



Stress Management Society
from distress to de-stress

The Effects Of Floating On Mental Wellbeing & Stress

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FLOATING POINT
FLOAT CENTRE

The Effects of Floating on Mental Wellbeing and Stress: A Mixed Methods Experiment

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Aims

The aim of this study is to explore the effects of floatation-REST (Restricted Environmental Stimulation Technique) on physiological, qualitative and quantitative measures of stress and mental wellbeing.

Earlier studies focus on the biological aspects of the effects of floatation-REST (such as lowered levels of cortisol); this research will aim to explore participants' subjective accounts of stress and mental wellbeing through a mixed-methods design study.

Methodology

Participants

9 participants were used in this study; the chosen demographics were gender, age and employment status. The sample group included 5 males and 4 females between the ages of 25 and 60.

Materials

Quantitative measures of stress included 7 questions from the Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS). The participants were asked about their feelings towards the future, self-worth, problem-solving, clarity, relaxation and the connection with other people. The questionnaire was filled out after every float.

HeartMath EMWave Pro was used to measure physiological changes in each participant across each float. This device measured an individual's 'Coherent State' by reading Heart Rate Variability, Blood Pressure and Pulse through an ear sensor which clips onto the participant's ear lobe. Each participant was connected to HeartMath via a tablet before and after every float for approximately 10 minutes.

Floatation-REST: Floating pods are provided by Floating Point, a float centre based in Reading, UK. The pods are 8ft x 5ft, filled with over 1000lb of Epsom salt dissolved in the water. The water and air inside the tank are heated to skin temperature. External sounds are kept to an absolute minimum through earplugs, and the design of the pods themselves.

Qualitative interviews were conducted after the study took place to explore the results gathered in further detail and provide a more holistic approach to quantitative and qualitative data gathered previously. The questions focused on participant's thoughts and feelings towards floating and wellbeing over the 6 week period.

Procedure

The participants from the sample group were tested over a six-week period on their four individual floatation sessions.

Informed consent was collected from all participants prior to conducting the experiment and participants were informed their involvement in the study was voluntary and they had the right to withdraw at any point.

Prior to their first floatation session the participants had to complete a short consultation form and waiver to confirm that they had no specific medical reasons that prevented them from floating. The participants were given a short induction to explain their float session. They were instructed on how the HeartMath device works and were asked to clip the ear sensor onto their earlobe to begin measuring their Heart Rate Variability and Coherent State (refer to 'HeartMath & Coherent State p.2 for further information).

Firstly, a HeartMath reading was taken for approximately 10 minutes before the beginning of each float. The participant was then taken to the floating tank and floated for x amount of time. HeartMath was also recorded post-float. It is important to note that participants' Heart Rate Variability and Coherence was not measured directly after floating. As floating does not require participants to wear clothes, after each float participants showered and changed before their post-float HeartMath reading.

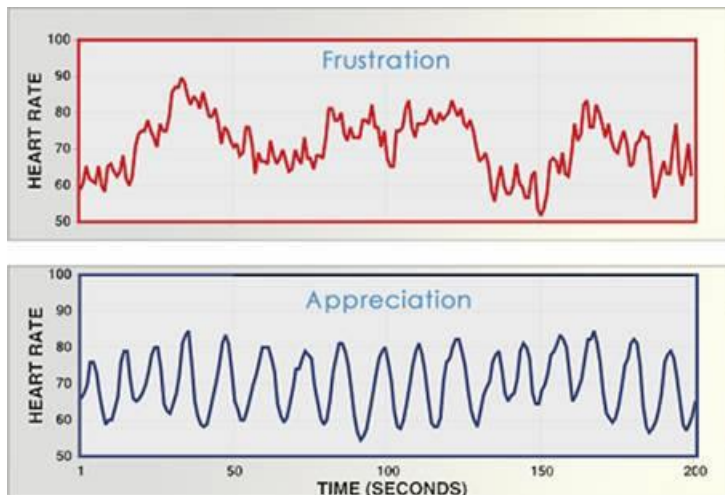
After the HeartMath reading, the participants filled out the questionnaire via DilogR platform. The questionnaire included seven questions from SWEMWBS, and two open format questions;

- **How was your float?**
- **Do you have any feedback you would like to add?**

This procedure was repeated over a six week period.

HeartMath & Coherent State

'Coherence' is a state that occurs when an individual's Heart Rate Variability (HRV) is rhythmic or balanced. This balance is linked to their nervous system that is associated with stress, and their emotional state. Coherence can be achieved by practising various breathing, visualisation or relaxation techniques. The HeartMath device used in this study calculated an individual's coherent state by first measuring and storing the continuous stream of inter-beat-intervals (IBI), calculated from pulse data received from the ear sensor. The figure below illustrates the difference between emotions or states that may elicit coherent and incoherent readings through HeartMath:



← This incoherent reading is also representative of states such as anxiety and stress.

← This coherent reading is also representative of states such as love, calmness and contentment.

Hypotheses

Hypothesis 1

We will see an increase in participants' mental wellbeing (Higher SWEMWBS scores) as they get start floating.

Hypothesis 2

The participants HeartMath results will demonstrate a higher level coherence (i.e. be in a state of feeling love, calmness and contentment, and feeling less anxious and stressed) after each floatation session.

Results & Findings

All responses gathered from each week have been collated and anonymised to contribute to the data analysis of this study.

Quantitative Analysis

This quantitative analysis is based on two different methods; the Short Warwick-Edinburgh Mental Wellbeing Scale and HeartMath readings of each participant.

Short Warwick-Edinburgh Mental Wellbeing Scale

Participants were asked to complete a survey after each float to measure their mental wellbeing levels.

The survey included 7 questions regarding emotional and mental wellbeing. The questions are based on the Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS), which looks at an individual's emotions, quality of interpersonal relationships and psychological functioning **over the past two weeks**. The scale ranges from 7 points (lowest level of mental wellbeing) to 35 points (highest level of mental wellbeing).

According to the NHS Edinburgh, most people have a score between 25 and 26. In line with NHS' usage, the Warwick-Edinburgh Mental Wellbeing Scale has been divided into five levels of mental wellbeing.

The questions of the Short Warwick-Edinburgh Mental Wellbeing Scale are:

SWEMWBS Score	Score (out of 35)
Excellent	29+
Good	27-28
Average	25-26
Below Average	22-24
Poor	7-21

Over the past two weeks,

1. I've been feeling optimistic about the future
2. I've been feeling useful
3. I've been feeling relaxed
4. I've been dealing with problems well
5. I've been thinking clearly
6. I've been feeling close to other people
7. I've been able to make up my own mind about things

Floating Sessions

After each of the four floats, the SWEMWBS scores were calculated for every participant. The below data demonstrates how the participants scored on mental wellbeing on each floating session.

Session 1

All nine participants completed the SWEMWBS questionnaire after the first float. The results demonstrate two of the participants scored in the 'good' range for mental wellbeing. However, a third of the participant's scored 'poor' for mental wellbeing and none of the participants scored 'excellent' for mental wellbeing.

Number of Participants	Mental Wellbeing Score	
3	Poor	20-21
1	Below average	22
3	Average	25-26
2	Good	28
None	Excellent	N/A

Session 2

Floating session 2 out of 4 is measured with answers from 7 participants; two participants didn't fill out the survey after their float. From the second float we can see that there are no participants with "poor" mental wellbeing. The majority finds themselves in "below average", "average", "good" and one participant have moved into the "excellent" mental wellbeing band.

Number of Participants	Mental Wellbeing Score	
None	Poor	N/A
3	Below average	24
2	Average	26
1	Good	28
1	Excellent	30

Session 3

All participants completed the questionnaire after their third float. In the third session, the vast majority find themselves scoring average and above - four participants are now experiencing 'excellent' mental wellbeing.

Number of Participants	Mental Wellbeing Score	
None	Poor	N/A
1	Below average	24
4	Average	25-26
None	Good	N/A
4	Excellent	30-31

Session 4

All participants also completed the questionnaire for their final float. At the end of the fourth and last float, **all** participants experienced mental wellbeing above the national average - in fact, the majority of the sample group now have excellent mental wellbeing.

Number of Participants	Mental Wellbeing Score	
None	Poor	N/A
None	Below average	N/A
2	Average	25-26
2	Good	27
5	Excellent	30-31

Average scores across each floating session

Analysing the session outcomes - overall, we see an increase in every participants' mental wellbeing scores. At the beginning of the study, 45% of the sample group had poor or below average SWEMWBS scores. At the end of the study, 100% scored over the national average - 78% had good/excellent.

Overall, there has been a significant increase in participants' mental wellbeing scores over the four float sessions. At the beginning of the study, 45% of the sample group had poor or below average SWEMWBS scores. At the end of the study, 100% scored over the national average – with 78% of participants scoring good/excellent.

Calculating the average SWEMWBS rating for each float, it is evident that the mean score for each session improves by one band after every session. The sample group's mental wellbeing score has improved from below average to excellent in the space of just four REST floatation over six weeks. These results therefore confirm a hypothesis?

Float session	Average Mental Wellbeing Score	
1 of 4	Below average	24
2 of 4	Average	26
3 of 4	Good	27.44
4 of 4	Excellent	28.55

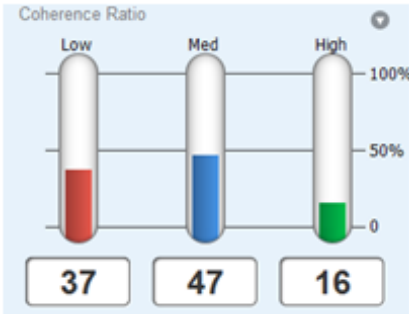
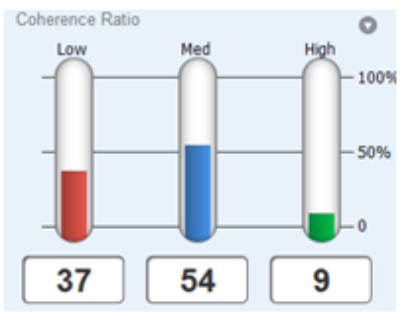
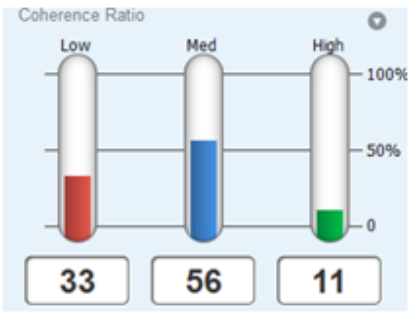
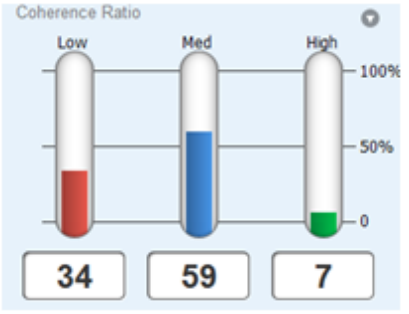
HeartMath Data Analysis

In this section, the results from the HeartMath readings across the 4 floats for each participant are presented and discussed. HeartMath readings were taken before and after each float. The tables below provide graphical representations of the participant's overall HeartMath reading before and after the first and fourth float and their Coherence Ratio.

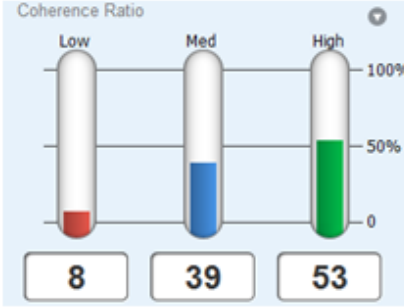
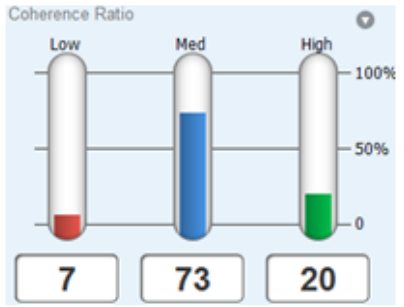
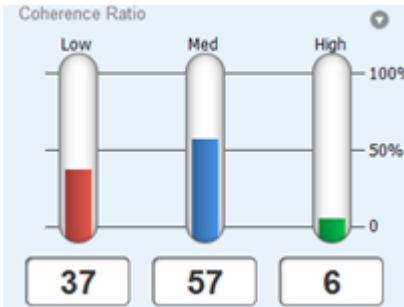
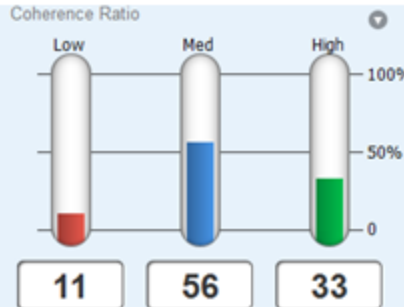
The coherence ratio is measured at three levels:

- ♥ Low coherence – red zone (hyperarousal)
- ♥ Medium coherence – blue zone (shifting between hyperarousal and coherence)
- ♥ High coherence – green zone (in coherence)

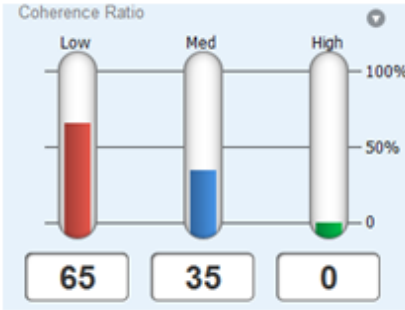
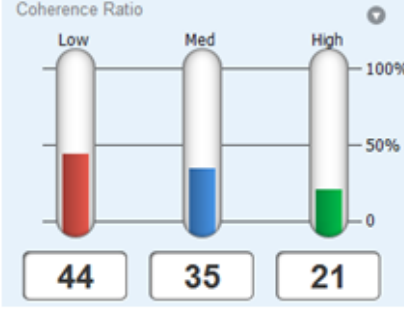
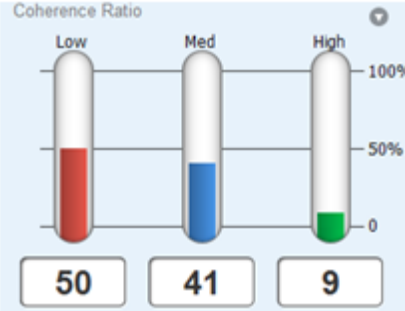
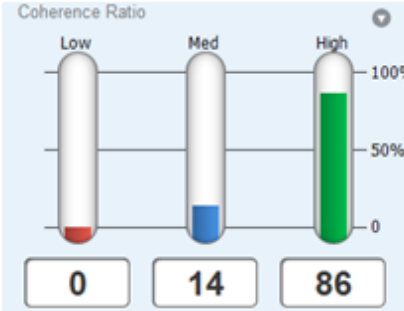
The HeartMath device provides a percentage of how long the participant has spent in each of these states. Given the proposed hypotheses of this study (hypothesis 2), it would be expected that the participants HeartMath results will demonstrate a higher level coherence (i.e. be in a state of feeling love, calmness and contentment, and feeling less anxious and stressed) after each floatation session, and that the time in the green zone will increase between each week. As discussed above, low coherence, or in the case of coherence ratios, the red zone, represents states of stress. Therefore, the more time the individual spends in the red zone in comparison to the blue or green zones, the more stressed they are.

Participant 1		
Session	Before Float	After Float
Session 1 of 4		
	<p>Participant 1: Session 1, post-float results</p> <p>Hyperarousal is the same.</p> <p>Shifting to coherence is slightly higher.</p> <p>Coherence is lower.</p>	
Session 4 of 4		
	<p>Participant 1: Session 4, post-float results</p> <p>Hyperarousal is almost the same.</p> <p>Shifting to coherence is slightly higher.</p> <p>Coherence is lower.</p>	

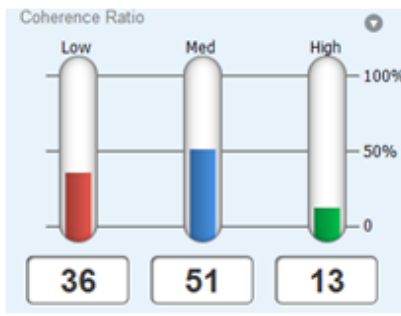
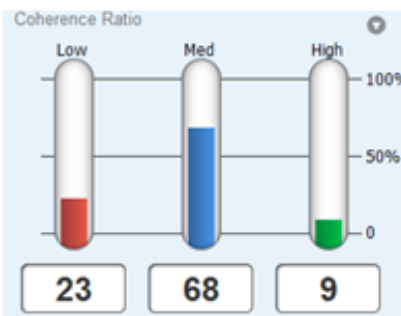
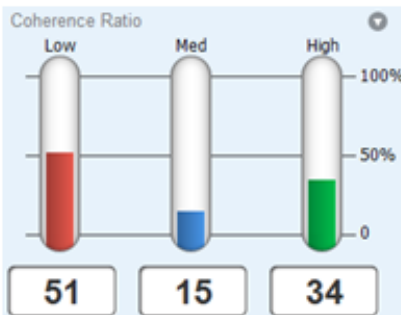
Participant 1 does not have the expected HeartMath readings for our hypothesis, and the readings do not indicate any changes.

Participant 2		
Session	Before Float	After Float
Session 1 of 4		
	Participant 2: Session 1, post-float results	
	<p>Hyperarousal is slightly lower.</p> <p>Shifting to coherence is higher, almost double.</p> <p>Coherence is lower.</p>	
Session 4 of 4		
	Participant 2: Session 4, post-float results	
	<p>Hyperarousal is lower.</p> <p>Shifting to coherence is the same.</p> <p>Coherence is significantly higher.</p>	

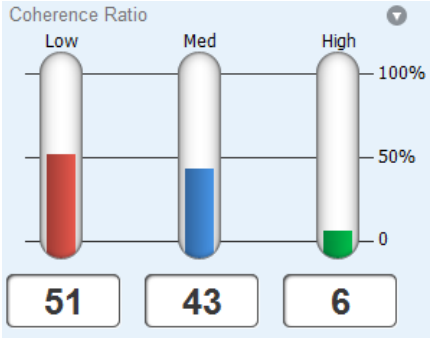
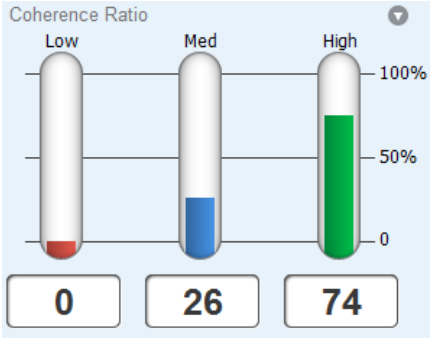
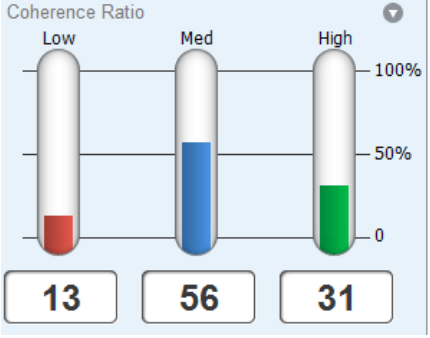
The HeartMath reading from the fourth float, would indicate that this participant has benefited from floating. During the fourth float the reading tells us that the participant spends the majority of time in a state of medium and high Coherence.

Participant 3		
Session	Before Float	After Float
Session 1 of 4		
<p>Participant 3: Session 1, post-float results;</p> <p>Hyperarousal is lower. Shifting to coherence is the same. Coherence is significantly higher.</p>		
Session 4 of 4		
<p>Participant 3: Session 4, post-float results;</p> <p>Hyperarousal has dropped down to zero. Shifting to coherence is lower. Coherence is significantly higher.</p>		

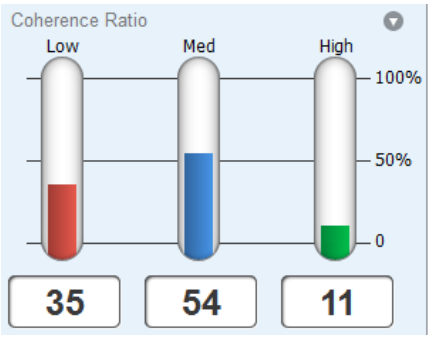
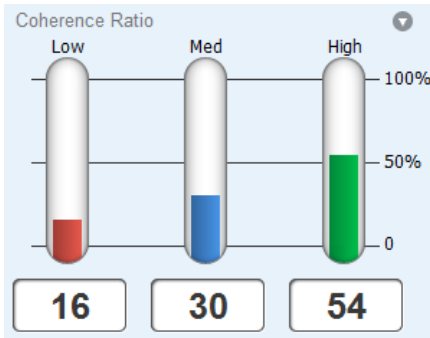
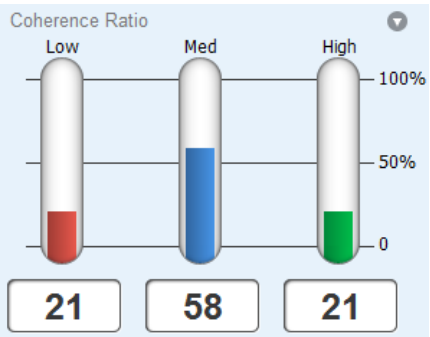
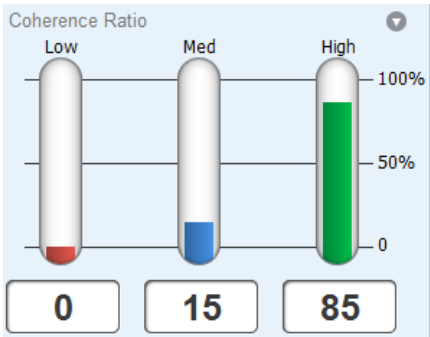
The post-float results demonstrate that this participant has spent greater time in the higher coherence level than pre-float. This could indicate that the participant has benefited from the floating sessions; the participant is able to relax after the float. Looking at the HeartMath from session four, there is a remarkable change in the high coherence ratio.

Participant 4		
Session	Before Float	After Float
Session 1 of 4		
	<p>Participant 4: Session 1, post-float results;</p> <p>Hyperarousal is lower.</p> <p>Shifting to coherence is higher.</p> <p>Coherence is the slightly lower.</p>	
		
Session 4 of 4	<p>Participant 4: Session 4, post-float results;</p> <p>Hyperarousal is lower.</p> <p>Shifting to coherence is higher.</p> <p>Coherence is lower.</p>	

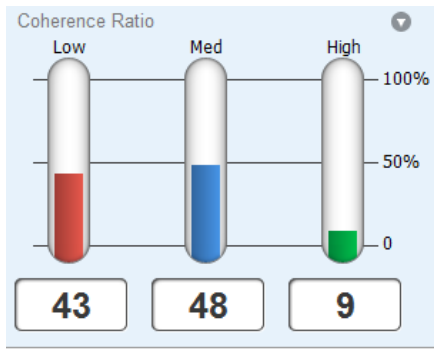
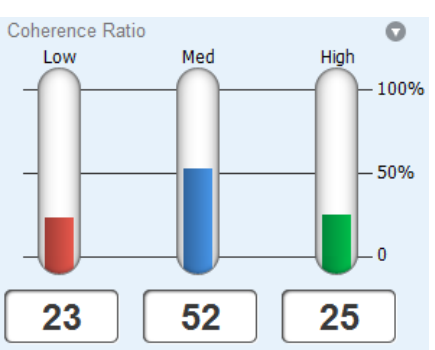
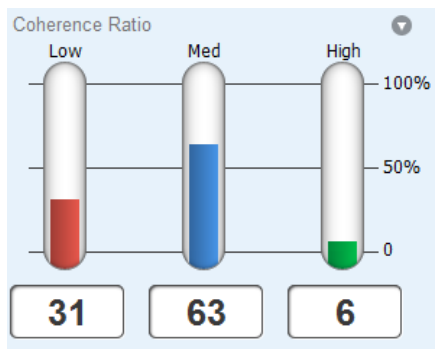
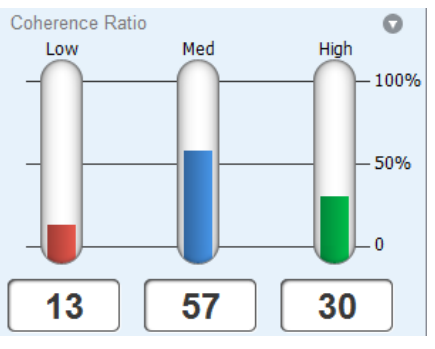
This participant does not show significant improvement in coherence when looking at the HeartMath readings. However, the state of Hyperarousal measures are lower, which indicate that the participant is less aroused and in a more relaxed state.

Participant 5		
Session	Before Float	After Float
Session 1 of 4		
	<p>Participant 5: Session 1, post-float results;</p> <p>Hyperarousal has dropped/reduced to zero</p> <p>Shifting to coherence is lower.</p> <p>Coherence is significantly higher.</p>	
		
Session 4 of 4	<p>Participant 5: Session 4, post-float results;</p> <p>Hyperarousal is lower.</p> <p>Shifting to coherence is lower.</p> <p>Coherence is significantly higher.</p>	

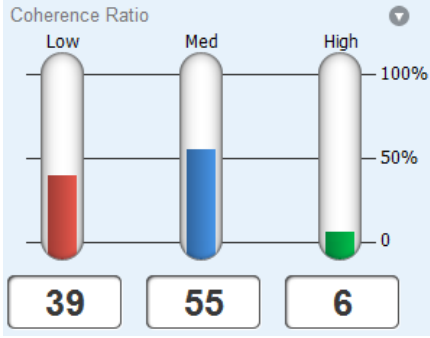
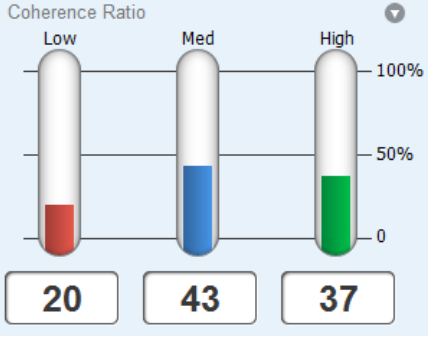
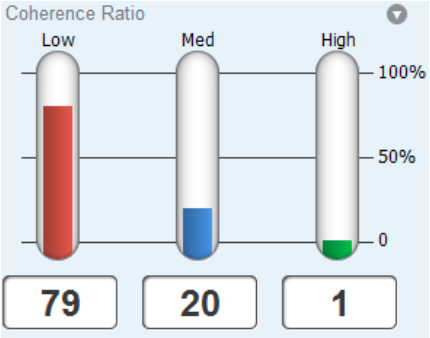
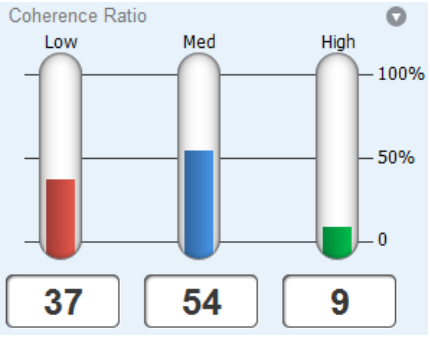
This participant's results confirm the second hypothesis and the time spend in the Hyperarousal state has reduced after the first and fourth float. This indicates that this participant is more relaxed, and less stressed than before the float.

Participant 6		
Session	Before Float	After Float
Session 1 of 4		
	Participant 6: Session 1, post-float results;	
	<p>Hyperarousal is lower.</p> <p>Shifting to coherence is lower.</p> <p>Coherence is significantly higher.</p>	
Session 4 of 4		
	Participant 6: Session 4, post-float results;	
	<p>Hyperarousal is reduced to zero.</p> <p>Shifting to coherence is lower.</p> <p>Coherence is significantly higher.</p>	

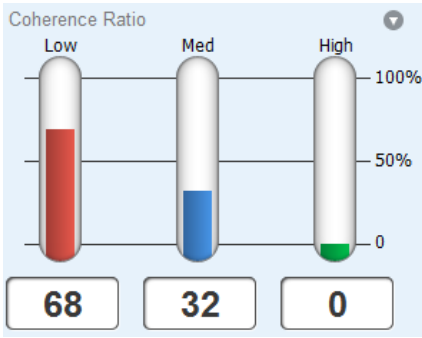
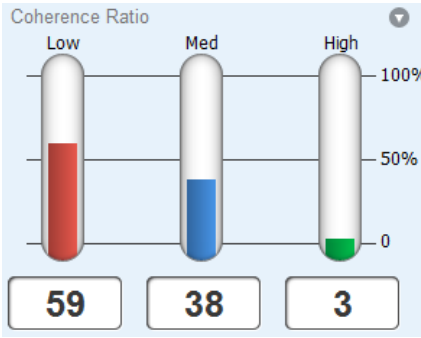
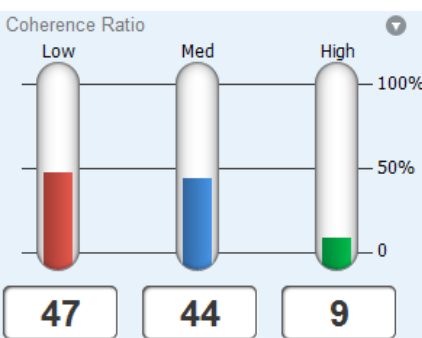
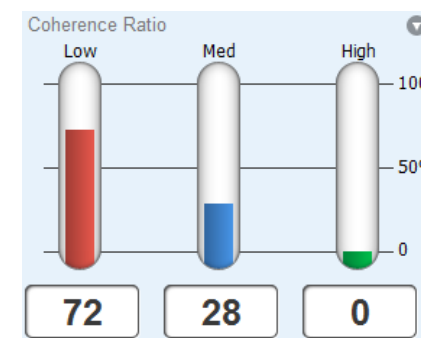
This participant's results confirm the second hypothesis and the time spend in the Hyperarousal state is almost at zero after the fourth float. This indicates that this participant is more relaxed, and less stressed than before the floatation.

Participant 7		
Session	Before Float	After Float
Session 1 of 4		
	<p>Participant 7: Session 1, post-float results;</p> <p>Hyperarousal is lower.</p> <p>Shifting to coherence is slightly higher.</p> <p>Coherence is higher.</p>	
Session 4 of 4		
	<p>Participant 7: Session 4, post-float results;</p> <p>Hyperarousal is lower.</p> <p>Shifting to coherence is almost the same, slightly lower.</p> <p>Coherence is significantly higher.</p>	

This participant's results confirm the second hypothesis and the time spend in the Hyperarousal state has reduced, as with the 4 participants above. This indicates that this participant is more relaxed, and less stressed than before the floatation.

Participant 8		
Session	Before Float	After Float
Session 1 of 4	 <p>Coherence Ratio</p> <p>Low Med High</p> <p>100% 50% 0</p> <p>39 55 6</p>	 <p>Coherence Ratio</p> <p>Low Med High</p> <p>100% 50% 0</p> <p>20 43 37</p>
<p>Participant 8: Session 1, post-float results;</p> <p>Hyperarousal is lower.</p> <p>Shifting to coherence is slightly lower.</p> <p>Coherence is significantly higher.</p>		
Session 4 of 4	 <p>Coherence Ratio</p> <p>Low Med High</p> <p>100% 50% 0</p> <p>79 20 1</p>	 <p>Coherence Ratio</p> <p>Low Med High</p> <p>100% 50% 0</p> <p>37 54 9</p>
<p>Participant 8: Session 4, post-float results;</p> <p>Hyperarousal has reduced by more than half.</p> <p>Shifting to coherence is higher.</p> <p>Coherence is higher.</p>		

This participant's confirms the second hypothesis, and the times spend in the Hyperarousal state has reduced. This indicates that this participant is more relaxed, and less stressed than before the floatation.

Participant 9		
Session	Before Float	After Float
Session 1 of 4		
	Participant 9: Session 1, post-float results;	
	<p>Hyperarousal is slightly lower.</p> <p>Shifting to coherence has slightly increased.</p> <p>Coherence is slightly higher.</p>	
Session 4 of 4		
	Participant 9: Session 4, post-float results;	
	<p>Hyperarousal is significantly higher.</p> <p>Shifting to coherence is lower.</p> <p>Coherence is has reduced to zero.</p>	

This participant spent a lot of time in the hyper aroused state, which is significantly different to the results of the other participants. For further information on why this may be the case, please refer to "Conclusion" on page 20.

Summary and key trends of HeartMath results

The HeartMath results of 7 out of 9 participants' show an increase of Coherence. This supports the hypothesis that the participants should feel less stressed after floating.

Over all we see a significant increase of Coherence and a decrease of Hyperarousal with the majority of the participants.

The few participants that didn't show an increase in their coherence state explained in their qualitative interviews that they felt uplifted and energised after the floats, which would explain their HeartMath readings.

The HeartMath devices were put on the participants after they've taken a shower and got dressed, which could take up to half an hour, this could also have an effect on the results of the reading.

Qualitative Analysis

The table below shows a summary of the key themes and sub-themes that have emerged through the 4 floats.

Float 1	Float 2	Float 3	Float 4
More positive outlook when dealing with others.	Been able to cope better in different situations	Good facilities, ex: Tea and sorbet after the float	Very useful and can see the benefits both physically and mentally.
Anxious prior to the float.	Felt more optimistic	The shower gel/shampoo/conditioner - its vegan, cruelty friendly and organic	Gratitude for being a part of the study
"Out of body" experience.	Able to think more clearly about things	Friendly guidance from personal, Tina and Michael.	Will float again!
	Calm, grounded and present	Spa-like experience	Will recommend it to others

Summary of themes

The first float

In general the majority of participants were nervous, and since most of them never tried floating before, they didn't know what to expect. However all the participants were pleasantly surprised after their first floating session.

After the first float, most participants felt very relaxed and calm. Two participants mentioned that they felt uplifted and recharged, energised, and ready to take on anything. They felt like their senses had heightened; colours, smells become clearer.

Most participants had previous experience with meditation and they found that in the float they could enter a meditative state faster than normally.

The float first was considered a "trial" for most of the participants. It took a little time to get comfortable physically and figure out how to get enjoy it the most. However once they did feel comfortable, they felt the float was very relaxing and pleasant.

Most of the participants mentioned that the first float was really special and unique; they compared this to an "out-of-body" experience in a very positive way.

Changes - Mentally, Physically & Emotionally

Mentally

The participants felt more in control and grounded. They felt like they were more prepared to take things on, work, family etc. And that they were able to stop and think before responding and be more aware of their own reactions.

A few participants experienced themselves to be more energised mentally, and perceived brighter lights and colours after the floats. They felt more creative and generally more in tune with themselves, and their mind the days following the floats. In addition to this, some participants experienced that their stream of thoughts were reduced, so that it became easier to focus.

One of the key points mentioned in the qualitative interviews was that it is an advantage to take time out of a busy schedule and do something for yourself. Not being able to get interrupted once you're in the float, and disconnecting to the outside world, was a relief. The participants agreed that the obligation to yourself, and taking the time to truly be in the moment was a huge advantage.

Physically

Overall the participants did not feel significant changes/improvement in their physical state. However, the participants felt that they became more aware of their bodies, such as noticing when their body became physically tired, and feeling how small old injuries became a focus when finding a comfortable position in the float.

One participant mentioned that the floating helped her with the pain from an old hip injury, because she felt less tense and more relaxed physically after each float.

Emotionally

In general, all of the participants felt that after the four float sessions, they were more in control of their feelings, and found themselves to be calmer, happier and more positive.

The participants felt the difference in their emotions for days afterwards, some even up to two weeks after. They felt that the emotions they experienced during and after the float were more raw and real, and amplified in a way. This gave them a clearer way to handle and balance distractions better, so they did not feel out of balance, and became more resilient in general.

Wellbeing

All the participants experienced an improvement in their wellbeing in the days after the floats, and one common factor for most of the participants, was setting the time aside to do something for themselves. That being said, a lot of the participants felt that the floating session had a greater positive impact/affect compared to other things they had tried previously. Because the floating sessions had to be booked in, the majority of the participants found it more obligating, than compared to meditation sessions at home, which for them left an opportunity to be rescheduled or interrupted. Therefore the floating had had a great effect on their wellbeing, because they followed through with it. A few participants mentioned that taking the time for "self-care", also had a great effect on their mental wellbeing.

Floating helped them slow down, worry less and feel more grounded. Even though the initial effect, as described above; the feeling of being more in control and calmer, of the float wore off after a few days (for some 1-2 weeks), the long-term changes that the participants described related to being better equipped to stop and think and implement the way they felt when they were floating to their everyday life.

Conclusion

Hypothesis 1 aimed to investigate whether there would be an increase in participants' mental wellbeing (higher SWEMWBS scores) as they start floating.

Results support this hypothesis. When the results of the SWEMWBS scores were analysed, the results indicated a steady increase in the participants' scores. They shifted from a state of "poor" and "below average" personal mental wellbeing to "good" and "excellent" personal mental wellbeing over the 6 week period'. When asked about their mental wellbeing in the qualitative interviews, they all feel an improvement. The improvement levels varied among participants – some felt their

mental wellbeing had slightly improved, whereas others felt there was a significant improvement. They felt more positive, handled different situations better and in general, were calmer.

Hypothesis 2 assumed that participants would have higher coherence (i.e. would feel less stressed or be more in the green zone) after each float.

Analysis of the HeartMath readings found that the majority of the participants felt less stressed than before they started floating.

The experiment found some interesting trends, such as:

- Some of the participants experienced that they felt uplifted and energised after the floats, which meant that their coherence became lower. A few participants explained in the qualitative interviews that the dominant feelings after the floats were high energy and the feeling of being ready to take on anything, after the floats, which can explain the absence of coherence and the high levels of Hyperarousal in the HeartMath readings from session four. However looking at the Hyperarousal measures, this is lower after the first float which is indicating a more relaxed state.
- That the participants were able to use their experience from the float sessions even weeks after the last float.

Peer Review

Michael Cordova, Floating Point Float Centre

The article is well written, treats an actual problem (managing stress and mental wellbeing effectively) and provides evidence about the positive effects of Floating for those suffering with stress.

Title: As results were collected in two different ways the title is appropriate for the content of the article.

Study: The study is comprehensive and detailed but there are some minor points that should be noted. Firstly, although this is a small study the results are in line with larger studies conducted by Dierendonck, Dirk & Nijenhuis, Jan (2005, 20(3): 405-412), *Flotation restricted environmental stimulation therapy (REST) as a stress-management tool: A meta-analysis: Psychology and Health* and Kjellgren, Anette et al. (2008, 636-656), *Sensory Isolation in Flotation Tanks: Altered States of Consciousness and Effects on Well-being: The Qualitative Report*. These highlight the benefits of Floating for stress management and show that hypothesis 1 for this study was correct.

With regards to hypothesis 2 and the study itself, it was assumed that participants would have higher coherence (i.e. would feel less stressed or be more in the green zone) after each float. It was found that some of the participants felt uplifted and

energised after their floats, this is normal from our experiences with a few of our regular clients.

There were some limitations to the study due to the device used to measure coherence and stress levels. At the time of the study a waterproof device to measure HRV (Heart Rate Variability) and stress levels was not available. This does not seem to have had a big impact on the desired results. A waterproof device would have provided real-time data during the float session, this is an area of research that can be explored in the future.