88	-16.00	5.00	-11.50	-1.00	3.50
8 PCLM_4_1	11	-6.64	11.57	-33.00	7.00	-14.00	-7.00	1.00
9 PCLM_8_1	10	-16.40	17.67	-48.00	2.00	-29.25	-12.50	-1.75
10 PCLM_4_2	8	-1.25	4.83	-7.00	7.00	-5.50	-2.50	2.75
11 PCLM_8_2	6	-12.17	9.87	-28.00	-2.00	-22.00	-9.00	-4.25
12 PCLM_8_4	9	-10.56	8.82	-26.00	1.00	-15.50	-13.00	-1.50
13 FACIT_2_1	9	6.00	13.87	-11.00	37.00	-3.50	4.00	10.50
14 FACIT_4_1	11	3.82	14.50	-17.00	38.00	-5.00	-1.00	10.00
15 FACIT_8_1	10	11.90	28.25	-20.00	65.00	-13.50	12.00	29.25
16 FACIT_4_2	8	-2.88	14.90	-28.00	21.00	-8.75	-7.00	9.75
17 FACIT_8_2	6	2.33	18.64	-24.00	27.00	-15.75	5.00	17.25
18 FACIT_8_4	9	3.67	12.92	-16.00	27.00	-5.50	2.00	13.00
19 POMS_2_1	12	-3.33	10.75	-19.00	17.00	-8.50	-5.50	4.00
20 POMS_4_1	11	-7.18	22.30	-48.00	40.00	-16.00	-4.00	0.00
21 POMS_8_1	10	-19.90	21.96	-64.00	8.00	-34.50	-17.00	-1.25
22 POMS_4_2	10	-3.00	23.65	-33.00	47.00	-20.00	-5.50	9.25
23 POMS_8_2	9	-17.44	22.42	-45.00	25.00	-34.50	-20.00	-3.00
24 POMS_8_4	9	-8.67	10.44	-28.00	6.00	-15.00	-9.00	0.50

*Note.* Positive values indicate that scores increased; negative values indicate that scores decreased irrespective of how the scale is directed. Higher score as measured by the PTGI and FACIT indicate improvement, while lower scores as measured by the PCLM and POMS indicate improvement.

Table 7:

*Test Results Summary–PTGI*

<b>Hypothesis Test Summary</b>				
	<b>Null Hypothesis</b>	<b>Test</b>	<b>Sig.</b>	<b>Decision</b>
<b>1</b>	The median of PTGI_2_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.345	Retain the null hypothesis.
<b>2</b>	The median of PTGI_4_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.646	Retain the null hypothesis.
<b>3</b>	The median of PTGI_8_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.515	Retain the null hypothesis.
<b>4</b>	The median of PTGI_4_2 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.933	Retain the null hypothesis.
<b>5</b>	The median of PTGI_8_2 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.686	Retain the null hypothesis.
<b>6</b>	The median of PTGI_8_4 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.123	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Table 8:

*Test Results Summary–PCLM*

<b>Hypothesis Test Summary</b>				
	<b>Null Hypothesis</b>	<b>Test</b>	<b>Sig.</b>	<b>Decision</b>
<b>1</b>	The median of PCLM_2_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.213	Retain the null hypothesis.
<b>2</b>	The median of PCLM_4_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.082	Retain the null hypothesis.
<b>3</b>	The median of PCLM_8_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.012	Reject the null hypothesis.
<b>4</b>	The median of PCLM_4_2 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.440	Retain the null hypothesis.
<b>5</b>	The median of PCLM_8_2 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.027	Reject the null hypothesis.
<b>6</b>	The median of PCLM_8_4 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.017	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Table 9:

*Test Results Summary--FACIT*

<b>Hypothesis Test Summary</b>				
	<b>Null Hypothesis</b>	<b>Test</b>	<b>Sig.</b>	<b>Decision</b>
<b>1</b>	The median of FACIT_2_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.236	Retain the null hypothesis.
<b>2</b>	The median of FACIT_4_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.505	Retain the null hypothesis.
<b>3</b>	The median of FACIT_8_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.308	Retain the null hypothesis.
<b>4</b>	The median of FACIT_4_2 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.575	Retain the null hypothesis.
<b>5</b>	The median of FACIT_8_2 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.686	Retain the null hypothesis.
<b>6</b>	The median of FACIT_8_4 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.407	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Table 10:

*Test Results Summary–POMS*

<b>Hypothesis Test Summary</b>				
	<b>Null Hypothesis</b>	<b>Test</b>	<b>Sig.</b>	<b>Decision</b>
<b>1</b>	The median of POMS_2_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.239	Retain the null hypothesis.
<b>2</b>	The median of POMS_4_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.123	Retain the null hypothesis.
<b>3</b>	The median of POMS_8_1 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.022	Reject the null hypothesis.
<b>4</b>	The median of POMS_4_2 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.508	Retain the null hypothesis.
<b>5</b>	The median of POMS_8_2 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.058	Retain the null hypothesis.
<b>6</b>	The median of POMS_8_4 equals 0.000.	One-Sample Wilcoxon Signed Rank Test	.038	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

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**Appendix**

**Client 6 Case Summary:** 7/16/13

Clt 6 is a 38yo married Hispanic male who served in the U.S. Marines in Iraq between 1993-1997 and 1998-2004 in special operations division. He reports exposure to heavy combat including IED explosions. He receives Primary Care at the San Diego VA. He works full time at a local non-profit as a peer advocate serving other veterans. He is married but currently separated from his wife who is also a veteran. Together they have two children, ages 9 and 11. He was born in Long Island, NY and raised in Los Angeles. He was exposed to gang and community violence growing up in Los Angeles. He is still in good relations with his family. He reports: "I have a great support system." He suffers from a combination of PTSD and TBI. Other health related concerns related to stomach and digestive problems (indigestion, ulcers, pain) and he associates the worsening of these sx's with increased stress. He is currently drinking 1-2 beer every other day and is seeking support around this, "because I never used to drink and it's surprising me." No other substance use indicated excluding caffeine.

**Current symptomology:** TBI: Body twitching and partial seizures triggered by transition from intense light to intense darkness. TBI has been confirmed with CT scan and brain imaging. PTSD: Depressed mood and anxiety symptoms without panic attacks; sleep disturbances (only sleeps about 4 hours per night); nightmares several times per week; irrational feelings of fear; and rare experiences of flashbacks. Primary complaint is anxiety symptoms and sleep disturbances.

**Treatment:** He was voluntarily inpatient at Palo Alto for PTSD treatment from Nov 2005-Feb 2006. He experienced several forms of individual and group psychotherapy, as well as pharmacotherapy, at that time. He reports he didn't like taking psychotropic meds as they "didn't help me at all with my symptoms and made me feel like a zombie." Currently he is in individual and group therapy at the San Diego Vet Center and is not taking any psychotropic medication.

**Comfort with water:** Clt reports he is very comfortable in the water. He has never experienced warm water therapy. He has received massage therapy before. He is not allergic to bee stings.

**MSE:** Clt appears in clean, professional clothing; early for appointment. Mood was "good" affect appropriate to euthymic mood. Eye contact: direct. Speech: WNL. Thought Process: linear. Thought Content: appropriate to situation; denies suicidal and homicidal plans or intent at this time or any time and in the past; no indication of psychotic sx's. Attitude: friendly and personable. Alert and oriented to person, place, time and situation.

**Goals:**

- 1) Improve sleep
- 2) Reduce anxiety
- 3) Increase coping skills related to fear

**Exit interview questions:**

**Client Number:** #130106

**Date:** 9/12/13

**Testimony, Feedback on Process and Organization, Areas to Improve, Continue Services at Sliding Scale?**

**Have you noticed any changes since you started warm water therapy?** Yes. MY anxiety level dropped dramatically and the water therapy allowed me to build on trust, and it also help to reduce my stress level.

**How has warm water therapy affect your PTSD symptoms?** It allowed me to sleep 8 hours plus and that's the first time since 2003 that anything has allowed me to do this. It's the only thing that has worked.

**What was your favorite thing about the treatment?** The results and I worked well with the therapist.

**What was your least favorite thing about the treatment?** I don't have a least favorite thing.

**What would make this treatment even better for you?** Increase the amount of sessions. I got to the place where I was sleeping and then I worried it was going to go away.

**How was the experience with wave academy staff and procedures?** Great. Everyone was friendly and willing to know more about the sx's and what was working and what wasn't. That makes a big difference.

**Are there any changes you recommend or suggestions that you have for us to improve our process?** Counseling combined with this therapy would be a good conjunction. Give an introduction of what exactly a session would look like. A lot of folks get jumpy if they do not know

**Interested in continuing sessions?** Yes

**Interested in education to become an aquatic therapist?** Yes. That is freakin' amazing, I would love to learn how to do that.

**Client Goals and Perceived outcomes:**

# 130106

Exit Interview

Page 2

- 1) Improve sleep: Yes. Went from 3-4 hours to 8 plus hours following the treatment. Once I slept 14 hours after the treatment.
- 2) Reduce Anxiety: That helped a lot, I don't even know how to explain that. A lot of deep breathing during the treatment so I did a lot of deep breathing while I was in the pool and then that automatically went on into my day and it helped me to deal with anxiety if it came up, the breathing came natural.
- 3) Increase coping skills related to fear: I did really help, because even during the treatments I was going through a lot of trials, so the trust work and the breathing helps me to deal with the anxiety and the fear if it comes up. It boosted my confidence, so anything that had to do with fear went out the window. The water therapist help a lot too because she helped to build me up.

**Client 8 Case Summary:** 7/30/13

Clt 8 is a 32yo married Caucasian male who served in the U.S. Navy between 2001 and 2010, with one tour in Iraq as a SEAL in 2004. He was discharged medical with inguinal hernia, sciatic nerve damage, chronic pain related to broken wrist and shoulder on the right side, and received full disability and benefits in 2011. Clt experiences severe asthma and sleep apnea, controlled with medication and assistance of CPAP machine. He receives Primary Care at the Mission Valley VA clinic with Dr. Barrows, VA case management with Sarah Crouch (619-400-5271), and receives individual PTSD counseling at the La Jolla VA with psychologist J. Rosen. Clt is not working at this time and is planning to return to school to study business. He has no children. He is a native of Maine. He reports no ETOH or other substance use, and drinks caffeine usually every morning.

**Current PTSD symptomology:** He reports exposure to combat including IED explosions, but most of the PTSD is related to water boarding he experienced in military training "I couldn't even take a shower for a year afterwards." Main complaint is "paranoia," stating that he feels people are "out to get him," and that "I cannot leave his house without my knife"; continuously doing security checks around his home; nightmares; doesn't leave his house very often; hyper vigilance; history of depression following discharge; history of anxiety with panic attacks; significant sleep disturbances with nightmares occurring every night (sleep at 4-6 hours per night); difficulty concentrating

**Treatment:** On pharmacotherapy, stable without changes: hydroxyzine for anxiety, Lexapro for depression, and one other medication he did not know the name of to help with nightmares; receives individual weekly counseling at the La Jolla VA with J. Rosen.

**Comfort with water:** Clt has experienced a significant water trauma and many of his PTSD sx's are related to this experience; however, when asked about his thoughts of experiencing warm water therapy, reports "I think I will be fine as long as I stay on the surface. Clt reports he can swim and even went swimming in the ocean last summer. He has never experienced warm water therapy. He has received massage therapy before. He is not allergic to bee stings. **RECOMMENDATION:** Proceed with caution regarding treatment in the water. Reports that he prefers a female massage therapist.

**Strengths:** Loves his dog, support from significant other who is a RN, regularly receives acupuncture, and has a strong relationship with his family.

**MSE:** Clt appears in worn, casual clothing; morbidly obese; punctual for appointment. Mood was "good" affect appropriate to euthymic mood. Eye contact: direct. Speech: WNL. Thought Process: linear. Thought Content: appropriate to situation; denies any current or historical suicidal or homicidal thoughts; denies psychotic sx's and none observed. Attitude: friendly and personable. Alert and oriented to person, place, time and situation.

**Goals:**

- 1) Improve sleep
- 2) Reduce anxiety

**Exit interview questions:**

**Client Number:** #130108

**Date:** 9/27/13

**Have you noticed any changes since you started warm water therapy?** On the days I get therapy I generally do not get nightmares that night, and I'm relaxed physically and mentally on those days.

**How has warm water therapy affect your PTSD symptoms?** I generally do not have nightmares on Thursdays, I don't have the nightmares like I do on the other days. This is the first thing that has helped with the nightmares.

**What was your favorite thing about the treatment?** The stretching and the massage.

**What was your least favorite thing about the treatment?** Being on my back in water (giggle)... [Note: the client has a history of PTSD related to water torture, so this was a challenge that he willingly undertook].

**What would make this treatment even better for you?** Maybe to lie on my side more, be sideways, if there is a way to do that.

**How was the experience with wave academy staff and procedures?** 100% good.

**Are there any changes you recommend or suggestions that you have for us to improve our process?** Get funding from the VA so you can have your own facility. Everything centrally located would be easier.

**Interested in continuing sessions?** Yup.

**Interested in education to become an aquatic therapist?** Yeah, that would be cool.

**Client Goals and Perceived outcomes:**

- 1) **Improve sleep:** Yes, it definitely was improved on Thursdays following the treatments, no nightmares and waking up less often. 100%. Not doing security checks around the house, etc.
- 2) **Reduce Anxiety:** Yeah, pretty much the same, on the same days as the treatments I don't get much anxiety and the next day too, less anxious.

Client 11 Case Summary: 8/8/13

Client 11 is a 48yo married Caucasian male who served in the U.S. Air Force from 1982 to 1987, and as an Army Reservist from 2002 to 2011. While in the Reserves he was called to active duty in Iraq from 2003 to 2005, where he worked as a transport driver. He reports that upon returning from Iraq "I was pretty beat-up," and indicated difficulty in readjusting to civilian life, especially in regards to driving vehicles. While in Iraq he was exposed to many IED explosions and bombs being thrown at vehicles from overpasses. For many years following return he was unable to go over or under freeway overpasses without triggering flashbacks and panic attacks. Today he notes that he is much better but still experiences occasional problems with driving. This exposure resulted in PTSD. He is 100% service connected, with a pending disability claim in process primarily to PTSD, and secondarily to tinnitus in his right ear. Other health conditions include left shoulder injury and pain, herniated L5 vertebrae with pain, and damage to right Achilles tendon with pain. Client is originally from Chicago, he has been married for 21 years to the same partner (Fran Dobrowski, 858-335-1955 ROI on file) and together they have two adult children. He receives Primary Care at the La Jolla VA with Dr. Dollarhide.

Current PTSD symptomology: Avoidance behavior; feeling anxious; occasional angry outburst; difficulty trusting people; flashbacks 1-2x/month triggered by war-related scenes on TV and in the news; reports broken sleep every night, with an average amount of 6 hrs/night and moderate nightmares occurring 1-2x/week; reports never considering suicide. Currently drinking 2-4 beers per day and feels that he is in control of his ETOH use at this time, though seems to indicate that drinking was a problem in the past when he first returned from Iraq.

Treatment Hx: Has tried group and individual psychotherapy, but not currently in psychotherapy; stable on medications: Trazadone 150mg to sleep; Sertaline 200mg for depression and anxiety.

Strengths: Happily married and has a strong desire to keep on living. Reports that he feels better and more free driving a motorcycle. Has recently started to reach out and get help from the VA and other organizations to help with his PTSD

Comfort with water: Reports that he likes the water, he can swim, and is not allergic to bee stings. Client reports that he has never before received warm water therapy.

MSE: Client with many tattoos appears in clean, casual biker clothing; punctual for appointment. Mood was "good" affect appropriate to euthymic mood. Eye contact: direct. Speech: WNL. Thought Process: linear. Thought Content: appropriate to situation; denies any current or historical suicidal or homicidal thoughts; denies psychotic symptoms and none observed. Attitude: friendly, open, and grateful. Alert and oriented to person, place, time and situation.

Goals:

- 1) Increase mental stability
- 2) Decrease anxiety and anger
- 3) Pain relief

**Exit interview questions:**

**Client Number:** #130111

**Date:** 10/23/13

**Have you noticed any changes since you started warm water therapy?** Yes, I have. I've been able to find relaxation easier, and I've been able to find inner peace easier.

**How has warm water therapy affect your PTSD symptoms?** I'm not as jumpy, I feel a lot more relaxed for a considerable amount of time after the session, not as edgy after session.

**What was your favorite thing about the treatment?** Flexibility with appointments, association with the therapist, confidence in the therapist.

**What was your least favorite thing about the treatment?** Not really anything. Met and surpassed all my expectation. Nothing I didn't like about it.

**What would make this treatment even better for you?** Central location, like in a facility, it would be better for the people receiving it and the people working there; for example dealing with inclement weather, being indoors vs. outdoors or with rain.

**How was the experience with wave academy staff and procedures?** Surpassed expectation

**Are there any changes you recommend or suggestions that you have for us to improve our process?** I didn't see any issues. Maybe having a facility and a bigger one so there is no back log.

**Interested in continuing sessions?** Yes

**Interested in education to become an aquatic therapist?** Possibly...

**Client Goals and Perceived outcomes:**

- 1) Increase mental stability: Yes I believe I have that.
- 2) Decrease anxiety and anger: Yes.
- 3) Pain relief: Yes, there has been, especially with the lower back.



Wave Academy Qualitative Analysis

Stephanie Whitmore, MPH

April 18, 2014

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### **1a. Introduction – Data Collection and Process**

Between January and December 2013, the Wave Academy provided water therapy sessions for 19 clients (the 20<sup>th</sup> client did not complete the qualitative assessments). Clients were asked to complete quantitative assessments prior to each session and qualitative assessments after each session. After assessments were completed, qualitative data were copied and provided to the analyst for review. The assessments included the following:

- 1) *Intake summaries* – completed before the first session, includes client demographics, diagnoses, symptoms, and goals.
- 2) *Program Evaluation Qualitative Assessments* – completed after each session, instructs clients to “*Briefly describe what your experience was like today during warm water therapy*” and asks therapists to note their “*observations.*”
- 3) *Exit Interviews* – completed at the end of the eighth session, asked clients to provide a testimony of their experience and feedback on the water therapy process and organization.

The analyst uploaded the “program evaluation qualitative assessments” into QSR-NVIVO; software used for qualitative data analysis, and reviewed the content for emerging themes. The following pages include descriptions of the thematic results as well as data summarized from the intake summaries and exit interviews.

### **1b. Intake Summaries**

*Intake summaries* were completed before each client’s first water therapy session and asked clients to provide demographics (gender, age, race, employment status), medical information (diagnosis and symptoms), and goals for their water therapy sessions.

Demographics: Of the 19 clients who completed intake summaries, 89% of clients were male (n=17) and 11% were female (n=2). Clients reported ages ranging from 24 – 48 years, with a mean age of 33 years. Clients reported ethnicity as: 53% Caucasian (n=10), 26% Hispanic/Chicano (n=5), 11% mixed race (n=2), 5% African-American (n=1), and 5% did not

respond (n=1). In addition, 37% of clients reported employment (n=7), 37% reported unemployment (n=7), and 26% (n=5) did not include their employment status.

Medical Information: Medical information showed multiple diagnoses for each client such as Post-Traumatic Stress Disorder (PTSD), Traumatic Brain Injury (TBI), chronic pain, major depression, tinnitus, and nerve damage. Symptoms affecting clients included depression, anxiety, nightmares, flashbacks, suicidal ideation, poor sleep, memory loss, and avoidant behavior.

Water Therapy Goals: Clients were asked to provide up to 3 goals for their water therapy sessions. Of the 16 clients who reported at least 1 water therapy goal, the most common goals were:

- 1) Decrease anxiety and anger (n=7)
- 2) Increase quality of sleep (n=5)
- 3) Decrease stress (n=4)
- 4) Increase coping skills (n=4)
- 5) Decrease flashbacks (n=2)

Other goals included statements such as *“Get back to practicing mixed martial arts,” “Increase feelings of serenity,” “Increase forgiveness for self,”* and *“Increase sense of overall well-being.”*

## **2a. Program Evaluation Qualitative Assessments (Client Themes)**

Clients were asked to complete a qualitative assessment at the end of each session. The questionnaire asked clients to respond to the following question: *“Briefly describe what your experience was like today during warm water therapy.”* On average, the 19 clients completed 7 sessions and 7 qualitative assessments each (range: 1-8). A total of 133 responses were included in this analysis.

Comments were uploaded into QSR-NVIVO, software used for qualitative analyses. Word frequencies were generated and used to code key phrases in the responses which were then organized into themes.

The following client themes were identified:

- 1) Relaxation (68 sessions; 18 clients)
- 2) Self-Reflection (50 sessions; 13 clients)
- 3) Body Awareness (45 sessions; 15 clients)
- 4) Reduction of Symptoms (40 sessions; 15 clients)
- 5) “Letting Go” (21 sessions; 11 clients)
- 6) General Satisfaction, Gratitude (39 sessions; 19 clients)
- 7) Suggestions (6 sessions; 6 clients)

Each theme was organized by the number of sessions in which a theme was mentioned and then by the number of clients endorsing the theme. For example, if 8 clients mentioned a theme in each of their 8 session responses, the number of sessions listed would be 64. In addition, even though the theme “General Satisfaction, Gratitude” contained statements that were endorsed by all the clients, this theme was listed towards the end due to the general nature of the statements. Most general satisfaction, gratitude statements included items such as “it was great” or “thank you” whereas, other themes included more specific statements. It is also important to note that many client responses included multiple themes. Quotes that are used as examples of themes may also describe other themes. The themes described give an overall idea of client responses to sessions however; this is not an exhaustive list of all ideas discovered in the data.

**1) Theme: Relaxation (68 sessions; 18 clients):** Each client mentioned “relaxation” in approximately 4 session evaluations. Most clients expressed relaxation in general terms to describe how they felt as a result of the session, overall. When describing relaxation, clients also used words such as “calming,” “peaceful,” “tranquil,” and “comfortable” to describe their experience. These comments included:

- *“After the session I am peaceful,” “Really more peaceful, tranquil knowing I could lay in the water and have my mind decompress. I felt my flexibility increase.”*
- *“That was excellent as always, thank you! Very relaxing and calming. Stress free. Really released everything.”*

Many clients also noted falling asleep as a result of relaxation. Some clients offered specific details regarding the results of relaxation or, how they felt before relaxing. For example, four clients described feelings of nervousness and anxiety before sessions and one client stated *“I was really nervous getting in the water but, I ended up being so relaxed that I fell asleep...twice.”* Other clients noted:

- *“After a week that I missed, I feel really relaxed and concentrated. I feel like the rest of my day may not be that bad.”*
- *“Relaxing - stress free. That's it in a nutshell right there.”*
- *“That is the most relaxing thing I have ever done in my whole life - with the warm water I could not tell when I ended and it began.”*

**2) Theme: Self-Reflection (50 sessions; 13 clients):** Comments noted that clients thought about their life experiences while in the pool and that during water therapy they were able to “process” difficult situations. Some clients also included thoughts on their daily lives, stressors, distractions, and situations possibly contributing to their water therapy sessions. Specific comments included:

- *“The session today helped me see some positives and negatives about separation anxiety and fears that are still there in regard to trust. I noticed I experience more anxiety when I'm facing outward in comparison to facing inward.”*
- *“Really hard things going on in my head. Didn't feel safe, everything processing felt safe in water - but not in my head. Brief moment saw the light and then I felt safe like when I went into cardiac arrest. How clear I saw it how safe I felt. I prayed for God, for me and you (therapist name) then we finished.”*
- *“The focus of the flashback is gone. This time with the flashback I did not feel the blame and guilt only extreme sadness. After the session I am peaceful.”*

- *“Felt like fish swimming under me – felt like I was in a boat. I was trying to release something about detaining – something detaining me. Was processing something about drowning at age 5 – went to save a little girl who was drowning – she kept pulling me down under. Now I feel stronger in the water and more connected – had a gentle awakening – feel alive again – excited to unite – being inspired and revitalized – most progress have made in three years.”*
- *“Cleared my mind. No craziness going on. After last session I had a full on hyper vigilance mode. No sleep. Lock, window, door checking all night.”*
- *“I did start thinking about my issue, tried not to when I am on my way over to session I start getting anxious. Dipping my head into water with ears under also causes anxiety. It's hard to relax.”*

**3) Theme: Body Awareness (45 sessions; 15 clients):** Comments indicated that clients were in-tune with their bodies during water therapy and recognized how they responded to body movements, areas in which they experienced pain, and areas in which they experienced pain relief. In addition, clients commented on enjoyment of stretching, mobility, and massage and breathing techniques. Body awareness was also tied to sleep, relaxation, and comfort during the sessions. Specific comments included:

- *“The lower back stretch, foot therapy is great,” “After a few weeks off, it took a little to find my breath, but once I found it, things got better. Great session. I'm learning to let go more and more, and keep my breath.”*
- *“The feet were especially useful. Felt whole body let go from feet. Right foot had been bothering me before.”*
- *“Extensive stretching - helped the legs and lower back, much looser, less pain. More relaxed today. Neck massage at the end perfect.”*
- *“Able to be more aware, and clear on how body felt,” and “The water session helped a lot to bring calmness...the water help(ed) bring out a physical pain...I couldn't pinpoint but now I can. Thanks!”*

**4) Theme: Reduction of Symptoms (40 sessions; 15 clients):** Clients discussed the reduction of both physical and mental symptoms such as anxiety, tension, and pain at the end of sessions. Many comments indicated that clients were surprised and relieved by the effects of water therapy. Specific comments included:

- *“Released pain in my neck - not able to for 8 months. Full rotation in my neck now - wow!”*
- *“A lot of pain relief - neck, shoulder, mid-back increased breathing ability - I really like that - general relaxation. Will sleep good tonight, I hope.”*
- *“My mind was racing when I came in. I've been a little more on edge and tensed up this week. I was able to let go of those feelings after today's session.”*
- *“Very relaxing - I felt like I got my head put back on.” It was one of the better sessions and it reduced my anxiety and got me out of my head.”*
- *“This was the best yet. All week have stayed more relaxed and been drawn to do more water activities on own. Looking forward to weekend trip with friends. The focus on the feet and hands I could really feel the release of tension out my arms and legs. Ribs hurt from surfing accident. Feeling much better. Could also feel work in abdomen relate to whole body - noticed smoother movement between moves.”*
- *“Wow. All pain completely gone, so is dark cloud. Feel relaxed + amazing on a scale of 1-10 → 100!”*
- *“Best session to date. Everything that I'm learning in the pool is starting to come together. I'm becoming more and more aware of things in my daily life that can improve my PTSD. I love the work from (therapist name). Life is getting better by the week..”*

**5) Theme: “Letting-Go” (21 sessions; 11 clients):** Clients used the term “let go” which described physical and mental releases and relaxation. “Letting go” comments included:

- *“I came with a lot of anxiety/tension. I was able to let go fast and relax. Iraq anniversary, (date).”*
- *“Helped let go of bad experience. Feel completely relaxed. Really felt feet and abdomen through whole body.”*
- *“The only place I really let go, I don't understand why and am glad anyway.”*



- *“Very surprised I could let go like that. Especially to trust someone. Surprised at big breaths and release I felt.”*
- 6) **Theme: Satisfaction, Gratitude (39 sessions; 19 clients):** All clients used words such as “good,” “great,” “amazing,” and “Thank you” to express satisfaction with the water therapy sessions and gratitude for the services. In addition, clients reported enjoyment of water through statements such as:
- *“I really like floating around in here. Felt like taking a bath as a kid. I take baths now but I don't fit. Feels like kicking back on my surf board. Don't want to get out”*
  - *“My session today was calm and fun.”*
  - *“Amazing. I'm very happy that I chose Pool Therapy. It's the best treatment for PTSD that I've ever come across. xxxx is an awesome worker and helped me out more than any doctor/social worker ever has. I will always hold on to what I have learned here. Thank you so much!”*
- 7) **Theme: Suggestions (6 sessions; 6 clients):** A few clients noted situations and experiences in the water which could have been improved upon. Three clients noted hearing noises and two clients reported feeling cold in the water. One client commented *“Relaxing - kept hearing noises thought I heard someone yelling - just must be me. Work on low back felt good. Water was cooler - would like it warmer.”* Another client stated *“Noticed an increase in anxiety during the session - we went over the hour today!”* It is interesting to note that these distractions did not appear to affect the overall session experiences of the clients.

**Figure 1. Top 50 Words Used To Describe Client Experiences**

able about after amazing anxiety asleep awesome back been  
being better body comfortable could down everything **feel**  
**felt** good great head helped last legs  
less life **like** mind **more** much neck  
noticed pain **really** relax **relaxed**  
**relaxing** release right safe sleep stretching thank think  
thoughts time today want **water**

### 3a. Program Evaluation Qualitative Assessments (Therapist Themes)

Therapists were asked to record “*therapist observations*” as part of the qualitative assessments that clients completed at the end of each session. A total of 133 therapist responses were included in this analysis. Like the client responses, therapist observations were uploaded into QSR-NVIVO and word frequencies were generated to code the data into themes.

The following themes were identified:

- 1) Relaxation (78 sessions; 17 clients)
- 2) Massage and Body Work (71 sessions; 18 clients)
- 3) Client Progress (51 sessions; 16 clients)
- 4) Client Situations (46 sessions; 12 clients)
- 5) “Letting Go” (31 sessions; 14 clients)

**1) Theme: Relaxation (78 sessions; 17 clients):** Similar to client responses, therapists frequently observed clients as “relaxed,” “calm,” and “comfortable.” Therapist observations regarding relaxation included:

- *“Client looked more relaxed and calm after session seemed to enjoy his first experience.”*
- *“Client was very relaxed and at ease in the water. Seemed to be able to drop into a space of deep relaxation. Very comfortable to work with.”*
- *“He seemed real relaxed and comfortable after the session. He was calm, reflective, and excited for more!”*
- *“He is very comfortable in water - arrived with a lot of physical pain low back and uncertainty with a new person, setting, and treatment. But he soon relaxed into the familiar love he has for water and seemed to rest deeply”*
- *“Once he relaxed and was really into his breath and the rhythms of the water tears flowed silently from him. It was silent and sweet.”*

**2) Theme: Massage and Body Work (71 sessions; 18 clients):** Multiple therapist observations discussed the particular water therapy techniques that were used with each

client. For example, one therapist noted that the client *“Seemed to let go right away. Tall and large, slow tempo yet very open to movement and body work, less change of planes and stretches more open to articulation and segmenting through the body which is a sign of integrating the work. Many large sighs - releases and energy releases”* Spine twist towards the left may be associated with chronic pain in the right side (shoulder, neck and upper arm) relaxed very deeply, many big exhales, more movement this session.” Another therapist observed:

- *“Client relaxed quickly, took many deep breaths throughout session. Head, neck and spine have a slight lateral twist to the left. Tight in the shoulders. Also, he had a significant tremor in the left hand during finger shiatsu.”*

**3) Theme: Client Progress (51 sessions; 16 clients):** Therapist observations noted client progression throughout the sessions. Specific comments included:

- *“She has had consistent shifts, healing and releasing in each session has been amazing to witness and hold space for her in the warm water therapy pool. She is ready for her next step.”*
- *“Today was about being ok with what is, he followed his breath through the session, honored his body’s need to open and let go, he could see the "layers" of tension and found ways to relax into his body. He noted that he can use it at work and other areas in his life!”*
- *“He seems genuinely happy to be in the water, coming to the sessions and having a positive experience. He is so much more relaxed and able to let go - he enjoys the stretching and reduction in pain he is experiencing.”*
- *“Client in high spirits today! I have witnessed him open more and more each week. He often talks about how his friends come to him with their problems. They say he is an "[source] of calm" for them. This at times, overwhelms him and he has realized that the water work offers him a place to move through his own creations and recuperate from daily life.”*

**4) Theme: Client Situations (46 sessions; 12 clients):** Therapists included anecdotes of conversations with clients, many of which discussed the client's unique situations. Therapist observations indicate that clients shared their life experiences with the therapists both in and outside the pool. Therapists' noted:

- *"He came in rather tense and talking about yesterday being the anniversary of the invasion of Iraq. He was really sad. After the session he exclaimed 'Wow, I am really tired...' I encouraged him to give himself time to complete the process"*
- *"Seemed tired when first arrived - had a rough holiday with the July 4th and family dynamics. The 4th activated a lot of bad memories. Seemed to need to really move - like pushing and moving away from the trauma. Did quiet down finally and seemed to reach a peaceful place when we were done."*
- *"After his session he let quite a lot out verbally. Which I sensed he just needed to get out. He talked a lot about his experience in the session. There were times that the intimate aspect of it was intense for him but he was able to calm himself and tell himself that he was safe. He talked about not being loved and held as a child. He also talked about having to be 'responsible'."*

**5) Theme: "Letting Go" (31 sessions; 14 clients):** Therapist observations used terms such as "Letting go" and "Picking up where we left off" to describe client progress. Observations included:

- *"Seemed to completely let go. End of session looked 10 years younger all tension in face gone voice soft and peaceful."*
- *"During session let go right away. It is like the sessions pick up where the last one left off like erases the effects in his face and body of his past week. Great flow and movement."*
- *"Seemed to pick up where left off very relaxed and moved easily. Slept soundly."*
- *"He has completely "let go" and continues to relax deeper with each session. Very pleased."*
- *"So my client wrote that [this was his] 'Fastest session to relax'. This was his 'Best' session where I observed him for the first time completely letting go and observing him"*

*totally comfortable, calm, peaceful, and quiet within his whole body for the first time Let go!!!”*

**Figure 2. Top 50 Words Used To Describe Therapist Observations**

able **about** after also asleep away **back** been before  
being **body** breath calm **client** comfortable deep  
down **during** face felt first good happy last left less like  
minutes **more** movement much neck  
open pain pool quickly really relax  
**relaxed** right slow talked through  
time today took **water** well work worked

#### 4. Exit Interviews

Clients were asked to complete an exit interview after completing their eighth water therapy session. Fifteen clients completed the exit interview at the time of the analysis.

Exit interviews included the following questions:

- 1) Have you noticed any changes since you started warm water therapy?
- 2) How has warm water therapy affected your PTSD symptoms?
- 3) What was your favorite thing about the treatment?
- 4) What was your least favorite thing about the treatment?
- 5) What would make this treatment even better for you?
- 6) How was the experience with Wave Academy staff and procedures?
- 7) Are there any changes you recommend or suggestions that you have for us to improve our process?
- 8) Interested in continuing sessions?
- 9) Interested in education to become an aquatic therapist?
- 10) Client Goals and Perceived outcomes

##### **Question 1: Have you noticed any changes since you started warm water therapy?**

As a result of water therapy, clients reported that they were more “*relaxed*” (n=9), “*calm*” (n=4), and “*less anxious*” (n=3). One client reported that water therapy “*helped a lot with pain management.*” Comments also indicated that warm water therapy helped clients to reflect and become self-aware. One client noted “*I'm able to process my thoughts better. I'm able to stay more relaxed when trouble starts to happen. It's taught me to take time for myself...To realize that everyone has problems and mine are not any more difficult than anyone else and that I could improve things in my life by being calm and I don't have to take things to the extent I used to.*”

##### **Question 2: How has warm water therapy affect your PTSD symptoms?**

Clients reported that water therapy allowed them to “*process*” their situations (n=5). One client stated “*It kind of brought some things to the surface and it allowed me to work through them as well*” and another client stated “*It's affected [me] for the better. It's not that anything went away, but I'm able to process my thoughts better. So if I'm getting a panic attack or if I'm having a bad*

*dream, I am better able to approach things because of the warm water therapy.”* Other clients noted that water therapy increased their sleep (n=3) and reduced anxiety (n=3) and nightmares (n=1). Another client stated *“I’m not as jumpy, I feel a lot more relaxed for a considerable amount of time after the session, not as edgy after session.”*

**Question 3: What was your favorite thing about the treatment?**

Multiple clients noted that working closely with the therapist was their favorite thing about the treatment (n=6). One client described his relationship with his therapist saying: *“Probably my therapist, because after going through this, I got a lot out of him and he was able to stay for 5-10 minutes after the session and I was able to talk with him about my experience. He helped me really understand what was going on in the pool and how the warm water therapy can affect my PTSD. Those little talks were so helpful.”* Another client noted *“The whole day after the treatment I feel totally stress free and feel calmer, felt a good connection with therapist and really open to it; felt like someone was helping me and not trying to hurt me.”* Clients also noted that they loved being in the water (n=3), the relaxation (n=3), and the bodywork (n=3) such as the *“stretching and the massage.”*

**Question 4: What was your least favorite thing about the treatment?**

Many clients stated that they *“didn’t have a least favorite thing”* about the treatment (n=6). Other clients stated difficulties with the distance (n=1), bad timing (n=1), and the lack of privacy (n=1). One client noted that *“The tarp covering the pool, anticipating the sunlight on the face was not comfortable”* and another stated *“Nothing really...Not having a towel right at the pool, getting cold right after getting out the water.”* Two clients noted that they were initially uncomfortable but ended up looking forward to the sessions.

**Question 5: What would make this treatment even better for you?**

Clients noted that they wanted *“more sessions”* (n=4) and that they wanted to experience *“underwater/submergence”* work (n=3). Additional recommendations included *“more privacy”* (n=1), *“a different location”* (n=1). Specific comments included *“I don’t think anything...that’s how much I liked it. Wait, maybe a speaker underwater so you could have sound treatments*



*while in the water” and “A longer duration of treatments (more than 8 sessions). Maybe if people were encouraged to submerge themselves for a few minutes and acclimate to the water before starting the sessions.”* Five clients did not list anything that could improve their experience.

**Question 6: How was the experience with wave academy staff and procedures?**

Clients reported their experience with Wave Academy staff as “great” (n=6), “good” (n=4); “amazing” (n=1), and “awesome” (n=1). Specific comments included “Great. Everyone was friendly and willing to know more about the services and what was working and what wasn't. That makes a big difference,” “It was great because it was always set to my schedule. And the communication with the therapist and myself was great,” and “Great. Questions [qualitative] assessments were kinda long.”

**Question 7: Are there any changes you recommend or suggestions that you have for us to improve our process?**

Seven clients noted praise and indicated that they did not have any suggestions for process improvement. Other clients indicated that a different facility would be helpful (n=3). Other comments focused on the assessments stating “That one sheet in the assessments, I couldn't answer it, I did not figure that one out, get rid of that piece of paper. Other than that I wouldn't change a thing you guys are doing” and “Might be faster if you didn't have to write it down every time, like use an iPad or laptop.” One client noted playing music during therapy would be beneficial and another client stated “Counseling combined with this therapy would be a good conjunction. Give an introduction of what exactly a session would look like. A lot of folks get jumpy if they do not know.”

**Question 8: Interested in continuing sessions?**

The fifteen clients all noted that they would be interested in completing sessions. One of the clients said yes, but was hesitant due to the distance.

**Question 9: Interested in education to become an aquatic therapist?**

Eight clients indicated that they were interested in becoming aquatic therapists. Other clients were unsure (n=3), said no (n=2), or did not reply (n=2). Specific comments included *“Yes. That is freakin' amazing. I would love to learn how to do that”*, *“Yeah, that would be great, that would be really cool. I have my personal trainer credential and a BA in biology”* and *“At this time no, but maybe one day.”*

**Question 10: Client Goals and Perceived outcomes**

Of the 15 clients, 10 clients completed the goals and perceived outcomes section of the interview. Of the listed goals, 9 clients reported meeting at least one goal. One client did not want to revisit his goals and stated *“I know I set really high goals sometimes and I don't want to be reminded of them.”* Of the clients who set the goal to decrease anxiety and anger (n=7), one client stated *“That helped a lot; I don't even know how to explain that. A lot of deep breathing during the treatment so I did a lot of deep breathing while I was in the pool and then that automatically went on into my day and it helped me to deal with anxiety if it came up, the breathing came natural.”* Outcomes regarding increasing client quality of sleep included *“Yes. Went from 3-4 hours to 8 plus hours following the treatment. Once I slept 14 hours after the treatment,”* and *“Actually did improve my sleep and I actually fell asleep in the pool a couple of times.”* A third client noted that his sleep did not improve and stated *“The same, just not so good...I think if it was more consecutive days then it would have been helpful but once a week and missing a few weeks wasn't enough to affect the daily stressor.”* Clients also indicated that they met their goals of *“Increasing coping skills”* (n=1), *“Improving mental clarity”* (n=1), and *“Being more peaceful”* (n=1).