

# Clinical research overseen by Dr. Zoe Fisher, Neuropsychologist, ABMU

## Quantitative Analysis

Down to Earth is a 'not for profit' organisation based in the Gower.

We have been working with Down to Earth over the past three years to develop co-created vocational neurorehabilitation projects. We have run 8 courses so far. Each course is a day a week for 10 weeks. Down to Earth staff provided specialist knowledge of their activities (bush craft, sustainable-building, adventure activity etc.) & the Community Brain Injury Department staff provided knowledge of brain injury & the clinical skills needed to help patients work towards their individual rehabilitation goals (i.e. return to work, community integration). Expert patients worked as mentors to offer reassurance & their knowledge to newer patients (they gives older patients a meaningful role and new patients hope and confidence).

In 2014, we won the 'Allied Health Care' awards for the work and we were finalist for the partnership working and putting patients' first category of the ABMU chairman's awards. In 2015, we were finalists in the national HSJ awards and we won the Chairman's Award in ABMU for 'Partnership Working'.

**Rational:** There were few community opportunities available for people with TBI to experience long lasting wellbeing. Following our rehabilitation efforts, patients often had nothing to do & they become socially isolated; poor adjustment & mental health followed. 'Positive Emotion', 'Engagement', 'Positive Relationships', 'Meaning' & 'Accomplishment' (Seligman, 2011) are critical for wellbeing/happiness. Experience of these factors typically comes from loving relationships, work & leisure. Severe brain injury often means relationships breakdown, return to work is not always possible & the ability to engage in leisure activities is compromised. Although people long to return to their old lives the key to successful adjustment is to learn how to flourish in a different way. However, it is clear that if one cannot contribute to society in a conventional way – opportunities to contribute at all are extremely limited. Our team wanted to work with community providers to develop opportunities for patients to experience lasting wellbeing/meaning. We wanted to give patients a platform from which to thrive and use their remaining strengths. This opportunity helps us bridge the gap between the health service and the community so that patients are able to access their communities in a sustainable way when their rehabilitation comes to an end.

Damage to the frontal cortex causes severe impairments of real-world behaviour, e.g. organising, emotional regulation, self-monitoring (Sohlberg, 1989); these deficits are difficult to capture in clinical settings (Tranel, 2007). These less measurable difficulties tend to have the greatest impact on social isolation & the ability to return to meaningful activity. The projects help us better assess the full impact of the brain injury in real world settings so that we can could better treat them & ameliorate their impact.

The root cause of the problem could be conceptualised in the following way:

Reduction of disability is NOT indicative of wellbeing/happiness. Thus working exclusively towards an 'impairment/problem' based model does not allow people to use their strengths and find new ways to achieve meaning/authentic happiness when the 'old ways of doing things' are no longer possible. The objective was to refocus our service provision to place greater emphasis on what people could do.

Standardised assessments do not always pick up some of the most disabling but less measurable aspects of brain injury which are often the biggest predictors of poor outcome if left untreated. It is well established that these behaviours are best observed in real life group settings. Our objective was to maximise the effects of neurorehabilitation by working with patients in a real world context such that the

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full impact of the injury could be determined and treatments could be implemented. Problem well documented in the literature.

There was a dearth of opportunities for patients to access their communities and a lack of understanding in the community about brain injury. We wanted to facilitate community integration by working with patients & community providers. We felt that this joint venture would be a stepping stone for patients to access communities independently as well as an opportunity to educate community providers.

### Method

Participants were adults affected by an acquired brain injury who came to Down to Earth as part of their neurorehabilitation. They were invited to attend by the Community Brain Injury Service in ABMU Health Board.

The research explored the impact of Down to Earth on anxiety (*as measured by the Beck Anxiety Inventory*), depression (*as measured by the Beck Depression Inventory – Fast Screen*), Quality of Life after Brain Injury (*measured by the Quality of Life after Brain Injury Scale*) and Wellbeing (*measured by the Warwick-Edinburgh Mental Wellbeing Scale – short version*). Questionnaires were administered prior to the group starting and shortly after the group had ended. The Down to Earth Groups were typically a day a week for ten weeks.

### Results

The findings showed that: -

1. The group showed a statistically significant reduction in depression after attending the Down to Earth Neurorehabilitation Project than at baseline ( $t = 2.264; df = 40; P < 0.05$ )
2. The group showed a statistically significant reduction in anxiety after the Down to Earth Neurorehabilitation Project than at baseline ( $t = 3.133; df = 40; P < 0.01$ )
3. The group showed a statistically significant increase in quality of life after the Down to Earth Neurorehabilitation Project than at baseline ( $t = -3.79; df = 19; P < 0.01$ )
4. The group showed a statistically significant increase in wellbeing after the Down to Earth Neurorehabilitation Project than at baseline ( $t = -2.981; df = 31; P < 0.01$ )

The data indicated that attending Down to Earth Neurorehabilitation Project significantly reduced depression and anxiety in people with an acquired brain injury. Wellbeing and quality of life after brain injury was also significantly improved as a consequence of the intervention.

### **A reminder about what this means**

*This is a little explanation about the above equations in case anyone asks or you want to know (The results have to be stated as they appear above and you don't need to know this next bit)*

$(t = 2.64; df = 40; P < 0.05)$

*I used paired samples t tests to analysis this above data. A 't' test looks for statistical **differences** between a set of scores. The 't' at the beginning of the equation just indicates a 't' test was used to analysis the data. The 'df' means degrees of freedom. In statistics, the number of degrees of freedom is the number of values in the final calculation of a statistic that are free to vary – in our case above 32.*

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The 'P' stands for 'probability. That is the 'probability' that the effect is 'real' or a product of 'chance' (remember the tossing a coin example). Before any statistical test is performed, a threshold value is chosen, called the [significance level](#), this is traditionally at 5% or 1%. That is, we are willing to say the effect is significant if there is a 5% probability ( $P = 0.05$ ) or a 1% probability ( $P = 0.01$ ) that the effect is due to chance. Put another way, we are willing to say the effect is significant if we can be 95% or 99% certain that the effect observed is not due to chance. You can see above that the probability value ( $P$ ) is less than ( $<$ ) 0.01. We tend to use the 0.01 probability level when carrying out drug trials where we need to be as certain as possible that any effect observed was due to the drug not due to chance. The 95% (or 0.05) level of probability is commonly applied to studies such as this one.

This means that we can be 99% confident that the effect that was observed was a 'real' effect that was the result of the intervention (Down to Earth and Neurorehab) rather than a spurious effect due to chance.

### Qualitative analysis

Each group of participants were interviewed after the project. The data was explored using thematic analysis. 55 participants were included in this analysis. It is difficult to explain qualitative data quickly but in short the themes identified could be easily mapped onto the PERMA model of happiness (Seligman, 2011)

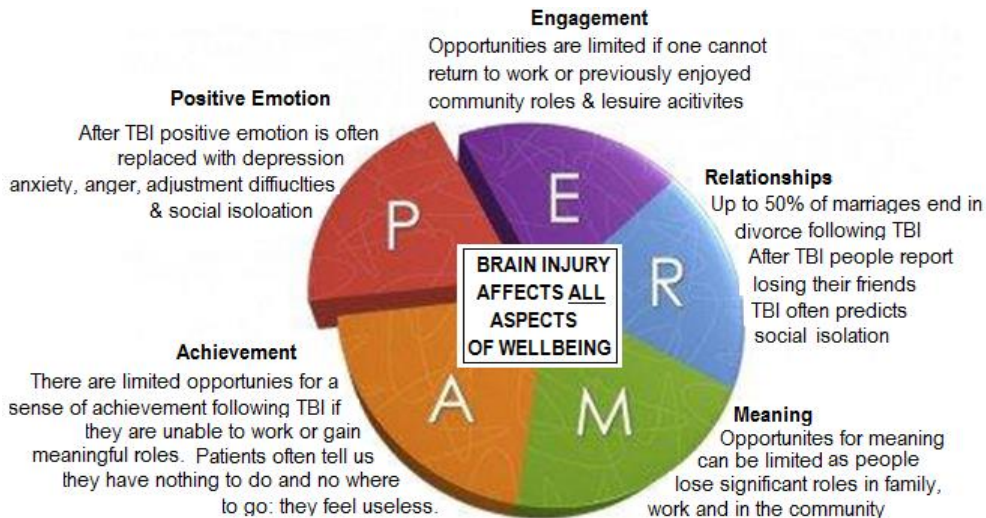
. This model is derived from thousands of studies from the field of positive psychology showing that the 5 essential elements needed for the experience of authentic happiness or wellbeing are presented in Figure 1.

**Figure 1: PERMA model of Wellbeing (Seligman, 2011)**



**Figure 2 illustrates how brain injury impacts of each aspect of wellbeing**

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The qualitative data collected after the Down to Earth Neurorehabilitation program mapped nicely onto this model. See Figure three for an example of this.

Figure 3: An example of themes identified in the qualitative analysis: -

