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12-1-2008

## Sensory Isolation in Flotation Tanks: Altered States of Consciousness and Effects on Well-being

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### Recommended APA Citation

Kjellgren, A., Lyden, F., & Norlander, T. (2008). Sensory Isolation in Flotation Tanks: Altered States of Consciousness and Effects on Well-being. *The Qualitative Report*, 13(4), 636-656. <https://doi.org/10.46743/2160-3715/2008.1577>

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## Sensory Isolation in Flotation Tanks: Altered States of Consciousness and Effects on Well-being

### Abstract

A qualitative analysis (The Empirical Phenomenological Psychological method) of interviews involving eight patients (depression, burn-out syndrome, and chronic pain) was carried out in order to obtain knowledge regarding the effects of flotation tank therapy. This knowledge might be helpful for both professionals and potential floaters. The analysis resulted in 21 categories, which were summarized as four themes: (a) experiences during flotation, (b) perceived effects afterwards, (c) technical details, and finally (d) the participants' background, motivation, and expectations. Floating was perceived as pleasant. An altered state of consciousness was induced, varying from a milder state including profound relaxation and altered time perception, to more powerful with perceptual changes and profound sensations such as out-of-body experiences and perinatal experiences.

### Keywords

Flotation Tank, Sensory Isolation, Altered States of Consciousness, Relaxation, Transpersonal, and Pain

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## **Sensory Isolation in Flotation Tanks: Altered States of Consciousness and Effects on Well-being**

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*A qualitative analysis (The Empirical Phenomenological Psychological method) of interviews involving eight patients (depression, burn-out syndrome, and chronic pain) was carried out in order to obtain knowledge regarding the effects of flotation tank therapy. This knowledge might be helpful for both professionals and potential floaters. The analysis resulted in 21 categories, which were summarized as four themes: (a) experiences during flotation, (b) perceived effects afterwards, (c) technical details, and finally (d) the participants' background, motivation, and expectations. Floating was perceived as pleasant. An altered state of consciousness was induced, varying from a milder state including profound relaxation and altered time perception, to more powerful with perceptual changes and profound sensations such as out-of-body experiences and perinatal experiences. Key Words: Flotation Tank, Sensory Isolation, Altered States of Consciousness, Relaxation, Transpersonal, and Pain*

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### **Introduction**

The restricted environmental stimulation technique (REST) in a flotation tank can generate a multitude of beneficial effects like pain reduction and stress reduction. Flotation-REST as a method was developed by Lilly (1972, 1977) in the 1950s. During flotation-REST a person is submersed horizontally, in a quiet and light-insulated tank, filled with magnesium sulphate (Epsom salt) and saturated water (1.3 g/cm<sup>3</sup>). The water temperature is maintained at approximately outer skin temperature (34.7 °C) and the depth of the water is between 200-300 mm. Since the water has high buoyancy, it is possible to lie on one's back floating with only the ventral parts of the body above the waterline. During the stay (often 45 minutes) in the tank, earplugs are used to avoid water in the ears and to minimize acoustic stimulation. Between floating-sessions the water is filtered and sterilized with UV-light and on a regular basis; hydrogen peroxide is poured into the water for hygienic reasons. The tank has a lid that is easy to open and close (from the inside and the outside) by the subject, who is able to terminate the flotation session at any moment. The tank is also equipped with an underwater lamp that can be switched on and off by the participant.

During the floating session all incoming stimuli are reduced to a minimum, a profound relaxation and increased well-being are induced. A multitude of beneficial effects have been reported as a result of flotation-tank therapy sessions, for example increased well-being (Kjellgren, Sundequist, Norlander, & Archer, 2001; Mahoney, 1990; Schulz & Kaspar, 1994), pain reduction (Kjellgren, 2003; Norlander, Kjellgren, & Archer, 2001; Kjellgren et al., 2001; Turner & Fine, 1984), stress reduction (Bood,

Sundequist, Kjellgren, Nordström, & Norlander, 2005; Bood et al., 2006; Kjellgren et al., 2001), and relief from “burn-out syndrome” (e.g., Bood et al., 2006; Åsenlöf, Olsson, Bood, & Norlander, 2007). Tank-therapy also seems to be a promising complement in conjunction with psychotherapy (e.g., Åsenlöf et al.; Jessen, 1990). For an in-depth overview of the effects of flotation tank therapy, see for example Kjellgren (2003) or van Dierendonck and te Nijenhuis (2005).

Different theories have been postulated, explaining these beneficial effects in terms of physiological markers, e.g., the reduction of stress hormones (e.g., Kjellgren et al., 2001; Turner & Fine, 1990), or through the endogenous release of endorphins (Schulz & Kaspar, 1994). So far, an actual increase of measurable plasma concentration of endorphins during flotation-REST has not satisfactorily been proven. It might also be hypothesized that alterations in the endogenous cannabinoid system may mediate the effect (Kjellgren, 2003).

An effect often occurring during sensory isolation/REST, in addition to the profound relaxation effect, is the induction of an altered state of consciousness (ASC). One definition of ASC was proposed by Charles Tart (1972), who is also often given credit for coining the term altered states of consciousness: “A qualitative alteration in the overall pattern of mental functioning, such that the experiencer feels that his consciousness is radically different from the way it ordinarily functions” (p. 1203). Metzner (1992) defined an ASC as a change in thinking, feeling, and perception that has a beginning, duration, and end. Other changes that can occur during flotation tank therapy are a disturbed time sense (acceleration of time or “time standing still”) (Kjellgren, 2003; Ludwig, 1990; Raab & Gruzelier, 1994), perceptual changes (visual, acoustic), body image changes like sensations of floating/flying or experiencing body-boundaries dissolved (Kjellgren; Norlander et al., 2001) alterations in thinking (e.g., multiple associations, a sense of increased creativity, or “magical thinking”). These latter cognitive alterations are commonly referred to as a shift to a more primary-process thinking at the expense of secondary-process thinking (Neisser, 1967; Norlander, Bergman, & Archer, 1998). In connection with floating, an increase of primary process thinking has been shown to persist for at least an hour following treatment (Norlander et al., 1998). The ASC is often considered a pleasant event (e.g., Norlander et al., 2001). Furthermore, it appears as though the state induced in the flotation tank is independent of the individual’s expectations and prior experiences with ASC (set), as well as the setting and circumstances surrounding the flotation session (Bood et al., 2005; Norlander et al., 2001).

Sometimes, during an ASC, transpersonal experiences occur. The term transpersonal implies beyond the personal. A transpersonal experience, in addressing all human experience beyond the ego level, also includes spiritual experiences. Such experiences can often be characterized as a sense of the ineffable, or a direct experience of the connectedness of everything, or feeling connected to the universe, or with “everything”. As Kasproff and Scotton (1999, p. 13) pointed out that “transpersonal psychiatry does not promote any particular belief system, but rather acknowledges that spiritual experiences and transcendent states characterized by altruism, creativity, and profound feelings of connectedness are universal human experiences widely reported across cultures.” The therapeutic impact of spirituality on health and wellbeing is beneficial and well documented (e.g., Åsenlöf et al., 2007; Breakey, 2001; Fallot, 2001).

During an ASC, memories from the past might emerge. Typically these memories are emotionally powerful. Some of these experiences may belong to the category “perinatal experiences” (Grof, 1996) where perinatal refers to the person’s own birth. It is not possible to assess whether such experiences are true memories or whether they can only be judged from a symbolic perspective. Despite the typically profound and emotional experiences during flotation, common assessments are that they are positive events, which do not give rise to persistent fear or discomfort. Very few participants terminate the floating prematurely. Suedfeld and Borrie (1999) reported a rate of premature termination less than 5%. Some studies have also shown that participants in flotation-REST rate the degree of perceived fear/discomfort as low (e.g., Norlander et al., 2001).

No objective measurement exists for the subjective experiences during an ASC. Qualitative methods, the analyses of written texts or transcribed interviews exist, based on the thesis that language content mirrors the degree of ASC (e.g., Martindale, 1990; Martindale & Dailey, 1996). Psychometric tools have also been designed to quantify the effects on mood, perception and cognition altering effects of ASC, such as the Hallucinogenic Rating Scale (HSR) (Riba, Rodriguez-Fornells, Strassmann, & Barbanoj, 2001) and the self rating APZ/OAVAV-questionnaire (Dittrich, 1998). A shortened and modified version of the latter scale, called Experience of Deviation from Normal state (EDN), is extensively used for flotation tank research (Kjellgren, 2003).

Most research on flotation tank therapy has focused on its effects on pain or stress reduction. There are, however, few studies, which have focused on the actual experience of flotation-REST during the flotation. Given that the flotation-REST technique is becoming more and more popular in various settings (SPAS, fitness centers) and that it is starting to be used in clinical practice (e.g., Bood, 2007; Kjellgren, 2003), it is important to examine the experiences that occur during and in connection with the floating sessions.

### **Aim of the Study**

The aim of this study was to obtain more in-depth knowledge of the effects of floating during and following the floating session, using a qualitative, phenomenological approach, and to explore the circumstances surrounding the flotation which might influence the effects.

### **The Self of the Researchers**

Three researchers conducted this study. The research group consisted of a doctor in psychology (Kjellgren), a student in psychology (Lyden), and a professor in psychology (Norlander). Kjellgren has an interest for investigating altered states of consciousness. She has conducted studies on different relaxation methods for inducing such states, mainly about sensory isolation in flotation tank, but also in connection with yoga and meditation outdoors in a natural environment. Lyden is a student in psychology with interest in health issues. Norlander was trained in an experimental paradigm, but has begun to conduct phenomenological studies within his area of interest. He has noted the value of broad approaches with different methods. Lyden conducted all interviews, transcribed the material, and together the three authors completed the analysis.

## Method

### Participants

A sample of eight persons, six females and two males, aged 35 to 69 years old ( $M = 49.5$ ,  $SD = 12.4$ ) from the Province of Värmland in Western Sweden were interviewed. The distribution of 75 % women was chosen, since it corresponds to the sex distribution of our previous clinical studies on flotation-REST therapy at the Human Performance Laboratory at Karlstad University (Bood, 2007). The participants represented different professions including active employees, individuals on sick leave, and retirees. Subsequently they were part of a flotation project at the stress clinic of the Human Performance Laboratory, where they had previously made an appointment because of mental or physical difficulties. They were selected from a group of patients who had floated at least eight times and visited the clinic within the previous month. The reason for this procedure was to include participants who were familiar with the technique, and whose experiences were recent.

After the study was approved by the Ethical Board on Experimentation on Human Subjects (Forskningsetikommittén) at Karlstad University, the researchers first contacted the participants by mail and asked whether they would be interested in giving an interview regarding experiences during flotation. The letter described the time involved in the interview and the fact that the interviewees would be guaranteed confidential treatment. The letter also included a stamped return envelope, with which they could respond. If they had any questions regarding the study before making a decision to participate, phone numbers and address to the clinic were attached. Seven of the eight individuals selected responded in favor and were included. One person declined without providing a reason. The eighth person was asked, and received the letter in connection with a clinic visit for a regular flotation session and was also included in the study. The inclusion criteria for floating at the clinic were tension-related pain of the neck or back, as well as depression with or without indications of burn-out syndrome. The exclusion criteria were pregnancy, psychotic disorder-present or past, as well as the presence of large open lesions.

### Procedure

The participants in favor of the study were telephoned by the project head, and a date, time and place for the interview were determined. The respondents themselves could decide the date, time and place. All chose the stress clinic as the place for the interview. The interviews, which lasted 45-60 minutes, took place in a secluded conference room adjacent to the clinic where only the interviewer and the respondent were present, so as to avoid any disturbances.

Before the start of the interviews the respondents were asked for their permission to tape record the interview. None declined. The interviewer also explained that nobody else would listen to the tapes and that they would be destroyed following transcription. The purpose of this procedure was to enable the respondents to talk freely without having their personal integrity jeopardized. Following the interviews the participants were once again informed that they were guaranteed confidentiality.

During the interview the respondents were asked to reflect on the questions: “Tell me what it feels like to float and has the floating affected your view of life?” In this open dialogue, the responses were followed up with corollary questions in a flexible and simple manner, but were strictly focused on what was relevant for the investigation. All interviews were tape recorded for the purpose of authenticity.

## Analyses

Prior to conducting the actual analyses, the taped interviews were transcribed verbatim. The analysis of the material was then done in accordance with Gunnar Karlsson’s (1995) EPP method (The Empirical Phenomenological Psychological Method). It was done in five steps.

In the first step of the analysis the second and third authors read the transcription of each participant’s interview until a good overview, understanding, and “feeling” for the material was achieved. In this study, the researchers read the transcriptions three times and in no particular order. The focus of this reading was to single out relevant psychological phenomena without the purpose of testing the validity of any particular hypothesis.

In the second step of the analysis, the second author distinguished “small units”, called meaning units (MU). This step did not follow rules of grammar, but as the text altered, meaning breaks were made, independent of grammar. An example, “1/I just thought that the flotation was enjoyable” and “2/ but I get irritated when the music starts, no, not now that I am enjoying it, not yet”

During the third step, the researchers transformed each MU from the language of the participant to the language of the researcher. The language of the participant was reformulated into a language that is relevant to the research question (i.e., into the researchers’ own words). There were no rules regulating the researchers’ language, although everyday usage was preferred to a “psychological language”. An example,

1. The participant experienced light phenomena such as sparks and saw various colors.
2. The participant described how her physical status improved due the flotation.

In the fourth step, the researchers synthesized the transformed MUs into a “situated structure” (summary formats). Depending on the phenomenon that is being referred to, these categories may look quite different.. One seeks to describe “how” (noesis) the phenomenon expresses itself and “what” (noema) the phenomenon is. The categories were developed during the processing wherein repeated consultations of the raw data continued in a hermeneutic manner.

In the fifth step, the researchers moved from the situated structure to a more general theme or structure. The level of abstraction for presentation of the results was decided upon, according to the principle that clarity should be attained without excessive detail. The purpose is to reflect at a more abstract level. The themes included categories reflecting various aspects of the experience of participating in the flotation tank therapy program; experiences during flotation-REST, effects of flotation-REST, technical details, and the target group for flotation.

## **Trustworthiness**

The Norlander Credibility Test (NCT), which is a trustworthiness test for the phenomenological analysis was used (Åsenlöf et al., 2007; Bergman & Norlander, 2005; Edebol, Bood, & Norlander, 2008; Janson, Archer, & Norlander, 2005; Norlander et al., 2003; Pramling, Norlander, & Archer, 2001; Pramling, Norlander, & Archer, 2003). It was done by randomly selecting ten of the 21 categories. Thereafter, five of the transformed MU:s were randomly selected from each of the ten categories. The material was then given to two independent individuals. Their assignment was to place the 50 MU:s in the ten different categories. One of the tests yielded an 86 % agreement, and the other test yielded an 80% agreement. The total agreement was thus 83 %, which is considered a typical value for the NCT.

Further, the trustworthiness of the study was assessed by asking the eight respondents after the categories had been created if they felt the categories reflected their view of floating. No respondent wished to change the results.

## **Results**

Following the sorting and analyses of the material, 471 MU:s were created providing insight into the research question as to how floating affects the individual and the circumstances surrounding the flotation. The MU:s then generated 21 categories which are presented below along a few randomly selected citations. The categories are not presented in any particular order.

### **Categories**

#### **1. Heterogeneous target group (45 MU:s)**

The participants of the study represent different professions and consist of active employees, retirees, and individuals on sick leave. Hobbies and view of life also differentiate the participants. The participants have either mental or physical difficulties in common, difficulties which have affected their lives. "The pain uses an incredible amount of energy, so it is very difficult to get back to work and to re-charge the batteries." "I am interested in so many things, since I worked as a teacher for 40 years, and I am interested in contacts with people and different things." "I really hit the wall last fall and it makes my thoughts very stressed out and I feel it is difficult to relax." "I have a back injury and I have trouble sleeping and relaxing. I have taken a great deal of medicine."

#### **2. Motivation to start flotation treatment (12 MU:s)**

The participants started floating for both physical and mental reasons. It occurred after they became acquainted with floating in various ways and decided that it might be worth trying. Some of the participants saw floating as the last resort since no other treatment methods worked. "I saw this project and you grasp every straw and I thought that it would be good for me to float." "Difficult time still and that is why I am part of



this flotation group to see if I can work through my grief and stress.” “I float to get rid of my stressful thoughts, my burn-out and to obtain relief for my neck and shoulders.” “I thought I would try this in connection with reducing my use of pain and sleeping pills.”

### 3. The first floating session (15 MU:s)

The first floating session constituted a totally new experience for the participants. Many participants found it difficult to relax the first time in the tank due to either being unaccustomed to put their head in the water or the feeling that it was a long time in the water or it was difficult to keep track of time. Some participants found the first session to be the most special one. “It was new then and I had to learn how to turn the light on and off etc. The first time was the greatest experience.” “The first times I floated I was unable to relax because I was unable to tilt my head back but tried to keep my head up. It was difficult then so I considered quitting.” “The first time it was all so new and I was nervous about knowing when time was up and I would get out and stuff like that. So I could not relax the same way.”

### 4. The feeling of floating (24 MU:s)

What characterizes the descriptions of the feeling of floating are primarily cognitive experiences and the sense of weightlessness. “I just rested away from everything...” “My thoughts just wandered and I thought of many things and then it dissipated. It is sort of like just before going to sleep, life passes by.” “The weightlessness is what distinguishes it from everything else in life...” “Of course it is my own thoughts. Today it was like a movie, but it is my own thoughts, I know that, but it is something more.”

### 5. Feelings following floating (23 MU:s)

A few participants felt some discomfort as they stepped out of the tank. The duration of the effect varies. A common view is that it is important to take it easy after the session in order to make the effect last as long as possible. “It lasts for a few hours...” “I can definitely say that it lasts, at least the first night. Am very relaxed when I get home and tired and lazy and I feel like it is OK to take it easy.”

You feel relaxed and the body feels heavy when you get out of the tank.  
You float so easily and then you get out of the tank and you have to work  
to use your body, try to stand up And it is hard sometimes, you almost feel  
like you have taken a drug sometimes...

“Then if I go home and just fix some food and stay still and peaceful, then I can feel it actively through the night...” “Then when you get home and I am very relaxed I usually lie down on top of the bed for an hour, meditate or just relax...”

## 6. Views on floating (43 MU:s)

After trying floating many individuals feel that it is a pity that it is not a regular part of health care, since it appears to be a good method for people with both mental and physical difficulties. The participants also provide suggestions for how further to improve the experience of floating. "I think it is a pity that it is not considered a method for people with pain, I mean in health care. They could use it more often since it works for me and helps me get relief from the pain..." "Actually I think one should have it twice a week." "I always choose to keep it dark in the tank because then I think maybe I have turned inward and been myself, you know..."

When I try to relax despite this pain I can picture the flotation tank and how I am lying there. Then I can create an image of the peace I feel there because I experienced it in the flotation tank. It is hard to do if you have not had the experience.

## 7. Powerful ASC -experiences (12 MU:s)

Several participants reported powerful altered states sensation during flotation such as dream-like sequences, hearing internal voices or music, as well as perinatal experiences. The sensations triggered by those experiences were very positive for some of the participants. Others felt some discomfort. I sensed a lot of light phenomena and there were sparks and I saw different colors."

Then it does not always happen, but sometimes I have the sensation of being transformed into a bird. And I am equally surprised each time it happens, like wow now I can fly and glide, yes fly-glide, so to speak and it is a great feeling being a sailing bird. And I always feel happy afterwards, when I have had such a floating sensation.

"I hear music, but there was no music, but I heard music." "I felt like I was in a fetal state, like I was in the uterus and it was my first time in the tank. So I guess the best time in the tank was the first time..."

It happened once that I felt like I was in the incubator. It was frightening; I can remember everything like when they pricked me with a needle. Afterwards I even had a red mark here when I got home and it was the right place. I called my mother and told her. Then she said, you know you were in an incubator for a little over a month. And they had this big band aid where they had taped the IV, and when they pulled it off some of the skin came off too because I was under a heating lamp so it had stuck to the skin. So I mean I got this really big, red mark here after the flotation experience and it smarted. That experience really felt like I was really re-experiencing it both bodily and the whole, all of me experienced it.

## 8. Out of body experiences and “soaring” (10 MU:s)

Sensations of soaring and being outside the body are common during flotation. Participants who have had such experiences find that they constitute a very positive state. The participants get a chance to be in a state without bodily restrictions.

I feel like my body is somewhere else, I feel like I do not have a body. And it was particularly evident when I was out in space, then I really felt like my body, it was down there on earth. I was somewhere else and I could go anywhere I wanted, I kind of thought, yes I can go there and boom there and it felt good not having to carry this body. It felt good...

“Then I had this feeling like could see myself, kind of, for a brief period...” “You have sort of felt like you are closing your eyes and you feel like you are just lying there, then it feels like soaring somewhere else. Like soaring somewhere, that you are in some empty nothingness.”

I am lying there soaring in a field and it is like the flowers lift me and rock me. And a warm wind comes which also helps rock me. And it is a very lovely feeling. It is an experience which is very lovely.

“It is almost like lying on some cloud, it is soft and comfortable. It is warm and it is a very odd sensation because you are kind of lying very high up.” “And your head starts to sing, I hear a singing sound and then I disappear and then I am outside the body, you see, and I see myself from above...”

## 9. A separate world (11 MU:s)

Being in the flotation tank feels like being in a different world. For most people it is a calm and safe setting where nothing bad can happen. They are inaccessible to the rest of the world with its stress and demands. There are also descriptions of feelings of isolation which give negative impressions. “I feel protected somehow and it is very nice and cozy I think, it is my small world in there. It is only me and I feel safe.” “Lie there completely weightless in this salt water and nothing disturbs me, nothing can harm me and nothing can set me off.” “Ever since I was a child I enjoyed crawling into something and shutting myself in. I found it cozy.”

In the beginning I had a very odd sensation, like feeling all alone in the world, there was only me and I was lying there shut in somewhere and I did not know where I was or time or space or something and I felt like I had been lying there forever and I wanted out. Relaxing was very difficult and there were such frightening thoughts in the beginning, almost like war and adversity and stuff and so you almost panic. Shut in, in a cell. It was very difficult at first but I thought that it will probably pass and it did. But it was the first three times I felt a bit like that, oh-oh now they won't let me out, they have forgotten about me.

#### 10. Previous experiences with transpersonal events (31 MU:s)

Some of the participants had experienced various transpersonal events on other occasions in life. Those experiences had affected their lives and their view of life in various ways. Those participants did not experience transpersonal states more easily than the others.

Because I think I was there on the other side and I did not dare tell anyone until ten years later, I thought I would be labeled mentally ill. But since then I have read a lot about near-death experiences and I realized that was what it was. It was quite lovely dying so I am not worried about that

“I participated in meditation in church three times two years ago, and there, once I suddenly heard music [the person mentions the name of the music] but the church was completely silent, only I could hear it.” “But I have felt this when it comes to healing and like being inside some other life, some odd feeling like that.” “I often have flashes when I am sitting and when I am doing things about going over in a different dimension.”

#### 11. Views on transpersonal experiences (37 MU:s)

Among those participants who had experiences with transpersonal event previously, there are some who would like such experiences again and those who do not “Both when you sleep and when you are in the flotation tank it is the imagination of the brain. But the feeling is different. You lose a sense of time and space and where you are.” “That I haven’t felt it now, that is probably what has been my frustration, that I got stuck, because you want it to happen all the time, you want to experience an altered state.” “My own theory, I guess, is that I needed to process it. And that my body knew that now, now I could do it, I was ready for it. And I remembered it more easily during the flotation.”

I have thought that I ought to be able to do it, so that I would be able to do it at home as well, you know, but no. It is like it is connected to the weightlessness you get here.

#### 12. Temperature (26 MU:s)

The normal temperature in the flotation tank is about 34°C. Some individuals have tried higher temperatures, about 38°C. It is a matter of preference. Higher temperatures seem uncomfortable to some people. Others prefer floating in warmer water if they feel cold in 34°C. Higher temperatures appear to induce more powerful sensations. “I feel like I want it warm, I like it really, really warm. It was 38 degrees the first time, and the second time when it was 34, I was cold.” “When I started out in the warmer tank I found it very comfortable, it sort enveloped me. But the second time I almost passed out, I had to open the top to get air, it got too hot.” “It was tough the first few minutes when it was too hot. But then it was, then it was pleasant, very pleasant.” “The first time I tried the warmer tank I thought it was uncomfortable, it was too hot.” “Thirty-eight degrees the first time I had the uterine sensation, the before birth stage.” “The water was

also warmer so that is when I felt more, you know, because when it was 34 degrees it was not as powerful...”

### 13. Music/Silence (14 MU:s)

The participants vary as to whether they prefer music or silence during flotation.. Their preference may also change from one session to the next. Those who definitely prefer music or silence, respectively enjoy their relaxation more if they can choose. “I have tried both, and I prefer silence.”

Today I listened to music the whole time but the last time I had music in the beginning and end in order to know when it starts and ends. It varies. Today it was great having music the whole time.

“Now that I have tried it again, I started having music the whole time, and it suits me quite well.”

“Without music, I feel extremely restless. I feel like I am losing time and space.”

### 14. Sense of time (11 MU:s)

People’s sense of time is quite different in the tank. Most individuals feel like it is impossible to maintain a sense of time while floating. Time may pass either quickly or slowly during the flotation session. Some participants feel like they can learn how to keep track of time through practice. “It is as if time disappears in the flotation tank.” “It varies. Sometimes I feel like time passes very quickly and other times I sort of wake up although I have not been sleeping.”

Now I can really keep track. But initially I had no sense of it at all, I can tell you. A quarter of an hour could have been 45 minutes and it might feel like one and one half hours or 45 minutes, so it varied.

“It gets crazy, my sense of time.”

### 15. The effects of the salt (16 MU:s)

For many participants the Epsom salt in the tank provides a positive side effect of the flotation. Some thought that the salt might be bad for the skin but they changed their mind. The negative expressions have to do with the fact that the salt affects the mouth, eyes, or sores. “I think salt is also good for the skin. After showering it feels good, so it might be good too.” “I also think the salt has a very positive effect on the body.” “I think my skin has improved and even my hair has improved. It used to be so tangled, it was awful, I was unable to brush it through, but now I think it is really good.” “It tastes awful and my eyes smart unless I am careful.” “If your body has sores, it is not very comfortable.”

## 16. Physical experiences from floating (18MU:s)

There were descriptions of powerful and positive physical reactions during and in connection with floating. Floating may provide a very enjoyable type of pain relief, pain relief which goes so far as to a loss of bodily sensations. Blood pressure and stress hormones have been shown to become lower during floating. "It is like taking pain medication, the pain is reduced and finally I can no longer feel my body."

And your body feels all warm, primarily your head. I feel the pulse, it gets going. Circulation increases, almost like after you have been out running a marathon, because you are all hot, it is weird you get that feeling when you are completely still.

"Your body was all tense and it really hurt and then after a while it just dissipates and floats out into the water somehow." "We also measured my blood pressure at different times, the pressure is lower afterwards, so that seems like a good thing." "Then I had a blood test to assess stress hormones, and they were at a high level, and then I had another test five and a half months later and then the hormones were very much reduced."

## 17. Experiences similar to those during flotation (17 MU:s)

The experience of floating is perceived by most as something unique, unlike everything else. There are participants, however, who believe the same type of relaxation may be attained on different occasions as well. "There are parallels to diving. When you are down there at a depth of 20-25 meters and everything is silent and you can't feel your body but you just soar." "No, it is so special, I do not think it is comparable to anything..." "I have the same sense of relaxation during acupuncture." "It is like lying in a soft, very soft bed and at the same time also being in the water, on your back, sort of, like a back stroke, so sort of somewhere between the two."

## 18. Relaxation (33 MU:s)

Floating is considered total relaxation. The great advantage of floating for the purpose of relaxation is that nothing presses on the body. It helps individuals with certain physical difficulties relax in the tank. The degree of relaxation is affected by the amount of relaxation that is present at the start of the session. If the individual is in a calm state, there is more relaxation, but if the individual has other activities planned following the session, relaxation is disturbed. "Here it is just a matter of relaxing, the water lifts you in a different way. Then you have the courage to relax too, and there is nothing shaving or irritating you."

It is easier to relax in a flotation tank than in a regular bed because there is pressure in the bed and it hurts even in the bed. After a few minutes I have to change positions etc. I never need to do that in the flotation tank, no. I just lie there and everything is just pleasant.

“If you come here already relaxed you have time to get into even deeper relaxation.”

#### 19. A change of a view of life, everyday life (27 MU:s)

Many participants experienced positive personal changes after starting flotation sessions. Floating helped them be more even tempered and life has become simpler.

I guess it is all about the idea that life is not just keeping on being good all the time, but you should feel as good as possible and try to help others feel as good as possible. You must take care of yourself, too. I did not realize that earlier.

“I believe we have a soul. I thought so earlier as well, but did not believe the soul was so loosely connected to me and thereby unconnected.” / ”I feel closer to Nature.” “I feel different in some way, lighter in a way. I am lighter both bodily and mentally, you don’t feel as grim. I feel less depressed, I feel more up.” “My mood is a lot calmer, I don’t get revved up, I don’t...”

#### 20. Positive thoughts on floating (17 MU:s)

Floating is seen as a unique possibility open only to a few. The most positive aspect is the total calm and relaxation attained during weightlessness in the warm water. Individuals who float due to physical difficulties report positive, psychological benefits. “It is incredible. I feel very privileged having this opportunity to participate in flotation.”

Then a bonus is the feeling of such internal calm that lasts for a while and yes, I feel like I am being helped not just the pain. I can help myself by floating, so of course it is worth it.

“The first time I thought, what is it going to be like? And then it felt so good I was irritated when I had to get out.” “It is just so good to float, so I guess there are only good things to say about it.” “It is a very pleasant type of relaxation lying there weightless. It is a good feeling when your thought stop somehow as you put yourself in that weightless state...” “I quickly enter a meditative state.”

#### 21. Negatives (29 MU:s)

Certain participants experience various negative effects in connection with floating, either physical or psychological. Most of the negative views on floating appear to deal with the procedures connected with the visit, and they can be improved. “It irritates me that it is not completely dark in the tank, there must be some vent in the tank providing some light.” “I almost prefer having the fan off, there is some kind of buzzing sound...” “The air is a nuisance, it is kind of oppressive in there and a strong odor. I want fresh air.” “I never thought of lying head flat, I always have a special pillow.”

## Themes

The study resulted in 21 categories, each of which providing interesting information, but they can provide even more information if they are related to each other in a general structure. The categories were combined into 4 themes and will be discussed as such. The four themes are; experiences during flotation-REST; effects of floating; technical details; and the target group for flotation treatment (see Table 1).

Table 1

<i>Summary of the Themes and Their Categories</i>	
Theme	Included Categories
Experiences during flotation-REST	4, 7, 8, 9, 11, 14, 17, 18, 20
Effects of flotation-REST	5, 16, 19
Technical details	3, 6, 12, 13, 15, 21
The target group for flotation	1, 2, 10

### **Experiences During Flotation-REST**

The theme refers to the various types of mental experiences elicited during flotation-REST (categories: 4,7,8,9,11,14,17,18,20). Floating was perceived as total relaxation, hardly comparable to anything else. The relaxation provides a sense of total calm and rest from everyday life. It is perceived as pleasant with nothing pressuring the body, especially for those who suffer from pain. Those individuals value the pain-free position of rest in the tank. The sense of soaring or weightlessness is also seen as something positive contributing to the deep rest and relaxation. The descriptions are in line with previous research showing pain reduction and significant relaxation effects of floating (e.g., Bood, 2007; Kjellgren, 2003).

An altered state of consciousness (ASC) was induced during floating. It could vary from a mild ASC, e.g., like meditative daydreaming to a more powerful ASC with more profound, cognitive, perceptual, or transpersonal experiences. The fact that the sense of time changed during floating is an indication that an ASC was induced. The most common experience was that time passed more quickly than usual in the tank. A changed sense of time in connection with floating is known from previous studies (e.g., Norlander et al., 2001). Raab and Gruzelier (1994) found that 94 % of the participants in flotation studies lost their sense of time. In connection with the experience of weightlessness, it is not uncommon that experiences of body image changes are induced. This phenomenon may vary from a weakly felt sense of the body (e.g., floating on a cloud, changing into an animal, or being in outer space) to having a complete out-of-body experience, where one's body can be seen from above. Most individuals found such



experiences positive, in which they felt they could transport themselves anywhere without the normal restrictions of the body.

Visual imagery was also common, sometimes only as individual sparks or still pictures, but at other times as complete picture sequences (as in a movie). The participants pointed out the similarity to dreams, but they also noted that they had been elicited during wakefulness. Even acoustic pseudo hallucinations in the form of singular words, sentences, or music were reported. Despite the fact that “hearing voices” traditionally is a phenomenon associated with psychosis, the participants did not feel that the “voices” were either demanding or frightening, as in the case of pathological states, but rather friendly, advisory, or encouraging. Those who perceived acoustic phenomena pointed out that they did not exactly “hear” voices, but said that they could hear thoughts. The phenomenon of visual imagery and acoustic pseudo hallucinations in connection with floating has been documented previously (e.g., Norlander et al., 2001). It is important that the staff members at the flotation tank centers are aware that such experiences may appear and that they are not indications of pathology. It is also of value if the staff members have had experience floating in order to talk with the participants in a more trustworthy manner avoiding stigmatizing views directed at those who report such experiences.

Two participants reported perinatal experiences during flotation, where the experiences dealt with events surrounding their own birth. For detailed accounts of perinatal experiences in general, see e.g., Grof (1975). One of the perinatal experiences was described in detail in the results section, due to the fact that it was highly emotional and constituted a very powerful experience for the participant. Whether it is a matter of true memories, or whether they should be seen as symbolic can not be evaluated here. In other flotation studies perinatal experiences have also been noted. In certain types of therapy, e.g., holotropic breath work (Grof), perinatal experiences are seen as valuable in the therapeutic process.

Similar, powerful ASC-experiences described above have been documented for other types of consciousness altering techniques, in particular in the case of drug states (e.g., LSD, psilocybin, ayahuasca; e.g., Grof, 1975; Griffiths, Richards, McCann, & Jesse, 2006; Kjellgren & Norlander, 2001). In contrast to the situation involving flotation tank-induced experiences, the individual in a drug induced state often lacks the possibility to control the experience should it become too overwhelming, with the risk of negative consequences. In a flotation tank the experience can immediately be interrupted in that the participant can turn the light on or get out of the tank. An experience induced in the flotation tank is also fairly mild and transient unlike a drug-induced state. Furthermore, a drug induced state is rarely supervised by clinical expertise. In most countries it is also illegal, further complicating the process. In one study (Norlander et al., 2001) the experience of individuals in drug induced states was compared to that of individuals in flotation tank induced states. Certain similarities were evident, but the experiences in the tank were of a smaller magnitude. During ASC in the tank, several participants reported a sense of “being in a different world.” It was perceived as pleasant and safe. One individual in the present study had a frightening experience and perceived a connection with evil and adversity in the world. Identification with other people, creatures, or phenomena has been documented in the transpersonal literature (e.g., Grof).

In our experience (10 years, and approximately 2,000 floating participants) the tank appears to be a safe container which harbors all feelings and above all, the magnitude of the experiences does not reach a level greater than one the individual desires or can deal with. However, it is of great importance to provide the possibility for peace and quiet following flotation and a period for a discussion of the experiences. It is not advisable to schedule participants so closely that they must leave without the possibility to talk about their experiences. Flotation tank treatment can be combined with psychotherapy/talk therapy (Åsenlöf et al., 2007; Jessen, 1990); it would be of great value if more studies were conducted on that promising combination.

### **Effects of Flotation-REST**

The second theme refers to experienced effects of flotation-REST (categories: 5, 16, 19). Floating was shown to produce pain relief and profound relaxation in the present study as well as in several others, effects that were much valued. A few participants noted that they might feel some discomfort leaving the tank. It appeared to be a rapid contrast to the state of light soaring in the water. More persistent changes in peoples lives were documented. Descriptive feelings of harmony, being more considerate, calm, and in a better mood were common. These findings are also in line with previous research on the positive effects of floating, depression, and problems of anxiety (e.g., van Dierendonck & te Nijenhuis, 2005; Kjellgren et al., 2001; Mahoney, 1990). Changes of a more existential and spiritual character were also evident in the present study and participants described positive changes in their world view.

### **Technical Details**

This theme comprises strategies in technical details or information affecting the floating experience (categories: 3,6,12,13,15,21). The water of the flotation tank is saturated with Epsom salt. Some participants believed it might be damaging to the skin and hair. They changed their view when they found that the skin became soft and the quality of the hair improved. There were some negative views regarding the influence of the salt, such as smarting, taste, on the mouth, eyes, and lesions. There is reason to inform participants in advance that they should avoid rubbing their eyes/face and should be careful not to swallow any water, and to inform them that there will be no negative effects on the skin. The salt is not damaging to the eyes, but as a service to the participants, one could offer sterile isotone 0.9% NaCl-solution for the eyes if needed. A dab of moisturizing cream can also be offered to be applied to minor lesions (e.g., mosquito bites) to alleviate smarting pain. Major lesions should, for various reasons, constitute exclusion criteria for floating.

The normal temperature in the flotation tank is about 34°C. The participants in the present study also tried floating at 38°C. Preferences varied. Some felt cold in the colder tank. If several tanks are available, it might be good service to offer a tank with warmer water.

Given that the principle of the restricted environmental stimulation technique involves the shutting out of external stimuli, it seems obvious that there should be silence in the tank. The participants of the present study also tried floating with soft, peaceful

music in the underwater speaker of the tank; the music can be heard although the participants wear ear protection. Participants vary in their preferences in this regard as well (with or without music). One can only speculate as to why some preferred music as opposed to silence. One guess might be that the tendency to have claustrophobic feelings, feelings of restlessness or anxiety might be reduced in the “company” of music. At the first floating session the method was new and unfamiliar. Several participants indicated that there was a lot to keep track of the first time, making it difficult to relax. Some also noted that it was difficult to lie with the head in the water. The conclusion is that it is important to schedule for more than just the flotation the first time in order to facilitate an evaluation of which method is suitable. An inflatable pillow can be offered. The participant can then try out the optimal position for the neck.

### **The Target Group for Flotation**

The final theme (categories: 1,2,10) summarizes information on the participants, their background and reason for floating. The group was heterogeneous, including actively working individuals, retirees, and individuals on long term sick leave. The participants also varied in terms of hobbies and view of life. What they had in common was that they had all suffered either physical (e.g., pain) or mental (e.g., depression, trauma, stress) difficulties, and saw floating as an opportunity to get help when other treatments had given no relief. The treatment effects and the experiences in the tank were independent of the background of the participants, suggesting that flotation tank therapy appears to be suitable for a wide target group. Some participants previously had transpersonal experiences under different circumstances. Those individuals did not exhibit a greater tendency to have such experiences again, compared to those who had not had such transpersonal experiences earlier. The effects of flotation-REST appear to be independent both of expectations and of other circumstances, a finding also reported in previous studies (Bood et al., 2005; Norlander et al., 2001.).

### **Discussion**

The results of the study showed that floating is a method generally perceived as pleasant and comfortable, that actual pain relief may be achieved, and that very deep relaxation may be obtained. Furthermore, we showed that altered states of consciousness (ASC) are induced during the session. Examples of experiences during ASC are visual imagery, acoustic, perceptual phenomena, an altered sense of time, a changed bodily sense, perinatal experiences of the fetal stage and birth, and even transpersonal experiences. Some of these experiences may be both powerful and profound, but they are most often viewed as positive and desirable.

Given that flotation tank therapy is now being used more and more by a greater number of people, both in clinical practice and in the area of SPAS and wellness, it is of great importance to offer knowledge about what types of experiences may be elicited and about the possibilities for improvement of the treatment sessions for the client/patient through simple solutions.

In this study patients with earlier experience of flotation tank therapy (at least eight times) were included, which might reflect the fact they liked this technique and

were positive to it. There are persons where this technique might not work out well, for example in cases of claustrophobia. There might also be a risk during an interview procedure, that respondents are given overly positive statements. In this study also some negative opinions were given. Also, earlier studies with flotation-REST (e.g., van Dierendonck & te Nijenhuis, 2005) have revealed many positive effects.

In summary, we can conclude that floating is a method suitable for a broad target group. The method can provide among other things, deep relaxation, pain reduction, and other positive changes in the life situation. Powerful mental experiences may sometimes be induced, but the experiences are often of a positive and fruitful nature. It is of value if the opportunity for peace and quiet is provided in connection with the flotation sessions, and if there is the opportunity for a discussion of the experiences, if needed. A suggestion for further research might be studies combining flotation tank therapy with psychotherapeutic intervention by psychologist or psychotherapist, investigating if such a combination might generate even more beneficial effects.

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This study was supported by grants from the County Council in Värmland, Sweden (LiV – Landstinget i Värmland), and from the Department of Psychology, Karlstads University, Sweden. The research adhered to the ethical standards of the World Medical Association Declaration of Helsinki concerning Ethical Principles of Medical Research Involving Human Subjects and the study was approved by the Ethical Board on Experimentation on Human Subjects (Forskningsetikkommittén) at Karlstad University, Karlstad, Sweden.

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#### Article Citation

Kjellgren, A., Lyden, F., & Norlander, T. (2008). Sensory isolation in flotation tanks: Altered states of consciousness and effects on well-being. *The Qualitative Report*, 13(4), 636-656. Retrieved from <http://www.nova.edu/ssss/QR/QR13-4/kjellgren.pdf>

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