



RECONSIDERING SENSORY ISOLATION IN FLOATATION TANKS AS A METHOD OF PROMOTING PSI-CONDUCTIVE IMAGERY

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ABSTRACT

Since the 1950s sensory isolation by means of floatation has been explored as to its impact on human consciousness. Similar to this, the ganzfeld has been famously used within parapsychology to investigate the psi-conductive nature of impressions perceived through sensory deprivation and homogenous stimuli. Lilly (1969) proposed that parapsychology adopt floatation tanks as a new method of exploration for psi, with some evidence of parapsychologists taking heed of such advice (e.g., Rogo, 1980). This pilot study aimed to further explore the methodological practicalities of using such tanks within parapsychology. Two of the authors acted as sender (Saunders) and receiver (Cooper) for a total of 12 trials that incorporated the Dalton clips as the target pool of focus. An independent judge was used to rate the mentations, while the receiver also attempted to judge their own mentations against each trial's target and decoy clips. No statistical significance was found from the scores produced by the participant ($z = .03$, $p = .51$ one-tailed) or the independent judge ($z = -.16$, $p = .44$ one-tailed). However, qualitative information produced instances of correctly identified targets (hits) demonstrating some promise in exploring the floatation tank method further. Limitations of this study are discussed, and recommendations are offered for refining the current methodological procedure. It is planned for this study to be taken forward on a larger scale with the use of a variety of participants.

INTRODUCTION

Sensory deprivation with homogenous stimuli as a means of promoting what appears to be psi-conductive imagery has most notably been explored through the ganzfeld method (Baptista, Derakhshani & Tressoldi, 2015). Within this procedure, participants are typically asked to sit and relax in a reclining chair, wearing eye shields – while keeping their eyes open – with red light beaming down on them from a lamp. At the same time, they wear headphones playing a relaxation procedure which the participant must follow. Once the relaxation procedure is complete, the participant is normally given instructions to focus on a target (e.g., a friend or a place) during which time the headphones begin to play the sound of reduced static (i.e., pink noise). Typically, this form of induced sensory isolation begins to produce hallucinations in the form of visual and auditory perceptions, which are later examined against an experimental target - when conducting studies of telepathy and remote viewing, for example.

The ganzfeld has received criticism regarding methodological weaknesses (Hyman, 1985), leading to Honorton (1985) conducting a meta-analysis of 28 ganzfeld studies (of the original 42 analysed by Hyman, 1985) which only used direct hits as a measure of success (a simpler methodological process and less sensitive form of analysis than free response ganzfeld typically uses)¹. This still yielded an overall significant effect, and concluded with Hyman and Honorton (1986) producing a debate on the process. Their debate explained that although there did appear to be an overall effect, they both differed in the conclusion for this being due to a psi effect. The interpretation of the outcome, in their opinion, could only be confirmed by further research over time carried out by other researchers and with more stringent standards applied. Later criticism from a new meta-analysis by Milton and Wiseman (1999) did not yield similar findings, arguing that ganzfeld did not provide evidence for psi, thus resulting in further controversial debate (Schmeidler & Edge, 1999). A subsequent meta-analysis by Storm and Ertel (2001) which included all the work by Honorton, Bem, Milton and Wiseman (79 reported studies in total) was carried out. They concluded from their findings that the ganzfeld still appeared to be a viable method for eliciting psi, despite a decrease in effect sizes, and criticised Milton and Wiseman (1999) for being not only selective of the studies they used in their meta-analysis, but also of the quotes they used from others in their reports to cast doubt alongside belittling statistical significance (cf. Milton & Wiseman, 2001; Storm & Ertel, 2002; Wiseman, 2002; Zingrone, 2002).

Certainly in recent years of employing the ganzfeld for remote viewing studies at the University of Northampton, we have had a string of successes for all the remote viewing studies conducted (Roe & Flint, 2007; Roe, Cooper, & Martin, 2010; Roe, Hodrien, & Kirkwood, 2012; Roe & Hickenbotham, 2015). Remote viewing can be defined as “anomalous cognition – typically extrasensory perception of a location or other target hidden from the senses by distance” in other words, “information gathering by the mind without the use of the normal senses, logical inference or intuition” (May, Rubel, & Auerbach, 2014, p. 4). However, while it is appreciated that the statistical success of ganzfeld studies being due to psi can still be debated, alternative explanations are increasingly limited as methods have become so thorough since the ganzfeld’s beginnings.

As an alternative to the ganzfeld, parapsychology was offered – and encouraged – to try another method involving floatation, as early as 1969. At the Parapsychological Association Convention, held in New York City, John Lilly as guest dinner speaker proposed this method (Lilly, 1969). As a pioneer of sensory deprivation exploration via floatation method – beginning such research in the 1950s at the National Institute of Mental Health (see Lilly, 1972, 1977) – he suggested that the types of imagery experienced within the floatation tank environment could be tested as to their susceptibility to extra-sensory influence. He further proposed employing previously used protocols for testing psi, and even, a sender-receiver set-up, if two tanks were available. Unlike the ganzfeld, which offers constant sensory input from the red light

¹ Regarding hits and misses – A trial is classed as a ‘hit’ if the receiver's mentations are judged as corresponding more closely to the target clip/image than 3 decoys contained within the trial's stimulus set. If a decoy is selected, it is classed as a ‘miss’.

over the eye shields and auditory reception of pink noise leading to a mild degree of sensory *deprivation* (homogeneous/consistent stimulation) of the normal senses, the tanks offer much more restriction of the senses through *isolation* – no sight, minimal sound and complete weightlessness. As in the case of the ganzfeld method, floating is frequently reported to induce an altered state of consciousness (see Kjellgren, Lindahl & Norlander, 2009; Lilly, 1969, 1972, 1977; Suedfeld, 1980). Given the aforementioned successes of using the ganzfeld procedure in remote viewing studies, it would be worthwhile to compare the efficacy of floatation in facilitating anomalous cognition.

To briefly describe the floatation tanks, they often appear as a pod shape (though different units vary), about the size of the average motorcar. They have a lid which opens to a pool of water, between 1-1.5ft in depth. The water is regulated to body temperature, regularly filtered by the tank, and contains diluted Magnesium Sulphate (Epsom salt). Therefore, it is impossible for the person using the tank to sink, irrespective of their weight or body shape. Once inside and the lid is shut by the participant, the safety light goes out and around an hour of floating in darkness takes place. Most people tend to do this while completely naked, as more than anything, bathing costumes can be a distraction against the skin while trying to achieve an altered-state of consciousness (ASC, see Tart, 1975) – participants floating in this state have reported perinatal experiences (Kjellgren, Lyden & Norlander, 2008). Floatation tanks are also commonly referred to as ‘restricted environmental stimulation therapy’ (REST) a term adopted by Peter Suedfeld, one of the co-developers of this method (Suedfeld, 1980).

Uniquely, in the same year as Lilly’s dinner speech, the *Proceedings of the Parapsychological Association* also published the summary of an experimental study of long-distance telepathy using an agent submerged 35ft underwater (Dean, 1969). The professional scuba-diver was based in Florida, while the sender, based in Switzerland, attempted to send targets from a specially made set of cards containing names and blanks. The study also employed electroencephalogram (EEG) and plethysmograph measurements. The report mentions that while EEG readings did not discriminate between names and blanks, greater levels of arousal were reported over the three-day study during target names being sent than blank targets, for both the diver and a control participant. The control participant in fact responded more (i.e. exhibited higher levels of arousal as measured by EEG) than the diver in this one-off study.

Following up on Lilly’s (1969) proposal, it appears that only a couple of individuals came around to consider using floatation tanks within parapsychological experiments. Rogo (1980) adopted a ganzfeld procedure within a small scale pilot study, which attempted to evaluate the use of floatation tanks to promote psi-mediated imagery. A tank was specially built for the purpose of the study (measuring 8ft x 4ft x 4ft, with a water depth of 1.5ft, treated with Epsom salt for buoyancy). Only three participants were used, all preferred to float naked. Four half hour sessions were completed, two in the traditional floatation tank environment of total darkness, and two with a red light and eye-shields on the participants, thus adopting elements of the ganzfeld procedure. All three participants were known to be friends, and alternated as sender and receiver. One participant had had prior experience in the ganzfeld. During

each of the four trials, the sender selected one envelope out of a possible twenty, with each envelope containing four smaller envelopes. A further one of the four was selected which was then to be the target. Each of the smaller envelopes contained view-master reels of distinctly different images. The sender was to view the selected target image through a view-master, and think about sending the information to the participant in the tank at the same time through a period of 30 minutes. An intercom system was set up in the tank to allow the researcher (Rogo) to hear what was being said within the tank, and transcribe the feedback ready for analysis (i.e. rank order between relation of feedback to the target and decoys). It was not stated as to whether the feedback, targets and decoys were given to an independent judge for ranking.

One reason for a lack of success in this study was the lack of imagery produced. Not only were no successful hits achieved, the only substantial information produced held no qualitative relationship to the target in that particular trial. However, Rogo (1980) noted that his focus for this study was on the method and practicalities of using the tanks for promoting psi-conducive imagery. Rogo further argued that the unusual environment (referred to as somatic stimulation) appeared to distract participants from the task at hand, as they seldom spoke out during the trial to report any internal thoughts or hallucinatory images experienced. It was concluded that anxiety should be considered (as is often reported by those new to the tank; see Kjellgren, Lindahl & Norlander, 2009) in the first experience of the tanks for participants, especially in terms of impeding psi (e.g. Palmer, 1977). Taking advice from Lilly (1969, 1972), Rogo (1980) also suggested that it would be of benefit for participants to have experience of the tanks for long periods of time before participating.

In later reflection on the pilot study, Rogo (1984, p.166) described his participants as having “lost all interest in the ESP test” due to the novel environment they were encountering for the first time. Once again, this enforces the idea that prior-experience of the environment is required so that the novelty can somewhat wear-off, and motivation for the task at hand can be maintained. Moreover, Tart (2015, 3rd September) believes that we should look to the visual benefits of these tanks, stating that “aside from what they actually do, just being in one says ‘this is special, the ordinary rules of reality don’t apply now!’”. Even so, individuals can react very differently to the tank environment. Some people report boredom and claustrophobia (Playfair, 2015, 4th September) and others anxiety. Using the Highly Sensitive Persons (HSP) questionnaire, Kjellgren, Lindahl and Norlander (2009) were able to successfully distinguish between those who showed anxiety in the tanks and those who didn’t. Consequently, a number of individual differences may be related to the efficacy of floatation in facilitating psi.

Beyond the study conducted by Rogo (1980), it appears that no formal studies have been conducted using the tanks for parapsychological purposes. However, the intention to do so has been there with initial exploration of the tank environment. For example, Schwartz (2015, 3rd September) purchased a floatation tank following the suggestion to do so from John Lilly. He began using it for meditation, spending approximately 40 minutes in it every day. Following this, he asked several of the remote viewers working with Mobius (see Schwartz, 1983, 2007) to also engage with the tanks. He stated that “the key to successfully performing all non-local tasks is the ability to hold intentioned focused awareness, and I thought the remote viewers who

were meditators would benefit from the tank”. These initial attempts were carried out, with a small speaker and microphone wired into the tank to hear the impressions of the participant. Improvements were noted in the “viewing quality” but were not considered great enough to warrant carrying out tank trials (they complicated the process, and required additional effort to maintain and clean). Meditation and working with highly motivated remote viewers were favoured instead.

Certainly, brief mentions of the use of floatation tanks for parapsychological research can be found. They have been associated with comparisons to the ganzfeld (e.g. Willin, 1996), inducing out-of-body experiences (e.g. Craffert, 2015; Kjellgren, Lyden & Norlander, 2008) and inducing apparitional experiences (e.g. Radin & Rebman, 1996). However, from extensive searches of the literature that mentions the use of such tanks within parapsychology, it appears that the reality of published research reports started and ended with Rogo (1980), even though casual exploration of the tanks have been noted here.

Evidence from the ganzfeld presents a strong case for using the floatation tanks as a method for comparison. Besides Rogo’s (1980, 1984) concerns for the methodological practicalities of using the tanks for psi research, other criticisms on record are highly scarce. Smith (2010) was found to have given mention to the tanks, but likened the imagery perceived to that of other instances of reduced sensory input.

Moreover, he casts doubt on any imagery produced by isolation in the tanks relating to psi. Even so, if deprivation causes internally generated ‘imaginative’ thoughts, sensations, and images, they still hold significance to parapsychological inquiry (e.g. Blackmore & Rose, 1997; Stevens, 2002; Warcollier, 1938), and can be put to the test to examine their ontology, as Lilly (1969) suggested with the floatation tank imagery.

Taking the lead on how altered states of consciousness appear to be psi-conducive (see Roe, 2009; Tart, 1975), it appears there is great potential for giving the floatation tanks a second chance at having an important experimental place within parapsychology. Although the floatation tank method may be just as time consuming to run as the ganzfeld protocol, there are many benefits to engaging with them. Positive psychological attributes could also be achieved through the tanks for suitably chosen participants (e.g. HSPs); due to ASCs creating flow (Csikszentmihalyi, 1990), improvements to personal well-being (Kjellgren, Lyden & Norlander, 2008), stress and stress-related pain reduction, decreased depression, anxiety and increased optimism (Kjellgren, Buhrkall & Norlander, 2010) and creativity enhancement (Forgays & Forgays, 1992). Therefore, the decision was made to develop a new pilot study, seek peer feedback through presentation of the design (e.g. Cooper & Saunders, 2017) and source a facility hiring out these tanks that was willing to allow studies to be carried out, thus avoiding purchase and maintenance within the university setting (see Cooper, 2018).

Aims and Rationale

The pilot study aims to expand on the brief pilot study by Rogo (1980). The main emphasis of this study is to further explore the potential of using such tanks within parapsychological studies, and any methodological and ethical issues which may arise. Two tentative hypotheses are proposed regarding how sensory deprivation within the floatation tank environment will impact on ESP scoring, with a standard

ganzfeld-type protocol applied in exploration of the psi-conducive nature of the hallucinations experienced within the tanks (Cooper, 2018; Lilly, 1969; Lilly & Gold, 2001). Unlike the study by Rogo, but following from some previous ganzfeld studies, an independent judge will be used for comparison. Some studies have shown that when comparing independent judges' scores with participant scores of their own mentations, psychological mechanisms could lead to perceived confidence in target selection, but negatively impact on the number of successful judgments (Watt, 2014). However, the debates surrounding this are still unsettled (cf. Milton, 1991). The exploratory hypotheses for the study are therefore as follows:

Hypothesis 1 – The Receiver will correctly identify the target clip in relation to their own mentations significantly more than chance expectancy.

Hypothesis 2 - The Independent Judge will correctly identify the target clip after reviewing Receiver's mentations significantly more than chance expectancy.

METHOD

Participants

Given that this was a pilot study to test for the methodological strengths and weaknesses in using the tanks for parapsychological experiments (and identify ethical concerns), the sole participants were the first two authors of this paper. In recent years, Luke (2011) has argued for this 'first person approach' to parapsychology experiments, which could lead to better determination of anomalous processes being present, and "help us discover new ways in which we can utilise the phenomena we study" (p. 194). Cooper (aged between 27-29 during the time of data collection) acted as the receiver and engaged with the tank environment. The receiver took some time to gain prior experience with the tanks to become familiar with the procedure and environment, and assess issues of initial anxiety some experiences claimed they'd encountered (Cooper, 2018). Saunders (31-33) acted as the sender. Neither participant was on any form of medication during this study, with Cooper considered 'healthy and active' following a GP check-up before this study began.

Materials and Equipment

The main equipment used within this study was the floatation tank. Access was made to two tanks (i-sopod, ver. 1, floatation pod, see Figure 1) located at Calm Water Floatation, Nottingham (see Appendix A for specifics of the tanks). Only one tank was required for this study, but were alternated depending on availability. Rubber ear plugs are provided to stop the solution getting into the ear sockets, as the salt crystallises once out of the tank and dry. Within the tank is a safety light which can be switched off and on by a button on the left, and an emergency button on the right which would alert any attendant in close proximity that the participant is encountering a problem they need help with. In this case, Mr Nick Parsons – the director of the floatation centre – was on hand during every session should a problem have occurred requiring that button to be pressed.

A clipboard containing lined and plain paper was used for the writing and drawing of impressions following every session. Telephones were also required for contact between the two experimenters to inform of the start and end of each session. For the sender, access to a laptop and the Dalton video clips (Dalton, Steinkamp & Sherwood, 1999) was required.



Figure 1. *Example of Receiver inside the tank (lid open and lights still on for photographic demonstration only – lid closed and safety light off during each trial)*

Target Selection

As with previous studies investigating the psi hypothesis conducted at the University of Northampton (e.g. Roe, Sherwood, Luke & Farrell, 2002; Sherwood, Roe, Holt & Wilson, 2005) target selection and randomisation was achieved utilising a Visual Basic coded pseudo-random algorithm ('rnd'), with target initiation made by using the timer at the start of the program ('RANDOMIZE TIMER'). Once initiated, the computer programme first selects a target set containing four potential dynamic targets, from a pool of 29 possible sets of 4 video clips (i.e. anything from cartoons to motion picture films ranging in style and genre). A target is then selected from the 4 potentials within the chosen set and played on repeat for an hour to the sender. The playing order of the clips when judging is equally randomised.

Procedure

Data collection began in mid-2016 and ended in December 2017. A total of twelve trials, decided in advance, were conducted. Both researchers agreed on a suitable time in which to carry out the experiment. The receiver was based in Nottingham at Calm Water Floatation, while the sender was based in Northampton. For approximately half the trials, the sender based himself inside a perception laboratory, typically used for ganzfeld research. This was done to see whether the environment helped with relaxation and focus on the task at hand. It was noted that for some trials, the sender

conducted the experiment from his home office in Northampton instead of the laboratory, for reasons of both comparison and work commitments.

Once both researchers were at their intended location, the receiver would telephone the sender to let him know they were soon to start. Once the receiver had showered and prepared himself to go in the tank the sender was then telephoned once more to tell him to commence the study, while the receiver then stepped inside the tank. The sender would begin the programme and watch the selected Dalton clip over and over, while trying to focus on the receiver. The receiver, once in the tank, would shut the lid, lay back in the water and get comfortable and then switch off the safety light. Relaxation music was played within the tank (typically pan pipes and ocean waves were used) for the first ten minutes, before fading out leaving the receiver floating in total darkness with no sounds apart from the occasional drip of water from the roof of the tank. During the next 45 minutes, various images were reported to come and go with varying levels of interaction (see Cooper, 2018). In the last 5 minutes, the relaxation music returned to signal the session ending, with the safety light automatically coming back on once the time was up.

The receiver would then get out of the tank and telephone or text message the sender to inform him that the session had ended, and the clips no longer needed to be viewed. (It is important to note that due to telephone communication between the receiver and the sender on some trials at this stage, the results of the receiver must be viewed with the potential for sensory leakage.) The sender would then make a note of which pool of clips had been selected for that trial, and make a further note of the target clip. After showering and getting dressed, the sender would then enter a debriefing room and write down all of the thoughts and impressions from the session that were most memorable. In some cases, drawings were more appropriate than written descriptions. Once signed and dated, these impressions were placed in a sealed envelope with the trial number marked on the front. Following all 12 sessions, these envelopes were passed on to an independent judge to rank order against the selected video clip pools. This involved the use of a pre-designed feedback sheet where the judge could comment on all 4 clips in relation to the mentation. They could also decide on a scale of 0-99 how much detail from the mentation to each clip matched, and finally, rank order them from 1 to 4 (1 being the presumed target and 4 least likely). Following this, the receiver also attempted to judge his impressions against the clips for judging comparison. All of this feedback was then returned to the sender, who then compared the actual targets for each trial to the feedback, where hit rate could then be calculated.

RESULTS

The data in Table 1 demonstrates no substantial deviations from mean chance expectancy for either the receiver or the independent judge. Indeed, the receiver ranked the correct target as 4th in his judgement 25% more frequently than would be expected by chance. By contrast the independent judge diverged in equal magnitude from chance for correct selection of the target, demonstrating a hit rate of 33% in comparison to the receiver's 25% hit rate.

Table 1
Distribution of Target Rank Frequency by Individual and Expected Rank Frequency

Rank	1	2	3	4
Receiver	3	3	2	4
External Judge	4	3	3	2
Expected Rank Frequency	3	3	3	3

Figure 1 demonstrates that for trial one, the receiver correctly identified the target whereas the independent judge placed the target at second place, this pattern is reversed for trial 7. The only substantial discrepancy for a successful trial is trial 9, with the receiver ranking the target as 4th (15/99), whereas the independent judge, reading the receiver's mentation ranked the target correctly (1st, 35/99). This is an interesting discrepancy that is worthy of closer consideration. The target clip was that of characters from the *Wizard of Oz* dancing to music down a yellow brick road/bridge over water towards a large building and a colourful sunset. The mentation shows initial repeating shapes and patterns (circles and semi-circles) and mentions a music video which the independent judge could relate to with the music in the clip. Although the receiver gives mention to these qualities, noting that "It was somewhat psychedelic, and I can relate that slightly to initial shapes I drew" stronger relationships were felt with a decoy clip. The decoy contained footage of a wildlife documentary on giant tortoises surrounded by green grass, soil, and muddy pools of water. The "psychedelic" shapes were related to the shells of the tortoises. The mentation also states "vast landscapes, water, river, green and dry land" hence the receiver's selection of this clip as first place. This highlights that there can be discrepancies between the judgments of the participants and independent judge when analysing mentations. Hence, this supports the need for multiple judges (e.g. Schlitz & Haight, 1984).

For analysis of the data, a binomial test was utilised to assess direct hits (with $p = .25$ and $q = .75$). In testing the first hypothesis, the receiver showed no significant effect ($z = 0, p = .5$ one-tailed) in terms of direct hits. In testing the second hypothesis, the independent judge also showed no significant effect ($z = .33, p = .37$ one-tailed) for direct hits.

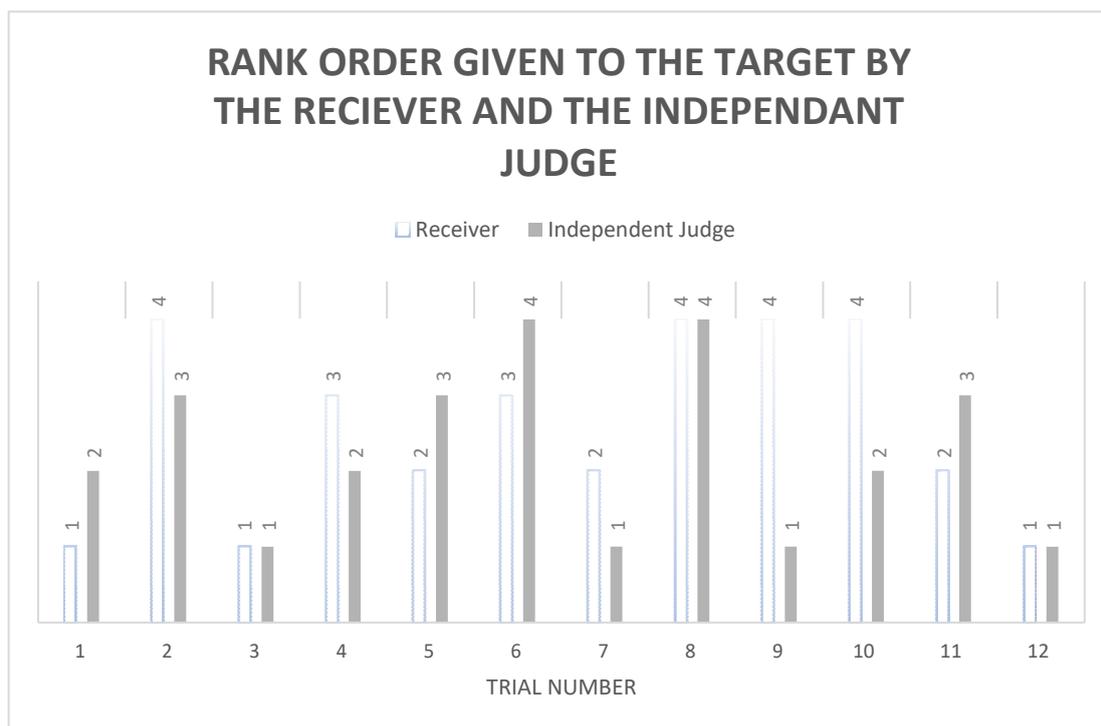


Figure 2. Ranking attributed to the target over time, for both Receiver and the Independent Judge

Examples of Targets and Decoys to Tank Mentation Feedback

Despite these non-significant effects there were some interesting correspondences between the tank mentations and the target characteristics. For each of these, a description of the target will be briefly provided, followed by the receiver's mentation report. Despite us not being able to use these qualitative examples as data from which statistically meaningful conclusions can be drawn – as with previous studies such as Dalton et al. (1999) – providing these examples may aid in the development of information about the underlying processes for the successful target selection. The reader should be reminded that the main aim of this pilot was to assess the method of employing the tanks for experimentation. These initial findings relating to the targets serve as a means of discussion, development and expansion of the project in testing for psi.

When completing the judging, the receiver noted instances of strong qualitative matches not only in relation to the mentions but the physical, emotional and visual experiences within the tank. In one instance, a drawing produced from the trial reported that in a flash a very clear shape appeared in front of him representing either a hot-air-balloon, a jellyfish, or a mushroom. Details of the shape were not clear enough to commit to one of those assumed items, but the dome shape and narrow base were very clear such that, when visualised in a flash, they caused the receiver to jolt. On viewing the clips that related to that trial, a decoy clip was from the animation *Fantasia* (released in 1940), and involved dancing mushrooms against a black

background (see Figure 3). Therefore, it was strongly felt to be the target and selected as such.

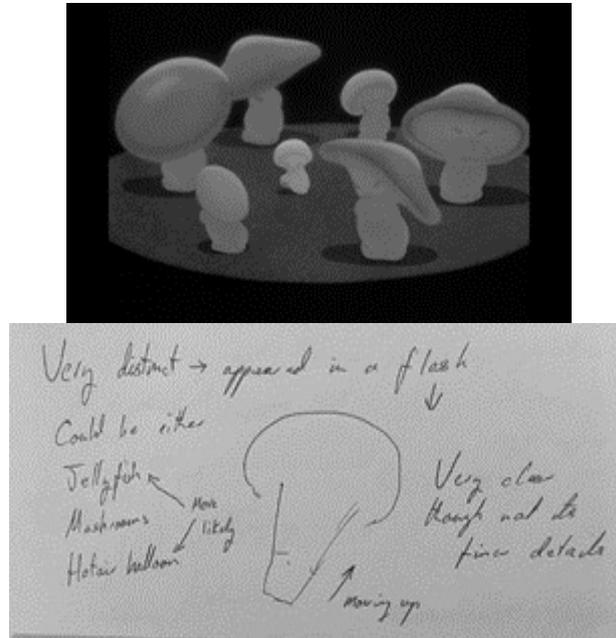


Figure 3. Decoy clip from trial 4 and drawing from mentation

Such impressions relating to decoy targets raises the question of a potential displacement effect. Displacement refers to a situation in which the participant's response in a psi related task corresponds to a target (or decoy) other than the one intended (Alvarado, 1989), and does so in such a way as to suggest knowledge of the nontarget being acquired by anomalous means (Milton, 1988a). Displacement has been of interest to experimental parapsychologists since the publication of Abbot (1938) and Carington's (1940) observations of the effect. While Carington coined the term, Alvarado (1989) highlights that displacement effects in some form have been documented by physical researchers since as early as Haddock (1851). While the majority of observations of displacement effects has concerned both the significant hitting of targets immediately preceding the correct target for the trial (known as -1, or *backward* displacement), and targets immediately following the correct target for the trial (known as +1, or *forward* displacement; Milton, 1988a), there is also evidence of displacement hitting occurring on decoys within the original target set (e.g. Braud 1987; Child & Levi, 1979, 1980; Markwick, 1983; Moss, 1969; Rogo, 1976; Stanford & Nelyon, 1975). Due to the lack of a prior label aside from within-trial displacement, this effect will subsequently be referred to as *sideways* displacement for the sake of brevity and to place the proposed form semantically in relation to the other potential forms of displacement effect.

Sideways displacement has been reported to occur exclusively within free-response studies (Palmer, 1978). Given the variety of imagery that participants can produce in these kinds of studies, and the detail/complexity of the targets used, one

would expect the occasional occurrence of spurious correspondences, giving the appearance of a displacement effect. Thus, it is wise to be cautious in interpreting accounts such as the example above as evidence of a sideways displacement effect. However, given its characteristics the researchers consider it pertinent to be mindful of this possibility and the factors previously associated with its occurrence (e.g. Abbot, 1938; Palmer, 1978; Milton, 1988b) when conducting the next study in the series.

Some examples of strong qualitative matches with what turned out to be hits occurred in trials 1, 3 and 12 for the receiver. In trial 1, impressions of a face, being high up and ice were reported. The target clip ranked as first contained white marble pillars, a large high statue, with the head cracking off like ice and falling to the floor with the face being the focal point of the clip from then on. Trial 3 produced imagery of a cog-wheel, lots of cars, and a bridge over water. The target clip selected featured a car driving over a suspension bridge as it raised up with images of the cogs turning. The car had been at a stand still with many other cars before driving over the bridge. And finally, trial 12 produced imagery of a desert island, palm trees, and the woods. The target clip selected featured sand, the woods, greenery, and dinosaurs making a nest. We found these qualitative matches to be promising. However, it has been found in recent parapsychology studies which employed an independent judge, that they scored slightly better in identifying the correct target in relation to the mentations (e.g. Krippner, Saunders, Morgan & Quan, 2019; cf. Child & Levi, 1980; Milton, 1989; Palmer, 2015).

Although these correspondences appeared striking upon analysis, it should be noted that in such a small scale pilot study, these outcomes are likely due to chance. For example, Westerlung, Parker, Dalkvist and Hadlaczky (2006) noted that strong perceived perceptual correspondences are not necessarily due to ESP, but could be the result of a cognitive illusion on the part of the perceiver (i.e. the judge). Four studies were conducted in order to investigate these possible outcomes. In these studies, student panels and independent judges were required to select segments and statements from ganzfeld mentations which appeared to show remarkable correspondences to the target clips used. They were blind to the actual outcomes. Both targets and decoys were shown to be equally striking, with the second study showing the decoys to be selected as having remarkable correspondences more often than the actual targets. The final two studies considered the possibility of a displacement effect taking place, but this was deemed highly unlikely. It was concluded that it is possible for very remarkable correspondences between mentation and target information to be perceived by chance alone. They also concluded that further replications by others may aid in the training of judges of ganzfeld – or similar experimental setups – in order to recognise the properties of striking chance correspondences, as distinct from those which may be mediated by psi.

DISCUSSION

This study achieved its aims in exploring some of the *methodological* and *ethical* concerns of utilising floatation tanks within parapsychological studies. Several concerns were raised which if addressed, could improve the experimental protocol,

quality and richness of the data produced. For example, the receiver noted that having to recall images and feelings within the floatation tank following an hour-long session meant that only the most striking hallucinations were recalled, and the more mundane sensory perceptions forgotten. The mundane and subtle feelings and imagery may contain critical extra-sensory information (e.g. Broughton, 2006; Cox, 1956), and therefore efforts should be made to attempt to record more of these lesser recalled aspects of the experience. Further specific considerations and suggested changes for future study are:

- The impact and ‘strikingness’ of perceptions in the tank could also be rated by the experient for the purpose of judging and analysis.
- Suspending a (waterproofed/protected) digital audio-recorder within the floatation tank would enable the participant to vocalise key thoughts, feelings, imagery, or sounds they believe they have interacted with, rather than relying on post-session memory recall alone. This was employed within Rogo’s (1980) study and has been done in many ganzfeld studies, using an intercom system.
- Although Tart (2015, 3rd September) mentioned that speaking out and describing the hallucinations would disrupt the ASC, it would at least be an available option for the participant returning from a cycle of an ASC to speak out about key information they wish to preserve. Certainly within this present study, the experimenter’s own subjective experience (e.g. Cooper, 2018) was that the imagery appeared to be far more distinct than that produced in the ganzfeld, which may show advantages in futures studies and as the methods are refined.
- Administering HSP scales to participants may produce useful feedback regarding their sensitive nature and openness to new experiences in line with previous research (Kjellgren, Lindahl, & Norlander, 2009).
- Health and safety issues of the tanks were discussed at length with Mr Nick Parsons at Calm Water Floatation, which have been thoroughly assessed and are in place for the smooth and safe running of the tank centre as a business. These will be translated into participant information forms and ethical proposal documentation in the design of the second run of this study when using a variety of participants.
- Closeness of sender-receiver pairing is worth further consideration. It has been found that in experimental tests where the sender-receiver pairing is emotionally close – twins, siblings, sexual partners, best friends, etc. – better effects are reported (cf. Bohm, 1984; Playfair, 2012; Reed, 1994; Sheldrake, 2015). The only pairing within this pilot was the receiver (Cooper) and the sender (Saunders). Thus, no comparison could be made to other pairings, nor were the roles switched at any point. Emotional closeness and rotation of roles should be considered in taking this study further.

The use of only two researchers, with one being the participant throughout, enabled the preempting of ethical concerns that might apply to other participants. Certainly, first impressions of going into a tank may lead to some anxieties for participants

(Kjellgren, Lindahl & Norlander, 2009). We support Rogo's (1980) advice to select participants who are: (a) comfortable with water and confined spaces, (b) have some experience with ASCs (e.g. the ganzfeld and meditative techniques – and preferably floatation), and (c) have experienced the floatation tank environment at least once before taking part in actual study trials.

Although no statistical significance was achieved from the judging that took place – as was the case with Rogo (1980) – the researchers discussed the potential significance of some of the individual qualitative matches and misses – which was not the case with Rogo (1980). Given the small number of trials, it is unsurprising that the study was found to be substantially underpowered. Due to the limited prior research utilising floatation-tanks, estimates of the size of the effect were taken from the nearest comparable medium; ganzfeld experiments. Here several meta-analyses have identified significant overall hit rates of 30-32% (Storm, Tressoldi & Di Risio, 2010; Williams 2011). If it can be assumed the effect elicited by the floatation tank would be comparable to that of the ganzfeld, post-hoc power analysis using G*Power 3.1 (Faul, Erdfelder, Buchner & Lang, 2009) demonstrated the current pilot study had an observed power ($1 - \beta$) of .03 for a 1-sided test. Furthermore, for a specified power of .8 the next study in this series will require a total of 205 trials if a direct hits approach is used. While the decision was made for comparison of direct hits, there have been a number of criticisms raised against this statistical approach as insensitive (cf. Carington, 1940; Solfvin, Kelly & Burdick, 1978; Stuart, 1942) leading to the loss of potentially useful aspects of the structure of data. Solfvin et al. (1978) clearly demonstrate this issue leading to an inability to identify potentially meaningful effects in the data. In response they propose a more powerful and discriminating measure in their ordinal weighted-sum approach, which allows for a more sensitive consideration of the distribution of counts across the data overall. Thus, for the next study in this series the ordinal weighted-sum approach shall be utilised as the preferred method of analysis.

These non-significant statistical results are consistent with Rogo's (1980) findings and are not evidential of psi being produced as a result of REST. Nevertheless, the qualitative correspondences observed between mentations and target clips at the judging stage provide more grounds for optimism than indicated by Rogo (1980) and hence warrant further investigation. Taking the study forward, and with the intention of carrying out more trials, we will be able to explore temporal patterns, practice vs. decline effects, novelty of the situation among various participants, comfort in the tanks, and levels of ASC. Therefore, acting on the points of this discussion, particularly with regards to methodology and ethics will lead to better understanding and interpretation of such data from a varied participant pool and a richer dataset.

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ACKNOWLEDGEMENTS

We are grateful to the Society for Psychical Research for providing financial support for this project. Thanks especially to Mr Nick Parsons, Director of Calm Water Floatation, Nottingham, for his help and support in this project and the ongoing research.

APPENDIX A: SPECIFICS OF THE TANKS EMPLOYED

The dimensions of the tanks (i-sopod, ver. 1, floatation pod) at Calm Water Floatation are as follows: length = 259cm; width = 170cm; height = 130cm. The approximate weight when filled with water (H₂O) and magnesium sulphate (MgSO₄) is 1350kg. The ratio of water to salt varies amongst users, but is approximately 600kg of magnesium sulphate to 500kg (or litres) of water. This works out at 49% salt to 51% water by volume, thus, 300kg of pure salt to 800kg/litres of water (ratio = 1:2.5). Gravity is considered one of the most important measurements for the tank use, and is held between 1.27 and 1.28 - neutral buoyancy for human tissue density. The solution in the tank is at a depth of 40cm, and is kept at a stable 35 degrees centigrade. A 15-minute automatic cycle of filtration begins once an hour, even if no session has taken place in order to keep the water at a stable temperature.