The mental health and wellbeing effects of a walking and outdoor activity based therapy project.

A Report for Discovery Quest and Julian Housing

Rachel Hine, Carly Wood, Jo Barton and Jules Pretty

interdisciplinary Centre for Environment and Society (iCES)
Department of Biological Sciences
University of Essex

March 2011
The mental health and wellbeing effects of a walking and outdoor activity based therapy project.

Report for Discovery Quest

Rachel Hine*, Carly Wood, Jo Barton and Professor Jules Pretty
Department of Biological Sciences and interdisciplinary Centre for Environment and Society, University of Essex

*Corresponding author: email rehine@essex.ac.uk

Contents

Acknowledgements 4
Executive Summary 5

1 Introduction 10
   1.1 Nature and mental health 10
      1.1.1 Background 10
      1.1.2 Green exercise and green care 12
      1.1.3 Healthy life pathways 13
   1.2 Contact with the wilderness 14
      1.2.1 Experiencing Wilderness 14
      1.2.2 Wilderness Therapy 14
   1.3 Walking programmes 18
   1.4 Limitations of evidence 19
      1.4.1 Limitations of current evidence base 19
      1.4.2 Evaluation of green care interventions 20

2 The Discovery Quest 2010 project 22
   2.1 The role of the Discovery Quest and Julian Housing 22
   2.2 Project overview 22
   2.3 Key objectives of the Discovery Quest 2010 project 22
   2.4 Structure of project 22
   2.5 Purpose and aims of the research 23
   2.6 Green Exercise Research Team at the University of Essex 24

3 Methodology 25
   3.1 Evaluation design 25
      3.1.1 Overview 25
      3.1.2 Sampling strategy 26
      3.1.3 Ethics and consent 27
      3.1.4 Training and acclimatisation 28
   3.2 Mental wellbeing measures 28
      3.2.1 Wellbeing 28
      3.2.2 Self-esteem 28
      3.2.3 Mood 29
   3.3 Perceptions of nature measures 30
### 3.3.1 Nature relatedness

### 3.3.2 Connectedness to nature

### 3.4 Healthy lifestyle measures
- 3.4.1 BMI and waist to hip ratio
- 3.4.2 Health
- 3.4.3 Physical activity
- 3.4.4 Smoking and drinking
- 3.4.5 Eating habits

### 3.5 Environmentally friendly behaviour measures

### 3.6 Community belonging measures

### 3.7 Distances walked

### 3.8 Anecdotal evidence

### 3.9 Role as participant observer

### 3.10 Statistical analysis

### 4 Results – Whole programme

#### 4.1 General information

#### 4.2 Mental wellbeing
- 4.2.1 Wellbeing
- 4.2.2 Self-esteem
- 4.2.3 Mood

#### 4.3 Perceptions of nature
- 4.3.1 Nature relatedness
- 4.3.2 Connectedness to nature
- 4.3.3 Nature contact

#### 4.4 Healthy lifestyle
- 4.4.1 BMI and waist to hip ratio
- 4.4.2 Health
- 4.4.3 Physical activity
- 4.4.4 Smoking and drinking
- 4.4.5 Eating habits

#### 4.5 Environmentally friendly behaviour

#### 4.6 Community belonging

#### 4.7 Other findings

#### 4.8 Importance of different aspects of the Discovery Quest programme

#### 4.9 Distances walked

#### 4.10 Anecdotal evidence
- 4.10.1 What participants were not looking forward to at the beginning and what they did not enjoy about the DQ programme
- 4.10.2 What participants were looking forward to at the beginning and what they did enjoy about the DQ programme
- 4.10.3 Suggestions for change
- 4.10.4 About the evaluation
- 4.10.5 Email feedback on the Discovery Quest programme from participants and support workers

#### 4.11 Key Findings

### 5 Results – Evaluated walks and challenges

#### 5.1 Walk 5
- 5.1.1 General information
- 5.1.2 Statistically significant findings
- 5.1.3 Narrative comments

#### 5.2 Norfolk Challenge
- 5.2.1 General information
Acknowledgements

Discovery Quest is currently funded by Natural England through its ‘Access to Nature’ grants scheme (which is part of the Big Lottery funded, Changing Spaces programme). The research for this study was supported by Discovery Quest and Norfolk Primary Care Trust. We are very grateful for all the help and support given by Discovery Quest staff and volunteers and to the staff of Mountain Wise.

The authors would especially like to thank all of the Discovery Quest 2010 participants for allowing us to share their DQ experience; for generously giving up time and energy for the evaluation – even when the weather was bad or when not feeling well; for being patient with the researcher with the video camera; and for being such an inspiration.

Further thanks also go to Edward Jackson for the use of his wonderful photos in this report.

Correspondence contact:

Rachel Hine, Assistant Director, interdisciplinary Centre for Environment and Society, Department of Biological Sciences, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, rehine@essex.ac.uk
Executive Summary

Introduction

It is believed that at any one time, at least one in six individuals’ is suffering from a ‘significant' mental health problem, and that one in four of us will experience mental illness at some time in our lives. Mental ill health can severely compromise an individual’s quality of life and it is a leading cause of disability. Sufferers of anxiety and depression are commonplace and by 2020 it is predicted that depression will be the second most common cause of disability in the developed world and sadly problems surrounding social exclusion, vilification and discrimination of the mentally ill are still real challenges to overcome.

There are many different interventions for tackling mental ill health but one approach which is beginning to be considered by mental health professionals is that of nature-based interventions. The natural environment is something that is for everyone, is available on our doorsteps and at minimal cost. Could one answer to improving our mental health be to encourage people to interact with nature and greenspace and to get active outdoors?

The positive relationship between exposure to nature and greenspace and an individual’s health is continually being proved. The quality and quantity of nature and greenspace in the surrounding environment can transform a person’s mental health, both at home, at work and at the places they visit. This concept whilst not revolutionary has yet to significantly influence the planning of our urban and rural environments or public health and social care priorities.

A wide range of international research has evidenced key health benefits experienced for many people after spending time in the natural environment and a link between nature and health seems to be clearly emerging. Health benefits include reduced stress levels, improved mood; enhanced psychological wellbeing and improved attention and concentration. Natural places facilitate stress recovery, encourage exercise participation, stimulate development in children and provide opportunities for personal development and sense of purpose in adults. Partaking in physical activity in natural surroundings - “green exercise”- may also have therapeutic properties and collectively, such therapeutic approaches have been referred to as “green care”. Many different organisations and services are starting to show an interest in green care including: healthcare professionals; social services providers; Local Authorities; offender management teams; probation services, youth services; education authorities and farmers. Although the area of green care is very diverse, the common linking ethos is the contact with nature, which generates the health, social or educational benefits.

There has also been an increase in popularity of organised facilitated walking programmes in the UK and a number of health initiatives and studies have reviewed the positive health benefits of organised facilitated walking programmes in greenspaces.

Wilderness therapy is an emerging treatment intervention which uses a systematic approach to work with participants. Many different groups of people can benefit from the outdoors, but wilderness therapy has, to date, most frequently been used with youth at risk, especially in the US, to help them address any emotional, adjustment, addiction or psychological problems. Wilderness therapy uses a systematic approach to work with participants.

\[1\] WHO 2001
\[2\] WHO 2004
\[3\] World Bank 1993
\[4\] See introduction section for complete list of references
\[5\] Health Council of the Netherlands, 2004
\[6\] Ashley et al. 1997, 1999
\[7\] Russell 1999
Therapy programmes typically provide healthy exercise and diet through hiking and physical activity, individual and group therapy sessions, educational curricula, primitive skills, group-living with peers, opportunities for solo time and reflection leadership training and challenges resulting from ‘back-to-basics’ living. The rationale for these interventions involves separating participants from daily negative influences and placing them in safe outdoor environments. Spending time in a natural setting enables participants to access those aspects of their self that may elude them in more conventional personal development or therapeutic settings.

Discovery Quest is a unique community based project which offers the opportunity for adults whose mental health difficulties have had a significant impact on the way they have managed their lives to be involved in an innovative and challenging walking and outdoor based therapy project. Discovery Quest promotes healthier lifestyles through challenging 6 month walking programmes, where people get quality time spent in green and wild places, this combining elements of both wilderness therapy and walking programmes.

Discovery Quest provides weekly facilitated walks in three areas: East Norfolk, Central Norfolk and West Norfolk, where participants get the opportunity to walk together in a group, explore some of Norfolk’s greatest countryside and to observe and learn about a variety of wildlife. Discovery Quest also provides three camping opportunities: Norfolk, Brecon Beacons and finally a week in Knoydart, in a beautiful and remote part of the Scottish Highlands. In addition to providing walking opportunities, Discovery Quest also aims to provide wider opportunities for participants and to enable participants to have greater aspirations, increased personal responsibility and to undertake real challenges.

**Methodology**

The University of Essex provided an independent monitoring and evaluation programme to assess key outcomes of the Discovery Quest project. The methodology was designed to provide comparative data, over time, on the personal outcomes of participating in the Discovery Quest project. There were two phases of the evaluation, firstly a longitudinal study comparing changes in outcome parameters, between the beginning and end of the six month Discovery Quest programme; and secondly a series of before and after activity evaluations at regular intervals during the programme.

A multi-method approach was used to assess the changes after participating in various stages of the project, incorporating both quantitative data and qualitative narrative. The primary sources of data collection utilised in this study included:

- Questionnaires
- On-site participant observation and informal interviews by primary researcher
- Participatory appraisal techniques

Main themes of the research were mental wellbeing and perceptions of nature; and secondary themes comprised environmentally friendly behaviour, social capital and healthy lifestyle. The short, composite questionnaires therefore included internationally recognised, standardised tools which measure participants’ wellbeing, self-esteem, mood, nature relatedness and connection to nature.
Qualitative questions were also asked for more detailed narrative and more information on what aspect of the trip participants enjoyed most, least and what they would change. Questions on smoking and drinking habits, community belonging and healthy eating were also included.

**Key Findings**

In total, 30 participants continued with the regular walks and the challenges right through until either Discover or Explore Scotland. The majority of the participants were male (67%) and ages ranged from the youngest of 20 up to the oldest at 68. Average total distances walked by participants ranged between 154km and 184km (96-114 miles) over the Discovery Quest programme.

In the health and social care sector mental well-being is generally accepted as being multi-faceted and therefore an individual’s well-being can be affected by many factors including both physical and mental health status, social inclusion, levels of control and the living environment. In this study, mental wellbeing was assessed using outcome measures chosen for the measurement of wellbeing, self esteem and mood (Warwick Edinburgh Mental Well Being Scale (WEMWBS), Rosenberg Self Esteem scale (RSE) and the Profile of Mood States (POMS) respectively) to act as a proxy for measuring changes in mental wellbeing parameters.

Positive changes in all 3 wellbeing measures were observed, with a statistically significant improvement in participant wellbeing, self esteem and total mood disturbance for the majority of participants on the Discovery Quest programme, both from the beginning to the end of the programme and before and after some of the evaluated walks and challenges.

Analysis of wellbeing, using a paired samples t-test, showed a statistically significant increase in participant WEMWBS from start of programme ($M=38.84$, $SD=6.59$) to the end of programme ($M=46.16$, $SD=7.39$, $t(18)=4.51$, $p<.001$) – Figure A. 89% of participants saw an increase in wellbeing.

Similar improvements were experienced in participant self esteem, a paired samples t-test showed a statistically significant increase in participant self esteem from the start of the programme ($M=26.50$, $SD=4.65$) to the end of programme ($M=22.69$, $SD=3.70$, $t(15)=4.55$, $p<.001$) – Figure B. The majority (88%) of participants saw an increase in their self Esteem scores as a result of taking part in the Discovery Quest programme.

These findings have important consequences for the participants' psychological health, as there is a strong relationship between self-esteem, mood and depression, anxiety, loneliness and alienation. Having good self-esteem is also a key indicator of emotional stability and predicts subjective wellbeing. Participants also told us in their own words, in the questionnaires, the participatory
sessions and in interviews to the participant observer, that they felt better in themselves, had gained confidence and a sense of achievement through physical challenge.

Connection to nature is considered to be an important predictor of subjective well-being and has also been found to facilitate social contact and build social capital all of which benefits are considered helpful to the participants in this programme. With this in mind, changes in participants’ nature relatedness and connection to nature were assessed using the Nature relatedness Scale (NRS) at the beginning and end of the programme and an adapted form of the Connection to Nature Scale (CNS) before and after the evaluated sessions.

The majority of Discovery Quest participants (79%) experienced an increase in the way they related to nature. A paired samples t-test showed a statistically significant increase in nature relatedness scores (NR) from the start of programme ($M=3.51$, $SD=.35$) to the end of programme ($M=3.76$, $SD=.42$, $t(12)=2.28, p<.05$) – Figure C.

A mix of physical measures (BMI and Waist to Hip Ratio) and outcome measures relating to physical activity, eating, smoking and drinking habits were used as a proxy for assessing healthy lifestyles. Nearly all participants experienced a decrease in BMI (Body Mass Index) and over half saw a decrease in their waist to hips ratio (WHR), representing a reduction in health risk, as a result of participating in the Discovery Quest programme. Several participants had moved to a healthier BMI category and there was a statistically significant decrease in participant BMI from the start to the end of the programme – Figure D. Similarly, approximately half of the participants saw improvements to their self-reported health state with statistically significant increases in health between the beginning and end of programme and 2 of the before and after studies.

In this study, to assess levels of participant environmental behaviour, questions were asked relating to environmental behaviour indicators for sustainability. Total environmentally friendly behaviour scores remained the same but slight increases were seen in 4 out of the 6 individual behaviour scores (recycling, turning off the plug and tap and picking up litter) over the course of the Discovery Quest programme. When looking at frequency of how often participants carried out environmentally friendly behaviours, starting responses suggested a reasonably environmentally pro-active group in the first place. Nevertheless, slight increases still occurred in proportions of participants carrying out all of the behaviours ‘often’ and ‘always’ as a result of participating in the Discovery Quest programme.
After taking part in the wilderness expedition, participants were asked to rate various aspects of the Discovery Quest programme including: the scenery, the wildlife, learning new skills, being part of a group, the exercise or the activity and being outside in wild places. All of the aspects of the programme were regarded as quite important to participants, however the most highly rated were the scenery and being outside in wild places, followed by the wildlife, exercise, being part of a group and learning new skills.

There were many more comments on what people had enjoyed about the programme than there were negative comments. It is interesting that the initial anxiety voiced by many participants at the start, the worry about meeting new people and how they would be seen by others, were not reported as problems in the end. In fact, meeting new people ended up being reported as one of the positive outcomes of involvement in the Discovery Quest programme. At the end of the programme, participants told us that they had enjoyed many aspects of the initiative, but principally these were being part of a group, getting fitter, being outside in nature and camping and walking – Box A. What people were expecting to enjoy and what they did enjoy in the end were very similar.

**Box A Some comments from participants in the Discovery Quest programme**

<table>
<thead>
<tr>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Getting a lot fitter, learning more about the outdoors and getting stronger”</td>
</tr>
<tr>
<td>“The DQ programme has been very good for me in disciplining me to walk regularly and I am back to my old fitness levels. I have also started eating more fruit etc”</td>
</tr>
<tr>
<td>“Being in a wild, remote, beautiful place away from civilisation and being with a group of people”</td>
</tr>
<tr>
<td>“The companionship, the achievements reached and the views”</td>
</tr>
<tr>
<td>“Everything, it was great especially Knoydart. I have met new people, learned new things and I have learned that I can relax and not panic. This is a useful skill when coming down mountains”</td>
</tr>
<tr>
<td>“Being in natural surroundings, getting to know new people”</td>
</tr>
<tr>
<td>“I achieved great respect for everybody involved in the quest”</td>
</tr>
<tr>
<td>“I enjoyed meeting up every week and exploring parts of Norfolk’s countryside”</td>
</tr>
<tr>
<td>“I have thoroughly enjoyed the Discovery Quest programme and I love the outdoors and going to beautiful places. I have also enjoyed the experience of being in a group and have made some new friends. Hopefully, I have got fitter and also improved my mental health too as I find walking very therapeutic and relaxing and good for the mind as well as the body”</td>
</tr>
<tr>
<td>“I didn’t have a good day yesterday but when I got to the top and it all opened up in front of me, I started to put things in order and it all started to make sense”</td>
</tr>
<tr>
<td>“DQ has done more for me than I could have imagined, it has released my spirit and I feel completely different”</td>
</tr>
</tbody>
</table>

**Conclusion**

It is clear from the findings discussed above that the Discovery Quest experience has contributed significantly to a range of important outcomes for the beneficiaries, for the programme and for the wider communities of mental health and green care. Discovery Quest has shown itself to be successful in developing and providing an innovative nature-based approach to the continued recovery of those suffering from severe and enduring mental health problems in Norfolk.

Participating in the Discovery Quest programme has been a catalyst for change for many of the participants involved. The majority of participants will leave the programme with better self-esteem and communicative skills, enhanced psychological health and wellbeing, improved physical health, a sense of personal achievement from the physical challenges and an increased connection to nature.

Those responsible for providing health and social care for adults with mental ill health should consider these multiple health and wellbeing benefits to participants in challenging walking and outdoor based initiatives, such as Discovery Quest, when commissioning and funding mental health services.
1 Introduction

1.1 Nature, physical activity and mental health

1.1.1 Background

The health of the UK population is suffering as a result of our increasingly sedentary lifestyles, poor diets and the prevalence of mental illness. It is believed that at any one time, at least one in six individuals' is suffering from a 'significant' mental health problem, and that one in four people will experience mental illness at some time in their lives.

Gaining positive mental health means not only being free of disease or disability but also achieving a balance between self-satisfaction, independence, capability and competency, achieving one's potential, and coping well with stress and adversity. Mental ill health can severely compromise an individual’s quality of life and it is a leading cause of disability. Sufferers of anxiety and depression are commonplace and by 2020 it is predicted that depression will be the second most common cause of disability in the developed world and sadly problems surrounding social exclusion, vilification and discrimination of the mentally ill are still real challenges to overcome.

Mental illness also inflicts additional economic and social costs both directly (health and social care; human cost) and indirectly (through output losses) and it is estimated that the total costs of mental illness in England in 2009-10 were approximately £105.2 billion. The majority of these costs fall mainly on those who experience mental illness and their families but it also generates sizeable costs for taxpayers and for business. According to a study in 2003 mental health problems carried a bigger cost to society than crime. Mental ill health is therefore a major public health issue.

There are many different interventions for tackling mental ill health but one approach which is beginning to be considered by mental health professionals is that of nature-based interventions. The natural environment is something that is for everyone, is available on our doorsteps and at minimal cost. Could one answer to improving our mental health be to encourage people to interact with nature and greenspace and to get active outdoors?

The positive relationship between exposure to nature and greenspace and an individual’s health is continually being proved. The quality and quantity of nature and greenspace in the surrounding environment can transform a person’s mental health, both at home, at work and at the places they visit. This concept whilst not revolutionary has yet to significantly influence the planning of our urban and rural environments or public health and social care priorities.

Nevertheless, nature and greenspaces are often perceived as places to relax, escape and unwind from the daily stresses of modern life, thus having a positive influence on our emotional (and physical) well-being. Three key theories offer explanations concerning the human relationship with nature, which all focus on the restorative effects of the natural environment – the Biophilia hypothesis; the Attention Restoration Theory (ART) and the Psycho-evolutionary stress reduction.

---

1 WHO 2001; In the UK it is more, in 2007 23% of people had at least one psychiatric disorder - ONS 2009
2 WHO 2004
3 Bird 2007
4 World Bank 1993
5 The Centre for Mental Health 2010
6 ONS 2009
7 WHO 2004
8 Bird 2007
9 The Centre for Mental Health 2010
10 ONS 2009
11 Sainsbury Centre for Mental Health 2003
12 Bermann et al 2008
13 Takano et al, 2002; Mitchell and Popham 2008
14 Barton et al 2009
15 Barton et al 2009
16 Wilson 1984
The 'Biophilia hypothesis' suggests an innate evolutionary foundation to the relationship and recognises the basic human dependence and preference to affiliate with nature\textsuperscript{19}. ART focuses on the cognitive changes associated with restoration, while PET argues that restoration is derived from reduction of stress, and acknowledges affective or emotional changes. However, all three theories agree that nature contributes to enhanced well-being, mental development and personal fulfilment\textsuperscript{20}. Therefore, in today’s world, where sufferers of mental ill health are more commonplace, nature can act as a vital health resource and with significant costs incurred to the individual, and from lost outputs and increased expenditure in the provision of care, the importance of access to nature and greenspace is paramount.

Physical activity has long been proved to be an important determinant of both physical health and psychological well-being\textsuperscript{22}. Moderate regular exercise reduces morbidity rates by 30-50\% and has a particularly protective effect against maturity onset Type II diabetes, coronary heart disease, musculo-skeletal diseases and cancer. It lowers blood pressure, improves blood lipid and glucose profiles and boosts the immune system. Physical activity also enhances mental health by improving mood and self-esteem, reducing stress, enriching an individual’s quality of life and diminishing the chance of depression. We are now gaining a better understanding of the intimate inter-relationship between mental and physical health, as the status of one considerably affects the other. Therefore, exercise can be used as a successful tool to enable a more positive health state.

Physical inactivity is one of the leading causes of death in developed countries, responsible for an estimated 22-23\% of coronary heart disease, 16-17\% of colon cancer, 15\% of diabetes, 12-13\% of strokes and 11\% of breast cancer\textsuperscript{23}. The annual costs of physical inactivity in England are reported to be approximately £8.3 billion\textsuperscript{24}, excluding individuals who are obese due to inactivity, which contribute a further cost of £2.5 billion per year to the economy\textsuperscript{25}. These figures incorporate both costs to the NHS and associated costs to the economy (e.g. work absenteeism). This rise in inactivity levels and the related problems with obesity are also a priority on the government’s agenda.

Undertaking physical activities in outdoor green environments is possibly a more sustainable option in maintaining long-term activity levels, as it is the interaction with the environment and the social contact that are the main incentives. In this situation, the health benefits derived from the exercise are not the sole focus and become a secondary outcome. With the current inactivity dilemma, exploring the use of rural and urban greenspaces as ideal locations to encourage physical activity could prove to be a benefit for all\textsuperscript{26}.

\textsuperscript{18} Kaplan and Kaplan 1989  
\textsuperscript{19} Ulrich 1981  
\textsuperscript{20} Wilson 1984; Kellert and Wilson 1993; White and Heerwagen 1998  
\textsuperscript{21} Barton et al 2009  
\textsuperscript{22} CDC 1996; Laumann et al. 2003; DoH 2004; Foresight 2007; Sandercock et al. 2010  
\textsuperscript{23} WHO 2002  
\textsuperscript{24} DoH 2004, NICE 2009  
\textsuperscript{25} As 13  
\textsuperscript{26} Mind 2007
1.1.2 **Green exercise and green care**

There is growing empirical evidence to show that exposure to nature brings substantial mental health benefits with the key message emerging that contact with these green spaces improves psychological health by reducing stress levels, enhancing mood and improving self-esteem\(^{27}\). At the same time, participating in physical activity is also known to result in positive physiological and psychological health outcomes. Therefore over the last 7 years at the University of Essex, these ideas have been combined into a programme of research investigating the synergistic benefits of engaging in physical activities whilst simultaneously being exposed to nature and this is referred to as ‘green exercise’\(^{28}\).

From this wide variety of University of Essex research, three broad health outcomes have been discerned: i) improvement of psychological well-being (by enhancing mood and self-esteem, whilst reducing feelings of anger, confusion, depression and tension); ii) generation of physical health benefits (by reducing blood pressure and burning calories) and iii) facilitation of social networking and connectivity (by enhancing social capital).

In addition, a recent green exercise dose-response study indicated that dose responses for both intensity and duration showed large benefits from short engagements in green exercise, and then diminishing but still positive returns\(^{29}\). The findings also suggest that those who are currently sedentary, inactive, and/or mentally unwell would accrue health benefits if they were able to undertake regular, short-duration physical activity in accessible (probably nearby) green space. Such doses of nature will contribute to immediate mental health benefits.

Our research findings therefore suggest that therapeutic applications of green exercise could be effective and this is termed ‘green care’\(^{30}\). Green care is generally used more as a therapy or specific intervention, for a particular participant or group of patients rather than simply as a ‘therapeutic’ experience. There is a growing movement towards green care in many contexts, ranging from therapeutic applications of green

---

\(^{27}\) Bird 2007; Burls 2007  
\(^{29}\) Barton and Pretty 2010  
\(^{30}\) Pretty 2006; Sempik, Hine and Wilcox 2010
exercise activities, Social and Therapeutic Horticulture (STH), Animal Assisted Therapies to Wilderness Therapy, Ecotherapy and Care Farming (see Figure 1).

Many different commissioning organisations and service providers are starting to show an interest in various forms of green care including: healthcare professionals; social services providers; community mental health teams; Local Authorities; offender management teams; probation services; youth services; education authorities; veterans charities and farmers. In the UK, STH is well established; in the Netherlands care farming is widely practiced; in the US it is wilderness therapy and adventure therapy that are more prolific and have been utilised for many years to improve the health of particular cohorts of vulnerable people.

Although the area of green care is very diverse, the common linking ethos is the contact with nature, which generates the health, social or educational benefits. By linking the exposure to nature with various activities, in a safe way that is often on a regular basis, facilitated and structured, this process can offer therapeutic benefits for those who are experiencing mental illness. By increasing participation and awareness, green care initiatives have the potential to ameliorate mental ill health and significantly reduce public health costs by enabling healthier communities.

1.1.3 Healthy life pathways

Several important multi-decade longitudinal cohort studies indicate that many of the social and environmental conditions of childhood predict or track adult health status. Childhood physical and mental ill-health is carried forward. Later emotional well-being and cognitive capacity is profoundly influenced by early social development suggesting a need to establish good behaviours early. There is also growing evidence to show that contact with nature and consequent levels of physical activity in childhood affects not only well-being at the time but also their health in later life.\(^{31}\)

Recent University of Essex research\(^{32}\) has developed a funnel of pathways within which all our lives are shaped (Figure 2). At the top, people live longer with a better quality of life; at the bottom they die earlier and often live years with a lower quality of life. On the healthy pathway, people tend to be active, be connected to people and society, engage with natural places, and eat healthy foods. As

\(^{31}\) Pretty et al 2010

\(^{32}\) As 24
a result, they tend to have higher self-esteem and better mood, be members of groups and volunteer more, keep learning, engage regularly with nature and be more resilient to stress.

On the unhealthy pathway, people tend to be inactive and sedentary, be disconnected from society and social groups, not engage with natural places, and eat energy-dense and unhealthy foods. They also tend to have lower socio-economic status, be in more stressful jobs, live where active travel to work or school is difficult, have increased likelihood of being mentally ill, and be overweight or obese.

There are clearly numerous pathways that lie between healthy path A and unhealthy path B - the figure has been simplified for illustration purposes only. There are many other factors that affect our long-term life and health pathways but the research describes the key mediators, such as social status, mental health, social capital, physical activity, urban design and contact with nature.

It is proposed that it is possible to shift across these life pathways - from B towards A as a result of adopting healthy behaviours, or from A to B as a result of shocks or an accumulation of stresses. Resilient individuals remain able to absorb and cope with shocks and stresses and remain on pathway A. It follows therefore that nature-based, green care interventions which aim to improve mental well-being, increase physical activity levels and foster a connection to nature, often at the same time as enabling healthy lifestyle behaviours and creating social capital; can help an individual shift across the life pathways for a healthier, happier life.

1.2 Contact with the wilderness

1.2.1 Experiencing wilderness

Throughout the 20th and 21st centuries the number of people living in an entirely urban setting has increased. It is predicted that within the next decade the number of urban dwellers will exceed those residing in rural environments for the first time\(^{33}\). Thus, many people in today’s society are living in urban areas with minimal contact with nature and greenspaces. Yet, contact with nature is essential for human development, quality of life and long-term health and wellbeing\(^{34}\). Nature is perceived by many as a place to relax, escape and unwind from the daily stresses of modern life and the psychological value of open space has long been recognised\(^{35}\). Wilderness experiences are also beneficial for learning respect for both other people and nature, allowing time for reflection, getting to know oneself better and learning not to take things for granted\(^{36}\).

The benefits of wilderness experiences date back to the testimony of 19\(^{th}\) century writers such as John Muir and Henry David Thoreau. Muir’s writing on the Sierra Nevada, and the importance of such wild areas for well-being was instrumental in the establishment of the world’s first national park at Yellowstone in 1872\(^{37}\). A number of studies have shown that people both seek and derive a variety of values when they visit wildernesses, in particular a desire for tranquility and natural beauty, escape from the stresses of urban life, and the potential for dramatic ‘peak experiences’\(^{38}\) or transcendent moments. These ‘transcendent’ experiences were found to provoke a sense of harmony, freedom and well-being that were sufficiently long-lasting to actually change peoples’ attitudes to the environment. Herzog and colleagues conclude that “the restorative potential of...
natural settings is probably underappreciated”, as many people do not appreciate the full benefits of such settings – particularly in the face of competition for multiple other leisure and entertainment opportunities of modern life\(^{39}\).

A study in 1999\(^{40}\) explored the effects of a wilderness experience on two groups of women in two areas of Minnesota and Arizona. Participants enjoyed both the individual contact with nature and being part of a group of people, who shared the experience together. Personal testimonies revealed that the experience left a lasting impression on most participants, especially as the experiences differed so dramatically from everyday life. Participants spoke of renewed hope, a reawakening of emotions and a new sense of identity.

Research has also examined the effects of nature on sense of purpose and personal growth and the positive effects on self-confidence, self-image and mood in various groups of people, including young offenders, people with depression and abused women\(^{41}\). Other studies have noted the value and therapeutic potential of natural and wilderness experiences, and the additional role that physical hardship can play in triggering more profound experiences\(^{42}\).

The University of Essex together with the Wilderness Foundation UK has also been undertaking a piece of ongoing research exploring the health benefits of participating in wilderness trails. The trails typically involve young people from the UK who have the opportunity to participate in a wilderness trail in Snowdonia National Park, North Wales or Imfolozi Game Reserve, Kwazulu Natal, South Africa. The trips have involved a variety of activities, such as camping, back packing and hiking, storytelling, observing wildlife, cooking, campcraft, conservation volunteering and learning about the environment. Results demonstrate that participating in the trails significantly enhances individuals’ self-esteem, improves psychological well-being and allows them to feel more connected to nature. The beauty of the scenic environment is a fundamental part of the experience but establishing new and special friendships is also very important in having a shared experience. A smaller scale snapshot analysis using identical methodology was also carried out by the University of Essex on a wilderness experience led by Discovery Quest in the Highlands of Scotland in 2009 with very similar findings\(^{43}\).

Recreational wilderness experiences encourage personal development by initiating feelings of competence and autonomy\(^{44}\). These feelings are said to be not solely due to the interaction with nature but also due to the absence of any social pressure and meeting the expectation of others\(^{45}\). Following these findings, Fox (1999) developed a model referred to as the ‘Spiritual Experience Process Funnel’. It proposes that during a wilderness experience an individual starts to relax and feel autonomous and competent, they begin to become receptive to the beauty and symbolic importance of nature, which

\(^{29}\) Rossman & Uleha 1977; Williams & Harvey 2001; Herzog et al. 2002  
\(^{40}\) Fredrickson and Anderson 1999  
\(^{41}\) Kaplan & Talbot 1983; Hazelworth & Wilson 1990; Stringer & MCAvoy 1992  
\(^{42}\) Mitchell 1983; Kaplan 1995; Fredrickson & Anderson, 1999; Williams & Harvey 2001; Herzog et al. 2002  
\(^{43}\) Hine et al 2009  
\(^{44}\) Coleman & Iso-Ahola 1993; Coleman 1993  
\(^{45}\) Hartig and Evans 1993
stimulates reflection and sense of purpose. The symbolic effect of nature describes natural elements and places such as trees, water, special locations, which act as symbols which relate to deeper meanings and values. Therefore, a 'sense of place' manifests itself which refers to an emotional bonding and identification with a particular place or area. 

1.2.2 Wilderness Therapy

Using wilderness experiences for opportunities for personal awareness, personal development, and personal change is not a new concept. This process has been in existence in human cultures for thousands of years, yet in more recent times the outdoors has been increasingly used to provide a range of personal development opportunities, for both individuals and groups, through their literal immersion in natural, wild, and wilderness settings. Although the term 'wilderness therapy' is a relatively new concept in the UK, programmes have been in existence for many years in the US. Multiple definitions have evolved as the concept has gained popularity, but they all acknowledge a therapeutic process which is inherent in wilderness expeditions. One of the initial definitions defined wilderness therapy as “the use of traditional therapy techniques, especially for group therapy, in an out-of-doors setting, utilising outdoor adventure pursuits and other activities to enhance personal growth”. However, in more recent years a more concise definition of wilderness therapy has been developed: "is an experiential program that takes place in a wilderness or remote outdoor setting". Essentially though wilderness therapy uses the ‘wilderness as co-therapist’ in addition to any professional therapy that may (or may not) take place whilst out in the wilderness.

Wilderness therapy is an emerging treatment intervention which uses a systematic approach to work with participants. Many different groups of people can benefit from the outdoors, but wilderness therapy has, to date, most frequently been used with youth at risk, especially in the US, to help them address any emotional, adjustment, addiction or psychological problems. Wilderness Therapy programmes typically provide healthy exercise and diet through hiking and physical activity, individual and group therapy sessions, educational curricula, primitive skills, group-living with peers, opportunities for solo time and reflection, leadership training and challenges resulting from ‘back-to-basics’ living. The rationale for these interventions involves separating participants from daily negative influences and placing them in safe outdoor environments. Spending time in a natural setting enables participants to access those aspects of their self that may elude them in more conventional personal development or therapeutic settings. The programmes facilitate self-awareness, communication, cooperation and contribution to the wellbeing of the group whilst allowing them to discover what they have taken for granted. Participation helps to address problem behaviours by fostering personal and social responsibility and providing the opportunity for emotional growth. Facing challenges in a wilderness setting gives participants the experience of daily successes which help to challenge old, negative beliefs and lead to new, more optimistic self-perceptions.

46 Health Council of the Netherlands 2004
47 Davis-Berman & Berman 1994
48 Connor 2007
50 Russell 1999
51 Connor 2007
52 Russell 1999
Several literature reviews have been conducted on the benefits of participating in wilderness therapy and related wilderness programmes\(^{53}\). A myriad of different benefits to participants have been reported, some of these have been measured by quantitative methods, others by qualitative methods and still others described anecdotally, depending on the individual wilderness context. However, 4 key therapeutic factors emerge:

1. **Personal development – changes to health and sense of self**
2. **Interpersonal development – social and family**
3. **Development of connection to nature and changes in spiritual aspects**
4. **Reduced recidivism rates**

**Personal development – changes to health and sense of self**

Health benefits reported included improvements both to physical and mental health parameters. Overall improvements in participants’ physical health included cardiovascular improvements, reduced fat in body mass, increased bone and muscle mass, increased physical fitness, reduced anxiety and stress, reduced sleep disturbances and hypertension. In terms of mental health and well-being, studies reported positive changes in self-esteem\(^{54}\), self-confidence, self-determination, increased self-efficacy\(^{55}\), self-image, greater sense of self-control\(^{56}\) and self-empowerment.

**Interpersonal development – social and family**

Wilderness experiences have been shown to improve communication between participants and the wider society, resulting in improved interpersonal relationships, the development of trust and increased social capital. Reported benefits of wilderness therapy highlight similar improvements in communication skills and family and social relations, especially pertinent when the majority of participants in the studies were adolescents.

Benefits reported include increased social skills\(^{57}\) and improved group cohesion through group and outdoor communal living\(^{58}\). Many young people involved in wilderness therapy programmes experience substance abuse or dependency issues and are continually subjected to negative peer influences. Introducing positive peer influences into their lives is a very effective way of reducing substance use post treatment and program facilitators play a key role in encouraging communication, support and trust through outdoor communal living. This often results in improved group cohesion, positive peer feedback and conflict resolution. This process often enhances participants’ sense of self-worth and improves their ability to relate to others, which can be an empowering experience\(^{59}\).

Spending time in the wilderness also allows a therapeutic relationship to be formed between the wilderness therapy facilitators and the participants\(^{60}\). The lack of time constraints and customary roles associated with many traditional therapeutic approaches allows more discussion and dialogue to occur in this safe and supporting environment. Because the facilitators engage in the same wilderness activities as the young people, sharing meals, sleeping in the same tents and hiking across the same terrain etc., the staff-participant relationship restructures and many participants see them as more approachable and easy to talk to\(^{61}\).


\(^{54}\) Cason & Gillis 1993

\(^{55}\) Hans 2000


\(^{57}\) Hattie et al. 1997

\(^{58}\) Bandoroff & Scherer 1994; Davis Berman & Berman 1994; Russell 2001

\(^{59}\) Russell & Phillips-Miller 2002

\(^{60}\) Russell 2001

\(^{61}\) Russell 2002, 2004
Development of connection to nature and changes in spiritual aspects

Feelings of connectedness to nature and changes in attitudes to nature have been widely reported in wilderness experience literature, ranging from the aesthetic appreciation of beautiful scenery and landscapes to a deep sense of belonging to the natural world. Participants report outcomes such as: feelings of peacefulness and harmony, a sense of timelessness, and state that exposure to a new experience and living a simple primitive lifestyle, creates a sense of vulnerability which is humbling, enabling an escape from daily stresses and learning a respect for nature. In addition, participants often reported an increase in spiritual values, an awareness of a spiritual dimension and a development of a sense of place.

Reduced recidivism rates

Many studies also report reduced recidivism rates and the nature of offences are less serious. Thus, findings from wilderness therapy programs suggested that young people particularly alter naturally when they are removed from negative environments, ‘bad’ influences and triggering events that produce challenging and destructive behaviours. The wilderness is a place where people appreciate the tranquillity and beauty of the landscape and the challenging environment can give people mental clarity, self-sufficiency and help moderate wayward behaviour.

1.3 Walking programmes

One of the most beneficial and preferred forms of green exercise is walking. We now walk less as part of our daily lives, though efforts to encourage walking for health are having some positive effects. Health experts have described walking as almost perfect exercise and many health benefits are associated with walking - both noticeable in the short-term (acute effects of exercise) and in the long-term (chronic effects) from adaptations following regular walking over a period of weeks or months. Walking is an everyday activity and is potentially available to almost all people, requiring no equipment or expense. People are more likely to walk with company or a pet, and more likely to walk in aesthetically-pleasing environments.

There has been an increase in popularity of organised facilitated walking programmes in the UK (see for example the Walking for Health initiative (WfH) and Paths to Health). Typically, volunteers are trained to lead walks and to encourage regular participation in a variety of weekly routes established by local people. All proposed routes are initially assessed for potential risks and subsequently publicised via a number of diverse sources. In the WfH programme, some participants are referred by general practitioners or other health professionals, while others join to become part of a social group and are self-referred. All members have the choice of walking with companionship or using the publicised routes to walk independently. Pedometers (step-o-meters) are used to encourage regular activity and have become extremely popular nationally.

The key assets of the WfH scheme include its database of walking routes, a popular website, the WfH brand name and profile, equipment, accredited training course and manuals, and evaluation results and stories. However, the underlying elements behind its success relate to the number of

---

62 Russell et al. 1998; Russell 1999, 2000; Russell et al. 2000; Caulkins et al. 2006;
63 Hine et al. 2009
64 Kelly & Baer 1969
65 Davies 2007
66 Takano et al. 2002
67 Countryside Agency 2000, 2003; Faber Maunsell 2003
68 Ball et al. 2001
69 The value of step-o-meters: “patients report that 93% said having a step-o-meter made them walk more. On average, patients increased their daily walking by at least 1500 steps – a 50% improvement on the increases found during their 2002 campaign when WHI simply gave Step-o-meters to people and did not provide any face-to-face support.” (Countryside Agency, 2004)
schemes set up (600 local schemes), the quantity of volunteers involved, and most significantly, that three-quarters of the way through the initiative it has 66,000 regular walkers. A number of health initiatives and studies have reviewed the positive health benefits of organised facilitated walking programmes in greenspaces. A national evaluation of WfH health walk schemes reported that 65% of attendees were achieving the weekly recommended levels of moderate physical activity. Many participants believed that the scheme had encouraged them to do more independent walking, especially for shorter journeys which they now walked instead of using the car. Reasons for participation in walking groups across the UK are fairly diverse, including enjoyment of the countryside, feeling healthier and more alive, experiencing increased confidence and becoming part of a social group. The first randomised control trial of the health walks programme analysed change in activity and fitness levels, and found that 36% of the participants in the health walk group introduced activity into their lifestyles and remained active compared with only 23% in the group solely receiving advice.

Findings, to date, seem to imply that although health reasons may be the primary drivers for joining walking schemes, it is the contact with nature and social networking that sustain motivation. Thus, activities which result in exercise becoming secondary to environmental or social benefits have a higher adherence rate than activities in which exercise remains the sole motivation.

1.4 Limitations of evidence

1.4.1 Limitations of current evidence base

The evidence base for the benefits of wilderness experiences is continually growing and the large amount of anecdotal data implies there is a strong link between wilderness exposure and improved health and well-being for a variety of cohorts. This type of green care initiative seems very successful with youth at risk; however, despite the longevity of practice there is still a need for further quantitative data to support the qualitative narrative as the majority of studies are purely qualitative (around 30%) or descriptive (around 50%) with much emphasis on anecdotal evidence.

Many studies suffer from methodological limitations which cast some doubt over their effectiveness as a therapeutic intervention. The lack of standardised, reliable and validated measures assessing changes in health parameters; absence of a control group; together with small sample sizes are major limitations of the research findings. Few studies have directly tested how effective wilderness therapy is in changing behaviour across multiple programmes of different length, with different leadership experience, and who target different cohorts. Methodologies are often not

[70] http://www.wfh.naturalengland.org.uk/
[71] Ashley et al. 1997, 1999
[72] Dawson et al. 2006
[73] Lamb et al. 2002
[74] Pretty et al. 2007
[75] Cason & Gillis, 1994; Davis-Berman & Berman, 1994
[76] Russell, 2003
replicable and not all details are reported, so there is a general lack of comparable findings\textsuperscript{77}. There is also a lack of longitudinal study designs as many studies do not administer follow-up measures to evaluate the long-term effects of participation\textsuperscript{78}. Therefore, there is a real need for a mixed approach adopting both robust standardised instruments to quantify outcomes and qualitative methodologies which capture rich quotes to support the quantitative analyses. There is therefore a need for further research to address these limitations.

In addition, there is limited evidence concerning the application of green care initiatives in the mental health population. Steps are being taken to try and engage individuals experiencing mental illness in green care (e.g. care farming\textsuperscript{79}, ‘Green Gyms’\textsuperscript{80}, green health walks etc). Green Gym groups often attract individuals experiencing mental illness and initial evaluation findings have reported significant increases in mental health state scores, a reduction in depression and a trend towards weight loss\textsuperscript{81}.

However, to date, there has been little research conducted which compares green care with more traditional treatment options, such as antidepressants or cognitive behavioural therapy (CBT). We anticipate that green care will be effective, but the robust scientific evidence to support this hypothesis is still lacking. For the idea to gain credibility and influence government policy and the health sector, more detailed research needs to be undertaken.

### 1.4.2 Evaluation of green care interventions

In the field of healthcare evaluation, the robustness and effectiveness of evidence is traditionally assessed using an idea of a ‘hierarchy of evidence’. In the traditional hierarchy, particular elements of evaluation design are seen as indispensable if the ‘scientific’ nature of evidence is to be preserved. Foremost among these are:

- the application of a comparative method including a ‘control’ sample
- the use of randomness as a principle in the construction of samples
- the use of ‘blinding’ (where research participants only (single blind) or participants and researchers (double blind) are uncertain of which individuals have received an intervention and which a placebo)
- the use of replicable methodology and standardised, validated instruments for the measurement of health gain and other outcomes

Because the randomised control trial (RCT) contains 3 of the elements above (comparison, randomisation and blinding) it is seen as the ‘gold standard’ in effectiveness methodology. The RCT is considered a ‘fair test’, involving the comparison of two treatments or interventions under conditions that remove any bias either in the selection of participants or the measurement of outcomes\textsuperscript{82}. However, evaluation of green care interventions may find it difficult to live up to this standard, as they, by their very nature, preclude the use of one (or several) desirable methodological elements. The main reasons for this are that green care interventions:

- do not necessarily involve the application of a discrete or defined ‘treatment’ such as a medicine.
- are often not amenable to placebo (e.g. it is not possible to design an activity that is just like being in the wilderness, but isn’t in the wilderness at all.)

\textsuperscript{77} Winterdyk & Griffiths, 1984; Gillis, 1992; Cason & Gillis, 1994; Hattie et al., 1997
\textsuperscript{78} Russell, 1999; Epstein, 2004
\textsuperscript{79} See [http://www.ncfi.org.uk/](http://www.ncfi.org.uk/) for more details on care farming
\textsuperscript{80} Set up by the British Trust of Conservation Volunteers (BTCV)
\textsuperscript{81} Reynolds 1999, 2002
\textsuperscript{82} Sempik 2007
• cannot easily be blinded as it would not be possible for a patient to be honestly unsure whether they had been in the wilderness or not
• outcomes are not necessarily discrete or easily measurable (e.g. feelings of improved general wellbeing, increased social inclusion etc)

In addition, it could be construed as unethical to deny participants access to green care interventions (i.e. withholding treatment) when they consider that it might be beneficial to their health and well-being. Given that most green care interventions are characterised by these aspects, the ‘gold standard’ of a blinded and randomised control trial has up until now not necessarily been considered an appropriate (or even possible) choice. Nevertheless, dismissing the RCT as ‘inappropriate’ for the evaluation of nature-based interventions may be limiting the perception of the effectiveness of such initiatives. Regardless of how viable RCTs are considered for green care, enhanced monitoring and evaluation of these programmes is needed to assess changes in health, social and economic outcomes.
2 The Discovery Quest 2010 project

2.1 The role of the Discovery Quest and Julian Housing

The Discovery Quest project began in 2006 and is a Julian Housing Support Trust Ltd (JHS) initiative. JHS is a Norfolk-based mental-health charitable organisation, enabling adults with severe and enduring mental health problems to live within the community, in accommodation suited to their needs. JHS philosophy is to build on peoples existing strengths and skills in order for them to live as independently as they wish.

Currently the Discovery Quest programme is funded by Natural England, through its ‘Access to Nature’ grants scheme which is part of the Big Lottery funded Changing Spaces programme. Discovery Quest is a unique community based project which offers the opportunity for adults whose mental health difficulties have had a significant impact on the way they have managed their lives to be involved in an innovative and challenging walking and outdoor based therapy project. Discovery Quest promotes healthier lifestyles through challenging 6 month walking programmes, where people get quality time spent in green and wild places.

2.2 Project overview

Discovery Quest provides weekly facilitated walks in three areas: East Norfolk, Central Norfolk and West Norfolk, where participants get the opportunity to walk together in a group, explore some of Norfolk’s greatest countryside and to observe and learn about a variety of wildlife. Discovery Quest also provides three camping opportunities: one in Norfolk, one in the Brecon Beacons and finally a week long field trip to Knoydart, in a beautiful and remote part of the Scottish Highlands. In addition to providing walking opportunities, Discovery Quest also aims to provide wider opportunities for participants and to enable participants to have greater aspirations, increased personal responsibility and to undertake real challenges.

2.3 Key objectives of the Discovery Quest 2010 project

The key objectives of the Discovery Quest project in 2010 were to:

- provide weekly countryside walks in 3 areas of Norfolk over a six month period
- develop wildlife, conservation and environmental awareness through workshops run by Norfolk Wildlife Trust
- undertake the John Muir Award, an environmental award that encourages people to connect, enjoy and care for wild places
- spend quality time exploring some of the UK’s most stunning National Parks
- to experience healthier community living via the camping trips
- receive nutritional advice to add the walking experience
- improve social interaction
- enhance social & psychological recovery through personal achievements
- increase self-confidence & aspirations of all those undertaking the project

2.4 Structure of project

---

83 This section taken from http://www.discoveryquest.org/index.php?page=aboutdq
84 Adapted from http://www.discoveryquest.org/index.php?page=aboutdq
The structure of the Discovery Quest programme comprises 4 stages, as illustrated in Figure 3.

Stage 1 is the induction phase, which lasts for six weeks and includes weekly walks and an overnight camp, all in Norfolk.

Stage 2 provides the opportunity to continue walking and exploring the Norfolk countryside, followed by the opportunity to explore a wild place elsewhere in Britain (Brecon Beacons).

Stage 3 is split into two: ‘Discover Scotland’ is designed for participants who wish to discover wild places at a more leisurely pace and ‘Explore Scotland’ is designed for those who wish to be more energetic.

Stage 4 can only be achieved once the other three stages have been completed and is designed for those wishing to further develop their walking leadership skills.

2.5 Purpose and aims of the research

The purpose of this research was to carry out an analysis of the Discovery Quest programme 2010, in order to provide robust scientific quantitative data on effects on participant psychological health and well-being derived from taking part and to compliment this quantitative data with the collection of qualitative and anecdotal evidence.

The aims of the University of Essex research were to:
- monitor and evaluate the Discovery Quest programme over six months
- develop a methodology to assess the change in people’s behaviour and emotional states after participating in the various stages of the Discovery Quest project; including a baseline assessment of current attitudes, emotional states and behaviours of the selected group
members, to allow direct comparisons to be made with identical measurements collected at future time points.

- design a repeatable evaluation process so that Discovery Quest can re-evaluate in the future
- formulate an evaluation process that can be shared with other similar organisations (or other Julian Housing initiatives) in the UK so that they may benefit and learn from the evaluation and repeat it in their own neighbourhoods.

2.6 Green Exercise Research Team at the University of Essex

The Green Exercise team involved in this study forms part of the interdisciplinary Centre for Environment and Society (iCES) at the University of Essex. There is growing empirical evidence to show that exposure to nature brings substantial mental health benefits and at the same time, physical activity is known to result in positive physical and mental health outcomes. Over the last 7 years at the University of Essex, we have combined these ideas into a programme of research on ‘green exercise’ (activity in the presence of nature) and ‘green care’ (therapeutic applications of green exercise). These address current concerns about the adverse health effects of modern diets, sedentary lifestyles and a disconnection with nature, along with growing evidence that stress and mental ill-health have become substantial health problems for many people in industrialised societies.

This cross-disciplinary University of Essex project team is engaged in primary research on i) the health benefits of green exercise – investigating the mental and physical health benefits of physical activities under exposure to different rural and urban environments and ii) evaluating a wide variety of green care options in varying contexts (including care farming, facilitated green exercise, ecotherapy and wilderness therapy); and is currently leading research in this field.

The interdisciplinary Centre for Environment and Society is also a leading authority on the use of Participatory Appraisal and Action Research to assess the needs and opinions of communities. With over 20 years experience of participatory assessment we have worked with a wide variety of organisations and target groups including work with Housing Associations, countryside management projects, Village Appraisals, Healthy Living Centres, Health Needs Assessments, sex and relationship education, local authority planning and urban regeneration both within the UK and internationally. The iCES has developed innovative techniques that engage communities as active participants and this approach encourages community ownership of outcomes so that they are self-sustaining in the longer term.

---

86 See http://www.greenexercise.org/ for more details of this research
3. Methodology

3.1 Evaluation design

3.1.1 Overview

The University of Essex provided an independent monitoring and evaluation programme to assess key outcomes of the Discovery Quest project. Having an independent evaluator eliminated any potential bias, so that the implementers would not have conflicting roles in the programme.

Previous research into wilderness therapy approaches has highlighted a lack of robust, quantitative studies used in the evidence base and a preference for qualitative analyses (see section 1.4.1). Case studies and narrative accounts have historically been the most popular methods used, but there is an increasing recognition that outcomes need to i) be quantified to provide further support of the beneficial effects and ii) utilise standardised health parameter measures. Therefore, internationally recognised standardised questionnaires were integrated into this methodology to quantify any changes in mental health parameters.

The methodology was designed to provide comparative data, over time, on the personal outcomes of participating in the Discovery Quest project (e.g. improved psychological health and wellbeing, environmentally friendly behaviours, lifestyle and connection to nature). There were two phases of the evaluation, firstly a longitudinal study comparing changes in outcome parameters, between the beginning and end of the six month Discovery Quest programme; and secondly a series of before and after activity evaluations at regular intervals during the programme. Particular questions were therefore administered repetitively at regular intervals.

A multi-method approach was used to assess the changes after participating in various stages of the project, incorporating both quantitative data and qualitative narrative. The primary sources of data collection utilised in this study included:

- Questionnaires
- On-site participant observation and informal interviews by primary researcher
- Participatory appraisal techniques

Main themes of the research were wellbeing and perceptions of nature; and secondary themes comprised environmentally friendly behaviour, social capital and healthy lifestyle. The short, composite questionnaires therefore included internationally recognised, standardised tools which measure participants’ wellbeing, self-esteem, mood, nature relatedness and connection to nature. Qualitative questions were also asked for more detailed narrative and more information on what aspect of the trip participants enjoyed most, least and what they would change. Questions on smoking and drinking habits, community belonging, environmentally friendly behaviours and healthy eating were also included.

Participants were asked to complete the questionnaires individually and not to compare or discuss their answers with other participants. Researchers collected baseline data, endpoint data and data for the 3 challenges. Questionnaires were specifically designed for each stage of the project and were administered immediately before and immediately after participants spent time on the Discovery Quest walks or wilderness expeditions, to enable comparisons to be made and to allow identification of any changes in parameters as a direct result of exposure to the wilderness environment. All questionnaires were collated and sent to the University of Essex for independent analysis.
The lead researcher acted as a participant observer and conducted on-site field observations during all of the trails. Field notes focusing on the participant experience and interaction between participants, staff and the environment were recorded along with interpersonal dynamics. Informal interviews using open-ended questions were also conducted with participants during the three challenges. This provided the participants with an opportunity to reflect on their experience and become more self-aware.

In addition, during the final fieldtrip a participatory appraisal approach to the evaluation was taken, where questions pertaining to the Scotland trip, the Discovery Quest programme as a whole and the evaluation itself were asked in an anonymous and informal way. Some of the questions included in the participatory approach mirrored those in the written questionnaire which was repeated at various points throughout the process.

### 3.1.2 Sampling strategy

Data was collected at 6 time points over the Discovery Quest programme (see Figure 4 for details of the evaluation process):

#### Figure 4. Discovery Quest evaluation process

1. **Start of programme** - Baseline data collected by University of Essex (U of E) researchers - Walk 1 (at 3 locations: Norwich, Great Yarmouth and Kings Lynn areas, during 10-12th May 2010)

---

87 Participatory appraisal involves a shift from verbal or written methods (formal interviews and written assessments) to visually-oriented ones (participatory diagrams and visualisations).
2. Before/after activity – data collected by trained Discovery Quest (DQ) staff - Walk 5 (at three locations: Norwich, Great Yarmouth and Kings Lynn areas, during 7-9th June)
3. Before/after activity – data collected by U of E and DQ - Norfolk Challenge (at one location Tuttoning, Norfolk during 29-30th June)
4. Before/after activity – data collected by Discovery Quest - Walk 11 (at three locations: Norwich, Great Yarmouth and Kings Lynn areas, during 26-28th July)
5. Before/after activity – data collected by U of E - Wild Challenge (at one location, Trewern, Brecon Beacons, during 17-19th August)
6. End of programme – data collected by U of E Discover Scotland (at one location Knoydart, Scotland during 3-10th September) and by DQ Explore Scotland (at same location Knoydart, Scotland during 15-22nd September)

Originally, it was planned to also include a before and after comparison of the Discover Scotland and Explore Scotland events, in addition to the end of programme questionnaire to be completed in Scotland. However after participant observations from the lead researcher at the Wild Challenge session and feedback from DQ staff, it was decided to alter the sampling strategy and methodology slightly. We felt that having the after activity questionnaire closely followed by the end of programme questionnaire (possibly only an hour later) to complete could possibly have a detrimental effect on participants and the evaluation process and increase the likelihood of ‘questionnaire fatigue’. To enable gathering of some data from these trips specifically, the participatory process was then designed and implemented instead (see 3.3.1 for more details).

3.1.3 Ethics and consent

Ethical approval for the evaluation was given by the University of Essex Ethics Committee. All participants of the Discovery Quest programme were invited to take part in the evaluation if they wished and their participation was on a purely voluntary basis. The reasons for the evaluation and details of the evaluation process were outlined by University of Essex researchers at an introductory session at the start of the first walk, in each of the three locations. All participants were given a participant information sheet to take away and a consent form to sign and return (see Appendix 1). The Participant information sheet gave i) details of the evaluation process; ii) details on how to withdraw from the evaluation or contact the research team and iii) information on storage of personalised data (in line with the Data Protection Act. Questionnaires were designed to be anonymous with the only personal data collected on questionnaires being participant date of birth and initials, purely to collate questionnaires from the same participant at different time points.

Only participants who consented to take part in the research (97%) were accepted onto the evaluation and then given questionnaires. Participants on the project were also asked by Discovery Quest for their consent for any photos or video footage of participants to be used either by Discovery Quest or the University of Essex research team as appropriate.

---

88 For more information see http://www.essex.ac.uk/reo/research_community/research_governance/ethics_in_research/guidelines_for_ethical_approval_of_research/
3.1.4 Training and acclimatisation

In order for Discovery Quest staff and volunteers to be fully informed about the University of Essex evaluation and to be given guidelines on how to administer questionnaires in an ethically sound and correct way, the University of Essex lead researcher gave a training/ acclimatisation session for all staff and volunteers that were to take part in the programme on 4th May 2010. In addition an evaluation guidelines document was also produced to compliment this process.

3.2 Mental wellbeing measures

Mental wellbeing is one of the two main themes for the Discovery Quest evaluation. Three standardised, internationally recognised instruments were therefore used in the evaluation to measure different elements of mental wellbeing.

3.2.1 Wellbeing

Wellbeing was measured using the Warwick-Edinburgh Mental Well-being Scale (WEMWBS). The WEMWBS is a relatively new measure developed by the University of Warwick and the University of Edinburgh, to enable the measurement of mental well-being of adults in the UK\(^8^9\). The scale examines a wide idea of well-being, including affective-emotional aspects, cognitive evaluative dimensions and psychological functioning, and is short enough to be practical for use in population-level surveys\(^9^0\).

WEMWBS is a 14 item scale of mental well-being covering subjective well-being, in which all items are worded positively and address aspects of positive mental health\(^9^1\). The positively focussed design of the WEMWBS enables its use by mental health promotion initiatives\(^9^2\).

The scale is scored by summing responses to each item answered on a 1 to 5 Likert scale. The minimum scale score is 14 and the maximum is 70. WEMWBS has been validated for use in the UK with those aged 16 and above\(^9^3\). WEMWBS showed good content validity; Cronbach’s alpha scores ranged from 0.89 to 0.91 and WEMWBS showed high correlations with other mental health and well-being scales. Test-retest reliability at one week was high (0.83) and social desirability bias was lower or similar to that of other comparable scales\(^9^4\).

3.2.2 Self-esteem

Self-esteem was measured using the one-page 10-item Rosenberg Self-Esteem Scale (RSE), which provides a one-dimensional measure of global self-esteem\(^9^5\). Its validity is widely acknowledged, it is easy to administer\(^9^6\) and is considered to be the most widely-used and popular self-esteem measure in health psychology and social science research\(^9^7\).

---

\(^{89}\) funded by the Scottish Government’s National Programme for Improving Mental Health and Wellbeing and commissioned by NHS Health Scotland  
\(^{90}\) Tennant et al 2007  
\(^{91}\) Parkinson 2006  
\(^{92}\) As 59  
\(^{93}\) Stewart-Brown and Janmohamed, 2008  
\(^{94}\) As 59  
\(^{95}\) Rosenberg, 1965;  
\(^{96}\) Fox 2000  
\(^{97}\) Rosenberg 1989; Cusumano & Robinson 1992; Brown et al. 1995; Palmer 1995; Mactavish & Searle 1992
The instrument’s reliability (internal consistency and test-retest) and face validity (convergent and discriminant) compares favourably with that of more elaborate measures. Test-retest correlations typically range from 0.82 to 0.88 and reported Cronbach’s alpha coefficients range from 0.77 to 0.88. The scale’s superior reliability and validity has been demonstrated with many different sample groups and its use has been validated for adolescents, adult and elderly populations. There are however no universally recognised normative population datasets available for comparison purposes and there are no discrete cut-off points representing high and low self-esteem.

RSE comprises ten statements relating to overall feelings of self-worth or self-acceptance and each item has four response choices ranging from strongly agree (1) to strongly disagree (4). The scoring method used in this research provided an overall singular score ranging from 10 (high self-esteem) to 40 (poor self-esteem), thus lower scores represent higher self-esteem.

### 3.2.3 Mood

Mood is defined as “the subtle subjective state or feelings of a person at any given moment”. It refers to certain sets of subjective feelings (e.g. lively, grumpy, tense, relaxed, excited and weary) which consequentially occur in everyday life and provides a reliable and valid indicator of the quality of the leisure experience.

The instrument used to provide a ‘snapshot’ of mood state and quantify any changes in mood factors was the Profile of Mood States (POMS) standardised 30-item short-form one page version. This is an adaptation of the original standard form, which was a widely applied self-report instrument, used to assess current mood states and fluctuations. According to Biddle, the POMS is the dominant instrument for measuring mood in studies examining the relationship between mood states and exercise and is historically the most frequently used tool. A recent edition of the POMS bibliography also reported that more than 2,900 articles have cited the instrument. This comprehensive inventory of POMS citations highlights the range of settings of its application.

The POMS consists of 30 adjectives which collectively measure six identifiable mood factors: tension-anxiety, depression-dejection, anger-hostility, fatigue-inertia, vigour-activity and confusion-bewilderment. Each adjective is rated using a 5-point Likert scale where a ‘0’ indicates ‘not at all’ and a ‘4’ indicates ‘extremely’. Participants were instructed to complete the form according to how they felt at that moment. The six subscales yield a global estimate of affective state referred to as Total Mood Disturbance (TMD). The TMD score denotes an overall assessment of emotional state and is calculated by summing the five negative subscales and subtracting the only positive affect subscale (vigour).

Reliability and validity of the shortened edition of the POMS was established by Grove and Prapavessis (1992). Internal consistency of the POMS inventory ranges from 0.84 to 0.95, and test-retest reliability coefficients range from 0.65 to 0.74. The validity of this version has been substantiated with Cronbach’s alpha reliabilities for a sample of college students, ranging from 0.67
to 0.93\textsuperscript{108}. In this study, with participants having been diagnosed as having severe and enduring mental health issues, mood sub-factor scores were calculated using outpatient norms.

### 3.3 Perceptions of nature measures

The second main theme of the Discovery Quest evaluation was nature perception. Two measures were used in the evaluation to examine changes in participant perception of nature over the programme. In addition, a question on frequency of contact with nature was included in the baseline and midpoint questionnaires.

#### 3.3.1 Nature relatedness

Nature relatedness describes individual levels of connectedness with the natural world and comprises the cognitive, affective, and physical connection we have with nature\textsuperscript{109}. The Nature Relatedness Scale is a relatively recent scale (2008) designed to measure an individual’s level of connectedness with the natural world. The scale consists of 21 items rated on a 5-point Likert scale, from 1 (disagree strongly) to 5 (agree strongly). Respondents are asked to respond as they "really feel, rather than how [they] think 'most people' feel." Items 2, 3, 10, 11, 13, 14, 15, and 18 are reverse scored. A total nature relatedness scale score is created by adding the total score and dividing by 21. Scores range from 1 to 5, with a high score endorsing a cognitive, affective, and physical connection with nature\textsuperscript{110}.

The Nature Relatedness Scale also has three subscales (Self, Perspective, and Experience). A subscale score can be created for each subscale by averaging the items within that subscale. Scores again range from 1 to 5, with high scores endorsing the subscale. The Self subscale measures "an internalized identification with nature, reflecting feelings and thoughts about one's personal connection to nature"; the Perspective subscale measures "an external, nature-related worldview, a sense of agency concerning individual human actions and their impact on all living things"; and the Experience subscale measures "a physical familiarity with the natural world and the level of comfort with and desire to be out in nature\textsuperscript{111}.

The internal reliability of the Nature Relatedness Scale using Cronbach’s alpha was .87 and for the subscales: Self = .84; Perspective = .66; and Experience = .80. Test-retest analysis were also conducted over a 6- to 8-week period and was $r = .85$. The subscales also showed good test-retest reliability (Self: $r = .81$, Perspective: $r = .65$; and Experience: $r = .85$)\textsuperscript{112}.

#### 3.3.2 Connectedness to nature

A measure for connectedness to nature was also included in the composite before and after activity questionnaires. This measure is based on the standardised and validated Connectedness to Nature Scale (CNS)\textsuperscript{113}, which is a 'new measure of individuals' trait levels of feeling emotionally connected to the natural world'. Connection to nature is considered to be an important predictor of ecological behaviour and subjective well-being. Connectedness to nature has also been shown to be related to an increase in both awareness of environmental issues and in environmentally friendly behaviour\textsuperscript{114}.

\textsuperscript{108} McNair et al. 1992
\textsuperscript{109} Nisbet et al. 2009, 2011
\textsuperscript{110} Nisbet et al. 2009
\textsuperscript{111} As 79
\textsuperscript{112} As 79
\textsuperscript{113} Mayer and Frantz 2004
\textsuperscript{114} Hine et al 2007 and 2008a
A simplified version of the CNS, adapted (but not validated) by the University of Essex was used in this context to assess whether being exposed to nature during walks in a countryside or wilderness setting increases an individual’s sense of feeling connected to nature.

Seven questions are scored on the scale range from a minimum of 1 to a maximum of 5, with a score of 5 indicating the most connected to nature. CNS score is calculated by adding the score for each question and then dividing by 7 to give a score between the minimum of 0 and a maximum of 5 (which represents the highest connectedness to nature).

3.4 Healthy lifestyle measures

Healthy lifestyle was one of the three secondary themes of the Discovery Quest evaluation. A mix of physical measures and questionnaires relating to physical activity, eating, smoking and drinking habits were used.

3.4.1 BMI and waist to hip ratio

Body Mass Index (BMI)\textsuperscript{115} is a simple index of weight/ height that has been widely used to estimate body fat and to classify underweight, overweight and obesity in adults for several decades\textsuperscript{116}. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m\textsuperscript{2}). BMI has been used by the World Health Organisation as the standard for recording obesity statistics since the early 1980s and is seen as useful estimation of risk for diseases that can occur with more body fat. The higher the BMI calculation, the higher the risk for certain diseases such as heart disease, high blood pressure, type 2 diabetes, gallstones, breathing problems, and certain cancers\textsuperscript{117}. Although controversies over the use of BMI for medical diagnosis remain, BMI is generally accepted for individuals with an average body composition\textsuperscript{118}. Classification of BMI scores is as follows: <18.5 = underweight; 18.5-24.99 = normal; 25-29.99 = overweight and >30 = obese.

Height was measured in the field by University of Essex researchers at the baseline stage using a manual stadiometer. Participants' weights were also taken at the baseline and endpoint stages using a digital scale. Participants were asked to remove boots before weighing and to ensure participant privacy weighing was conducted away from the group.

Waist to hip ratio (WHR) is a simple and useful measure of fat distribution and is a tool that helps determine overall health risk\textsuperscript{119}. People with more weight around their waist are at greater risk of lifestyle related diseases such as heart disease and diabetes than those with weight around their hips. The classification of risk as defined by waist to hip ratios is as follows: Men: <0.95 = low risk; 0.96-1 = moderate risk; >1 = high risk and Women: <0.8 = low risk; 0.81-0.85 = moderate risk; >0.85 = high risk. The norms for adults are 0.84 for males and 0.72 females.

Waist was measured with a measuring tape around the narrowest circumference between pelvis and thorax (or 2 finger width above navel) with participant standing, arms folded and hips were measured from the side at the level of the maximal protuberance of buttocks with participant standing feet together.

\textsuperscript{115} Developed by Ancel Keys – see Keys et al. 1972
\textsuperscript{116} WHO 201,1 NHS 2011, NIH 2011
\textsuperscript{117} NIH 2011
\textsuperscript{118} WHO 1995
\textsuperscript{119} NHS 2011
3.4.2 Health

A one-off, simple question on ‘health’ was included in all of the composite questionnaires to allow participants to give their perception of their own health status. This simple question was devised by University of Essex and has been successfully used by the team in similar green care evaluation contexts. Participants were asked to complete on a scale of 1 – 10, “how healthy do you feel at the moment?”

3.4.3 Physical activity

The current physical activity recommendations in the UK state that adults should undertake at least 30 min of moderate-intensity activity at least five times a week and the Department of Health is keen to increase the number of people achieving these guidelines\textsuperscript{120}. For this reason Discovery Quest like many other non-governmental organisations is interested in the baseline physical activity levels of participants and any changes that may occur as a result of involvement in the programme.

A single item measure to assess physical activity levels was therefore included in the baseline and endpoint Discovery Quest questionnaires. The question asks respondents “In the past week, on how many days have you accumulated at least 30 minutes of moderate intensity physical activity such as brisk walking, cycling, sport, exercise, and active recreation?” This single item measure has been widely utilised since 2007 by Natural England and the British Heart Foundation in their ‘Outdoor Health Questionnaire’ used in the evaluation of the national ‘Walking the way to Health’ programme\textsuperscript{121} and has the advantage of being tailored to the current national recommendations. This single item measure has since been tested for validity and test-retest reliability and has demonstrated strong repeatability and moderate validity, and overall it performed as well or better than other short or single-item physical activity tools\textsuperscript{122}. The single-item instrument demonstrated strong reproducibility (r=0.72–0.82), using Spearman’s rank correlation coefficients and showed strong agreement in the classification of respondents meeting the current physical activity recommendation (kappa=0.63, 95% CI 0.54 to 0.72)\textsuperscript{123}.

3.4.4 Smoking and drinking

Questions devised by the University of Essex on cigarette smoking and consumption of alcohol were included in the baseline and endpoint questionnaires. These questions addressed frequency and quantity.

3.4.5 Eating habits

Questions on priorities relating to food perceptions and eating habits were included in the discovery Quest evaluation. The questions used were originally developed for use as part of the Big Lottery Fund National Well-being Evaluation\textsuperscript{124}, by their evaluators the Centre for Local Economic Strategies (CLES) and nef (new economics foundation)\textsuperscript{125}. One question from the Core tool was used, a 5 point

\begin{itemize}
  \item[]\textsuperscript{120} Dof H 2009
  \item[]\textsuperscript{121} Natural England 2011
  \item[]\textsuperscript{122} Milton et al. 2010
  \item[]\textsuperscript{123} As 91
  \item[]\textsuperscript{124} For more details see: http://www.biglotteryfund.org.uk/index/evaluationandresearch-uk/learning_themes/eval_health/evaluation_well-being.htm
  \item[]\textsuperscript{125} See http://www.cles.org.uk/ and http://www.neweconomics.org/
\end{itemize}
Likert scale asking participants to state how much they agree or disagree with the statements: “I enjoy putting effort and care into the food that I eat” and “Healthy food often tastes nicer than unhealthy food”. One question from the in depth ‘Healthy Eating Module: Goals, intentions and confidence’ was also used, where participants are asked to rank in order of importance a number of food criteria (e.g. cost, ease of preparation, taste etc).

3.5 Environmentally friendly behaviour measures

Another secondary theme of the Discovery Quest evaluation was environmentally friendly behaviour. To assess levels of participant environmental behaviour, questions were asked relating to environmental behaviour indicators for sustainability (adapted from Hine et al 2008a and 2007b). The set of 6 questions was adapted from the original 14, to account for use with Discovery Quest participants, referring to practices which are easily achievable and require little or no cost (e.g. turning off power at the plug when appliances are not in use). Responses were scored on a 5 point Likert scale where respondents were asked to choose from 'always', 'often', 'sometimes', 'rarely' and 'never’, for overall behaviour scores to be obtained for each respondent (the sum of score for each question divided by 6). Environmental behaviour scores therefore range from a minimum of 1 to a maximum of 5.

3.6 Community belonging measure

Finally to examine one element of social capital in the Discovery Quest evaluation, a question (devised and used previously by University of Essex) on community belonging was included in the baseline and endpoint questionnaires.

3.7 Distances walked

In order to calculate how many steps taken and how far walked, for each participant, basic pedometers were given out by DQ staff at the beginning of every walk and worn by all participants. A chart detailing the number of steps for each person for every walk was constructed and each participants step length was measured by counting how many steps taken over a 10 metre distance (marked out by University of Essex researchers) and dividing by 10. The aim being to tally up the steps taken at the end of programme to calculate how far participants have walked and the calories they have used.

3.8 Anecdotal evidence

Qualitative narrative was collected using a series of open-ended questions in the administered questionnaires. During on-site observations, researchers also recorded and transcribed comments made during group activities and discussions. The participants on Discover Scotland and Explore Scotland trips were also given the opportunity to give narrative feedback as part of the participatory appraisal, where they filled out comments on post-it notes and stuck them to the walls to answer questions relating to the Discovery Quest programme, the wilderness trip and the evaluation process. After the 2 challenges, the wilderness trip and the evaluated walks participants were asked to rate several aspects of the experience and then to tell us what they enjoyed most, what they did

---

126 BLF, CLES and NEF 2009
not enjoy and finally whether they would change anything about the trip. On the baseline questionnaire participants were also asked to tell us in their own words about their anxieties before the programme and about what they were most looking forward to. Anonymised email feedback from clients and carers was also included in the evaluation process.

3.9 Role as participant observer

The role of the researcher was that of a participant observer at the first walk and the three camping trips, which meant they "felt that an insider's perspective was vital to forming an accurate appraisal of human group life, so they observed and interacted closely enough with members to establish an insiders' identity". This ensured the researcher became as fully integrated into the group as possible and could observe the Discovery Quest process in context. The researcher took on this role during the three camping trips and all social situations. The researcher did not take in staff meetings in the field but was consulted in the planning process to enable scheduling of the evaluation process into the activities. The 'insiders identity' was established by participating in all activities, eating meals together, adhering to the same rules, without ever differentiating between participants and researchers. The idea was to become accepted as a group member, but still be removed enough to independently observe group dynamics. There was still a chance that the presence of the researcher affected the situation, but by becoming a participant in the group process this risk was minimised. Taking on the role of participant observer enabled the researcher to develop a rapport with the participants, which helped to increase the level of trust. This was important in soliciting honest and open responses during informal interview sessions and questionnaire responses. A major challenge faced by the researcher was not to be too intrusive, influential of group dynamics or negatively affect the Discovery Quest experience in any way. Therefore, all on-site observations were conducted in a collaborative manner and extreme care was taken in being non-intrusive, especially during sensitive and challenging situations.

3.10 Statistical analyses

A database was created using SPSS 18.0 to assist in manipulating data, detecting inconsistencies and statistically analysing the results. All data measures were tested, where appropriate, for normality (Kolmogorov–Smirnov test), homogeneity of variance and sphericity (Mauchly's Test of Sphericity). Descriptive statistics were obtained for each measure and mean differences between beginning and endpoint and before and after activity scores were recorded along with the 95% confidence interval for the estimated population mean difference. Statistical significance was set at $p < 0.05$.

Where the data were normally distributed, a series of parametric statistical analyses were conducted including one-way between groups analysis of variance (ANOVA); one-way repeated measures analysis of variances (ANOVA) with posthoc Tukey comparisons; mixed between-within subjects analysis of variances (ANOVA) with posthoc Tukey comparisons; paired samples t-tests; and one-way between subjects multivariate analysis of variances (MANOVA). Were the data were not normally distributed or did not fulfill the sample size and stringent assumptions of parametric techniques, analyses used non-parametric techniques including Friedman test with posthoc Wicoxon Signed-Rank Tests (with Bonferroni correction applied). Statistical tests were carried out at all possible opportunities, although analysis was sometimes limited due to missing data and the number of participants. Therefore, descriptive data is also reported to provide an insight into any interesting trends.

127 Adler & Adler, 1994
4 Results – Whole programme

The results from the Discovery Quest 2010 programme are in two parts. Firstly, the results relating to the programme as a whole are outlined in Chapter 4 and secondly, the results from the 4 evaluated sessions – the before and after activity studies are outlined in more detail in Chapter 5.

This chapter gives general information about the participants on the Discovery Quest programme and then the results are organised by the main themes of the research (wellbeing and perceptions of nature) followed by the secondary themes (healthy lifestyles, environmentally friendly behaviour, and social aspects). Finally narratives (from questionnaires, participatory sessions and from participant observer interviews) about the programme as a whole and regarding the evaluation process are outlined.

4.1 General information

In total, 61 participants started the Discovery Quest programme evaluation and 30 participants continued with the regular walks and the challenges right through until either Discover or Explore Scotland. The reasons for not continuing with the programme were varied, some unfortunately had to stop due to underlying physical health constraints, others for practical reasons, some wanted to do the walking but not the challenges and one went back to work as they were feeling better. The three geographical groups contained approximately the same number of participants: Yarmouth 20; Norwich 23; and Kings Lynn 19. The majority of the participants were male (67%) and ages ranged from the youngest of 20 up to the oldest at 68 although the average age was 38 (see Figure 5).

Initially, a series of one-way between groups ANOVAs were conducted to identify any significant differences in the participants’ preliminary outcome measures scores between the 3 walking groups. No significant differences were found in any of the measures between the groups (p>0.05) indicating that all participants had comparable initial scores. Therefore all participants’ scores were aggregated, enabling us to analyse the 3 groups as one dataset.

4.2 Mental Wellbeing

Mental wellbeing was assessed using the Warwick Edinburgh Mental Well Being Scale (WEMWBS) at the beginning, midpoint and at the end of the programme only; self-esteem was tested both at the start and end of the programme and before and after each of the 4 evaluated sessions; and mood was assessed solely before and after the evaluated sessions.
4.2.1 Wellbeing – WEMWBS

Wellbeing scores were assessed at the beginning, mid-point and end of the Discovery Quest programme and were examined to see whether there were any significant changes between wellbeing scores across the 3 time periods. A Freidman test showed a statistically significant difference in WEMWBS scores with time, $\chi^2(2) = 7.366, p < 0.05$. However, post-hoc analysis with Wilcoxon Signed-Rank Tests (with a Bonferroni correction applied) showed that only the difference between time 1 and time 3 (i.e. before and after programme) was statistically significant ($Z = -6.63, p<0.001$).

As shown in Figure 6, further analysis using a paired samples t-test\(^{128}\) showed a statistically significant increase in participant WEMWBS from start of programme ($M=38.84, SD=6.59$) to the end of programme ($M=46.16, SD=7.39$, $t(18)=4.51, p<.001$)\(^{129}\).

When examining the proportion of participants who had experienced a change in wellbeing scores over the course of the Discovery Quest programme it was found that 89% of participants saw an increase in wellbeing, 11% saw no change and no-one at all experienced a decrease.

4.2.2 Self esteem - RSE

Participants’ self esteem was assessed both at the beginning and at the end of the Discovery Quest programme and again before and after the evaluated activity sessions. This enables us to examine changes as a result of the programme; trends over the course of the programme; and changes as a result of each evaluated activity.

As shown in Figure 7, a paired samples t-test showed a statistically significant increase in participant self esteem from the start of the programme ($M=26.50, SD=4.65$) to the end of programme ($M=22.69, SD=3.70$, $t(15)=4.55, p<.001$)\(^{130}\) – note a decrease in RSE.

---

\(^{128}\) Only Time 2 was non parametric and as Time 1 and Time 3 were parametric this allowed us to subsequently use a parametric test

\(^{129}\) The eta squared statistic (0.54) indicated a large effect size

\(^{130}\) The eta squared statistic (0.59) indicated a large effect size
scores denotes an increase in self esteem. The majority (88%) of participants saw an increase in their self Esteem scores as a result of taking part in the Discovery Quest programme. Participant self esteem scores taken at regular intervals over the whole course of the programme were then examined in order to identify the presence of any trends over time. A Freidmans test showed a statistically significant increase in self esteem with time, \( \chi^2(7) = 14.18, p < 0.05 \) (see Figure 8). However, post-hoc analysis with Wilcoxon Signed-Rank Tests (with a Bonferroni correction applied) showed that although mean values suggest an increase for all before and after self esteem measurements only the differences between before and after walk 5 \( (Z = -3.21, p < 0.001) \) and before and after Norfolk Challenge \( (Z = -3.17, p < 0.01) \) were statistically significant.

4.2.3 Mood - POMS

Another component of wellbeing, mood, was tested using the profile of mood states (POMS) before and after each of the 4 evaluated sessions. We can therefore see trends from walk 5 through to Wild Challenge but not for the whole Discovery Quest programme. The POMS measure gives us 6 sub-factor mood states (anger, confusion, depression, fatigue, tension and vigour) as well as an indicator of overall mood – Total Mood Disturbance (TMD). The 6 sub-factors and the TMD score are considered over the timescale in this section and for each of the 4 evaluated walks or challenges in Chapter 5.

Anger

To examine trends in anger scores between walk 5 and Wild Challenge a Freidman test was conducted and this showed statistically significant differences in anger scores over time, \( \chi^2(7) = 24.29, p < 0.001 \). Post-hoc analysis with Wilcoxon Signed-Rank Tests (with a Bonferroni correction applied) showed that although mean values suggest an decrease for all before and after anger measurements (i.e. a decrease in feelings of anger) only the improvements between before and after walk 5 \( (Z = -3.81, p < 0.001) \); before and after Norfolk Challenge \( (Z = -2.66, p < 0.01) \) and before
and after walk 11 (Z= -2.70, p<0.01) were statistically significant\(^{131}\) (see Figure 9 for more details).

**Confusion**

Similarly, a Friedman test also showed statistically significant differences with confusion over time, \(\chi^2(7) =19.14, \ p < 0.001\). Post-hoc analysis with Wilcoxon Signed-Rank Tests (with a Bonferroni correction applied) showed that mean values did represent a statistically significant decrease (denoting a reduction in feelings of confusion) for all before and after confusion measurements: before and after walk 5 (Z= -3.51, p<0.001); before and after Norfolk Challenge (Z= -3.47, p<0.001); before and after walk 11 (Z= -2.26, p<0.05); and before and after Wild challenge (Z= -2.26, p<0.001)\(^{132}\). More details are shown in Figure 10.

**Depression**

Examining changes in depression scores, a Friedman test showed statistically significant differences with depression over time, \(\chi^2(7) =21.65, \ p < 0.01\). Post-hoc analysis with Wilcoxon Signed-Rank Tests (with a Bonferroni correction applied) showed that although mean values suggest an decrease for all before and after depression measurements (denoting a reduction in feelings of depression) only the improvements between before and after walk 5 (Z= -4.12, p<0.001); before and after Norfolk Challenge (Z= -3.73, p<0.001) and before and after walk 11 (Z= -2.56, p<0.05) were found to be statistically significant\(^{133}\) (see Figure 11).

---

\(^{131}\) Also between before Walk 5 and before Norfolk challenge (Z= -2.11, p<0.05) and after walk 11 and before wild challenge (Z= -2.41, p<0.05)

\(^{132}\) Also after walk 5 and before Norfolk challenge (Z= -2.90, p<0.01) and after Norfolk challenge and before walk 11 (Z= -2.53, p<0.05)

\(^{133}\) Also before walks 5 and 11 (Z= -2.20, p<0.05) and after walk 5 and before Norfolk challenge (Z= -3.04, p<0.001)
**Fatigue**

Similarly, a Freidman test showed statistically significant differences with fatigue over time, $\chi^2(7) = 21.01, p < 0.01$. For Walk 5, Norfolk Challenge and for the Wild Challenge, mean fatigue scores increased as a result of the activity but for walk 11, fatigue scores decreased.

*Post-hoc* analysis with Wilcoxon Signed-Rank Tests (with a Bonferroni correction applied) showed that only the increase in feelings of fatigue as a result of the Wild Challenge ($Z = -3.58, p < 0.001$) were found to be statistically significant\(^{134}\) (see Figure 12).

**Tension**

To examine trends in tension scores between walk 5 and Wild Challenge a Freidman test was conducted and this showed statistically significant decreases with tension over time, $\chi^2(7) = 24.07, p < 0.01$. *Post-hoc* analysis with Wilcoxon Signed-Rank Tests (with a Bonferroni correction applied) showed that the decreases in mean tension values (denoting a reduction in feelings of tension) were statistically significant for all tension measurements: before and after walk 5 ($Z = -4.41, p < 0.001$); before and after Norfolk Challenge ($Z = -4.27, p < 0.001$); before and after walk 11 ($Z = -3.53, p < 0.001$) and before and after Wild challenge ($Z = -2.32, p < 0.05$)\(^{135}\) – as shown in Figure 13.

Interestingly, tension scores before walk 5 and after Wild challenge ($Z = -2.42, p < 0.05$) i.e. the first and last time points where mood was measured, show a statistically significant decrease in feelings of tension with time participating with Discovery Quest.

---

\(^{134}\) Also after Norfolk challenge and before walk 11 ($Z = -2.78, p < 0.01$) and before Wild challenge ($Z = -2.09, p < 0.05$)

\(^{135}\) Also before walks 5 and 11 ($Z = -2.16, p < 0.05$); after walk 5 and before Norfolk challenge ($Z = -3.45, p < 0.01$) and after walk 11 and before Wild challenge ($Z = -3.32, p < 0.01$)
**Vigour**

Although differences in mean vigour scores before and after the 4 evaluated Discovery Quest sessions suggest there have been some changes over time (see Figure 14) — decreases after walks 5, 11 and Wild Challenge; and an increase after Norfolk Challenge, closer examination with a Freidman test showed no statistically significant differences with vigour over time.

The proportion of participants who experienced improvements in the 6 mood factors over the 4 evaluated Discovery Quest sessions can be seen in Table 1 below.

**Table 1 Proportion of participants seeing improvement in 6 mood sub-factors over the 4 evaluated walks and challenges**

<table>
<thead>
<tr>
<th>Mood sub-factor</th>
<th>Walk 5</th>
<th>Norfolk Challenge</th>
<th>Walk 11</th>
<th>Wild challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td>79% saw an improvement</td>
<td>72% saw an improvement</td>
<td>71% saw an improvement</td>
<td>57% saw an improvement</td>
</tr>
<tr>
<td>Confusion</td>
<td>77% saw an improvement</td>
<td>66% saw an improvement</td>
<td>68% saw an improvement</td>
<td>49% saw an improvement</td>
</tr>
<tr>
<td>Depression</td>
<td>77% saw an improvement</td>
<td>78% saw an improvement</td>
<td>56% saw an improvement</td>
<td>50% saw an improvement</td>
</tr>
<tr>
<td>Fatigue</td>
<td>47% saw an improvement, (47% saw an increase)</td>
<td>52% saw an improvement, (41% saw an increase)</td>
<td>33% saw an improvement, (57% saw an increase)</td>
<td>9% saw an improvement (83% saw an increase)</td>
</tr>
<tr>
<td>Tension</td>
<td>82% saw an improvement</td>
<td>87% saw an improvement</td>
<td>75% saw an improvement</td>
<td>75% saw an improvement</td>
</tr>
<tr>
<td>Vigour</td>
<td>46% saw a decrease, 43% saw an improvement</td>
<td>38% saw a decrease, 55% saw an improvement</td>
<td>54% saw a decrease, 38% saw an improvement</td>
<td>52% saw a decrease, 37% saw an improvement</td>
</tr>
</tbody>
</table>

Note: for negative factors anger, confusion, depression, fatigue and tension, a decrease represents an improvement; for the positive sub factor vigour, an increase is desirable.

**Total Mood Disturbance**

A Total Mood Disturbance (TMD) Score was calculated to denote an overall assessment of emotional state (giving an indicator of overall mood). On average after each walk or challenge, 66% of participants experienced improvements in total mood disturbance as a result of the Discovery Quest activities.
Paired sample t tests were then performed on the before and after scores for each of the 4 evaluated events\textsuperscript{136}. As highlighted in Figure 15, paired samples t-test showed a statistically significant decrease in participant TMD scores (representing an improvement in mood) before (\(M=154.48, SD=24.32\)) and after walk 5 (\(M=143.42, SD=20.34, t(30)=4.89, p<.001\))\textsuperscript{137}; and before (\(M=162.04, SD=24.97\)) and after Norfolk Challenge (\(M=150.11, SD=21.19, t(27)=4.41, p<.001\))\textsuperscript{138}. Although mean scores for walk 11 and Wild Challenge show changes over the course of the sessions (a decrease and an increase respectively) these were not found to be statistically significant.

### 4.3 Perceptions of nature

Participant perceptions of nature were assessed using the Nature Relatedness Scale (NRS) at the beginning and at the end of the programme only; an adapted Connectedness to Nature scale (CNS) was used before and after the 4 evaluated sessions; and participants were also asked about their ‘actual’ contact with nature at the start and at the end of the programme.

#### 4.3.1 Nature relatedness

The Nature relatedness scale is a measure which gives an overall score that describes individual levels of connectedness with the natural world and also three subscales scores (Self, Perspective, and Experience). Nature relatedness was tested both at the beginning and then again at the end of participants involvement with the Discovery Quest.
programme to enable comparisons to be made (see Figure 16). Paired samples t-test showed a statistically significant increase in nature relatedness scores (NR) from the start of programme ($M=3.51, SD=.35$) to the end of programme ($M=3.76, SD=.42, t(12)=2.28, p<.05$)\textsuperscript{139}. The majority of Discovery Quest participants (79\%) experienced an increase in the way they related to nature.

The first factor, ‘Self’, represents “an internalized identification with nature, reflecting feelings and thoughts about one’s personal connection to nature”\textsuperscript{140}. Again, the majority of participants (75\%) saw an increase in their NR Self scores, i.e. an increase in their connection to nature. Comparison of the start and end point scores with a paired samples t-test showed a statistically significant increase in the sub scale factor of ‘Self’ in the nature relatedness scale from the start of programme ($M=3.42, SD=.30$) to the end of the programme ($M=3.91, SD=.61, t(14)=3.55, p<.01$)\textsuperscript{141}.

The ‘Perspective’ subscale measures “an external, nature-related worldview, a sense of agency concerning individual human actions and their impact on all living things”\textsuperscript{142}. The majority of participants (61\%) experienced an increase in their NR Perspective scores over the course of Discovery Quest programme, representing an increased awareness of the mankind and nature interaction. However these increases were not found to be statistically significant.

The third factor, ‘Experience’, reflects “a physical familiarity with the natural world and the level of comfort with and desire to be out in nature”\textsuperscript{143}. Approximately half of the participants (47\%) saw increases in their Experience scores, but comparison of the mean beginning and end of programme scores revealed no changes that were statistically significant.

### 4.3.2 Connectedness to nature

Connection to nature was measured using an adapted version of the Connectedness to Nature Scale (CNS) before and after each of the 4 evaluated Discovery Quest sessions. We can therefore see trends from walk 5 through to Wild Challenge but not for the whole Discovery Quest programme. Although mean scores suggested increases in CNS scores between before and after Norfolk Challenge, walk 11 and Wild Challenge (see Figure 17) a Friedman test showed no statistically significant changes.

However, the majority (60\%) of discovery Quest participants experienced an increase in connection to nature over time, between the start of walk 5 and the end of Wild Challenge.

---

\textsuperscript{139} The eta squared statistic (0.3) indicated a large effect size.

\textsuperscript{140} Nisbet 2009

\textsuperscript{141} The eta squared statistic (0.47) indicated a large effect size.

\textsuperscript{142} As 133

\textsuperscript{143} As 133
4.3.3 **Contact with nature**

Participants were also asked about their levels of contact with nature in their everyday lives and to report any changes, 56% of participants reported an increase in their nature contact as a result of their involvement in the Discovery Quest programme.

However as Figure 18 shows, starting points were quite high as the majority (76%) of participants already went out in nature at least once a week.

4.4 **Healthy lifestyles**

Information about aspects of participants lifestyle included: physical measurements enabling the calculation of BMI and waist to hip ratio at the beginning and at the end of the programme; a self-reporting ‘health’ measure at both the beginning and endpoint of the programme and before and after the 4 evaluated sessions; and questions about smoking, drinking and eating habits.

4.4.1 **BMI and Waist to Hips Ratio**

**BMI**

Nearly all participants (96%) experienced a decrease in BMI (Body Mass Index) as a result of participating in the Discovery Quest programme. Several
participants had even changed BMI category: 3 people went from being clinically obese to being overweight and 5 people went from overweight to normal. Figure 19 shows proportions of participants in each of the BMI categories at the beginning and endpoint of the programme and by the endpoint, more people were in the 'normal' range than at the start and numbers of people in the overweight and obese weight categories had fallen. When BMI scores were examined in more detail (Figure 20), a paired samples t-test showed a statistically significant decrease in participant BMI from start of programme ($M=27.88, SD=4.95$) to the end of programme ($M=26.17, SD=4.72$, $t(22)=6.28, p<.001$).

Figure 21 Proportion of participants in each health risk group (from WHR) at beginning and end of Discovery Quest programme

Approximately half of the Discovery Quest participants (52%) saw a decrease in their waist to hips ratio (WHR), representing a reduction in health risk. In terms of the associated health risk category, two participants moved from high risk to moderate risk; one participant went from high risk right down to low risk and one participant went from moderate to low; the remainder who saw decreases didn’t move risk group. Proportions of Discovery Quest participants in each health risk category at the beginning and end of the programme, are shown in Figure 21, which highlights that there were fewer participants in the high risk category and more in the low risk category at the end of the programme, than at the start. When mean WHR scores from the start and end of the programme were examined in more detail no statistically significant changes were found.

4.4.2 Health

Participants were asked to report how healthy they felt on a 1 to 10 scale at regular intervals over the Discovery Quest programme.

Approximately half of the participants (52%) saw increases in their self-reported health state and Figure 22 shows the changes in average health score over the programme.

Figure 22 Health scores taken at regular intervals over the course of the Discovery Quest programme

The eta squared statistic (0.65) indicated a large effect size
Average health scores increased as a result of taking part in the Discovery Quest programme, from 6 at the beginning to 7.5 at the end (see Figure 23).

A Freidman test was conducted to examine the significance of these increases over time and this showed statistically significant differences with self reported health scores over time, $\chi^2(7) =12.25$, $p < 0.05$. Post-hoc analysis with Wilcoxon Signed-Rank Tests (with a Bonferroni correction applied) showed that although increases were seen at all of the time points, the increases in health scores were only statistically significant for: beginning and end of programme ($Z = -2.10$, $p<0.05$); before and after walk 5 ($Z = -3.84$, $p<0.001$); before and after Norfolk Challenge ($Z = -3.59$, $p<0.001$), as shown in Figure 24.

### 4.4.3 Physical Activity

A single question was used to assess physical activity levels at the baseline and mid-point of the Discovery Quest programme. The question asks respondents “In the past week, on how many days have you accumulated at least 30 minutes of moderate intensity physical activity such as brisk walking, cycling, sport, exercise, and

---

45 Shown in Figure 22
active recreation?” Results showed that although there was no significant difference between mean values at the beginning and half way through the programme, there were positive changes at the extremes. Fewer participants said that they took part in physical activity for only 1 or 2 days a week and more participants said that they now participated in moderate physical activity 6 or 7 days a week at the mid-point than they did at the beginning of the programme (see Figure 25). It must be noted however that these changes were from the beginning to the mid-point of the programme (walk 11), and more significant changes may have been observed if the endpoint values had been used, i.e. after the participants had been on the programme for a longer period of time.

4.4.4 Smoking and drinking

Smoking and alcohol consumption frequency and quantity were measured using self-reporting measures at the beginning and again at the end of the discovery Quest programme. However numbers of participants that gave us comparable data were low (n=5 for smoking and n=10 for drinking), that is, those who completed this section of the questionnaire both at the beginning and then again at the endpoint. For this reason the findings may not be representative of the true picture. Positive changes of the parameters of drinking and smoking were observed in the smaller scale study of the previous Discovery Quest wilderness challenge in Scotland in 2009 so it can be surmised that similar trends may apply for the programme in 2010.

Smoking

There was a ratio of 50:50 of participants on the Discovery Quest Programme between those who smoke and those who don’t. No significant changes in quantity of cigarettes smoked by participants at the beginning and at the end of the programme were observed, however one participant did give up smoking completely over the course of the programme.

Alcohol consumption

As with the data for smoking habits, no significant overall changes in usual alcohol consumption were observed, either in terms of frequency or quantity between the beginning and end of the Discovery Quest programme. However Figure 26 shows that the number of participants drinking alcohol 2-3 times a week dropped by 10% by the end of a programme and the proportion of participants drinking less frequently (2-4 times a month and once a month) rose accordingly. In terms of quantity of alcohol consumed by participants fewer participants said that they drank 7-9 drinks on a ‘typical day when drinking’ at the end of the programme when compared to the beginning and this corresponded with an increase in those who said they drank 3-4 drinks at a time. Therefore although for the majority of Discovery Quest participants there were no changes to their usual alcohol consumption patterns, some people reduced both their frequency of drinking and number of drinks consumed.

146 See Hine 2010 for more details
4.4.5 Healthy eating

Both at the start and endpoint of the Discovery Quest programme participants were asked a number of questions relating to their eating habits and attitudes to food. Firstly participants were asked how often they "Eat a meal that has been cooked by yourself or someone else from basic ingredients" and the majority of participants replied that they did this 'often' for both the measuring times, implying that there had been no change over the course of the programme.

Participants were also asked how much they enjoyed “putting effort and care into the food that I eat” by stating how much they agreed with the statement on a Likert scale. Although mean scores increased slightly these weren’t found to be statistically significant, but Figure 27 shows that more participants ‘agreed’ or ‘strongly agreed’ with the statement by the end of the programme.

Similarly, participants were also asked how much they agreed with the statement that “Healthy food often tastes nicer than unhealthy food” and again more people agreed or strongly agreed with the statement at the end of the programme (Figure 28).

Finally participants were asked to rank in order of importance a “list of things that some people find important when it comes to food”, including: Choosing food products and dishes that you enjoy eating; Eating a healthy diet; Keeping your
spending on food as low as possible; Eating your meals in the company of other people; and Choosing food products and dishes that are quick and easy to prepare. Figure 29 shows that at the beginning of the programme more participants felt that low cost food was the most important aspect than did at the end, and at the end of the Discovery Quest programme higher numbers of people felt that eating food that they enjoyed and healthy food were the top priority aspect than they did at the beginning.

4.5 Environmentally friendly behaviour

Six questions relating to various environmentally friendly behaviours were asked at the beginning and at the end of the discovery Quest programme to discern if there had been any changes in participant behaviour as a result of taking part in the programme. Differences in start and end scores for each aspect and for ‘total environmentally friendly behaviour’ were calculated but no statistically significant change in overall scores or on each question were found. Total environmentally friendly behaviour scores remained the same but slight increases were seen in 4 out of the 6 individual behaviour scores (recycling, turning off the plug and tap and picking up litter).

However when looking at frequency of environmentally friendly behaviours, starting responses indicate that the majority of participants usually often or always recycle, buy energy saving light bulbs, turn off the power at the plug, and turn off the tap when cleaning their teeth anyway, suggesting a reasonably environmentally pro-active group in the first place. Nevertheless, slight increases still occurred in proportions of participants carrying out all of the behaviours 'often' and 'always' as a result of participating in the Discovery Quest programme (see Figure 30).

![Figure 30 Change in proportion of participants undertaking various behaviours 'often' and 'always' after taking part in the Discovery Quest programme.](image)

4.6 Community belonging

To give us some measure of participants’ sense of community belonging, participants were asked at the beginning and end of the programme “How strongly do you feel you belong to your immediate neighbourhood or community?” Changes after the Discovery Quest programme.

![Figure 31 "How strongly do you feel you belong to your immediate neighbourhood or community?" Changes after the Discovery Quest programme.](image)
When considering the results as a whole, the majority of participants (approximately 65%) stated that they were either not very, or not at all strongly part of their community, either at the beginning or at the end of the Discovery Quest programme, suggesting some social isolation.

However, Figure 31 shows that some positive changes did occur, with an increase in proportion of participants feeling a strong sense of belonging and a decrease in those who felt that they were not at all strongly part of their community. These findings although not statistically significant do show that for 10% of participants their sense of social belonging increased.

4.7 Other findings

To investigate whether there were any significant differences in mental wellbeing, health and nature perception outcomes with: i) age, ii) gender and iii) baseline contact with nature, a series of mixed between-within subjects ANOVAs were conducted (where the data were parametric) or the data file was split and a series of Wilcoxon Signed-Rank Tests conducted (when the data were non-parametric).

Age
There were found to be no statistically significant differences in the changes of mental wellbeing, health or nature perception parameters attributable to age. Age was compared both by decades (i.e. 20-29 years; 30-39; etc) and by an over 40: under 40 split.

Gender
For gender differences, the only parameter that was statistically different for male and female participants was that of self esteem. A mixed between-within subjects analysis of variance was conducted to assess the impact gender on participants’ self esteem levels across two time periods (beginning and end of programme)\(^{147}\). As we have ascertained in section 4.2.2, there was a substantial main effect for self esteem changes over time, Wilks Lambda = .50, F (1, 13) = 13.02, p < .01\(^{148}\), with both genders showing an improvement in self esteem scores across the programme (see Table 2). However comparing the genders was significant, F (1, 13) = 4.87, p < .05\(^{149}\), suggesting a difference in the improvements of self esteem of men and women. Further analysis found\(^{150}\) that the improvement in self esteem was more significant for men\(^{151}\) than for women.

| Table 2 Differences in mean start and endpoint self esteem scores by gender |
|--------------------------------------------------|------------------|
| **Gender**                                      | **Beginning of programme** | **End of programme** |
| Male                                            | 24.92             | 21.58             |
| Female                                          | 30.00             | 25.33             |

Note: a decrease in RSE scores denotes an increase in self esteem.

Amount of baseline nature contact
When the wellbeing, health and nature perception parameters were compared for those who had regular contact with nature (at least once a week) with those that had less regular contact with nature (once a fortnight, monthly etc), no significant differences were found.

---

\(^{147}\) There was no significant interaction between gender and time, Wilks Lambda = .97, F (1, 13) = .36, p = .59, partial eta squared = .02

\(^{148}\) Large effect size: partial eta squared = .50

\(^{149}\) Again a large effect size: partial eta squared = .27

\(^{150}\) Using paired samples T-test on data file split by gender

\(^{151}\) (M=24.92, SD=3.80) to the end of programme (M=21.58, SD=3.52, t(11) = 3.23, (p<0.01), eta squared statistic .51 indicates a large effect size.
4.8 Importance of different aspects of the Discovery Quest programme

After taking part in the wilderness expedition, participants were asked to rate various aspects of the Discovery Quest programme on an 'importance scale' of 1-5. Aspects included: the scenery, the wildlife, learning new skills, being part of a group, the exercise or the activity and being outside in wild places. All of the aspects of the programme were generally regarded as quite important to participants, however the most highly rated were the scenery and being outside in wild places, followed by the wildlife, exercise, being part of a group and learning new skills (see Figure 32). Figure 33 gives more detail as to how the participants rated each aspect and it clearly shows that the majority of participants felt that most of the aspects of the programme were important to them.

4.9 Distances walked

In order to calculate how many steps taken and how far walked, for each participant, step length was measured and basic pedometers were given out by DQ staff at the beginning of every walk. The aim was to tally up the steps taken at the end of the Discovery Quest programme to calculate how far individual participants had walked and the calories they had burned. Unfortunately the reliability of the pedometer readings was questioned when readings were found to be erratic, often giving an unfeasible range in numbers of steps (both too high and too low) for participants on the same walk. Although initially this was a conversation starter and a source of amusement for many, it quickly became frustrating for all and so halfway through the programme their use was discontinued.\footnote{Although pedometers were always available if participants wished to 'try their luck' with them.}

However, project staff had been calculating the distances for each of the walks and challenges in each of the areas using GPS mapping software so it was possible to calculate the distances walked by each participant. Walk distances varied week by week, depending on location and theme of the
walk. Walks which didn’t contain John Muir Award or Norfolk Wildlife trust sessions were slightly longer, although participants were always outdoors in nature for 5 hours.

Average total distances walked by participants ranged between 154km and 184km (96 - 114miles) over the Discovery Quest programme, but these varied slightly between the 3 groups and depended on whether the participants took part in the ‘Discover’ or the ‘Explore’ Scotland challenge. More details can be seen in Table 3.

Table 3. Distances walked (in km) for each group in the Discovery Quest programme

<table>
<thead>
<tr>
<th>Walk/ Challenge</th>
<th>Great Yarmouth Group</th>
<th>Kings Lynn Group</th>
<th>Norwich Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk 5</td>
<td>11</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Norfolk Challenge</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Walk 11</td>
<td>12</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>Wild Challenge</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Discover Scotland</td>
<td>28-32</td>
<td>28-32</td>
<td>28-32</td>
</tr>
<tr>
<td>Explore Scotland</td>
<td>42</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>≈Total distance over DQ programme</td>
<td>165</td>
<td>154</td>
<td>173</td>
</tr>
<tr>
<td>Average walk distance</td>
<td>9.3</td>
<td>8.5</td>
<td>9.9</td>
</tr>
</tbody>
</table>

4.10 Anecdotal evidence

The following section contains feedback from both participants themselves and the participant observer, relating to the Discovery Quest programme as a whole. Participant feedback is taken from baseline and endpoint questionnaires; the participatory process in Knoydart, Scotland; and from direct quotes to the participant observer. This section also includes participant feedback about the evaluation process. Chapter 5 contains the feedback from participants specifically relating to each of the 2 walks and 3 challenges that were evaluated.

To protect participant anonymity, all names of participants have been replaced by the names ‘Peter’ or ‘Polly’ to denote gender only. These names were chosen by the researcher as there were no participants with either of these names on the Discovery Quest programme. Where comments refer to staff or volunteers their names have been replaced by their role in brackets – e.g. [mountain leader] or [volunteer].

Where possible (and appropriate) feedback and observations for each question have been themed under 5 main headings in line with the main outcomes of the research:

- Health and wellbeing
- Nature
- The exercise or activities
- Social aspects
- Other

Participants were asked at the start of the discovery Quest programme whether there was anything that they were not looking forward to or that they were nervous about. This question was included for 2 reasons: firstly, to see if these anxieties were still present for participants at the end of the
Discovery Quest programme; and secondly to inform future programmes so that Discovery Quest staff and volunteers can try to alleviate such fears in subsequent initiatives. Participants were also asked what they were most looking forward to or what they were excited about.

At the end of the programme, participants were then asked to reflect on the good points; any not so good points; and on opportunities for change or improvement. In the following 2 sections we have linked together i) the initial anxieties and subsequent aspects that participants felt were not so good; and ii) the aspects that participants were most looking forward to with what they told us they enjoyed the most.

4.10.1 What participants were not looking forward to at the beginning and what they did not enjoy on the DQ programme

The most frequently mentioned concern by participants at the start of the programme was that of meeting new people and how they would be seen by others in the group. At the end of the programme many of the participants did not complete the section asking if there had been anything that they did not enjoy, and 11 of the participants reported that there had been nothing they hadn’t enjoyed. There were many more comments on what people had enjoyed about the programme than there were negative comments. However several of the participants reported that they had found the walking up hills particularly arduous, some had felt they had been pushed too hard and others had frustrations with staff members.

It is interesting however, that the initial anxiety voiced by many participants at the start, that of meeting new people, was not reported as a problem in the end. In fact, meeting new people ended up being reported as one of the positive outcomes of involvement in the Discovery Quest programme.

Other concerns and comments are organized by theme below.

Health and wellbeing
Participants had anxieties about the programme highlighting their existing health problems and perhaps hindering their progress on the walks and challenges.

“Bit worried that I may not complete the course - may not be fit enough”
“I do suffer with back and heart problems. I am hoping none of these will affect my walking”

Others had a general anxiety about the whole “adventure” and one participant was worried about the health effects of travelling for long periods of time in a minibus (on the way to and from walk locations).

At the end of the programme, some participants did report that they had found it hard going at times, both physically and mentally and said that this had been a low point for them.

“Being pushed mentally on a couple of occasions and when Polly fell ill”
“Feeling knackered and useless when trying to climb the mountain in Knoydart”
“Aches and pains”
“Pain when pushed too hard”
“Being tired”
“Struggling walking up the mountain”
The exercise and activities
Some participants were concerned about some of the courses and activities; one worried that they wouldn’t be able to get up on time to participate in the walks; others worried about using the toilet while out in nature and one person was uneasy about walking in adverse weather conditions. In the end, only one of the initial concerns about the activities was a problem for a participant, when they had felt a bit “overwhelmed” by one of the Norfolk Wildlife Trust workshops. Other comments relating to activities included:

“The amount of hill and mountain walking was too much. [DQ staff member] doesn’t listen and what happened to Polly could have been prevented.
“Some Norfolk walks were bland, but the people made it fun”
“The lack of basic education when we go camping”

Social aspects
Many of the participants said that they were worried about meeting other people and about how they would be perceived by others. This was perhaps the main concern of participants at the start of the programme.

“Meeting a large number of people, keeping my temper in is difficult at times”
“Falling over in front of people as I can be clumsy”
“I am nervous about feeling abandoned if people misunderstand my problems and the way I react to them”
“I haven’t got much confidence so I worry that people won’t like me”
“Having to be around lots of people, but I will get used to that I think”
“I’m also very nervous about going up and down hills. I don’t want to look like an idiot”

In the end there were only 3 negative comments pertaining to social aspects of the programme and they were not focused on initial worries about not ‘fitting in’ to the group.

“The meals and some of the other people”
“Noise from other people and [their] complaining”
“Being treated like an idiot”

Other
Several of the participants were concerned about food and meals while away from home on the programme; others were worried about being weighed as part of the evaluation and some people had general worries about not living up to expectations.

“Not looking forward to the issue of food, meals etc when I am away with DQ”

Many participants however told us that they had no real anxieties and some left the answer box blank. In the same way, at the end of the programme many also left this section blank but the only other things that participants did not enjoy so much which are not already covered in the previous sections included:

“The weather”
“Lack of space in minibus”
4.10.2 What participants were looking forward to and what they enjoyed the most on the DQ programme

The most frequently mentioned aspects of the Discovery Quest programme that participants were most looking forward to or excited about were: going walking, camping and climbing mountains; getting fitter; being outside in nature and meeting new people. At the end of the programme, participants told us that they had enjoyed many aspects but principally these were being part of a group, being outside in nature and camping and walking. Interestingly what people were expecting to enjoy and what they did enjoy in the end were very similar.

Further comments from participants are organized by theme below:

Health and wellbeing
Several participants mentioned looking forward to getting fitter and stronger and feeling healthier.

“Going places, getting healthy, gaining confidence and meeting challenges”
“Improving my health and fitness and climbing mountains at the end of the course”
“Getting a lot fitter, learning more about the outdoors and getting stronger”

Indeed at the end of the programme participants mentioned that they did feel fitter, more relaxed and they felt a sense of achievement and one person reported that they had ‘found themselves’.

“The DQ programme has been very good for me in disciplining me to walk regularly and I am back to my old fitness levels. I have also started eating more fruit etc”
“I really have enjoyed everything we have done. Meals and teabreaks were all good too. I’ve become quite relaxed knowing that I don’t have to do all the mundane things at home - will try to continue walking ‘after DQ’ but I doubt I will buy a tent!”
“Everything, it was great especially Knoydart. I have met new people, learned new things and I have learned that I can relax and not panic. This is a useful skill when coming down mountains”
“Finding myself- I lost it. I also enjoyed seeing absolutely stunning scenery and views- absolutely gorgeous”

Nature
Many participants stated that they were looking forward to getting outside into natural surroundings.

“Adventure in a new environment”
“Seeing beautiful views and learning about nature”
“Being in natural surroundings, getting to know new people”
Similarly, at the end of the programme, participants said that they had enjoyed the dramatic scenery (particularly in Scotland and Wales), being in natural surroundings generally, seeing wildlife and learning more about it.

“Being in a wild, remote, beautiful place away from civilisation and being with a group of people”
“Seeing wildlife, reading maps and going to Scotland”
“Feeling secure in mountains and succeeding with activities”
“The wilderness of Knoydart”
“I have enjoyed exploring new areas of the Norfolk countryside”

_The exercise and activities_
Many participants mentioned how much they were looking forward to the activities on the Discovery Quest programme, from climbing a mountain, camping and climbing to learning more about nature and wildlife.

“Staying away from home and being in the outdoors”
“I am really excited about learning stuff with NWT”
“Climbing mountains”
“Learning about nature, wildlife and conservation; walking in areas that I rarely go to”

When participants had finished the programme, comments about what they had enjoyed relating to the activities and exercise mirrored those from the start of the programme and included:

“[volunteer]teaching me how to pace myself whilst walking up hill – martyr help – thank you!”
“Loved the wildlife workshops”
“Team work, exercise, outdoors”
“The camping trips in Wales and Scotland”
“The walking and help from the staff”
“Travelling to the North of Britain”

_Social aspects_
Just as many participants were initially nervous about meeting new people, others were really looking forward to it.

“Meeting new people, getting good exercise and discovering new places”
“I am looking forward to making new friends, being able to improve my confidence and being able to have fun exploring wildlife and nature”
“Camping and feeling part of a like-minded community”

Again at the end of the programme, these were the aspects that many people did enjoy as they reported that they had most enjoyed being part of a group and meeting new friends.

“I achieved great respect for everybody involved in the quest”
“I enjoyed meeting up every week and exploring parts of Norfolk’s countryside”
“The walks on a Monday and Scotland and I have made some good friends”
“Meeting like minded people”
“Being in the company of similar minded people”
“The companionship, the achievements reached and the views”
“The comradeship in all the groups”
Other
Several participants mentioned that they were really looking forward to the “whole thing”; going to Scotland and Wales and generally “getting away from it all”.

“Going to Wales and Scotland camping”
“All of it. A holiday, being outside, being with people etc.”

After the programme many participants told us that they had indeed enjoyed the whole of the Discovery Quest programme.
“I enjoyed the lot - no matter how hard “The activities, the people - The whole thing really”
“The whole thing”

4.10.3 Suggestions for improvement

At the end of the programme participants were asked if there were any aspects of the Discovery Quest programme that they would change, or if they had and ideas or suggestions for improvement in future. Suggestions largely focused on making the programme longer; including more female participants; and for some participants, having more of a challenge and for others, having less of a challenge. All other suggestions are shown in Box 1 below.

Box 1 Suggestions for improvements to the Discovery Quest programme

<table>
<thead>
<tr>
<th>Suggestions for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;As so many photos were taken, it would be really special for each Scotland participant to have a book of pictures as a ‘forever’ memento (like the CGSU group had)”</td>
</tr>
<tr>
<td>“Making people aware of how difficult it is in Scotland physically!”</td>
</tr>
<tr>
<td>“Lots of food, staff to take it more easily on us with the amount of walking.</td>
</tr>
<tr>
<td>“Yes, educate the people before we get dumped in the wilderness”</td>
</tr>
<tr>
<td>“Is there a possibility of staying in Brecon Beacons for an extra day?”</td>
</tr>
<tr>
<td>“Does it have to end at 6 months – why not a year programme?”</td>
</tr>
<tr>
<td>“Overall the programme has been great – shame it is coming to an end”</td>
</tr>
<tr>
<td>“More time in Scotland”</td>
</tr>
<tr>
<td>“Make the programme longer”</td>
</tr>
<tr>
<td>“More time with other groups, more female participants and more ethnic minorities”</td>
</tr>
<tr>
<td>“To listen more to the group of walkers”</td>
</tr>
<tr>
<td>“Hot meal before an all day walk”</td>
</tr>
<tr>
<td>“The rules”</td>
</tr>
<tr>
<td>“I just wish we could have some more challenging walks through the summer”</td>
</tr>
<tr>
<td>“More rural, remote and wooded areas for the walks”</td>
</tr>
</tbody>
</table>

4.10.4 About the evaluation

Participant feedback on evaluation methodologies and logistics is always invaluable in planning and adapting future evaluation processes. As part of the participatory process, participants were asked what they thought about the evaluation process, whether they thought it was ok, if there was anything that they didn’t think was ok and if there was anything they thought we could do
differently in future. Participants also spoke to the researcher about the evaluation process throughout the Discovery Quest programme.

The majority of participants were willing to take part in the evaluation, even though sometimes for some completing questionnaires and being filmed was clearly not easy. On occasions, particularly after a physically demanding and mentally tiring walk or on a ‘bad’ day, many participants told us that the last thing that they had wanted to do was to complete a questionnaire, but they took part anyway. On the whole, most participants appreciated that in order for programmes such as Discovery Quest to continue to run, and to improve year on year, some kind of evaluation needed to take place, to establish to what extent the programme has achieved what it had set out to do. There was therefore a feeling amongst participants that by helping with the research they were “doing their bit” to enable others to take part in such programmes in the future. Several participants also expressed an interest both in seeing the results of this research and in finding out more about nature based interventions in general.

The overall feeling from participants, who spoke to the researcher, was that the evaluation process was tolerable and that it largely did not detract from the enjoyment of the programme. When asked was it ok, most people said ‘yes’ and others made the comments below:

“I am really looking forward to seeing the results from the research evaluation. It will be interesting to see how effective the tools being used actually are”

“The methodology I am sure will produce actual results but I would be more interested in seeing individual statements based more in reality than in academically recognised research – this would be hard though I know!”

When asked if there was anything about the evaluation that wasn’t ok, a couple of participants mentioned the questionnaires and one commented about the faulty pedometers.

“The pedometers didn’t work properly so mileage about walking is misleading”

“questionnaires sometimes seemed like overkill”

In addition, participants informed the researcher about any aspects of the evaluation process that had made them slightly uneasy in the beginning and then went on to discuss with the researcher how this could be alleviated in future. One example of this concerned anonymity of questionnaire responses, where although participants knew that they were only giving us initials and date of birth on their questionnaires so that we could match up ‘before’ and ‘after’ questionnaires, they were still a little uneasy about being honest on paper, as it was assumed that the research team also had a full list of participant names, and therefore would find it easy to match names to initials. In fact, at no point, did the research team have a list of participant names, but one of the suggestions participants put forward, was that we needed to emphasise this fact more at the introductory session in future.

Another useful suggestion for improvement was to “Include a participant in the evaluation process to help others understand, explain, help etc”. Suggestions about some of the logistics of completing questionnaires outside after a walk were also discussed. On a couple of occasions participants told researchers that they had felt ‘rushed’ when trying to complete questionnaires after a walk, and before getting back into the minibus, and felt that this could be avoided in future by letting people complete questionnaires while sitting down in the minibus.

Other suggestions for improvement of the evaluation included:

“One event for each group (Norwich, Kings Lynn, Great Yarmouth) with a short walk, buffet lunch at base and evaluation at the same time”
“People are clearly feeling better while the programme is active, but surely evidence of the effectiveness of DQ has to involve questionnaires after it has ended?”

The latter comment about participants completing questionnaires after the programme had ended, to enable us to examine longer term effects of the programme, is likely to be addressed as many participants told us that they would complete a postal questionnaire, in six months time if we would send it to them.

4.10.5 **Email feedback on the Discovery Quest programme from participants and support workers**

Several participants and support workers were inspired to email the Discovery Quest team to share their observations on how the Discovery Quest process had affected their lives or the lives of someone they care for. A selection of these comments have been included in this section and again all names have been substituted to protect anonymity.

**Comments from participants:**

“Also, I’d just like to say that I thought Wales and Scotland were brilliant, I enjoyed them both so much. Thank you for letting me join in with these great experiences.”

“I have thoroughly enjoyed the Discovery Quest programme and I love the outdoors and going to beautiful places. I have also enjoyed the experience of being in a group and have made some new friends. Hopefully, I have got fitter and also improved my mental health too as I find walking very therapeutic and relaxing and good for the mind as well as the body”

“I also found the information we were given about wildlife very interesting and it also made me feel more confident as it made me realise that I know quite a lot about nature. Altogether, I found the Discovery Quest programme a very inspiring experience and thought that all the help and teaching we had from the guides and instructors was top quality”

“Since starting with Discovery Quest in the Spring I have come a long way & starting to be more positive in my future. This is some of the best therapy I have had to help me with my illness. I thought the Norfolk walks in the summer were not really challenging enough but I know you were catering for many different levels of fitness. What kept me going on those walks was the trip to Knoydart at the end which I thought was amazing because I will probably never go there again”

“Just a little note to say Thank You to you and all the team, for the lovely camping experience at Tuttington. It was a very special time, and the workshops provided an opportunity to reflect on how much Discovery Quest has enabled me to re-connect with nature in a simple but more grown-up and responsible way (I hope that makes sense). It also made me realise what a close bond the Great Yarmouth group has formed and how important the group has become as an integral part of the DQ experience.”

**Comments from carers and support workers**

“Polly is doing great, has put her name down for lots of the new workshops in September to keep herself busy after DQ finishes and seems much more confident in taking charge of her life!”

“Peter has shown a genuine enthusiasm for the project. I know that there have been transport difficulties at times. Peter has been able to educate our leisure group when out on walks with facts
about the environment that he has picked up along the way. He does appear more confident in groups and is more relaxed. I think he has really benefited from the quest so far”

“Polly stated that she is concerned that she will be lost when DQ ends”

“DQ is a great thing for Peter. When I started working with him he would give me one or two word answers to questions about interests/hobbies. If I ask him about DQ his face lights up, he smiles and he’s very enthusiastic about it. He is not forthcoming about what you have been up to but will talk a lot about it if asked. Peter had previously been a skier, rock climber etc and had withdrawn himself because of his depression and anxiety but I think he making great strides towards getting back there again because of DQ. DQ and Peter suit each other very well”

“Since Peter started Discovery Quest he’s a ‘different person’. He has become a lot more animated and talkative. Peter hasn’t had any other changes in his life, so his positive outcomes can be attributed to involvement in DQ”

4.11 Key Findings

- In total, 69 participants, volunteers and staff started the Discovery Quest programme evaluation and 30 participants continued with the regular walks and the challenges right through until either Discover or Explore Scotland. The majority of the participants were male (67%) and ages ranged from the youngest of 20 up to the oldest at 68.

- Mental wellbeing was assessed using the Warwick Edinburgh Mental Well Being Scale (WEMWBS), self-esteem was tested using the Rosenberg Self Esteem scale (RSE) and mood was assessed using the Profile of Mood States (POMS). Positive changes in all 3 wellbeing measures were found. Analysis using a paired samples t-test showed a statistically significant increase in participant WEMWBS from start of programme (M=38.84, SD=6.59) to the end of programme (M=46.16, SD=7.39, t(18)=4.51, p<.001). 89% of participants saw an increase in wellbeing.

- Again, a paired samples t-test showed a statistically significant increase in participant self esteem from the start of the programme (M=26.50, SD=4.65) to the end of programme (M=22.69, SD=3.70, t(15)=4.55, p<.001) – note a decrease in RSE scores denotes an improvement in self esteem. The majority (88%) of participants saw an increase in their self Esteem scores as a result of taking part in the Discovery Quest programme.

- The results of the POMS mood test showed that 66% of participants experienced improvements in total mood disturbance (TMD) as a result of the Discovery Quest activities. A paired samples t-test showed a statistically significant decrease in participant TMD scores (representing an improvement in mood) before (M=154.48, SD=24.32) and after walk 5 (M=143.42, SD=20.34, t(30)=4.89, p<.001); and before (M=162.04, SD=24.97) and after Norfolk Challenge (M=150.11, SD=21.19, t(27)=4.41, p<.001).

- Participant perceptions of nature were assessed using the Nature Relatedness Scale (NRS) and an adapted Connectedness to Nature scale (CNS). The Nature relatedness scale is a measure which gives an overall score that describes individual levels of connectedness with the natural world and also three subscales scores (Self, Perspective, and Experience). The majority of Discovery Quest participants (79%) experienced an increase in the way they related to nature. A paired samples t-test showed a statistically significant increase in nature relatedness scores (NR)
from the start of programme ($M=3.51, SD=.35$) to the end of programme ($M=3.76, SD=.42$, $t(12)=2.28, p<.05$).

- The majority of participants (75%) saw an increase in their NR Self scores, i.e. an increase in their connection to nature. Further analysis revealed a statistically significant increase in the sub scale factor of ‘Self’ in the nature relatedness scale from the start of programme ($M=3.42, SD=.30$) to the end of the programme ($M=3.91, SD=.61$, $t(14)=3.55, p<.01$). The majority of participants (61%) also experienced an increase in their NR Perspective scores over the course of Discovery Quest programme, representing an increased awareness of the mankind and nature interaction and approximately half of the participants (47%) saw increases in their NR Experience scores, but these were not statistically significant.

- Although mean scores suggested increases in CNS scores between before and after Norfolk Challenge, walk 11 and Wild Challenge a Freidman test showed no statistically significant changes. However, the majority (60%) of discovery Quest participants experienced an increase in connection to nature over time, between the start of walk 5 and the end of Wild Challenge.

- Nearly all participants (96%) experienced a decrease in BMI (Body Mass Index) as a result of participating in the Discovery Quest programme. Several participants had even changed BMI category: 3 people went from being clinically obese to being overweight and 5 people went from overweight to normal. When BMI scores were examined in more detail, a paired samples t-test showed a statistically significant decrease in participant BMI from start ($M=27.88, SD=4.95$) to the end of the programme ($M=26.17, SD=4.72$, $t(22)=6.28, p<.001$).

- Approximately half of Discovery Quest participants (52%) saw a decrease in their waist to hips ratio (WHR), representing a reduction in health risk. In terms of the associated health risk category, two participants moved from high risk to moderate risk; one participant went from high risk right down to low risk and one participant went from moderate to low; the remainder who saw decreases didn’t move risk group.

- Similarly, approximately half of the participants (52%) saw increases in their self-reported health state. Analysis with Wilcoxon Signed-Rank Tests (with a Bonferroni correction applied) showed that although increases were seen at all of the time points where health was measured, the increases in health scores were only statistically significant for: beginning and end of programme ($Z=-2.10, p<0.05$); before and after walk 5 ($Z=-3.84, p<0.001$) and before and after Norfolk Challenge ($Z=-3.59, p<0.001$).

- Although there was no significant difference between mean physical activity level values at the beginning and half way through the programme, there were positive changes at the extremes. Fewer participants said that they took part in physical activity for only 1 or 2 days a week and more participants said that they now participated in moderate physical activity 6 or 7 days a week at the mid-point than they did at the beginning of the programme.

- Due to very small numbers of participants who gave us comparable ‘before’ and ‘after’ data, there were no discernable or statistically significant changes in participant smoking and drinking habits over the course of the Discovery Quest programme.

- Participants were asked a series of questions about their eating habits and attitudes to food. When asked how much they enjoyed “putting effort and care into the food that I eat”, more participants ‘agreed’ or ‘strongly agreed’ with the statement by the end of the programme than they did at the start. Similarly, participants were also asked how much they agreed with the
statement that “Healthy food often tastes nicer than unhealthy food” and again more people agreed or strongly agreed with the statement at the end of the programme

- Finally participants were asked to rank in order of importance a “list of things that some people find important when it comes to food”, including: Choosing food products and dishes that you enjoy eating; Eating a healthy diet; Keeping your spending on food as low as possible; Eating your meals in the company of other people; and Choosing food products and dishes that are quick and easy to prepare. At the beginning of the programme more participants felt that low cost food was the most important aspect than did at the end, and at the end of the Discovery Quest programme higher numbers of people felt that eating food that they enjoyed and healthy food were the top priority aspect than they did at the beginning.

- Total environmentally friendly behaviour scores remained the same but slight increases were seen in 4 out of the 6 individual behaviour scores (recycling, turning off the plug and tap and picking up litter). When looking at frequency of how often participants carried out environmentally friendly behaviours, starting responses indicate that the majority of participants usually often or always recycle, buy energy saving light bulbs, turn off the power at the plug, and turn off the tap when cleaning their teeth anyway, suggesting a reasonably environmentally pro-active group in the first place. Nevertheless, slight increases still occurred in proportions of participants carrying out all of the behaviours ‘often’ and ‘always’ as a result of participating in the Discovery Quest programme

- In terms of how much participants felt that they were involved in their neighbourhood, some positive changes did occur, with an increase in the proportion of participants feeling a strong sense of belonging; and a decrease in those who felt that they were not at all strongly part of their community. These findings although not statistically significant do show that for 10% of participants their sense of social belonging increased.

- After taking part in the wilderness expedition, participants were asked to rate various aspects of the Discovery Quest programme including: the scenery, the wildlife, learning new skills, being part of a group, the exercise or the activity and being outside in wild places. All of the aspects of the programme were regarded as quite important to participants, however the most highly rated were the scenery and being outside in wild places, followed by the wildlife, exercise, being part of a group and learning new skills

- Average total distances walked by participants ranged between 154km and 184km (96-114miles) over the Discovery Quest programme, but these varied slightly between the 3 groups and depended on whether the participants took part in the ‘Discover’ or the ‘Explore’ Scotland challenge

- There were many more comments on what people had enjoyed about the programme than there were negative comments. However some participants reported that they had found the walking up hills particularly arduous and some had felt they had been pushed too hard. It is interesting however, that the initial anxiety voiced by many participants at the start, the worry about meeting new people and how they would be seen by others, were not reported as problems in the end. In fact, meeting new people ended up being reported as one of the positive outcomes of involvement in the Discovery Quest programme.

- The most frequently mentioned aspects of the Discovery Quest programme that participants were most looking forward to were: going walking, camping and climbing mountains; getting fitter; being outside in nature and meeting new people. At the endpoint, participants told us that
they had enjoyed many aspects, but principally these were being part of a group, being outside in nature and camping and walking. What people were expecting to enjoy and what they did enjoy in the end were very similar.

“Getting a lot fitter, learning more about the outdoors and getting stronger”
“The DQ programme has been very good for me in disciplining me to walk regularly and I am back to my old fitness levels. I have also started eating more fruit etc”
“Being in a wild, remote, beautiful place away from civilisation and being with a group of people”
“The companionship, the achievements reached and the views”

• The majority of participants were willing to take part in the evaluation, even though sometimes for some completing questionnaires and being filmed was clearly not easy. On occasions, particularly after a physically demanding and mentally tiring walk or on a ‘bad’ day, many participants told us that the last thing that they had wanted to do was to complete a questionnaire, but they took part anyway. On the whole, most participants appreciated that in order for Discovery Quest to continue, some kind of evaluation is needed to establish what extent the programme has achieved what it had set out to do. There was therefore a feeling amongst participants that by helping with the research they were “doing their bit” to enable others to take part in such programmes in the future.
5 Results – Evaluated walks and challenges

This chapter includes the more detailed results from the 2 walks and 3 challenges that were evaluated, i.e. the before and after activity studies. It includes: i) general information about the number of participants on each trip; ii) activities undertaken; iii) any statistically significant findings particular to that session; and iv) narrative comments from participants, about the specific sessions - given under the 3 themes: what participants enjoyed, what they did not enjoy and any suggestions for change. Observations from researchers are also included in this chapter.

5.1 Walk 5

5.1.1 General information

General information about walk 5, activities, numbers, duration and other details can be seen in Table 4.

Table 4. General information about Walk 5.

<table>
<thead>
<tr>
<th>Walk 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date</strong></td>
</tr>
<tr>
<td><strong>Location</strong></td>
</tr>
<tr>
<td><strong>Level of wilderness</strong></td>
</tr>
<tr>
<td><strong>Duration</strong></td>
</tr>
<tr>
<td><strong>Number of participants</strong></td>
</tr>
<tr>
<td><strong>Weather</strong></td>
</tr>
<tr>
<td><strong>Activities</strong></td>
</tr>
<tr>
<td><strong>Other</strong></td>
</tr>
</tbody>
</table>

Ponies on Roydon Common – Photo Edward Jackson
5.1.2 **Statistically significant findings**

Statistically significant findings for walk 5 included positive changes in self esteem, total mood disturbance, tension and self reported health.

In terms of self esteem, 65% of participants saw improvements after taking part in walk 5, and using a Wilcoxon Signed-Rank test the differences between before and after walk 5 ($Z = -3.21, p<0.001$), were statistically significant, denoting an improvement in self esteem.

Improvements in Total Mood Disturbance from before and after the walk were found, a paired samples t-test showed a statistically significant decrease in participant TMD scores (representing an improvement in mood) before ($M=154.48, SD=24.32$) and after walk 5 ($M=143.42, SD=20.34$, $t(30)=4.89, p<.001$). The majority of participants (79%) experienced improved TMD as a result of the walk.

A one way between groups MANOVA was also conducted to evaluate the impact of walk 5 on the 6 mood sub-factors: anger, confusion, depression, fatigue, tension and vigour. Preliminary assumption testing was conducted to check for normality, linearity, outliers, homogeneity of variance-covariance matrices and multicolinearity with no serious violations noted.

There was a statistically significant difference between before and after scores on the combined dependent variables $F(6,61) = 2.82, p=.017$; Wilks’ Lambda = .78; partial eta squared=.22. When the results were considered separately, the only difference to be statistically significant (using a Bonferroni adjustment) was tension $F(1,66)=8.59; p=0.005$, partial eta squared = .12, where mean scores showed tension levels were higher at the beginning of the walk ($M=36.19, SD=5.83$) than afterwards ($M=32.37, SD=4.86$) – see Figure 34.

The majority of participants (64%) also experienced an increase in self reported health after walk 5.

A Freidman test was conducted to examine the significance of these increases over time and this showed statistically significant differences with self reported health scores over time, $\chi^2(7) =12.25, p < 0.05$. Post-hoc analysis with Wilcoxon Signed-Rank Tests (with a Bonferroni correction applied) showed that the increase in health scores was statistically significant for before and after walk 5 ($Z= -3.84, p<0.001$).

![Figure 34 Subscale mood factors pre and post walk 5](image)

---

153 Conducted as a posthoc analysis from a significant Friedman test

154 The eta squared statistic (0.44) indicated a large effect size
5.1.3 Narrative comments

What participants enjoyed
Participants were asked what they enjoyed about walk 5 and responded with comments about the beauty of the natural environment, about the walk itself and about enjoying being with the Discovery Quest group.

“The lovely views, the weather was just right, meeting the ponies at lunch and chatting with friends”

“Beautiful landscape, interesting companions and testing my stamina”

All other comments from participants on walk 5 can be found in Box 2.

Box 2. What participants enjoyed about walk 5

- The fact that I was out and about and I was able to come on the walk.
- I love my bravery
- The lovely sunny weather
- Being out in the county, naming the trees
- Exercise, outdoors
- The wide open spaces, wild flowers.
- Meeting new people, being outdoors, watching birds
- Bad weather increased bonding around us.
- Meeting up with people, and just enjoying the lovely walk along the coast.
- Walking by the sea
- Braving the elements, talking to people
- Walking outdoors
- Walking, looking at wild flowers and scenery
- different areas to walk in
- Walking, nature, fresh air and companionship
- Just getting out and about
- Seeing the horses
- Plenty of horses
- Walking and chatting to other members.
- Walking and chatting
- Company and environment
- The walk and the sights
- Being outdoors, doing the workshops and the walk
- All of it
- Everything
- meeting new people and getting some exercise
- Camaraderie
- Talking with others, seeing ponies
- The group
- Taking photographs and socialising
- Being outside
- Walking at the beach and in the woods. Watching and learning and talking about foraged food.
- I enjoyed a new walk in a new area.
- The exercise

Was there anything that participants did not enjoy?
When asked whether there was anything that they did not enjoy so much, the majority of participants either left the box blank or stated no, however participants did comment that they had not enjoyed the weather or the pace of the walk (both too fast for some and too slow for others). All comments are shown in Box 3.

Box 3. Was there anything that participants did not enjoy about walk 5?

- Yes, but I don’t want to say
- climbing over fences
- Walking too slowly and stopping a lot
- The cows
- Feeling anxious on arrival and during day 1.
- Sometimes not being able to keep up
- The humidity
- questionnaire
- Rain
- My wisdom tooth started coming through and it aches
- I was tired
- Hard going in wet weather, route went back on itself.
- Rain
- Weather at times
- The wet paths
- The weather
Was there anything that participants would change?
When asked whether there was anything about walk 5 that they would change, 22 participants said ‘no’, whilst one person commented that the “Walk could be longer”, another mentioned “food” and another said “It would be nice if we stayed in a group”.

5.2 Norfolk Challenge

Norfolk challenge was an overnight camp in the Norfolk countryside aimed at getting all three of the groups together to meet for the first time, to experience sleeping in a tent and to take part in walking, workshops and communal cooking.

5.2.1 General information

General information about Norfolk Challenge, activities, numbers, duration and other details can be seen in Table 5.

<table>
<thead>
<tr>
<th>Table 5. General information about Norfolk Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Norfolk Challenge</strong></td>
</tr>
<tr>
<td><strong>Date</strong></td>
</tr>
<tr>
<td><strong>Location</strong></td>
</tr>
<tr>
<td><strong>Level of wilderness</strong></td>
</tr>
<tr>
<td><strong>Duration</strong></td>
</tr>
<tr>
<td><strong>Number of participants</strong></td>
</tr>
<tr>
<td><strong>Weather</strong></td>
</tr>
<tr>
<td><strong>Activities</strong></td>
</tr>
<tr>
<td><strong>Other</strong></td>
</tr>
</tbody>
</table>
5.2.2  **Statistically significant findings**

Statistically significant findings for Norfolk Challenge included positive changes in self esteem, total mood disturbance, tension and self reported health.

In terms of self esteem, 71% of participants saw improvements after taking part in Norfolk Challenge and using a Wilcoxon Signed-Rank test the differences between before and after the challenge \( Z = -3.17, p<0.01 \), were statistically significant, denoting an improvement in self esteem.

Improvements in Total Mood Disturbance from before and after the challenge were found, a paired samples t-test showed a statistically significant decrease in participant TMD scores (representing an improvement in mood) before \( (M=162.04, SD=24.97) \) and after Norfolk Challenge \( (M=150.11, SD=21.19, t(27)=4.41, p<.001) \). The majority of participants (86%) experienced improved TMD as a result of the challenge.

A one way between groups MANOVA was also conducted to evaluate the impact of the Norfolk Challenge on the 6 mood sub-factors: anger, confusion, depression, fatigue, tension and vigour. Preliminary assumption testing was conducted to check for normality, linearity, outliers, homogeneity of variance-covariance matrices and multicollinearity with no serious violations noted.

There was a statistically significant difference between before and after scores on the combined dependent variables \( F(6,44)=3.58, p=.006; \) Wilks’ Lambda =.67; partial eta squared=.33. When the results were considered separately, the only difference to be statistically significant (using a Bonferroni adjustment) was tension \( F(1,49)=8.06; p=0.007, \) partial eta squared =.14 where mean scores showed tension levels were higher at the beginning of the challenge \( (M=38.50, SD=6.71) \) than afterwards \( (M=33.39, SD=5.98) \).

The majority of participants (63%) also experienced an increase in self reported health after the Norfolk Challenge. A Friedman test was conducted to examine the significance of these increases over time and this showed statistically significant differences with self reported health scores over time,

---

155 Conducted as a posthoc analysis from a significant Friedman test
156 The eta squared statistic (0.42) also indicated a large effect size
\(\chi^2(7) = 12.25, p < 0.05\). Post-hoc analysis with Wilcoxon Signed-Rank Tests (with a Bonferroni correction applied) showed that the increase in health scores was statistically significant for before and after Norfolk Challenge (\(Z = -3.59, p < 0.001\)).

Although mean scores suggested increases in CNS scores between before and after Norfolk Challenge, a Freidman test showed that this increase was not statistically significant.

5.2.3 Narrative comments

What participants enjoyed

Participants were asked what they enjoyed about walk 5 and responded with comments about how they enjoyed the whole experience, the walking, the camping and the beauty of the location.

“Enjoyed the wilderness side of things, trees around me and being in the woods”

“The country and the whole experience”

“I enjoyed the diversity of the workshops and the site blew me away”

All other positive comments from participants on the Norfolk Challenge can be found in Box 4.

Box 4. What participants enjoyed about Norfolk Challenge

<table>
<thead>
<tr>
<th>The whole nature experience</th>
<th>Just getting out and camping in a lovely spot</th>
</tr>
</thead>
<tbody>
<tr>
<td>The venue</td>
<td>I enjoyed all three workshops a lot of though and preparation was involved</td>
</tr>
<tr>
<td>Being around nature</td>
<td>The walks, the camping experience</td>
</tr>
<tr>
<td>Rural setting. Getting into the wild</td>
<td>The ability to have times when you could switch off and have thought time</td>
</tr>
<tr>
<td>Being away from the city</td>
<td>Everything - all activities</td>
</tr>
<tr>
<td>Being in a safe space outdoors</td>
<td>Walking, camping, nature quiz</td>
</tr>
<tr>
<td>The location for the camp is excellent</td>
<td>Learning to use a map more effectively</td>
</tr>
<tr>
<td>Outdoors, company, nature, lovely spiritual field space away from home, laughter and fun</td>
<td>It was a learning curve</td>
</tr>
<tr>
<td>Being in the open air and seeing wildlife and flowers</td>
<td>Everything x 3</td>
</tr>
<tr>
<td>People and place</td>
<td>The food</td>
</tr>
<tr>
<td></td>
<td>Workshops testing names of stuff we’ve learnt and quiz. Campfire with everyone.</td>
</tr>
<tr>
<td></td>
<td>The three different tasks and sleeping in tents</td>
</tr>
<tr>
<td></td>
<td>Meeting new people and being made to feel welcome by everyone including staff</td>
</tr>
<tr>
<td></td>
<td>Meeting different people in different groups</td>
</tr>
<tr>
<td></td>
<td>Map reading, meeting new people</td>
</tr>
<tr>
<td></td>
<td>The fact that I was very anxious about it but came and enjoyed it.</td>
</tr>
</tbody>
</table>

Was there anything that participants did not enjoy?

When asked whether there was anything that they did not enjoy so much, the majority of participants again either left the box blank or stated no, however participants did comment that they had not enjoyed the weather at times, some hadn’t liked the toilet arrangements and others hadn’t enjoyed some of the activities. All comments are shown in Box 5.
Box 5. Was there anything participants did not enjoy about Norfolk Challenge?

- I didn’t enjoy the toilets because of the midges.
- Using a composting toilet
- Toilets and not mixing with the men
- the toilets and the heat
- The toilet facilities, the lack of direction/things to do on the first day.
- Toilets
- The heat! The toilets were a bit dodgy
- Spiritual nature workshop, too personal in front of strangers
- The map reading because I couldn’t do it
- Being in the tent when it’s hot
- Lack of sleep
- It seemed odd that the women were separated from the men
- The lack of organisation- no discipline, basic stuff
- Having to do activities that were too childish and not being challenged enough
- Rules
- Boys
- Weather at times

Was there anything that participants would change?

When asked whether there was anything about Norfolk Challenge that they would change, 10 participants said ‘no’, whilst some participants commented that they would have liked to have walked further, others that some of the activities could be adapted and several commented on not separating males and females in the camp.

All suggestions for future changes are shown in Box 6.

Box 6 Was there anything that participants would change about Norfolk Challenge?

- Create more structure so people know what is happening and when
- Maybe another day
- Shorter periods of ‘non-activity’ time (between activities. Non-separation of sexes during activities would be better.
- Maybe some more organised activity in the evening
- Make it 1 more night. Spend longer getting to know others before intensive stuff.
- Slightly better facilities if possible
- Transportation
- Would change the way people interact with each other, group activities, mingle more.
- Hay fever
- Myself
- Would be time on spiritual workshop to do path working.
- Maybe the toilets
  I would like to have walked further
- More challenging activities, split groups into abilities so everyone has a suitable challenge.
- Mix girls and boys for daytime workshops
- Group splitting

5.3 Walk 11

5.3.1 General information

General information about, walk 5 activities, numbers, duration and other details can be seen in Table 6.
Table 6. General information about walk 11

<table>
<thead>
<tr>
<th>Date</th>
<th>26th, 27th and 28th July 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Lound East Runton, Wiggenhall</td>
</tr>
<tr>
<td>Level of wilderness</td>
<td>Rural</td>
</tr>
<tr>
<td>Duration</td>
<td>4-5 hours</td>
</tr>
<tr>
<td>Number of participants</td>
<td>32</td>
</tr>
<tr>
<td>Weather</td>
<td>Varied – two walks hot, one raining and humid</td>
</tr>
<tr>
<td>Activities</td>
<td>Walking, navigation, group work,</td>
</tr>
<tr>
<td>Other</td>
<td>On one walk, quite a feeling of pressure reported from several participants</td>
</tr>
</tbody>
</table>

5.3.2 **Statistically significant findings**

There were no statistically significant findings for Walk 11 specifically, although 41% of participants saw an improvement in self esteem, 50% of participants experienced an improvement in total mood disturbance and 36% of participants saw increased health scores as a result of taking part in the challenge.

Although mean scores suggested an increase in connection to nature scores between before and after walk 11, a Friedman test showed that it was not statistically significant.

5.3.3 **Narrative comments**

*What participants enjoyed*
Participants were asked what they enjoyed about walk 11 and responded with comments about how they enjoyed the walking and the company.

“Walking and being with others in the group”
“Talking with others and enjoying nature”

All other positive comments from participants on walk 11 can be found in Box 7.
Box 7. What participants enjoyed about walk 11

- Woods
- Walking through the yellow corn fields
- Fresh air
- Countryside and sunshine
- Sitting under the tree canopy at lunchtime, looking at the sun shining through the leaves
- Being outside and relaxing
- The landscape
- Nice views
- Company
- Everything
- Seeing birds
- The scenery
- Scenic Views
- The rain
- Fresh air
- Seeing around where I used to visit
- Talking with others, being outside.
- Being out with people Walking
- Having a walk around
- The people
- Walking itself, I like the exercise.
- The walk and the company
- I enjoyed the walk, even though the sun made it harder for me to walk as it made me hot and worn out
- Showed somebody a style for walking downhill which made them feel more confident, lent my coat to someone who was without- it felt good to be helping. Talked about old times and places in Norwich, great views of the coast.
- Energetic

Was there anything that participants did not enjoy?

When asked whether there was anything that they did not enjoy so much about walk 11, the majority of participants again either left the box blank or stated no, however participants did comment that they had not enjoyed the weather at times and others had found the walk either too long or too short. All comments are shown in Box 8.

Box 8. Was there anything that participants did not enjoy about walk 11?

- Walking along a path that wasn’t there
- Hot sun
- Mobile phones
- Feeling distressed and unable to deal with it in my own way.
- There was not anything I did not enjoy.
- Route was not as long as it should have been.
- Lots of rain.
- The weather
- The rain
- The last bit walking through the woods
- Feeling out of control with emotions
- weather
- Just that I had a pulled muscle that hindered me a lot
- wet
- Stopping

Was there anything that participants would change?

When asked whether there was anything about walk 11 that they would change, 12 participants said ‘no’, whilst other comments were varied. All suggestions for change are shown in Box 9.

Box 9 Was there anything participants would change about walk 11?

- more woods
- my stomach cramps
- Weather
- We seem to be just walking now with the sole objective of covering the distance- no time to enjoy the surroundings.
- food
- Myself
- More recognition of slower people
- Longer walk
- We must have Ella [staff dog] with us more often.
- I would like to be able to interact and get to know others in the group.
5.4 Wild Challenge

Wild Challenge was a 2 night camp in the Brecon Beacons in Wales, aimed at i) getting the three geographical groups to together again, ii) to continue the camping experience, iii) to get participants used to walking up and down hills before Scotland, iv) for participants to meet staff from Mountain Wise and v) for staff to assess capability of participants before selecting which Scotland trip would best suit their ability level.

On the first day many participants had their first experience of walking up hills and a very different countryside to that of Norfolk. On the second day, the participants were split up into three groups depending on ability, for the longer and more physically demanding ‘mountain day’ where all three groups reached the summit of Pen y Fan (the highest peak in the Brecon Beacons). The third day was more relaxing and participants walked, learned bushcraft skills, had the opportunity to go wild swimming and to ‘chill’ before the journey back to Norfolk. In the evenings participants had the opportunity to try out the indoor climbing wall (under full supervision of trained climbing experts) and to cook damper bread over a campfire if they wished.

5.4.1 General information

General information about Wild Challenge, activities, numbers, duration and other details can be seen in Table 7.

<table>
<thead>
<tr>
<th>Wild Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
</tr>
<tr>
<td>Location</td>
</tr>
<tr>
<td>Level of wilderness</td>
</tr>
<tr>
<td>Duration</td>
</tr>
<tr>
<td>Number of participants</td>
</tr>
<tr>
<td>Weather</td>
</tr>
<tr>
<td>Activities</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>17th – 19th August 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Trewern, Hay-on-Wye, Herefordshire</td>
</tr>
<tr>
<td>Level of wilderness</td>
<td>Campsite: rural; walks in Brecon Beacons, mountainous and fairly remote</td>
</tr>
<tr>
<td>Duration</td>
<td>3 full days and 2 overnight camps</td>
</tr>
<tr>
<td>Number of participants</td>
<td>36</td>
</tr>
<tr>
<td>Weather</td>
<td>Varied, sometimes hot and sunny but on mountain day some very heavy downpours and bitter winds</td>
</tr>
<tr>
<td>Activities</td>
<td>Hill-walking, hiking, indoor climbing, camping, bushcraft skills, wild swimming, quiet reflection, campfire and damper, map reading</td>
</tr>
<tr>
<td>Other</td>
<td>First time all participants had experienced hill-walking in Discovery Quest programme Introduction to the mountain leader staff</td>
</tr>
</tbody>
</table>
5.4.2 **Statistically significant findings**

There were no statistically significant findings for Wild Challenge specifically, although 48% of participants saw an improvement in self esteem, 46% of participants experienced an improvement in total mood disturbance and 43% of participants saw increased health scores as a result of taking part in the challenge.

Although mean scores suggested an increase in connection to nature scores between before and after Wild Challenge, a Freidman test showed that it was not statistically significant.

5.4.3 **Narrative comments**

*What participants enjoyed*

Participants were asked what they enjoyed about the Wild Challenge and comments related to the stunning Welsh scenery, the achievement of climbing a mountain, the climbing wall and being ‘away from it all’.

All other positive comments from participants about Wild Challenge can be found in Box 10.

---

**Box 10. What participants enjoyed about Wild Challenge**

- stunning scenery, remoteness
- The magnificent views and feeling healthy
- Being in countryside, around nature amongst un-judgmental people
- The countryside, making a walking stick
- People and environment
- Pushing myself as hard as I can and achieving the amazing views and feeling totally connected with nature
- I was proud of myself, enjoying myself, climbing the mountains
- The scenery, the overnight camping
- Climbing a big hill
- Time away from everyday life
- The mountain climb and carpentry
- It was good to test myself
- Having the courage to talk to people
- Scenery
- Meeting nice people, lovely scenery, sense of achievement from getting to the top of a mountain and pushing myself to the limit
- walking and the scenery.
- The walks, scenery
- Climbing wall
- Walking
- walking up the small mountains, the climbing wall
- Completing the hill climb
- The views
- Meeting new people and looking at scenery
- Achieving the goal I set myself
- The lot
- Everything-tremendous sense of achievement, teamwork etc.
- Everything
Was there anything that participants did not enjoy?

When asked whether there was anything that they did not enjoy so much about Wild Challenge, the majority of participants either left the box blank or stated no, however some participants did comment that they had not enjoyed being put in a ‘new’ group, a lack of sleep, the mealtimes or feeling tired. All comments are shown in Box 11.

Was there anything that participants would change?

When asked whether there was anything about Wild Challenge that they would change, participants mentioned changes to food and to spend longer at the site. All suggestions for change are shown in Box 12.

Box 11. What participants did not enjoy about Wild Challenge

- food
- Being exhausted
- Lack of sleep and I would like more of my own time to take things in
- Lack of sleep
- Plenty, but that’s for me only
- Feeling so tired
- Not doing well uphill- i.e. neck and shoulder injury.
- This questionnaire cutting my finger
- Food
- Meal times
- invasion of privacy with pictures being taken
- Journey was tough but I expected it to be so.
- The food,
- Arriving and being put with people I didn’t know and not understanding why I was away from people I felt comfortable with

Box 12. Was there anything that participants would change about Wild challenge?

- More stops on the journey
- My physical fitness- want to get fitter
- Making sure people know what they would need on Thursday morning.
- Could be longer
- longer time away
- Food-packed lunches needed to be larger
- Just to stay with the people I am used to walking with.
- Amount of information about activities
- More food
- Have extra time here
- My preparation psychologically as my underlying expectations of myself overwhelmed and ruined the first day as my self esteem plummeted. I was angry with myself and did not feel that I was good enough to go to Scotland
- Swimming

5.4.4 Comments to/from participant observer

Many participants talked to the researcher about how they felt physically, about walking up hills in the first day and climbing Pen y Fan the following day.

“I’m amazed how quickly I recovered after struggling up that slope”

“superb walk today, superb”

“totally knackered but glad we did it”

“good to get some practice in before the real mountains in Scotland”

“not thinking about Scotland yet – I will get through this first!”

“yes it is what I expected – can’t wait to get out there properly tomorrow”
Others talked about how the trip itself, the walks and the climbs had affected them personally, emotionally and about the sense of achievement in reaching the summit.

“ I didn’t sleep at all last night (well only an hour) as I was nervous and excited about this trip”

“I didn’t have a good day yesterday but when I got to the top and it all opened up in front of me, I started to put things in order and it all started to make sense”

“good company – good to get”

“[DQ volunteer] is brilliant – we couldn’t have got up here without her”

“caring environment”

“I felt I had been stuck on a mountain on my own forever and [DQ volunteer ]just talked to me and helped me to get there”

“[mountain leader] is such a brilliant teacher – a bit forceful but great!”

“good company, good support”

“Being amongst a group of people and having total freedom we are doing our own thing we don’t have to do this”"

A few participants struggled with the food, and others were tired as they didn’t get much sleep in their tents. Some participants had realised things about themselves and had intentions to get out in nature more in future after the Wild Challenge.

“ I used to think I just wanted to be away from people and on my own, but since DQ I realise I like talking and being part of a group”

“I would like to get out as a family and walk in the future when our health improves”

“Damn DQ for bringing out the best in me!!”

5.5 Discover and Explore Scotland

Depending on ability, participants either went on the ‘Discover Scotland’ or the ‘Explore Scotland’ Discovery Quest wilderness experience. The location was the same remote location for both trips in the Highlands of Scotland, only accessible by walking (4 hours) or by boat. There was no mobile phone signal in the area and the valley where Discovery Quest camped, ended with a sea loch and beach surrounded by mountains.

Participants left Norfolk, camped overnight near Loch Lomond and then travelled the remainder of the way to Barrisdale the following day. This trip was the last of the Discovery Quest sessions in 2010 for the majority of participants and was the longest time away, the furthest distance from Norfolk and the most physically demanding.
5.5.1 General information

General information for both the discover Scotland and the explore Scotland trips are shown in Table 8.

<table>
<thead>
<tr>
<th>Discover/Explore Scotland</th>
<th>Discover Scotland: 3rd-10th September 2010</th>
<th>Explore Scotland: 17th-24th September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Barrisdale, Knoydart, Highlands of Scotland</td>
<td></td>
</tr>
<tr>
<td>Level of wilderness</td>
<td>Remote wilderness – mountains and lochs</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Number of participants</td>
<td>29 (approximately 15 in each)</td>
<td></td>
</tr>
<tr>
<td>Weather</td>
<td>Varied – some very high winds, some rain, some sunshine</td>
<td>Discover Scotland: Walking, some challenging hill-walking, conservation work, bivvy making, communal cooking, wild swimming, beach-combing, quiet time, map reading, foraging.</td>
</tr>
<tr>
<td>Activities</td>
<td>Explore Scotland: Walking, some challenging hill-walking, wild camping, communal cooking and food preparation, conservation work, Grade 1 scrambles, night navigation.</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Sometimes the midgies were very bad</td>
<td>Participants often very tired in the evenings</td>
</tr>
</tbody>
</table>

5.5.2 Narrative comments

What participants enjoyed
Participants were again asked what they enjoyed about the Scottish challenge and comments related to the remoteness, the scenery, the achievement of climbing mountains and being part of nature. All other positive comments from participants about Wild Challenge can be found in Box 13

Was there anything that participants did not enjoy?
When asked whether there was anything that they did not enjoy so much about the Scotland trips, there were only 2 comments:

“People continually grumbling about the same things continuously, without thinking of their own solutions or stating what they do want or what would help them”
“Being with other people and the long journey here”
Box 13 Was there anything that participants wanted to change about Discover of Explore Scotland?

- I have been given the opportunity to do things that I never ever thought I could achieve. The staff, especially [DQ staff member] and [mountain leader] have been fantastic. The unique landscape has also helped me to feel safe, secure and positive.
- Great experiences, great challenges, great achievement, walks are getting better.
- The walk in was hard but very rewarding, starting to look forward to the walk out.
- DQ have done more for me than I could have imagined it has released my spirit and I feel completely different.
- The boat house, climbing through voodoo valley, learning the drains on the hillside
- Being in nature and realising you are part of it
- Thoroughly enjoyed the trip was really impressed how hard the volunteers worked to give us a memorable trip and responded to our feedback. Well worth the journey from Norfolk.
- Knoydart was a really good location, very isolated and may not ever come back here, so feel privileged to have been given the opportunity to come here
- Being situated in a wild open space.

Was there anything that participants would change?
When asked whether there was anything about the Scottish challenges that they would change, participants mentioned wanting to spend longer at the site and practical issues. All suggestions for change are shown in Box 14.

Box 14. What participants would like to change about Discover or Explore Scotland

- More information/details/ pictures about Knoydart beforehand, so I can prepare myself for what to expect.
- Number of people in the kitchen at mealtimes
- Would be nice to go on the boat back to the van – the walk will be an achievement though
- More time in Knoydart

5.5.3 Comments to/from participant observer

Many participants talked to the researcher about how they felt physically and mentally, about the activities and the landscape. Some participants mentioned how the scenery and fresh air made them feel better.

“I wasn’t feeling at one with myself before and I am now”

“Polly wasn’t feeling so good today, but we think the fresh air has helped her to feel better”

“I feel more secure here than in Brecon. Brecon was more open whereas here the mountains surround and protect you – I feel safe here – I know I could just fall down there [pointing to gulley] but I still feel safe”

Many participants really enjoyed the conservation work, restoring an ancient path coming down from the mountain.

“amazing to clear the drain by the path of plants etc – good to see you have done the job well as the water starts to flow through again”
“fantastic to feel rock underneath the mud and grass and know you are discovering the path that those feet walked on all those years ago”
“touching the stone was good”
“good to put something back – conserving the beauty”

The majority of participants enjoyed every minute of the time in Knoydart, whatever the activity, they said they enjoyed pushing themselves and the feeling of achievement after they had done something they only imagined they could do. Some participants with underlying physical health issues on the Discover Scotland trip felt that walking up hill everyday was too much physically. They really loved the location but wanted to take in the scenery without necessarily climbing it.

Both Scotland trips gave the participants the opportunity to learn how to safely ‘scramble’ on slopes and after a gulley scramble participants said the following:

“scary in places but glad I did it – [mountain leader] is a great teacher”
“I felt a deep buzz after yesterday – I hope I get the same buzz today”
6 General Discussion

The following section provides an overview of the effects on participants as a result of taking part in the Discovery Quest programme. These include key changes in the main themes of mental wellbeing and perceptions of nature and in the secondary themes of healthier lifestyles, environmentally friendly behaviours and community belonging. It extrapolates the potential consequences of these changes for the participants involved and the wider society. It concludes by identifying key successful outcomes, acknowledging potential limitations and discussing future steps.

6.1 Effects on participants

The evaluation was designed to examine changes in participants’ mental well-being, connection to nature, lifestyle and social inclusion as a result of taking part in a 6 month walking and outdoor activity project culminating in a wilderness experience. Effects on participants were assessed over time, both at the beginning and at the end of the programme and before and after participating in several walks and challenges. In addition patients were involved in more interactive evaluation processes to enable them to give personal feedback on the effects of project in their own words.

6.1.1 Mental wellbeing

In the health and social care sector mental well-being is generally accepted as being multi-faceted and therefore an individual’s well-being can be affected by many factors including both physical and mental health status, social inclusion, levels of control and the living environment. In this study, mental wellbeing was assessed using outcome measures chosen for the measurement of wellbeing, self esteem and mood (Warwick Edinburgh Mental Well Being Scale (WEMWBS), Rosenberg Self Esteem scale (RSE) and the Profile of Mood States (POMS) respectively) to act as a proxy for measuring changes in mental wellbeing parameters.

Positive changes in all 3 wellbeing measures were observed, with a statistically significant improvement in participant wellbeing, self esteem and total mood disturbance for the majority of participants on the Discovery Quest programme, both from the beginning to the end of the programme and before and after some of the evaluated walks and challenges. These findings have important consequences for the participants' psychological health, as there is a strong relationship between self-esteem, mood and depression, anxiety, loneliness and alienation. Having good self-esteem is also a key indicator of emotional stability and predicts subjective wellbeing. Participants also told us in their own words, in the questionnaires, the participatory sessions and in interviews to the participant observer, that they felt better in themselves, had gained confidence and a sense of achievement through physical challenge.

6.1.2 Perceptions of nature

The evidence base tells us that there is a positive relationship between exposure to nature and mental and physical health, with nature able to reduce stress, to act as a restorative environment and to engender feelings of calm. Connection to nature is considered to be an important predictor of subjective well-being and has also been found to facilitate social contact and build social capital all of which benefits are considered helpful to the participants in this programme. With this in mind, changes in participants’ nature relatedness and connection to nature were assessed using the Nature relatedness Scale (NRS) at the beginning and end of the programme and an adapted form of the Connection to Nature Scale (CNS) before and after the evaluated sessions.
The majority of Discovery Quest participants experienced an increase in the way they related to nature with a statistically significant increase in overall nature relatedness scores and in their ‘NR Self’ scores (i.e. confirming an increase in their connection to nature) from the start of programme to the end of the Discovery Quest programme. Increases in CNS scores were also seen between several of the before and after studies and the majority of discovery Quest participants experienced an increase in connection to nature over time. Again participants also told us in their own words how much more connected to and part of nature they felt both after the programme overall and particularly after the Scottish wilderness experience.

6.1.3 Healthy lifestyles

Healthy lifestyle was one of the three secondary themes of the Discovery Quest evaluation. A mix of physical measures (BMI and Waist to Hip Ratio) and outcome measures relating to physical activity, eating, smoking and drinking habits were used as a proxy for assessing healthy lifestyles.

Nearly all participants experienced a decrease in BMI (Body Mass Index) and over half saw a decrease in their waist to hips ratio (WHR), representing a reduction in health risk, as a result of participating in the Discovery Quest programme. Several participants had moved to a healthier BMI category and there was a statistically significant decrease in participant BMI from the start to the end of the programme. Similarly, approximately half of the participants saw improvements to their self-reported health state with statistically significant increases in health between the beginning and end of programme and 2 of the before and after studies.

Although there was no significant difference between mean physical activity level values at the beginning and half way through the programme, there were positive changes at the extremes. Fewer participants said that they took part in physical activity for only 1 or 2 days a week and more participants said that they now participated in moderate physical activity 6 or 7 days a week at the mid-point than they did at the beginning of the programme. Due to very small numbers of participants who gave us comparable ‘before’ and ‘after’ data, there were no discernable or statistically significant changes in participant smoking and drinking habits over the course of the Discovery Quest programme.

When considering participant eating habits and attitudes to food, Participants were asked a series of questions about their eating habits and attitudes to food. At the beginning of the programme more participants felt that low cost food was the most important aspect than did at the end, and at the end of the Discovery Quest programme, higher numbers of people said that eating food that they enjoyed and healthy food were the top priority aspect than they did at the beginning. Participants also reported to the research team that they felt fitter and stronger and one person said they were now eating more fruit as a consequence of being on the discovery Quest programme.

6.1.4 Environmentally friendly behaviour

Another secondary theme of the Discovery Quest evaluation was environmentally friendly behaviour, in this study, to assess levels of participant environmental behaviour, questions were asked relating to environmental behaviour indicators for sustainability. Total environmentally friendly behaviour scores remained the same but slight increases were seen in 4 out of the 6 individual behaviour scores (recycling, turning off the plug and tap and picking up litter) over the course of the Discovery Quest programme. When looking at frequency of how often participants carried out environmentally friendly behaviours, starting responses suggested a reasonably
environmentally pro-active group in the first place. Nevertheless, slight increases still occurred in proportions of participants carrying out all of the behaviours ‘often’ and ‘always’ as a result of participating in the Discovery Quest programme.

6.1.5 Community belonging

In addition to mental health issues, participants may also be negatively affected by a variety of social factors that maintain and exacerbate their condition including social isolation, social exclusion, a lack of access to healthy, positive activities and a lack of opportunity to integrate with their wider community. To examine one element of social capital in the Discovery Quest evaluation, participants were asked about their sense of community belonging at the start and end of the programme.

In terms of how much participants felt that they were involved in their neighbourhood, some positive changes did occur, with an increase in the proportion of participants feeling a strong sense of belonging; and a decrease in those who felt that they were not at all strongly part of their community. These findings show that for 10% of participants their sense of social belonging increased. This finding was certainly reflected in the anecdotal evidence where participants said that the social aspects of meeting, walking and chatting with other people had helped them. Participants really appreciated being part of a group of like-minded people, they felt an enhanced sense of belonging and had more confidence to become involved in other groups in future.

6.2 Successes, limitations and future opportunities

6.2.1 Key successes

- It is clear from the findings discussed above that the Discovery Quest experience has contributed significantly to a range of important outcomes for the beneficiaries, for the programme and for the wider communities of mental health and green care.

- Discovery Quest has shown itself to be successful in developing and providing an innovative nature-based approach to the continued recovery of those suffering from severe and enduring mental health problems in Norfolk.

- The aims of the Discovery Quest programme were primarily to provide walking opportunities, enhance social and psychological recovery through personal achievements, to improve social interaction, to experience healthier community living and nutritional advice and to increase self-confidence and aspirations of all those undertaking the project. In addition to providing walking opportunities, Discovery Quest also aimed to provide wider opportunities for participants and to enable them to have greater aspirations, increased personal responsibility and to undertake real challenges. These research findings show that the Discovery Quest aspirations have been successfully attained for the majority of participants.

- Wilderness experiences typically have been reported to induce personal development through improvements to psychological wellbeing and physical health; to encourage interpersonal development through facilitating social connections and a sense of belonging; and to foster connection to nature through nature and wilderness contact. In a similar way, walking programmes are known to produce positive outcomes for physical and social health and for relating to nature. In this regard, this Discovery Quest programme has been successful in
providing the essential elements of both approaches to produce health and wellbeing benefits for its participants.

- In addition, the Discovery Quest programme may have gone some way to enhance and maintain a healthier life pathway for participants and volunteers, enabling them to lead healthier, more active, connected and happier lives.

- In terms of the evaluation process, the University of Essex has provided Discovery Quest with a mixed design methodology for evaluation that provides both quantifiable and qualitative data, allows comparison and changes to be monitored and that can be repeated, scaled-up and shared with the wider green care community. Previous research in this field has highlighted a need for robust wilderness studies, using standardised and validated outcome measures, on larger numbers of participants, with different cohorts and longitudinal in nature, therefore this study will also contribute to the broader evidence base.

6.2.2 Limitations of research

With this type of research there were some limitations which should be acknowledged. The field-based research was subjected to many extraneous variables which were beyond the control of the evaluator, such as programme content, leadership style, walk location, group dynamics, selection of participants and changeable weather conditions. Thus, achieving experimental control was virtually impossible. The nature of the research also made random assignment infeasible and the selection of Discovery Quest participants was purposive. There was no control group included for comparative purposes, which has potential implications for internal validity. However, as discussed in section 1.4.2, it could be considered unethical to withhold treatment that could potentially be of benefit to a participant and many barriers would have to be overcome to set up a control group.

The program required voluntary participation, which has potential implications for external validity as participants were self-selecting and may have been chosen because it was perceived that they would benefit from such an intervention. This project did not seek to make generalisations about people with severe and enduring mental health issues in the UK but it provided a framework of potential benefits and outcomes to inform future decisions and raise awareness of alternative treatment options.

Although the Discovery Quest programme has been found to be very successful in helping the majority of participants to feel better, to feel more connected to nature and to other people, not all participants saw such significant changes. Although this may in part be a consequence of the severity of their mental health condition, or the stage in their recovery process, the walking and wilderness challenge may not be appropriate for everyone living with mental ill health.

Research questionnaires had to rely on self-reported information from participants, which may have been potentially biased. However, effort was made to ensure a rapport was established between the researcher and the participants to encourage accurate responses. As the project progressed it was evident that the participants were more comfortable with the evaluation process and provided more honest and sincere responses.

Notwithstanding the potential limitations identified, standardised, internationally recognised questionnaires were used to collect primary data, so their validity and reliability is proven. Data collection was obtained using a consistent protocol and therefore the findings have significant implications for relevant authorities and policy makers. The results can be used to inform further
discussions about the use of these alternative nature-based intervention programmes for people with mental health issues in the UK.

### 6.2.3 Future steps

Several participants wondered if it would be helpful for future programmes to run for a longer time period, or to continue the weekly walks after the final wilderness challenge in Scotland. The reasons given for this were threefold, i) to continue the mental health recovery process; ii) to facilitate the continuance of healthy lifestyles with physical activity and iii) to nurture the social bonds formed between participants over the programme. Although financial resources may limit the expansion of the project in this way, further research to provide evidence to determine the optimum duration of the programme, in terms of changes in mental health parameters, would greatly inform this debate.

Very few such wilderness and walking programme studies of this type have been longitudinal in nature, so sustainability of adherence levels, behaviour changes and attitudes, and long-term health and wellbeing effects have not been monitored. Although an informal arrangement with participants on the 2010 programme means that follow up data may be yet be received, it would be useful if a longitudinal study could be implemented in future. The long term monitoring of this intervention would provide indicators and statistics of any further or continuing treatment, further education and job achievements as well as attainment of personal health and wellbeing goals which, when compared to a similar group not receiving this intervention will provide a valid comparison of the effects of the programme. The findings from this longitudinal study could subsequently be used to inform ideas for best practice, which can be shared with other communities in the UK and abroad.

Further research possibilities also lie in determining i) any further individual characteristics which should be considered when referring a participants to the group (i.e. what leads to the programme having such a profound impact for some people but not necessarily for everyone); ii) a comparison study between a group based in a clinical setting versus the outdoor and wilderness setting (in terms of clinical outcomes, adherence levels and in reduction of the use of more expensive subsequent mental health services for example) – this would be useful in order to inform the NHS debate on good practice in the treatment of mental ill-health; and iii) a cost-benefit comparison study between participation in a group walking and outdoor activity based therapy programme and individual therapy in a clinical setting.

In the specific wilderness therapy evidence base there is still a need for studies which directly test how effective wilderness therapy is in changing behaviour across multiple programmes of different length, with different leadership experience, and targeting different cohorts and research that compares the effects of different types of wilderness or countryside on either the same sample of participants or the same cohort type, examining whether a particular type of wilderness or nature results in a more successful outcome for a particular cohort.

A combination of attributes, needs and other factors are likely to affect the scaling up and mainstreaming of this type of initiative to other mental health care providers in the UK and beyond:

- The dissemination of a combination of robust scientific and anecdotal evidence of the success of this Discovery Quest programme in terms of clinical and personal outcomes and perceived quality of life - in order to convince clinicians and NHS managers.
- Resources – finances (longer-term funding), time, trained staff
- Political will to adopt more nature-based approaches in the treatment of a variety of mental health issues - there is still limited acceptance of therapeutic value of the outdoors (both rural and urban) for delivering physical and mental health and well-being – ‘green care’.

83
6.2.4 **Concluding comment**

Participating in the Discovery Quest programme has been a catalyst for change for many of the participants involved. The majority of participants will leave the programme with better self-esteem and communicative skills, enhanced psychological health and wellbeing, improved physical health, a sense of personal achievement from the physical challenges and an increased connection to nature.

Those responsible for providing health and social care for adults with mental ill health should consider these multiple health and wellbeing benefits to participants in challenging walking and outdoor based initiatives, such as Discovery Quest, when commissioning and funding mental health services.

"DQ has done more for me than I could have imagined, it has released my spirit and I feel completely different"
7. References


Burls A. 2007 People and green spaces: promoting public health and mental well-being through ecotherapy. Journal of Public Mental Health 6 (3)


Conner M. 2007. What is Wilderness Therapy and a Wilderness Program? Website: [http://www.wilderness-therapy.org/Wilderness/WhatsWilderness.htm](http://www.wilderness-therapy.org/Wilderness/WhatsWilderness.htm)


Hobbs TR and Shelton GC. 1972. Therapeutic camping for emotionally disturbed adolescents. Hospital & Community Psychiatry, 23, 298-301


Kelly FJ and Baer D. 1969. Jesness inventory and self concept measures for delinquents before and after participation in Outward Bound. Psychological Reports, 25, 719-724


McNair DM, Heuchert JWP and Shilony E. 2003. Research with the Profile of Mood States (POMS) 1964-2002: A comprehensive bibliography Toronto, Canada: Multi-Health Systems


Muir J. 1911. My First Summer in the Sierra, Boston: Houghton Mifflin


Pretty J. 2006. Physical activity in modern society: is there also an environmental benefit? *Environ Conserv 33 (2)*, 87-88


Russell KC. 2006a. Brat camp, boot camp, or...? Exploring wilderness therapy program theory. *Journal of Adventure Education and Outdoor Learning*, 6, 51-68


Russell KC. 2004. *Evaluating the Effects of the Project DARE Program on Young Offenders*. Durham, NH, University of New Hampshire

Russell KC. 2003a Assessing treatment outcomes in outdoor behavioural healthcare using the Youth Outcome Questionnaire *Child and Youth Care Forum*, 32, 355-381


Russell KC. 2002. *A Longitudinal Assessment of Treatment Outcomes in Outdoor Behavioural Healthcare*. Moscow ID, Idaho Forest, Wildlife, and Range Experiment Station


Russell KC and Hendee JC. 2000. Outdoor behavioral healthcare: Definitions, common practice, expected outcomes, and a nationwide survey of programs. Moscow ID, Idaho Forest, Wildlife, and Range Experiment Station


8. Appendices

Appendix 1 Participant information sheet and consent form

Evaluation of Discovery Quest – Information for Participants

Here are more details about this evaluation for you to keep and details of who to contact if you would like to know more.

The University of Essex is carrying out an evaluation of Discovery Quest’s 6 month walking programme on behalf of Julian Housing.

Taking part in the research is on a purely voluntary basis and participants are free to withdraw at any time without prejudice and without providing a reason. All data collected will be held by the University of Essex in hard copy for the duration of the programme and electronically for up to 2 years after this. The data will only be accessible to the researchers Rachel Hine and Jo Barton at the University of Essex, and will not be passed on to any third party.

If you have any questions or if you would like to withdraw your data from the research then please contact the key researcher Rachel Hine,

either by post: iCES - Interdisciplinary Centre for Environment and Society, Department of Biological Sciences, University of Essex, Wivenhoe Park, Colchester CO4 3SQ

or email: rehine@essex.ac.uk

Please fill out the consent form below, then tear or cut it off and hand it back to project staff.

Consent Form

If you wish to participate please read and tick the first four boxes.
If you do not wish to participate please tick only the fifth box.

I have read and understood the project information above.

I understand that my participation in the research is voluntary and that I am free to withdraw from the study at any time without giving a reason

I understand that all of the non-anonymous information I provide (my date of birth and initials collected for identification purposes) will be kept confidential, as described above

I agree to take part in the study. Taking part in the study may include completing questionnaires or taking part in interactive workshops

I do not agree to take part in the study

Name of Participant Signature Date

Please tear off this consent form and hand back to project staff – Thank you