THE OVERVIEW EFFECT AND COUNSELLING PSYCHOLOGY
...ASTRONAUT EXPERIENCES OF EARTH GAZING

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PORTFOLIO FOR PROFESSIONAL DOCTORATE IN COUNSELLING PSYCHOLOGY

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List of Abbreviations

ART	Attention Restoration Theory
CBT	Cognitive Behavioural Therapy
CG	Complicated Grief
CMHT	Community mental Health Team
DA	Discourse Analysis
DBT	Dialectical Behaviour Therapy
DSM-5	Diagnostic and Statistical Manual of Mental Disorders
EGVRi	Earth Gazing Virtual Reality Interventions
EPP	Existential Positive Psychology
FDA	Foucauldian Discourse Analysis
GP	General Practitioner
GT	Grounded Theory
IPA	Interpretative Phenomenological Analysis
ISS	International Space Station
MDD	Major Depressive Disorder
NASA	National Aeronautics and Space Administration
NHS	National Health Service
OE	Overview Effect
PRT	Prospect Refuge Theory
RKA	Russian Space Corporation
SRT	Stress Recovery Theory
UK	United Kingdom
USA	United States of America
VR	Virtual Reality
WHO	World Health Organization

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p. 271, Submission Guidelines

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p. 214-251, Case Study

Acknowledgements

I embarked on the journey of qualifying as a Counselling Psychologist and writing this portfolio six years ago. These past few years have been a journey for me. At times, the journey was lonesome and the road bumpy. Looking back, I feel proud I was able to face and overcome significant personal and professional challenges. With systematic determination and passion, I eventually reached the final destination. However, in reality this achievement has been a group effort, because it would not have been possible without the kind support and guidance of several people who have inspired and encouraged me along the way. Firstly, I would like to say a heart-felt thank you to Mr Frank White for all of his support and unwavering dedication throughout the years. Without him, this project would not have been possible. He taught me about the power of the Overview Effect and connecting with people and sharing ideas. My deepest thanks and respect also go to the seven National Aeronautics and Space Administration (NASA) astronauts who agreed to participate in the study. They shared their stories and wisdom with me and I will always be grateful for their generosity and kindness. Their stories influenced my life and changed the way I connect with the world. Finally, my research supervisor, Dr. Julianna Challenor has been my professional touchstone over the years and I would like to thank her for her patience, advice, and insightful feedback during the research process.

Throughout the whole journey my family and close friends were there encouraging and inspiring me. Their belief and continuous support lifted my energy when times were hard. These professional and personal connections reinforced my belief in the importance of connection, dedication, and kindness.

Declaration of Powers of Discretion

I hereby declare that the work presented in the thesis is my own. The development of this thesis has been under the supervision of Dr Julianna Challenor and any other assistance has been stated and referenced in the thesis accordingly.

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Confidentiality

The confidentially of the client in the case study has been protected throughout this portfolio by changing/omitting the names of the individual(s) and any identifying places or characteristics. However, in the research section, the participant names were included. Several reasons guided this decision. Firstly, the participant pool was not a high-risk group. Secondly, the participants indicated on the consent forms that they wanted their names included in the study. Furthermore, the participants are individuals who are in the public eye and the in-depth data generated in the current study meant that they would be easily identifiable. Finally, it was deemed that such information may be useful for those wanting to conduct follow up studies.

1 Preface

1.1 Outline of Portfolio

This portfolio contains a selection of work completed for the Professional Doctorate in Counselling Psychology at City, University of London. The portfolio contains an introductory Preface section, followed by three main sections, namely, Research, Journal Article, and Client Study.

The Preface section outlines my theoretical and epistemological positions and the current studies link to Counselling Psychology. Subsequent to the Preface, is the first part of the portfolio, which explores the research entitled: 'The Overview Effect and Counselling Psychology: Astronaut Experiences of Earth Gazing'. It employs a qualitative methodology in the form of Interpretative Phenomenological Analysis (IPA) (Smith, Flowers & Larkin; 2009) to explore astronaut experiences of Earth gazing from orbit. The aim is to develop a richer understanding of the participant's individual stories, unearth key themes related to the phenomenon and use existential and ecopsychological theories and constructs to make sense of the findings. A further aim is to gain insight into how people develop meaningful attachments to the natural world and to explore the impact this has on them. Finally, the research will explore ways we can harness and apply extraordinary experiences such as this in order to promote societal and individual wellbeing.

The second part of the portfolio presents a Publishable Paper that adheres to the contributor's guidelines of the European Journal of Ecopsychology (EJE). The journal is peer reviewed and publishes one issue yearly. EJE discusses psychological and ecological ideas. The main aim of EJE is to further our understanding of the psychological, emotional and spiritual relationship with nature. The piece is presented in the form of a 'research article' and is titled: 'Frontiers in Ecopsychology: The Overview Effect and Virtual Reality'. The article supports the criteria for publication in EJE (see appendix 15). The article presents Earth gazing from space as an impactful way of engaging with nature. The aim is to consider a number of implications of Earth gazing for ecopsychological theories and Counselling Psychology practice. The publication of the journal article will serve as platform to disseminate the findings and ideas discussed and encourage academic debate.

The third part of the portfolio includes a Client Case Study titled 'Complex Grief: A Journey of Reconnection'. The client study is a piece of work that aims to demonstrate the understanding of theory and practice. In addition, it captures

the professional learning and development that took place because of the therapeutic process and professional reflection. Within it, I present a case study of a client I worked with at a placement in a National Health Service (NHS) community mental health setting whilst on the Professional Doctorate in Counselling Psychology course. The client is a thirty-year old woman. Her mother passed away during her early teenage years and she found it difficult to make sense of and come to terms with the loss. As a result, the client experienced a continued sense of emptiness and sorrow that affected every aspect of her life. The focus of the case study is on loss and the long-term suffering, and the confusion and trauma this can cause, and on the client's journey to reconnect with the world and find meaning again. I worked with the client for almost a year and used Cognitive Behaviour Therapy (CBT) (the primary model in this placement) to guide the therapeutic and conceptualisation process. There were several advantages in using the CBT model long term, for example having the time to build a trusting relationship with the client and being able to attend to several issues on the client's problem list. However, the CBT model was too problem focused and goal directed to contain moments of deep suffering and distress that the client endured. This case is significant because it demonstrates how the connecting theme of attachment and connection can emerge in a clinical context. It also demonstrates the importance of using the therapeutic relationship and connection in the process of change.

A thread weaving the three pieces of work together in this portfolio is attachment and connection. Research from a seventy-five-year longitudinal study suggests that people who are socially connected, who form strong and meaningful relationships are healthier and happier. Thus, it seems that the quality of our close relationships is important in determining the 'good life' (Vaillant, 2012). However, emerging research in the field of ecopsychology suggests that a meaningful connection with nature is also important in cultivating the good life. In view of this, the three pieces of work look at the attachments we form and the impact they have on our lives. The thread of connection highlights how connecting with the world around us can enhance wellbeing on an individual, a community, and societal level.

1.2 Theoretical Approach to Research

I situate myself within an existential and ecopsychological approach. These perspectives deal with the "big questions" about our connection to the world and nature, and the meaning and purpose of life (Milton, 2016; Spinelli, 2014). In addition, these perspectives have also informed my professional

identity as a Counselling Psychologist and the way I practice, relate, and understand my clients.

1.3 Epistemological Approach to Research

Since starting the course my philosophical stance has evolved as I broadened my knowledge surrounding the topic. Initially I elected a constructivist and relativist stance. These views argue that there may be a reality out there, but we do not have the means or the capacity to understand it (Willig, 2013) (see p. 58 for definition of these terms). However, I soon realised that there is a complex link between realist and relativist positions. For example, although I largely believe that we are subjective beings who construct our own version of reality and my project places emphasise on subjective experiences (relativist), I am also aware that contextual and relational conditions play an important role in shaping our identity and our understanding of the world (realist). I believe that multiple realities can also co-exist (relativist). However, we do not have access to the majority of these realities because they are beyond our frame of reference and understanding (relativist). Nonetheless, we can acquire knowledge about the subject under scrutiny and aspects of the world we are situated in (realist). Thus, I conceptualise reality holistically, contextually, relationally and subjectively. In view of this, I realise that although I am instinctively drawn to relativism, I also respect realist ontologies. Therefore, I adopt a moderate constructivist position in the current study because it compliments relativist views yet also respects the realist perspective (Willig, 2013, 2016).

1.4 Counselling Psychology

Counselling Psychology emphasises relational and humanistic values. It views humans as being free and autonomous yet intrinsically relational (Douglas, Woolfe, Strawbridge, Kasket, & Galbraith, 2016). It is a field that adopts a pluralistic standpoint that accepts both the scientist practitioner and reflective-practitioner assumptions of psychology (Kasket & Gil-Rodriguez, 2011). The Division of Counselling Psychology describes the field as; “marry[ing] the scientific demand for rigorous empirical enquiry with a firm value base grounded in the primacy of the counselling or psychotherapeutic relationship’ (Division of Counselling Psychology, 2005, p.1). There are several advantages to this pluralistic position, it serves to unite relationality, subjectivity, and objectivity, and allows Counselling Psychologists to consider the diversity and complexity of the world from various perspectives. Yet this epistemological stance also creates paradoxes and tensions that can present themselves during therapy, professional

work, and research (Kasket & Gil-Rodriguez, 2011). Such tensions require careful and reflexive deliberations and if attended to appropriately can add value to psychological practice and enhance academic research.

Meaningful and healthy connections improve the quality of our lives and are fundamental to being human. Yet we live in a fast-paced hyper-connected world, governed by ruthless competition, logic, and reason. This cultural context has given rise to social disconnection and societal desensitisation, which has fundamentally changed how we relate to other people and the world and in turn decreased the quality of our relationships (Matè, 2010; Milton, 2016; McPherson, Smith-Lovin & Brashears, 2006). I argue that these occurrences have contributed to the dramatic rise in mental health problems. Psychologists largely promote wellbeing by helping our clients explore, understand and change aspects of their internal worlds (mind, body, and spirit), and their relationships. However, the psychological profession has largely ignored a third crucial element, how we relate to nature and the world we live in (Milton; 2016; van Deurzen, 1997, 2015). Neglecting this third component limits our professional ability as Counselling Psychologists to promote wellbeing holistically. In view of this, I argue that Counselling Psychology as a profession should adopt a more holistic approach to wellbeing, where we explore the causes of mental distress at the grass roots level and consider ways we can promote the wellbeing of entire societies. This paper hopes to provide some directions in how we can achieve this.

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2 Research: The Overview Effect and Counselling Psychology

...Astronaut Experiences of Earth Gazing

2.1 Abstract

A significant number of space travellers have reported seeing Earth from orbit or the moon as an awe-inducing experience that is deeply impactful. To date existent research has provided convincing evidence that nature is therapeutic but there is limited research exploring the impact of extraordinary awe inducing natural environments. In order to bridge this gap, this study used Interpretative Phenomenological Analysis (IPA) to explore how seven retired National Aeronautics and Space Administration (NASA) astronauts experienced Earth gazing from orbit and viewing nature from this perspective. Three main themes emerged: 1) Deeply Impactful Perceptions of Earth, 2) Profound and Unexpected Emotional Impact and, 3) A Space Odyssey. The first theme describes the initial aesthetic observations and the dynamic interaction with the natural world. The second theme describes the emotive impact and noetic contemplation that took place. The final theme represents the embodiment of the experience post-flight. It seems that Earth gazing can strengthen our connection to nature and life, elicit awe, gratitude, humility, and reverence, and enable a sense of social cohesion. These features suggest it can instigate behavioural change and foster wellbeing, and therefore make it relevant to Counselling Psychology. Finally, this study recommends that this experience can be adapted and simulated via positive technologies, such as virtual reality (VR), as a green wellbeing intervention at an individual, local, and global level.

2.2 Personal Reflexivity

Van Manen (2016), highlights that phenomenological research can have a transformative effect on the researcher. This was certainly true in my case. In the following segment, I have described the conceptualisation of the current research. The process involved reflecting upon the ways in which my personal experiences, professional aims and the research process may have affected and possibly changed me, and influenced the research outcome (Finlay, 2002; Willig, 2013).

The inspiration for this research initially developed from observations I made during work as a trainee Counselling Psychologist and relevant reading I completed subsequently. Around the time I turned thirty my curiosity and concerns intensified surrounding questions about the meaning of life, my own mortality and my place in the world. My attitudes and concerns surrounding my existence began to permeate into aspects of my life. These interests and concerns filtered through to my clinical work. For example, I observed at work that moderate to severe existential and/or attachment issues often precipitated mental illness. I noted that a significant proportion of my clients identified experiencing existential angst surrounding the givens of existence (mortality, isolation, meaninglessness, and freedom) before, during or after the onset of their mental health problems (Yalom, 1980). In contrast, I observed that others were able to find some solace through their existential pursuits; for this group, their existential quest seemed to have facilitated a positive cognitive shift, which advocated a sense of spiritual wellbeing. I wondered why some people were able to find solace in their existential pursuits and diminish some of their worries whilst for others their anguish seemed to increase. I realise that for most people many of these questions remain unanswerable, yet I felt that if we do not come to some kind of resolution about why we are here we may feel more alienated and disconnected which may lead to deepened angst (Wong, 2009).

Around this time, I was particularly interested in the topic of ‘quantum entanglement’. Quantum entanglement refers to the behaviour of separated entangled particles, which act as if they are still physically connected (Gardiner, 2015; Gilder, 2009). The basic concept behind quantum entanglement is this idea of oneness, which resonated with me and the more knowledge and insight I gained on the topic the more I felt connected to nature and the world around me. I found my framework about the nature of reality began to shift and my personal understanding of my place in the world and the meaning of life evolved. I noticed

that this understanding lifted away some of the angst and disconnection I had felt previously.

I reflected about the similarities that exist between quantum physics and Eastern traditions, particularly in relation to this idea of oneness. These traditions, including Buddhism and Yoga, use ideas such as 'oneness' to change people's awareness of their own existence (Gilder, 2009). I noticed how the 'third wave' of psychology has introduced practices such as mindfulness, self-compassion, and acceptance, which resemble elements of these Eastern traditions (Linehan, 1993). I reflected how else we could further use this idea of oneness to facilitate our ability as psychologists to go beyond the traditional theoretical framework when dealing with mental health issues.

These concepts led me to think about research surrounding transformations in consciousness, in particular, the feeling of oneness which Freud referred to as an 'oceanic feeling' (Freud, 1930). I began to think of people that might have experience of this sense of oneness. A preliminary review revealed people involved in extreme sports (Willig, 2008; Brymer, Downey, & Gray, 2009; Brymer & Schweitzer, 2012), who have had near death experiences (Greyson, 2003; Greyson, Broshek, Derr, Fountain, 2015; Khanna & Greyson, 2015), and astronauts (Ihle, Ritsher, & Kanas, 2006; White, 2014; Yaden et al., 2016) are more likely to relate to this feeling of oneness as a transformative phenomenon. As I explored further I came across the work of Frank White (2014/1987) who coined the term the 'Overview Effect' (OE) and wrote a book with the same name. White describes the OE as:

> A cognitive shift in awareness reported by some astronauts and cosmonauts during space flight, often while viewing the Earth from orbit, in transit between the Earth and the moon, or from the lunar surface. It refers to the experience of…Earth in space, a tiny, fragile ball of life, hanging in a void, shielded and nourished by a paper-thin atmosphere. Some common aspects of it are a feeling of awe for the planet, a profound understanding of the interconnection of life, and a renewed sense of responsibility for taking care of the environment (White, 2014).

In his book, White conducts journalistic style interviews with 29 astronauts and details personal accounts of their experience of the OE (White, 2014). The astronauts in the book reported this feeling of oneness with the world, nature, and

humanity, particularly during the moments they see Earth from space. I directly contacted Frank White to inquire if he could help recruit participants. He kindly agreed and with this in mind, I felt I could narrow down the group of participants to astronauts and the phenomenon of seeing Earth from space. This is how my research on astronauts' experiences of Earth gazing transpired.

I realise that the context in which this study arose, particularly in relation to my interest in quantum theory and higher states of consciousness have shaped my epistemological perspective (constructivism) and the trajectory of this research. I also recognise I have a stake in the research outcome. For instance, if the outcome of this study is that the experience is growth enhancing and life affirming I intend to use findings to inform my Counselling Psychology practice and perhaps implement some of its concepts into therapy. Furthermore, based on past research I considered the OE to be a valuable experience; this assumption could influence the direction of my questions, for example asking leading questions and ignoring explanations or nuances that might suggest otherwise. The reflexive process allowed me to develop my awareness surrounding some of my preconceived ideas about the phenomenon and the participants. It also meant that I was more mindful during interviews of these issues and more able to make authentic and meaningful interpretations during analysis instead of ones that focus on personal objectives"

2.3 Introduction

Past research highlights how the quality of our relationships with one another can enhance the quality of our lives and improve wellbeing (Vaillant, 2012). In support of this, emerging research has found that improving the quality of our relationships with the world and nature can also play an important role in promoting our wellbeing (Capaldi, Passmore, Nisbet, Zelenski, & Dopko, 2015; Hartig, Mitchell, De Vries, & Frumkin, 2014). The current study explores what the experience of seeing Earth and natural phenomena from space (from orbit or the moon) is like for space traveller's and the sense making process related to this experience. The current study will act as a confirmation of the existing literature in ecopsychology and positive psychology. In addition, the unique nature of the research will bring new insight into the human-nature relationship and provide novel directions for promoting wellbeing and advancing mental health care, making it relevant to the field of Counselling Psychology and beyond.

Although Counselling Psychology as a profession is widening its practice to community, social, and political arenas, it largely neglects our relationships with things beyond ourselves and other humans, and the conflicts that arise as we battle to understand the meaning of life (Milton, 2016; Spinelli, 2014). Two approaches, namely existential psychology and ecopsychology focus on these matters. Therefore, ecopsychological and existential philosophies and theories were chosen because it was felt these approaches underpin the aims and ideas being reflected in the current study.

Within the field of ecopsychology, several theoretical models and perspectives have been adopted, to explain how our relationship with nature plays a fundamental role in our wellbeing: the biophilia hypothesis (Shepard, 1982; Ulrich, 1983; Wilson, 1984), the attention restoration theory (ART) (Kaplan & Kaplan, 1989), the stress recovery theory (SRT) (Ulrich, 1983), and the 'eco-existential positive psychology' perspective (Passmore & Howell, 2014a). These models and perspectives will add further insight into the impact a more meaningful connection with nature has on our wellbeing.

The key focus of this section is primarily on mapping out the conceptualisation process and the rationale of the current study for the reader. The introduction section explores the climate of mental health in postmodern times and some of the demands placed on it. This is followed by a review of two theoretical perspectives in Counselling Psychology that underpin the current study, namely ecopsychology and existential counselling psychology. Following the introduction of terms, three influential ecopsychological theories (Biophilia

hypothesis, ART and SRT) will be outlined and the evidence in relation to these theories will be critically reviewed. The phenomenon of Earth gazing from space was elected in the current study because it was considered a unique and powerful way of engaging with existential issues and the natural world. In view of this, the segment that follows summarises the critical review of the empirical evidence surrounding the salutogenic (causing health and wellbeing) effects of space flight. The introduction section will close with a rationale for the current study, a summary of why this topic is relevant to Counselling Psychology and finally the research questions and aims.

Context of the Research

Psychological distress continues to be recognised as an important health and social problem. Currently in the United Kingdom (UK) and across many parts of the world mental health service demand surpasses supply. The World Health Organisation states that mental and behavioural problems are the biggest single cause of disability on the planet and estimates one in four people will experience an episode of mental illness in their lifetime (Kessler & Üstün, 2008). This estimate is mirrored in the UK where approximately 26% of adults have reported being diagnosed with at least one mental illness in their lifetime (Kessler & Üstün, 2008). These statistics probably underrepresent the problem, nevertheless they highlight the postmodern challenges we face and the importance of finding holistic solutions that address some of the underlying causes of mental distress.

Indeed, global urbanisation (Seto; Fragkias, Güneralp & Reilly, 2011; United Nations, 2014), an aging population (Bridges, 2015; Tarrier, 2002), economic inequality (Sebelius, Frieden, & Sondik, 2011), social isolation and loneliness (McPherson, Smith-Lovin & Brashears, 2006), and increasing rates of chronic disease mean that incidences of mental health are likely to rise drastically. Such issues will continue to place further pressure on mental health services (Fisher & Abram, 2013; Harper, 2016; Hidaka, 2012).

Cartesian dualism is a theory that has heavily shaped postmodern Western values and culture. Cartesian dualism asserts that the immaterial mind and the material body are two completely distinct and separate types of substances that interact with each other. Some argue that this way of reflecting has meant that we divide and separate systems, reduce phenomena into mere mechanisms (Fisher & Abram, 2013; Hidaka, 2012; Milton, Craven & Coyle, 2010), de-emphasise the importance of emotions in health (Matè, 2010) and construe existence from a boundaried and individualistic perspective as opposed

to a relational one (Spinelli, 2014). Thomas Moore (1992) forewarned that a culture that places emphasis on individualism and separation would slowly diminish core values associated with connection, and intensify feelings of emptiness and meaninglessness in people.

Recently influential academics have stressed that the biomedical approach to mental health is also restrictive and has considerable disadvantages (Botha & Dozois, 2015; Fletcher, 2012; Lam & Salkovskis, 2007; Milton, et al., 2010; Moncrieff, 2013; Woolfe, 2016). The main criticisms centre on the biomedical emphasis on predicting cause and effect, how it reduces complex mental health problems into discrete categories, and fails to consider the influential role of social factors and individual subjectivity regarding mental health problems. In particular, there are concerns surrounding the model's advocacy of and to a degree dependence on, the mental health classification systems (e.g., DSM-5) (Woolfe, 2016). Some have also criticized pharmaceutical interventions and questioned the efficacy of dependence on medication in mental health, arguing that such interventions have concomitant negative side effects (Fletcher, 2012; Moncrieff, 2013). In support of this, one influential study found that medication is effective for severe and enduring symptoms of depression but has minimal or non-existent effects for mild or moderate symptoms (Fournier et al., 2010). Such findings and concerns raise serious questions surrounding the efficacy and overuse or misuse of pharmaceutical interventions (Eko, 2015). Despite these concerns, the use of antidepressant medication has increased dramatically since 1991 (Social Exclusion Unit, 2004) largely because of the influencing power of pharmaceutical companies but also because no alternative solutions that are deemed safe, credible, or cost effective have been identified for managing mental health problems. Thus, pharmaceutical interventions remain the main choice of intervention offered by General Practitioners (Hairon, 2006; Layard, 2006).

Gabore Matè (2010) adds to this debate by suggesting that the materialistic culture exasperates mental illness by idealising greed, competition, and individualism and ignoring emotional needs. In support of this view, Van Deurzen (1997) argues a materialistic culture places value on entitlement, comfort, and instant gratification, which disrupts the more natural human cycles in which pleasure and effort, are proportionate, thereby creating a society that has too much choice and demands too much instant pleasure. There is some evidence that supports this view, for example, one American study found a link between materialism and traits associated with narcissism (Konrath, O'Brien, &

Hsing, 2010), and in a similar study a decline in empathy was observed (Twenge, & Foster, 2010). Furthermore, other studies have found a link between materialism (wealth, material possessions, and status symbols) and mental distress (Kasser, 2003; Richins & Dawson, 1992).

Currently there are various psychological approaches concerning mental health issues. Each has contributed to our understanding of the development and management of these problems. However, many of these approaches continue to consider mental health on the micro level and fail to consider the human mind as being framed within a larger context (that of the physical world). Albee (1999) suggests that psychologists need to take a more holistic and preventative approach to mental health. He argued "No mass disorder" has ever been eliminated by treating one person at a time" (p. 133). Increasingly Counselling Psychologists are becoming more involved in raising awareness about some of the root causes of mental distress such as social oppression, abuse, and injustice. It is important for Counselling Psychologists to continue to raise awareness and instigate candid debate surrounding new approaches to wellbeing and mental health care in order to meet the needs of an increasingly diverse and complex world (Boyle, 2003; Gilbert, 2002; Harper, 2016; Hillman & Ventura, 1992; Humphreys, 1997; Seligman, 2004).

This introduction section highlighted that the cost of modern mental health treatment, particularly pharmaceutical medicine is increasing due to the growing worldwide population, higher prevalence of mental distress and the complexity and sophistication of current treatments. In addition, the discussion highlighted how some psychologists and psychiatrists are arguing how conventional psychotherapeutic and pharmacological treatments appear to be partially effective in managing what Loizzo (2000) calls "diseases of civilization" (pp34). In view of this, it seems alternative treatment approaches are needed.

Ecopsychology provides insightful theories surrounding the rise in mental health problems. It ascertains the individualistic culture has occasioned the current disconnection from nature, which has had adverse side effects on our mental health (Fisher & Abram, 2013; Higley & Milton, 2008). Moreover, ecopsychologists suggest that this disconnection is also contributing to environmentally damaging behaviours (Boston, 1996; Searles, 1960; Shepard, 1982; Shepard & McKinley, 1969). Perhaps this emerging field can shed further insight into ways we can meet the growing mental health care demands. Mounting empirical evidence supports the idea that a connection to nature is important for our wellbeing (Berman, Jonides, & Kaplan, 2008; Capaldi et al.,

2015; Howell, Dopko, Passmore & Buro, 2011; Passmore & Howell, 2014a). This paper argues that an existential and ecopsychological approach may provide new insight into mental distress. These perspectives focus on what it means to be human and relationships beyond the self and perhaps because of this can offer holistic solutions that address the third component of wellbeing, our connection to nature, and therefore can provide some solutions to the challenges discussed (Eko, 2015; Milton, 2016).

Ecopsychology

Ecopsychology is an emerging field, which explores human beings relationship with nature. The field of ecopsychology aims to understand diverse issues such as climate change, the development of sustainable behaviour, the psychological effects of the natural world, the mutually beneficial relationship between humankind and the planet and the impact of separation from nature (Milton; 2016; Roszak, 1992). Ecopsychology therefore asks questions about the significance of our relationship to things beyond our self. One of the central tenets of ecopsychology is that human beings are connected to Earth in symbiotic relationship (Milton, 2016). Naess (1988), an influential figure in ecopsychology, suggests that human beings should aspire to transcend the notion of the individuated "egoic" self (relating to a person's sense of self) (Freud, 1930) and arrive at a position that identifies with Earth and nature which he referred to as ‘ecological self’.

Cartesian Dualism and Ontological Holism

There are many variants of holistic ideas. Within psychology, humanistic, existential and ecopsychological approaches share an implicit core vision of holism. Holism perceives the cosmos as an organic whole. It is a view that attempts to understand life and the universe in terms of interdependence, interconnectedness, and life networks. In this way, it provides a broader framework for our relationship with nature and life (Aanstoos, 2009). Holistic philosophies argue that without changing our relationship with Earth, the cosmos and the way we define ourselves, solutions to human, environmental and global problems will always be myopic (Aanstoos, 2009; Katinić, 2013; Valverde, 2016).

Existential Counselling Psychology

Existential thought and practice has distinguishing features that focus on what it means to be human, to exist, and to be a relational being. A major focus of existential psychology concerns the quest for meaning and purpose and existential anxieties surrounding the meaning of life, isolation, freedom, and

death (Yalom, 1980). The area of existential philosophical literature is vast; therefore, this brief introduction aims to review some of central concepts from a Counselling Psychology viewpoint.

Existential theory asserts that human beings are always in the process or 'flow' of 'becoming'. We continuously engage in the world and in reflexive practice in an attempt to understand or structure the act of becoming. However, this process only produces limited and incomplete constructs and meanings that never fully portray, contain, secure, or stabilise this flow. Thus, this flow and our knowledge of imminent death is the source of inescapable human experience of existential anxiety (Spinelli, 2014; van Deurzen, 2015). In this way, existentialists argue that the quest for any fully realised and permanent coherence, completeness, or fulfilment in one's being can only ever be a quest that is never fully realised (Spinelli, 2014).

Existential theory begins with the basic assumption of a foundational being-derived relatedness that highlights that we are inseparable from the world and others (van Deurzen, 2015). Heidegger (1927/1962), Merleau-Ponty (1945/1962), and Sartre (1943) are among the existential philosophers who have heavily commented upon our relational position (van Deurzen, 1997). For example, Heidegger thought of an individual as being at the centre of a network of interactions, and talked about the importance of language, emotions, mood, and atonement. For Heidegger our mood is attuned to our world and others. Van Deurzen (2015) expands on this view, arguing that we are emotional beings and require love, affection, attunement, and closeness in order to thrive. Merleau-Ponty (1945/1962) argues that we are embodied beings and we engage, encounter, and relate to our world through our body, bodily senses, and touch. Merleau-Ponty states, "there is no inner man, man is in the world, and only in the world does he know himself" (p. xi). Finally, Sartre denotes that our existence and how we see ourselves is guided by non-verbal communication, for example what we read into the gaze of others, and highlights this as an important function in relationships (van Deurzen, 1997).

Thus, existentialists argue that the embodied experience (touch, gaze, presence, and language) serve as a navigation device, they ensure our survival, they allow us to develop our sense of self and become complete human beings. Yet, the essence of existential counselling psychology is that our existence is not merely self-contained and our embodied felt-experience only provides one aspect of existence. Therefore, In order to develop a complete understanding of our existence we need to explore it in and through the inter-relational context, and

our relationship to the world (Spinelli, 2014; Van Deurzen, 2015). Thus, this approach honours the importance of subjectivity and inter-subjectivity as well as interpersonal relations.

Van Deurzen (2015) has contributed greatly in contextualising and applying existential methods in the field of psychology. In her work, she explores the four dimensions of being within which existence takes place (physical, social, personal, and spiritual). The physical dimension is concerned with the relationship between our physical body and the natural environment and the biological forces that regulate us. The social dimension involves our social and cultural network through which we relate to others. There is also a psychological dimension, which concerns our personality, character, and mental processes. Finally, there is a spiritual dimension that helps us experience, conceive of the world beyond, and involves our relationship to the framework of meaning. Van Deurzen highlights that these modes of being are not distinctive and can manifest as paradoxes, dilemmas, contradictions, and conflicts in life (van Deurzen, 1997, 2015).

The existential perspective construes expressions of mental distress as an inherent process that is essential to reflective beings. In taking this stance, existential counselling psychology shifts the focus on to exploring relational and experiential circumstances and conditions as oppose to categorising and directive interventionist treatment of dysfunctions (Spinelli, 2014). In this way, the existential approach is distinct from dominant modes of theory and practice within Counselling Psychology.

In recent times, existential theorists have started to explore the concept of authentic happiness and wellbeing. Wong's (2009) 'existential positive psychology' stresses the importance of an authentic self-identity in promoting what he terms 'mature happiness'. Three types of mature happiness are endorsed: (a) authentic happiness (arises from being an authentic person), (b) eudaimonic happiness, (arises from doing virtuous deeds and (c) chaironic happiness (connected with our spiritual nature). Based on his extensive work Wong (2009) identified two further existential anxieties of happiness and identity and referred to them as 'positive anxieties'. Wong argues that EPP is different from traditional existential philosophies by the way it faces the issue of death, as he states,

> How we react to death will impact how we live . . . and this link represents the last frontier of Positive Psychology. . . we can use

> our capacity for meaning, spirituality and narrative construction to transform death anxiety. (pp. 367–368).

Passmore and Howell (2014a) extend Wong's work by using existential and positive psychology as a framework from which to address existential anxieties from an ecopsychological perspective and term this approach 'eco-existential positive psychology'. They argue that addressing all six types of existential anxieties, meaning in life, isolation, freedom, and death (Yalom, 1980) and identity and happiness (Wong, 2009) is necessary for human flourishing. They propose that cultivating our innate biophilic tendencies through experiences with natural environments plays a fundamentally important role in promoting wellbeing and diminishing the six existential anxieties outlined (Passmore& Howell, 2014). These existential ideas and approaches serve as a framework throughout the current research to make sense of the findings and draw conclusions.

The next segment within this portfolio is the literature review. It begins by describing the three main ecopsychological theories (biophilia, attention restoration theory, and stress recovery theory) that add insight into the human nature relationship. It then presents influential empirical evidence in relation to these theories, paying particular attention to the impact of our relationship with nature on wellbeing. It then considers two pathways (positive emotions and spirituality) that research suggests can engender a deeper connection to nature. This is followed by a critical review and limitations of the research presented. Next, the literature review presents Earth gazing as an extraordinary and atypical form of interaction with nature and reviews research on salutogenic effects of spaceflight. The literature review ends with a rationale and the research aims and questions.

2.4 Literature Review

2.4.1 Theoretical Understanding of Human-Nature Relationship

Interactions and a sense of connectedness with nature[1] are considered important contributors to human health and wellbeing (for reviews see, Capaldi et al., 2015; Hartig, 2014). Much of this research is based on several influential ecopsychological ideas, namely, the biophilia hypothesis (Wilson, 1984), ART (Kaplan & Kaplan, 1989) and SRT (Ulrich, 1983). These theories attempt to explain our relationship with nature and the impact it has on our wellbeing. This segment will describe these theories, and provide a brief review of the empirical evidence supporting them.

Shepard (1982), Ulrich (1983) and Wilson (1984) each argue that human beings have an innate genetically based inclination to affiliate with other forms of life and natural environments, and that this emotional connection is important for our wellbeing (Kellert & Wilson, 1993). This hypothesis was termed the biophilia hypothesis by Wilson. Two other theories, ART and SRT, explain the processes that underline connectedness to nature and its consequent psychological effects. The former model focuses on affect and the latter on cognition.

Environmental psychologists R. Kaplan and S. Kaplan (1989) have contributed to expanding our understanding of ART. ART (Kaplan & Kaplan, 1989; Kaplan, 1993; Kaplan, 1995) argues that stress reduces directed attention. The ART suggests that nature is unique because it can engender soft fascination and therefore aid recovery from this specific type of cognitive stress (attention fatigue). ART outlines several characteristics of restorative environments; the first is ‘soft fascination’ (as opposed to hard fascination e.g., accident scenes and sports events). The second component of ART is ‘being away’, which is about separating from mental activity and the everyday environment. This can also be achieved by a perception or feeling that one has disconnected from the stress-inducing environment. The third component is labelled ‘extent’ which refers to the degree and level of fascination the stimuli provides At the higher ends of the fascination continuum the stimuli can make a person feel as though they are in a different world. The fourth and final component of ART is ‘compatibility’ between the environment and the person (Kaplan, 1995; Kaplan & Kaplan, 1989).

[1]Nature for the purpose of this research is considered the collective natural phenomena in the physical world on Earth and in space.

Ulrich (1983) proposed the SRT, which postulates that natural environments can aid recovery from many forms of stress by automatically eliciting a variety of stress-reducing psycho-physiological responses, specifically positive emotions that act as a stress buffer. Both the SRT and ART theories argue, "...the restorative effects of nature have an innate, evolutionary basis" (Health Council, 2004), thus the main commonality as highlighted by Hartig et al. (2014) is that nature is the precursor condition that has restorative effect on stress.

There is mounting empirical evidence that shows that nature can provide psychological health and restorative benefits to individuals (for reviews see, Hartig et al., 2014). The primary focus of this study surrounds the experience of Earth gazing from space. With this in mind, the forthcoming segment will provide a brief overview of some of the significant findings in relation to biophilia hypothesis and ART, draw some conclusion from the research, and discuss some of the limitations surrounding these studies.

2.4.2 Empirical Research on Biophilia and ART

To date, there is little evidence to support that human beings have an innate genetically predisposed affiliation to nature. However, extant research has found that people have a preference for natural environments compared to built environments, and tend to recover from attentional stress quicker in natural environments (Herzog, Black, Fountaine & Knotts, 1997; Kaplan, Kaplan, & Wendt, 1972; Korpela & Hartig, 1996; Korpela & Ylén, 2007; Korpela, Ylén, Tyrväinen & Silvennoinen, 2008; Korpela, Ylén, Tyrväinen & Silvennoinen, 2009; Ulrich, 1981; Ulrich et al., 1991). People also have a more positive response to increased levels of biodiversity (Lindemann-Matthies, Junge & Matthies, 2010), and it seems such environments can enhance psychological wellbeing (Fuller, Irvine, Devine-Wright, Warren, & Gaston 2007; Irvine et al., 2010). Furthermore, it appears that repeated exposure to environments that lack natural features such as plants, trees and water can have negative consequences on mental and emotional wellbeing (Kellert& Wilson, 1993). There has also been promising evidence that indicates attraction to nature exists across diverse cultures (Ulrich, 1993; Newell, 1997) and at very young ages (Kahn, 1997).

Research has found that natural environments provide the core characteristics of restorative environments (being away, fascination, coherence, and compatibility) (Kaplan, 1995; Korpela & Hartig, 1996). Various studies have found that contact with nature as opposed to built environments aids recovery from mental fatigue, can improve directed attention (Berman, et al., 2008; Berto,

2005; Gonzalez, Hartig, Patil, Martinsen, & Kirkevold, 2010; Hartig & Staats, 2006; Kaplan, 1995), and can stimulate concentration (Berman et al., 2012; Kaplan, 1995; van den Berg, Koole, & van der Wulp, 2003). In addition, research has demonstrated that contact with nature can improve reflective practice (Herzog et al., 1997), restore working memory capacity, and improve self-regulation effectiveness (Kaplan & Berman, 2010).

Research within occupational settings also support ART and has found that access to nature can have positive physiological consequences and enhance attention and long-term memory (Pilotti, Klein, Golem, Piepenbrink, & Kaplan, 2015), improve workplace attitude (Leather Pyrgas, Beale & Lawrence, 1998; Lottrup, Grahn & Stigsdotter, 2013), and overall provide significant stress-relieving effects (Nejati, Rodiek, & Shepley, 2016; Shukor, Faris, Stigsdotter, Lottrup, & Nilsson, 2012).

Shinrin-yoku, a Japanese term for 'forest bathing' (sitting or walking in a forest) has also demonstrated clinical efficacy as a relaxation and stress management activity in Japan (Ochiai et al., 2015). Several studies have demonstrated that a programme of forest bathing increased a sense of relaxation and decreased confusion with middle aged men and women (Li et al., 2016; Ochiai et al., 2015) and promoted concentration and subjective wellbeing in people with fibromyalgia (López-Pousa et al., 2015).

Although there is little in the way of evidence that supports the idea that we have an innate genetically predisposed affiliation to nature, the evidence supports the hypothesis that people prefer natural environments as opposed to built environments, and nature has a unique ability to restore stress, in particular in relation to attentional fatigue.

The next segment will focus on research surrounding SRT and positive emotions.

2.4.3 Empirical Research on SRT

Positive Emotions: The SRT argues that we are attracted to natural environments because they provide an early-warning signal for safety and survival that triggers emotional reactions, which in turn has a positive impact on wellbeing (Ulrich, 1983). Thus, from this premise our emotional responses to natural landscapes are instinctive and occur before cognitive information processing.

Two streams of research dominate the area of subjective wellbeing, the hedonic and eudaimonic approaches. Hedonism focuses on 'feeling good' and is concerned with high levels of positive emotions, low levels of negative emotions

and pain avoidance. The eudaimonic tradition focuses on the 'good life' and focuses on cultivating and expressing inner virtues. Within eudaimonic wellbeing, constructs such as meaning, autonomy, vitality, and feelings of transcendence are important (Keyes & Annas, 2009; Keyes, Shmotkin, & Ryff, 2002). Thus, the eudemonic tradition embraces both positive and painful emotions.

Fredrickson's (2001, 2009) broaden-and-build theory of positive emotions (often related to hedonistic wellbeing) has found that positive emotions can facilitate the broadening of people's mindsets and enhance their psychological resources and coping strategies. Mounting empirical evidence supports the broaden and build theory and suggests that positive emotions can help modulate or relieve symptoms of chronic pain (Bushnell, Čeko, & Low, 2013; Rainville, Bao, & Chrétien, 2005), improve cardiovascular health (Stellar et al., 2015), enhance creativity (Isen, Daubman, & Nowicki, 1987; Rowe, Hirsh, & Anderson, 2007), and people's openness to new experiences (Kahn & Isen, 1993). At the interpersonal level, research has demonstrated that positive emotions can increase people's sense of 'oneness' with close others (Waugh & Fredrickson, 2006), their trust in acquaintances (Dunn & Schweitzer, 2005), and their ability to recognise individuals of another race (Johnson & Fredrickson, 2005). Other studies have found that positive emotions can stimulate feelings of hope and optimism, which are associated with greater tenacity, versatility and self-confidence (Cohn, Fredrickson, Brown, Mikels & Conway, 2009; Snyder, Rand, & Sigmon, 2005). The evidence is promising, and seems to suggest that hedonistic emotions and strivings play an important role in well being. However, a number of these studies have focused on the immediate impact of positive emotions on wellbeing and fail to differentiate between hedonistic and eudaimonic emotions.

Some argue hedonistic pursuits may result in happiness that dissipates or results in no increase in happiness creating a barrier to lasting wellbeing, defined as 'hedonic adaptation' (Frederick & Loewenstein, 1999; Sumner, 1996; Waterman, 2007; Wilson & Gilbert, 2008). Waterman (2007) suggests eudaimonic strivings are unique because they create an upward spiral of continual (or renewable) wellbeing. Indeed, research appears to support the view that hedonic pursuits are associated with greater immediate wellbeing, while eudaimonic pursuits are associated with wellbeing over time (Deci & Ryan, 2008; see review by Huta, 2013; Steger, Kashdan & Oishi, 2008).

A meaningful sense of connectedness with nature involves a sense of meaningful involvement with something larger than oneself, and therefore relates more to eudaimonic aspects of wellbeing (Passmore & Howell, 2014a).

Research suggests that people with a felt-connection with nature are more likely to see themselves as being part of nature and more able to identify with an ecological self (Bragg, 1996; Higley & Milton, 2008; Mayer & Frantz, 2004; Vining, Merrick & Price, 2008). Schultz et al.'s (2004) study found similar results and posited the connection as unconscious and implicit. It is clear that a felt connection is important in cultivating a stronger bond to nature. It is therefore important to understand why some people experience a stronger connection, e.g., childhood affiliation to nature, and how to cultivate a stronger bond with nature e.g., more meaningful contact with nature.

Passmore and colleagues, based on extensive research suggest a connection with nature can increase our eudaimonic wellbeing by helping to address existential anxieties (Capaldi et al., 2015; Howell, et al., 2011; Passmore & Howell, 2014a, 2014b). In Howell et al.'s (2011) study hedonistic aspects of wellbeing (emphasising feeling good and emotional wellbeing) had a weaker association to nature connectedness than eudemonic aspects of wellbeing (emphasising functioning well and psychological and social wellbeing). In addition, Passmore and Howell (2014b), in their clinical trial, found that nature involvement was beneficial to participants' wellbeing regardless of trait levels of nature connectedness. This implies that nature involvement is beneficial among a variety of individuals and that drastic life changes are not required in order to gain the benefits of natural interventions. However, interestingly their findings also suggest that nature connectedness is associated with the extent to which people are flourishing in their private and personal lives, which suggests that successful or affluent people in society are more likely to reap the restorative benefits of nature. Overall, these studies found ongoing nature involvement and a sense of connectedness to be associated with higher positive affect, feelings of elevation, meaning in life, and self-concordant motivation.

Capaldiet al.'s (2015) recent review of research found that various studies have shown that brief contact with nature promotes positive emotional states. In addition, the review suggests that repeated contact and a sense of connectedness to nature leads to improved emotional functioning, greater life satisfaction, sense of vitality, meaning in life, and promotes personal growth, self-esteem, self-regulation, and social competency. In summary of the review, the authors state that "a plethora of research shows that connecting with nature is associated with improved emotional functioning and satisfaction with life" (p. 5). It appears both brief and repeated contact with nature can be beneficial, however repeated contact with nature has the potential to elicit the first two types of

mature happiness identified by Wong (2009), a sense of authentic happiness and eudaimonic happiness. Accordingly, the following segment will explore, the third type of happiness referred to as 'chaironic happiness' which is described as a connection with our spiritual nature (Wong, 2009).

Spirituality: Spirituality is not a clearly understood term, and often overlaps with other experiences (Salander, 2006). Spirituality and nature connectedness can provide a sense of purpose and meaning and in this way can be linked to eudemonic wellbeing (Capaldi et al., 2015; McCoubrie & Davies, 2006). Ecopsychologists argue that one important feature of spirituality is that it is often experienced in and through a sense of connectedness with nature (Fox, 1995; Higley, & Milton, 2008; Roszak, 1995). This ecological type of spiritual development embodies a change in self-perception and a movement beyond individualistic self-construal. Ultimately, it leads to an "expansive or field like sense of self, which includes all life forms, ecosystems, and the Earth itself" (Bragg, 1996, p. 95). Naess (1988) refers to this type of spiritual development as the 'ecological self'. Naess suggests that an ecological self allows a person to react spontaneously to the 'other' as if it was oneself and therefore motivates them to defend and care for the other (Bragg, 1996; Naess, 1988). Naess argues that the ecological self can elicit altruism, empathy, and enhanced connectedness and promote pro-environmental behaviour (as a form of self-interest).

Awe is part of a larger class of positive emotions and is a transcendent emotion (Emmons 2005, Shiota, Keltner, & Mossman, 2007) that is associated with spirituality. Awe is an emotional response that can vary in levels of intensity and can arise from various experiences. Two defining features have been associated with awe: 1) the sense of vastness (perceptual and/or conceptual) that overwhelms current mental structures; and 2) the need for accommodation, defined as the inability to assimilate an experience into current mental structures (Keltner & Haidt, 2003). Awe is considered a complex emotion because of the unique way it overlaps with a range of states, including wonder, fear, surprise, and curiosity (Emmons 2005; Piff, Dietze, Feinberg, Stancato, & Keltner, 2015).

Encounters with natural phenomena that are immense in size, scope, or complexity (e.g., the night sky or the ocean) are considered prototypical awe elicitors (Keltner & Haidt, 2003; Shiota et al., 2007). Some argue that natural scenes can engender elevated feelings of awe, feelings of transcendence, and a spiritual exaltation, which can help us change our perspective and find meaning in life (Cohen, Gruber, & Keltner, 2010). For example, Keltner and Haidt (2003)

found that the sights and sounds of nature (birds, waterfall, and trees) are some of the most common elicitors of awe; others have found similar results (Forsythe & Sheehy, 2011; Richards, 2001; Shiota et al., 2007; Terhaar, 2009). Shiota et al., (2007) state panoramic photographs of nature are a "prototypical awe elicitor" (p. 951). In support of this idea Joye and Bolderdijk (2014) found that mundane images of nature can also increase feelings of awe and viewing either unspectacular or awesome photographs of nature can make people feel more connected to others, more caring, and more spiritual. Even imagined experiences in nature can evoke intense feelings of awe and connectedness, as well as the feeling of being in the presence of something greater (Shiota et al., 2007). These studies suggest that both extraordinary and every day natural sights and sounds can elicit various awe responses. This is important because it means ordinary and extraordinary natural scenes, as well as direct and passive exposure to nature, can induce varying levels of awe. Research has found that there is an association between the experience of awe and a number of psychological benefits, such as the facilitating of complex cognitive processing (Griskevicius, Shiota, & Neufeld, 2010; Keltner & Haidt, 2003) and that awe can be a powerful trigger for altruistic and other pro-social behaviour (Piff, et al., 2015). Emerging research also suggests awe can have positive impact on physical health, for example one study found that awe was a predictor of lower levels of pro-inflammatory cytokines (inflammation) (Stellar et al., 2015). From a psychological perspective, the association between spirituality, nature, and awe suggest nature-based interventions are therapeutically viable.

Several studies provide empirical support for a close relationship between spirituality and nature (Diessner, Solom, Frost, Parsons, & Davidson, 2008; Fredrickson & Anderson, 1999; Heintzman, 2003, Leary, Tipsord, & Tate, 2008; Saraglou, Buxant, & Tilquin, 2008; Vining et al., 2008; White & Hendee, 2000; Williams & Harvey, 2001). A number of qualitative studies have found connecting with nature can promote a sense of spirituality. For example, a qualitative study by Powch (1994) looked at women who found the experience of wilderness as empowering. The participants reported a spiritual restorative effect in relation to a sense of connectedness with Earth. Another study that explored the spiritual understandings of 12 Appalachian Women, Burkhardt (1994) found that participants frequently spoke of spirituality in terms of being in nature, connecting with the Earth, and deriving strength from nature. Other qualitative research supports these findings and suggest that nature can be a source and context for

people to experience a sense of spirituality (Dossey, Keegan, & Guzzetta, 2005; Lincoln, 2000).

There appears to be less quantitative research in this area, perhaps because of the subjective nature of the topic. Kamitsis and Francis (2013) conducted a quantitative study that explored the psychological impact of the ecological self. They found that engagement with nature, through both direct sensory exposure and a sense of connectedness related to better psychological health. In addition, a stronger spiritual orientation was positively associated with higher levels of nature exposure and connectedness to nature. An interesting finding in this study was that exposure to nature outside of participants everyday environments was more strongly associated with psychological wellbeing compared to 'everyday' nature exposure.

One quantitative study assessed spirituality in 103 patients diagnosed with cancer over a period of five years. The findings suggest that the existential component of spirituality was highly associated with less distress and better quality of life (Laubmeier et al., 2004). This finding is important because implies that the existential component, or the 'meaning making' implied by a spiritual orientation, plays an important role in the positive psychological health outcomes also, particularly during existential crises. Passmore and colleagues support the view that the existential component of spirituality is important in promoting wellbeing. They argue that a spiritual connection with nature helps to moderate existential anxieties and in this way can increase eudemonic wellbeing (Capaldi et al., 2015; Howell, et al., 2011; Passmore & Howell, 2014a, 2014b).

Elmer, MacDonald and Friedman (2003) conducted a review of research and summarise that on average people who are spiritually oriented have better health, longevity, respond better to medical intervention, and cope better when their state of health and functioning is compromised. Furthermore, the review found a positive association between spirituality, life satisfaction and subjective wellbeing and a robust inverse relationship between spirituality/religiousness and drug and alcohol use and abuse. More generally, it appears spiritual individuals tend to engage in less antisocial behaviour (e.g., delinquency and criminal behaviour) and display greater amounts of pro-social behaviour. Finally, the research suggests that spiritual individuals appear to demonstrate higher levels of empathy and altruism (see review by, Elmer et al., 2003).

However, a spiritual or religious affiliation does not necessarily provide protection against mental disorders. For example, King and colleagues conducted several studies in the UK and found no association between spiritual

beliefs and better physical health outcomes. Based on their findings, they argue that spiritual beliefs in the absence of a religious framework may also be associated with poorer mental health (King, Speck & Thomas, 1995; King, Weich, Nazroo, & Blizard, 2006). King et al (2013) conducted a more recent survey of 7,403 randomly selected people in the UK based on a shared postal code to explore the link between spirituality and mental health. They found that people professing to be spiritual, but not conventionally religious, are more likely to suffer from a range of mental health challenges. Furthermore, no clear relationship existed between religious belief and happiness. King and colleagues' studies are equivocal, which reduces confidence in establishing robust conclusions. The main limitation is that cross-sectional research is descriptive in nature; it can only expose whether a relationship exists, not comment on whether spirituality can affect mental health or cause mental distress. Furthermore, there is some ambiguity surrounding the definition of the multiple components of spirituality. In addition, the 'religious group' were mainly middle-aged white British Christians and therefore are not generally representative of the British population.

Personality differences and personal beliefs also play a role in whether spirituality manifests in healthy or distressing forms. For example, Elmer et al (2003) in their study noted a trend in the direction of a greater pathology between spirituality and authoritarianism, tolerance of ambiguity, rigidity, suggestibility, and dependence. In addition, during personal crisis or illness, a belief in a higher power that is benevolent is more likely to have positive health outcomes (Elmer et al., 2003).

The review of the literature highlighted that spirituality can manifest in healthy and pathological forms and our values and beliefs play an important role in promoting healthier forms of spirituality. Of course, psychological problems may develop when some individuals are unable to effectively comprehend and assimilate expressions of spirituality into their identity and understanding of the world (Grof & Grof, 1989; Wilber, 1977, 1980). Nevertheless, the evidence largely supports the view that a stronger spiritual orientation can provide a buffer against existential crises (Capaldi et al., 2015; Laubmeier, et al., 2004), negative life circumstances (Burkhardt, 1994; Elmer et al), and promotes subjective wellbeing (Capaldi et al., 2015; Dossey et al., 2005). It seems that the quality and type of spiritual orientation is important. For example, research suggests that the existential component of spirituality plays an important role in promoting wellbeing (Laubmeier et al., 2004). This is important; because extant research implies a connection with nature promotes positive engagement with existential

matters (Howell, et al., 2011; Passmore & Howell, 2014a, 2014b). Considering the evidence, there appear to be various pathways to spirituality. It seems that the quality and type of spiritual orientation is important. One argument might be that a connection with nature promotes positive engagement with existential matters (Howell, et al., 2011; Passmore & Howell, 2014a, 2014b) and the ecological self orientates people towards a transcendent and healthier form of spirituality (Dossey et al., 2005; Kamitsis & Francis, 2013).

Depression is a common mental health problem that is often associated with connection issues. In view of this, the next segment will focus on nature's impact on depressive symptoms. A plethora of research exists on nature's impact on trauma and anxiety disorders, however it is not within the realms of the current study to investigate all of these areas.

2.4.4 Nature's Impact on Depressive Symptoms

Until recently, there were few studies exploring the link between reduction in depressive symptoms and one's interaction with nature. Berman et al. (2012) investigated the association between walking in nature and impact on symptoms of depression. They found that participants experienced an increased level of concentration and a positive mood after contact with nature. In a similar study, Berman and colleagues, explored the psychological impact of interacting with nature in people diagnosed with depression and non-depressed individuals. Depressed participants reported greater psychological benefits after walking in a natural setting compared to their non-depressed counterparts (Berman et al., 2008). This study is important because it suggests spending time in nature may be more beneficial for people experiencing depression compared to non-depressed individuals. A recent mixed methodology study by Eko (2015) with a sample of depressed individuals suggests that a sense of connectedness with nature has restorative effects on mood. Another study by Gonzalez et al (2010) assessed the change in depression severity, perceived attentional capacity, and rumination in twenty-eight individuals with clinical depression during a therapeutic horticulture programme. The results showed a decline in depression in over half of the participants. The study concluded that 'being away' and 'fascination' appear to be active components in green interventions for clinical depression. In view of this, future research should explore further the benefits of nature for individuals experiencing mental distress. The findings are promising; however, the changes observed in the participants can be attributed to ordinary changes that occur in time, influence of the person delivering the intervention, or change in circumstances unrelated to the intervention.

2.4.5 Critical Review of Research

The review in this study demonstrated that regular physical contact as well as an emotional connection with nature could play a role in supporting spiritual, emotional, and cognitive wellbeing. However, several limitations exist in relation to the evidence surrounding the three core theoretical models (biophilia, ART, and SRT). Firstly, many of the studies, particularly in relation to ART, largely involved quantitative experimental methods and rely on controlled experiments, which search for correlation between variables that some argue lack subjective insight and forgo exploring the complex and multifaceted interrelationship between the mind and the body (Kerr & Key, 2011;Scull, 2009). In view of this, more qualitative efforts would be useful to gain further insight in this area. Secondly, many of the studies have been with non-clinical populations, involved small sample sizes, and have investigated brief exposure to nature and short-term effects. Therefore, it is difficult to generalise results to the wider population or make inferences about the long-term benefits of green interventions.

Preliminary quantitative studies suggest that spending time in nature can be helpful in alleviating some aspects of depression (Berman et al., 2008; Berman et al., 2012; Eko, 2015; Gonzalez et al., 2010). This is important because it suggests that physical and emotional connection with nature can be beneficial for reducing symptoms of depression. However, it seems that physical contact and a sense of connectedness are important as opposed to physical contact alone. A recent study found a link between nature connectedness and the extent to which people are flourishing in their private and personal lives (Passmore & Howell, 2014b). This study implies that those who would benefit most from a meaningful connection with nature are not reaping all the benefits. These findings highlight the need to investigate how people experiencing mental health problems or those who are from low socioeconomic status can cultivate a stronger emotional connection to nature in order to lead healthier lives.

There appears to be a plethora of research indicating that people typically prefer natural scenes as opposed to built environments (Herzog et al., 1997; Kaplan et al., 1972; Korpela & Hartig, 1996; Korpela & Ylén, 2007). However, only anecdotal evidence exists in relation to the evolutionary concept of biophilia hypothesis. Other questions also remain unanswered in relation to the biophilia theory. For example, some people find aspects of nature erratic or threatening (natural disasters and dangerous animals) (Eko, 2015; Ulrich, 1993; White & Heerwagen, 2013). Thus some may experience an aversion to nature referred to

as ‘biophobia’ (Torgersen, 1979), and others may experience phobias related to various natural phenomena (Agras, Sylvester & Oliveau, 1969; Torgersen, 1979).

Research also suggests that other types of environments, such as museums and places of worship may be just as restorative as typical nature scenes (Fredrickson & Anderson, 1999; Hartig, Mang, & Evans, 1991; Kaplan, Bardwell, & Slakter, 1993; Kaplan & Kaplan, 1989; Ouellette, Kaplan & Kaplan, 2005; Talbot& Kaplan, 1986; Williams & Harvey, 2001). Furthermore, research has also demonstrated that favourite places that may not be in a natural setting have the potential to engage involuntary attention (deliberate focus of attention), for example, kinetic sculptures, fish tanks, or tracery shutter shadows (Korpela & Hartig, 1996; Korpela, Hartig, Kaiser, & Fuhrer, 2001). In addition, much of the focus of research has been on natural environments and not on other natural life for instance concerning our interaction with animals. A few qualitative studies have found that contact with animals has physical and psychosocial benefits (Favali & Milton, 2008; Frumkin, 2001). In view of this, it appears some people prefer environments or scenes that do not involve nature, and others find contact with animals more therapeutic meaning that nature’s therapeutic value is not necessarily superior to other environments (Eko; 2015).

There is also some evidence that both passive and active exposure to the natural world has beneficial effects on the health and wellbeing of individuals (Frumkin, 2001; Goto, Kamal, Puzio, Kobylarz, & Herrup, 2014; Kahn, 1997; Lohr & Pearson-Mims, 2005; Maller, Townsend, Pryor, Brown & Leger, 2008; Ulrich, 1993; Ulrich, Lundén, & Eltinge, 1993). For example, murals depicting nature as opposed to a black wall, was effective in reducing levels of anxiety and stress in individuals visiting the dentist (Heerwagen, 1990). Another study found immersion in the virtual natural environment lowered stress and was restorative. The study concluded that virtual reality (VR) had the potential to reproduce the restorative effect of natural environments (de Kort, Meijnders, Sponselee & Ijsselsteijn, 2006). Another more recent study conducted an experiment that simulated mission to Mars. Astronauts were isolated for 500 days and their psychological and physiological responses monitored. One of the experiments involved monitoring participant responses to VR nature scenes. The results show VR technology to be useful for inducing positive moods (Botella, Baños, Etchemendy, García-Palacios, & Alcañiz, 2016). These cases illustrate that interaction with nature through art, technology and media can be beneficial. Considering the mental health and restorative benefits provided by nature and natural phenomena, it is interesting that very few studies have explored the

restorative effects of visual versus physical access to nature, active versus passive exposure to nature and typical versus extraordinary natural settings.

One argument in support of the biophilia hypothesis might be that all people have a connection to nature, but for some this connection is dormant and needs to be cultivated via a more meaningful engagement with nature and/or via interaction with preferred natural environments or stimuli. Prospect-refuge theory (PRT) (Appleton, 1975) provides an explanation as to why people are attracted to particular natural scenes. The PRT argues specific natural configurations with a clear view provide 'prospect' while safe places to hide provide 'refuge' and these spatial configurations evoke an intrinsic positive response, which in turn promotes a sense of wellbeing in observers. Wekerle and Egan (1991) support this theory and state that the perception of safety is necessary for feelings of enjoyment and comfort in urban open space.

There is robust empirical evidence that consistently supports the idea that spending time in nature aids attention restoration (Berman et al., 2008; Berto, 2005; Kaplan & Berman, 2010; Kaplan, 1995; Hartig, Evans, Jamner, Davis, & Gärling, 2003; Isen, 1990; Leather et al., 1998; van den Berg et al., 2003). Several cross-sectional reviews have concluded that exposure to nature has a positive effect on recovery from stress and attention fatigue, and a positive impact on factors such as mood, concentration, self-discipline and physiological stress (Health Council, 2004; Largo-Wight, Chen, Dodd, & Weiler, 2011a, 2011b; Passmore& Howell, 2014b). Overall, these findings indicate that nature can have a positive impact on our cognitive functioning and provide further support for Kaplan's (1993) ART. However, it is also clear from the evidence presented that other types of environments can be equally restorative.

The research has highlighted that multiple personal and contextual factors can influence the strength of our relationship with nature. Within ecopsychology frameworks, positive emotions, a sense of connectedness to nature and being spiritually orientated have been posited to be experienced in and through a relationship with nature, and may be examples of variables that strengthen our relationship with nature (Kamitsis & Francis, 2013). In relation to SRT, there is ample evidence that supports the restorative effects of positive emotions. The broaden and build theory highlighted that positive emotions (related to hedonic wellbeing) may be influential in the process of building enduring aspects of character that afford lasting happiness (i.e., eudaimonic wellbeing). Moreover, the evidence suggests that nature can promote both hedonic and eudaimonic wellbeing (see Bird, 2007; Capaldi et al., 2015). This is important because it

suggests connection with nature (physical and emotional) can promote aspects of wellbeing related to both 'feeling good' (hedonistic approach) and to leading 'a good life' (eudaimonic approach) (Keyes & Annas, 2009; Keyes, Shmotkin, & Ryff, 2002). Furthermore, there is also evidence that supports the idea that a meaningful connection with nature can promote authentic and eudaimonic happiness (Burkhardt, 1994; Capaldi et al., 2015), the first two components of 'mature happiness' (Wong, 2009). It is logical to assume that many people enjoy spending time in and with nature, yet it may be that some people are connecting to nature on a more superficial level and although this makes them 'feel good' in the moment they lack a more meaningful sense of connectedness to nature and therefore do not gain the long-term benefits.

Positive emotions can promote different behavioural outcomes. For example, Algoe and Haidt (2009) found that elevation led to greater pro-social motivations and a desire to be a better person, admiration motivated self-improvement, and gratitude motivated people to improve their relationships (related to eudaimonic wellbeing). However, amusement (related to hedonic wellbeing) created no clear pattern of motivation. Based on these findings they encourage the practice of differentiating between the meaning and consequences of different positive emotions. One avenue for future researchers could be to differentiate between hedonistic and eudemonic responses in natural settings as recommended by (Passmore & Howell, 2014b, 2014b).

Extant evidence has also found a close relationship between spirituality and nature (Fredrickson & Anderson, 1999; Heintzman, 2003; 2009; Leary, Tipsord, & Tate, 2008; Saraglou et al., 2008; Vining et al., 2008; White & Hendee, 2000; Williams & Harvey, 2001). It appears that nature has the power to boost our sense of 'ecological self' (Diessner, et al., 2008; Dossey et al., 2005; Higley & Milton, 2008; Lincoln, 2000). This is promising because it suggests that nature has the potential to engender all three types of 'mature happiness' identified by Wong (2009). One argument may be that nature provides a pathway to spirituality or vice versa. What is evident is that spiritual people experience a more pronounced positive emotional reaction in natural settings, are more likely to be in frequent contact with nature, and experience a stronger bond with nature, and therefore are more likely to reap better health benefits (Dossey et al., 2005; Passmore & Howell, 2014b). However, overall the evidence seems to support the associations of spirituality to both health and pathology. Perhaps an ecological self encourages less distressing and therefore healthier forms of

spirituality (Liester, 1996). What is clear from the review of evidence is there is limited knowledge surrounding the various pathways and mediating factors that can reinforce or activate a closer connection to nature. Future researchers might want to investigate this area further. It is important to research this area because it provides insight into how meaningful connections with nature can be cultivated.

Some studies suggest that natural settings that go beyond our usual frame of reference, that are spectacular and extraordinary, and sometimes even provoke fear, can promote wellbeing (Fredrickson & Anderson, 1999; Hartig et al; 1991; Higley & Milton, 2008; Kaplan, 1984; Kaplan & Kaplan, 1989; Talbot & Kaplan, 1986; Williams & Harvey, 2001). Furthermore, the review of research highlighted that various natural scenes from the ordinary to the extraordinary can be considered as a 'prototypical awe elicitors' (Shiota et al., 2007). This is important because it suggests that contact with natural environments can elicit various degrees of awe, which is a transcendent emotion that is often associated with eudemonic wellbeing (Piff et al., 2015).

Overall, the findings are promising as they strengthen the case to establish nature interaction as an effective wellbeing intervention (Eko, 2015; Passmore & Howell, 2014b). However, perhaps healthcare professionals need to think beyond merely prescribing green interventions and consider how people can reengage or connect with nature on a more meaningful level, for it is the quality and type of connection that will determine the extent to which it influences our wellbeing (Schultz, 2002). Future researchers may want to test individual factors that mediate our connection to nature and the extent of nature's role in stimulating positive emotions (hedonic and eudemonic).

Earth gazing from space for the purpose of the current study is regarded as atypical and extraordinary way of interacting with nature. Accordingly, the next segment focuses on salutogenic effects of spaceflight, with a particular focus on findings surrounding the impact of Earth gazing.

2.4.6 Atypical Involvement with Nature: Earth Gazing

The current study argues that seeing Earth from orbit or the moon provides space explorers with visual and passive exposure to an extraordinary natural setting. Furthermore, this unique setting captures the holistic root of the human-nature relationship (Fisher & Abram, 2013; Higley & Milton, 2008) and therefore can provide further insight into this relationship.

The Overview Effect (OE) (White, 2014) describes the psychological effects of viewing natural landscape from an expansive vantage point and seeing Earth from space is considered to be the epitome of this type of experience

(Yaden et al., 2016). Less than six hundred people have had the privilege of seeing Earth from above its atmosphere. These individuals have had the opportunity to encounter a drastically different perspective of life, nature, the planet, and the cosmos. Journals, interviews, and autobiographies of astronauts have highlighted how a significant number of space travellers report post mission they felt a deep sense of interconnection with all life, have come to see themselves and their world differently, and have returned to Earth with a renewed sense of purpose (Gallagher et al., 2015; White, 2014; Yaden et al., 2016).

Past astronaut journals and interviews suggest that "Earth gazing" is a valuable and beneficial activity for astronauts whilst on board the International Space Station (ISS). For example, a study by Stuster, (2010) found that Earth gazing and photography help astronauts adjust to the physical and behavioural conditions of life on board the International Space Station (ISS). However, little research exists detailing the psychological impact of Earth gazing on space veterans postflight.

Gallagher and colleagues conducted two influential experimental interdisciplinary studies (neuroscience, psychology, and phenomenology) on the experience of space flight, Earth gazing and awe (Gallagher et al., 2015). In one study, forty-five astronaut texts (17 in flight journals and 34 postflight interviews and reflections) were thematically analysed. The study found that feelings of awe and wonder were salient characteristics of the space flight experience. Another significant finding was that descriptions in flight space journals were much more concrete (or less abstract) than the descriptions in later reflections and interviews (Gallagher, Reinerman-Jones, Sollins, & Janz, 2014). In another study, Yaden et al (2016) deployed thematic analysis on astronaut journals and interviews and identified constructs, such as awe and self-transcendence as being an important response to the experience of spaceflight. Gallagher and colleagues also simulated the space flight experience with VR and conducted a neurophenomenological study with students on the experience of awe and wonder. They found differences in theta and beta activity throughout the brain in participants who experienced awe compared to those who did not. Furthermore, participants who reported experiencing awe and wonder reported less affiliation with religious and spiritual practices. Another finding was that awe and wonder were more likely to occur when watching the simulated Earth view instead of the deep Space view (Reinerman-Jones, Sollins, Gallagher, & Janz, 2013) and overall Earth gazing elicited a stronger emotional response compared to deep space view. These studies provide evidence that confirms space flight as an

awe-inducing experience. Moreover, it appears that seeing Earth from this view can have a lasting positive impact on space veterans. However, Earth gazing from space is an area of research that has received very little empirical attention in the past. Nonetheless, there is emerging evidence on the salutogenic and positive effects of spaceflight (Ihle et al., 2006) which will be the next area of focus.

Ihle et al. (2006) recruited 39 NASA astronauts to complete a questionnaire on the positive effects of space flight. The astronauts indicated that the greatest change they experienced was an enhanced appreciation of Earth's beauty and fragility, treasuring the Earth more, and an increase in their involvement with environmental causes. The outcome of their study supports the idea that being in space and Earth gazing from this perspective are meaningful experiences that make an enduring positive impression on astronauts and cosmonauts and that these changes appear to have implications on their behaviour post-flight. Interestingly, Ihle et al. (2006) observed that response patterns did not vary by demographic group, number of missions flown, or total elapsed time in space. This suggests that this group of astronauts all had a positive impression of space flight and the participants share commonalities in the way they made sense of the experience and how it influenced their actions post flight.

Suedfeld and Weiszbeck (2004) conducted a thematic content analysis of four astronaut memoirs to investigate the frequency of specific values and compared the profile of these values before, during, and after their flight to look for changes over time. The findings suggest that the space flight experience affected the structure of participants' values. All the participants in the study showed increases in spirituality and three had increases in universalism. The word Universalism means an understanding, appreciation, tolerance, and protection for the welfare of all people and for nature (Schwartz, 1992). In a larger and more recent study, Suedfeld, Legkaia, and Brcic (2010) conducted quantitative research with 125 astronauts/cosmonauts. Their findings suggest that universalism and spirituality values increased post-flight and thus support Suedfeld and Weiszbeck's (2004) finding.

Suedfeld, Brcic, Johnson, & Gushin (2012) recruited 20 retired Russian Space Agency (RKA) astronauts. Respondents were asked to complete questionnaires surrounding pre-and post-flight values and the positive effects of space flight. Overall, the cosmonauts reported significantly higher levels of positive change postflight. The data suggests higher levels of self-reported

personal growth among cosmonauts who had spent less than a year in space compared to those who spent more than a year in space. This implies that those who spent more time on board the ISS came away with less psychological gains. Perhaps this is because some aspects of the experience are normalised for longer missions. Alternatively, spectacular awe-eliciting scenes can evoke a sense of perceptual and conceptual vastness. Often during such instances, existing mental structures feel overwhelmed (Keltner & Haidt, 2003) and this can delay the assimilation of the experience into schematic memory. In relation to the space flight experience, it is likely that astronauts who go on longer missions, require more time to assimilate the experience and therefore more time for the salutogenic effects to manifest (Gallagher et al., 2015; Keltner & Haidt, 2003; Yaden; 2016). Respondents in Suedfeld et al.'s (2012) study also reported change in the categories of 'perceptions of space' and 'perceptions of the Earth'; however, no changes in values related to benevolence, universalism, and spirituality in the hierarchy were reported. This variance in outcome might be due to cultural differences between the veteran cosmonauts and the American and international astronauts studied earlier, or because of the quantitative measurement methodology. Interestingly, the changes observed in values were also significantly higher than values in Ihle et al.'s (2006) subjects who were active space fliers. Their findings are consistent with Gallagher et al.'s (2014) and similarly the difference in results might be due to the delay in integrating the experience as outlined earlier (Keltner & Haidt, 2003).

Brcic and Della-Rossa (2012) employed thematic content analysis and looked for references to Schwartz's well-established value markers in narratives (media interviews, journals, and pre-flight interviews) of seven Canadian astronauts. They then compared the results to the values of NASA and RKA astronauts. The most frequently mentioned values for all the participants were achievement, universalism, security, and self-direction. Universalism was significantly higher among the Canadian astronauts compared to American and Russian space travellers. In Suedfeld et al.'s (2012) study RKA cosmonauts expressed less change related to universalism or at least were less inclined to talk about this value. Conversely, in Brcic and Della-Rossa's (2012) study Canadian astronauts appear to relate to universal values more post-flight compared to NASA and RKA astronauts.

Some of the space flight conditions are analogous to confined and isolated environments such as polar research stations and submarines. A study by Golovchaev (2004) on a group of cosmonaut trainees in confined, isolated, and

dangerous environments found that most reported positive personal growth effects such as improved self-confidence. The findings indicate that astronauts and cosmonauts are more likely to adapt and assign positive meanings to the experience and that there may be an element of post-traumatic growth related to the experience (Ritsher, Kanas, Ihle, & Saylor, 2007).

These studies suggest that missions in space and space-like environments on Earth can provide long-term psychological benefits. However, it is important to gain further insight into what aspects of the spaceflight experience advance salutogenesis and eudemonic wellbeing. The evidence suggests Earth gazing is an activity that improves astronaut morale during missions and strengthens values related to eudemonic wellbeing postflight. The biophilia theory provides a framework that allows us to draw some conclusions. It seems that Earth represents an image of nature that is powerful and awe inducing. This view activates higher level cognitive processing and intense emotional responses that in turn activate biophilic tendencies. Furthermore, planet Earth from orbit also symbolises an object that provides refuge, prospects, and security, which based on the prospect refuge theory, elicits an instinctive positive response (Appleton, 1975; Ulrich, 1983).

Astronauts are screened and recruited for specific characteristics and personality suited to the role referred to as the “right stuff” (Kanas et al., 2009; Ritsher et al., 2007; Santy, 1994) which may mean that they are more likely to derive short-term and sustained health benefits from their experiences, a phenomenon known as ‘salutogenesis’ (Antonovsky,1987). Therefore, it is difficult to generalise findings to other populations. Furthermore, space travel exposes space travellers to several stressors that can potentially have adverse effects. For instance, danger and hazards, isolation, separation from family and friends, lack of privacy, difficult living conditions, workload, microgravity, and problems with assimilating the extraordinary experience. Support issues have improved significantly since the first generation of cosmonauts and astronauts went to space. In addition, the strict screening process means that the risks of adverse psychological effects are minimised. Even so, there is often a period of physiological and psychological adaptation both during and postflight (Ritsheret al., 2007). Furthermore, reaching professional heights may induce a great wave of initial euphoria, appreciation and a sense of accomplishment and mastery, yet long-term these feelings may subside and be replaced with feelings of confusion, bewilderment or lack of direction and perhaps purpose (Kanas et al., 2009;Stuster, 2010). A small number of cases have been documented relating to

substance abuse, anxiety, and major depression that have necessitated psychotherapy and psychoactive medications. However, many of these cases involved first-generation space travellers who had more media attention and less support upon their return (Kanas, 1990). In support of this, Stutsters (2010) study suggests that modern-day life onboard the ISS is not as difficult as the astronauts expect it will be prior to launch.

These studies reflect the phenomenological complexity of the experience of space flight. The research suggests that awe and wonder are salient features of the experience and Earth gazing is an important and beneficial activity on board the ISS and has salutogenic effects postflight (Stuster, 2010, Yaden, et al 2016). Overall, it appears the space flight experience also broadens a set of references to values oriented toward the collective good (Suedfeld, 2006; Suedfeld, Legkaia & Brcic, 2010; Suedfeld & Weiszbeck, 2004). Preliminary evidence suggests that there may be cultural differences that influence the degree and type of positive change (Brcic& Della-Rossa, 2012; Ritsher et al., 2007; Suedfeld et al., 2012). The current study presents Earth gazing as an atypical method of interacting with nature and hypothesises that Earth gazing is an experience that can elicit powerful positive emotions such as awe and has the potential to strengthen eudemonic strivings. To date there is little in the way of research investigating different ways that people can experience nature, for example when viewing natural elements or landscapes from a distance or in VR setups. The current study hopes to provide new insight in this area.

2.4.7 Rationale

This review demonstrated the challenges currently faced by mental health and argued that alternative therapeutic interventions are required. The evidence surrounding biophilia, the ART and SRT demonstrated the restorative potential of natural environments. Much of the research into the benefits of nature-based activities has, to date, focused on contact and connectedness with direct and everyday natural activities. In view of this, the current study wanted to consider ways of interacting and immersing in nature that are perhaps not typically associated with nature-based activities and interventions but may be equally as restorative and beneficial for wellbeing. The phenomenon under investigation in the current study (Earth gazing from orbit or the moon) is an atypical method of engaging with nature. Past research indicates that this experience can elicit intense transcendent emotions such as awe and wonder (Gallagher et al., 2015; Yaden et al., 2016). Furthermore, a significant number of space travellers have reported that seeing Earth from orbit or the moon has changed the way they view

existential matters and their relationship with other people and nature (Gallagher et al., 2015; NASA: Johnson Space Center, Astronaut Journals; Poole, 2008; White 2014; Yaden et al., 2016). Indeed, it seems that the experience can foster outcomes associated with natural settings such as awe and wonder, universalism, vitality, spirituality, self-transcendence, connectedness and personal growth (NASA: Johnson Space Center; Ritsher et al., 2007; Yaden et al., 2016).

Thus, this study presents outer space as the new frontier for connecting with nature and exploring existential issues (Gallagher et al, 2015; Suedfeld & Weiszbeck, 2004; Yaden et al., 2016). This paper argues insight into this area can extend our understanding of how to cultivate a more meaningful connection with nature as well as how to promote psychological wellbeing and growth. The current study aims to instigate a multidisciplinary discussion as to how this experience can be conceptualised, adapted and simulated as an ecopsychological intervention, and introduced in various settings and institutions to reduce stress and promote eudemonic wellbeing.

2.4.8 Research Aims and Question

The experience of seeing Earth from orbit will be examined. The research question that is of interest is: What is it like to see Earth from space, and how has this experience affected you. The aims of the study are firstly, to explore astronaut experience (visual, noetic, philosophical, and emotive) of seeing Earth and natural phenomena from orbit, and secondly, to explore their lived experience, exploring the impact and benefits post-flight. Existential and ecopsychological theories will be used as a framework to help make sense of the findings. Finally, the research will explore ways we can harness and apply awe-inducing and extraordinary nature-based experiences such as Earth gazing in order to promote societal and individual wellbeing, making the current research relevant to all health care professionals. In particular, the current study is relevant to Counselling Psychologists working with individuals or groups in clinical practice, in educational settings, prisons, and occupational health given that they are in a pivotal position to implement psychotherapeutic groups, promote wellbeing, and explore existential matters.

In accordance with the aims of this study, a qualitative research design in the form of IPA was used to unearth participants' lived phenomenological experience, to provide a description of the experience as it appeared, and explore what the experience was like and the meanings assigned to the

experience (Smith & Osborn, 2008). IPA also allowed for specific categories of experience to emerge from the data.

Thus, to summarise the aims are:

a) To explore what the experience was like for the participants, focusing on their visual, noetic, philosophical and emotive understanding of seeing Earth and natural phenomena from space
b) To explore the participant's lived experience (the impact and benefits post-flight)
c) To extrapolate shared commonalities between the astronaut's accounts.

The next section will outline the Methodology and associated methods and procedures carried out.

2.5 Methodology

2.5.1 Research Title

'The Overview Effect and Counselling Psychology: Astronaut experiences of Earth gazing'

2.5.2 Research Design and Question

This qualitative study used semi-structured interviews to gather data from a homogenous sample of astronauts. IPA was chosen to explore the research question 'What is it like to see Earth from orbit, and how has it impacted you?'

2.5.3 Overview

This section begins with a brief introduction on reflexivity, an outline of the techniques deployed in order to approach the issue of reflexivity and moves on to the epistemological parameters which frame this particular study. The next segment provides a rationale for adopting a qualitative methodology and a description of IPA and its philosophical roots. This is followed by a rationale for the use of IPA and an overview of some of the limitations. After this, the methods used to carry out the research and the process of data analysis is described. The section closes with a discussion surrounding methodological and procedural reflexivity, which seeks to review the methods adopted.

2.5.4 Reflexivity

Reflexivity acknowledges that it is impossible to remain completely objective and 'outside of' one's subject matter while conducting research. It considers our role as researchers as co-constructors of knowledge by virtue of our presence. It forces the researcher to reflect on their involvement with the research process, how this influences the construction of meanings, the boundaries of the study, and contradictions that these issues raise. By doing so, it is believed that researchers will produce a more trustworthy study and develop their skills to enter and reflect more deeply upon the lived experience of others (Smith et al., 2009; Willig, 2013).

Various layers of reflexivity have been established by researchers, including 1) 'introspective' reflexivity (Finlay, 2002, Willig, 2013), 2) 'methodological' reflexivity, and 3) 'epistemological' reflexivity (Johnson & Duberley, 2003, Willig, 2013). Alvesson and Sköldberg (2009) interpret reflexivity as 'interpretation of interpretation' and consider it important to add another layer of reflexive analysis after the process of data interpretation. I have been aware that my beliefs, epistemology, and methodological approach have inevitably contributed to the context of the phenomenon I am exploring (Smith et al., 2009; Willig, 2013). Therefore, I have aimed to draw out these influences within the

following methodology segments. I have weaved the three reflexive layers throughout the research sections. I used Alvesson and Sköldberg's (2009) 'interpretation of interpretation' principle after the data had been analysed as I gained more insight regarding my own preconceptions once the interpretation was underway.

2.5.5 Epistemological Framework

This segment identifies my ontological and epistemological positions. Ontology, broadly speaking, explores the nature of being and existing. More specifically, epistemology refers to the theory of knowledge and considers the scope, validity, and reliability of claims to knowledge: what we think we know, how we think we know, and whether or if we can know (Smith, 2007; Willig, 2013). Willig (2013) suggests that it is important for qualitative researchers to attempt to outline their epistemological position. However, Willig (2016) forewarns researchers that identifying and subscribing to a clear-cut and unambiguous epistemological perspective is challenging and might not be realised. From early on in the research process, I recognised my own epistemological oscillations and inconsistencies (combination of relativist and positivist approaches). This awareness allowed me to consider how my personal epistemological theories present both benefits and limitations in relation to the research process and outcome (Willig, 2016). I critically reviewed the epistemological stance elected and the challenges it posed in order to maintain a trustworthy study (see sections 2.2, 2.5.6, 2.6.15, & 2.7.7).

The current research was influenced by the ontological position of holism. These perspectives argue that reality is interrelated, multi-dimensional and several simultaneous and distinct realities can co-exist. Such ontological conceptualisations question the validity and usefulness of conceptualising self as located exclusively within individuals and seeing ourselves as entirely separate beings. Thus, holism supports the view that realities are relative, dependent on the position and state of the observer. In essence, such a view integrates the materialist and idealist positions and suggests that both these positions are valid and true at their own level and each level has different realities with their own laws of nature that are valid there (Willig, 2016)

A constructivist epistemology was chosen within a qualitative framework because it initially seemed to align with my ontological position as well as the elected methodology in the current study. Constructivism is a philosophical paradigm informed by a relativist ontological position. Relativism does not reject the possibility of an ontological reality but claims it is incomprehensible.

Relativists suggest that the act of observing provides us with limited, fragmented, and perhaps distorted perceptual data from the surrounding environment. As such, we have no way of knowing with certainty what kind of reality exists beyond our experiential interface (Willig 2013). Therefore, the idea of truth is always relative to a particular frame of reference. Constructivist epistemology argues that people have a need to measure and construct models of the natural world in order to assign meaning to it and make sense of it, and achieve this through acquiring 'knowledge' (Raskin, 2002).

However, Constructivism is on a continuum; at the extreme end is 'radical constructivism' and in the middle lays 'moderate constructivism'. Moderate constructivism maintains that reality is apprehended and mentally constructed through our social encounters and our experiences. The form and content of these constructions vary depending on the individual person or group holding them. Although this perspective recognises the relative nature of mental constructions, it diverges from the radical stance that asserts such constructions have no independently identifiable real-world referents. From this premise, scientific 'knowledge' is comprised of shaped social variables, yet can serve as a viable vehicle to encode and map the world in which we live in and help expose facets of reality that are close enough to the ideal truth. In contrast, radical constructivism is a form of anti-realism. It claims that scientists do not discover the world but impose a structure on it. In other words, scientific 'knowledge' is socially constructed (Guba & Lincoln, 1994; Willig, 2013). Whilst radical constructivism is aligned with relativism, features of moderate constructivism can be seen to be compatible with both realism and relativism (Willig, 2016). Not only does moderate constructivism coincide with my personal and methodological epistemology, it is felt it is aligned with Counselling Psychology as a profession (Raskin, 2002). As a result, I will be adopting this stance for the purpose of this study.

2.5.6 Epistemological Reflexivity

Johnson and Duberley (2003) and Willig (2013) ascertain that a trustworthy qualitative study needs to include a layer of 'epistemological' reflexivity. The following segment will explore my epistemological stance and reflect upon how this has influenced the research process and outcome.

The process of epistemological reflexivity has allowed me to deliberate over the fact that when we study and analyse any form of text we automatically assume one or multiple theoretical frameworks that are informed by the dominant epistemology(ies) that we adhere to. This framework influences how we

approach the text and how we define the status of it. I approach this study with the understanding that each epistemological position contributes to a better understanding of the world and its phenomena. However, I have learned that each epistemological stance and methodology has different philosophical roots, ascribes to different theoretical assumptions, has different types of questions, and thereby produces different types of knowledge (Hansen, 2007; Willig, 2013). The French philosopher Gaston Bachelard (1938) warns that this is a problem inherent in all research and summarises an 'epistemological obstacle' in the following quote: "in the life of a science, problems do not arise by themselves…All knowledge is in response to a question. If there were no questions, there would be no scientific knowledge" (Bachelard, 2002, p. 117).

Epistemological reflexivity has also encouraged me to consider my assumptions about the world and knowledge in relation to this research. It has allowed me to acknowledge that the context of this research, including how my preconceived assumptions and my epistemological position have influenced the formation of the research question. If as a Psychologist I aligned to a positivist orientation, I would be more inclined to ask questions that focus on cause and effect, and perhaps deploy questionnaires that measure impact and outcome, and my approach to interviews would be more objective and regimented. Thus, the epistemological position adopted in research can influence the way the researcher interacts with participants (such as interview style and behaviour) and how they interpret and draw meaning from encounters with them. Based on my epistemological position I believe interactions with participants cannot be entirely neutral and that my interpretations cannot be entirely objective. Through reflexive practice, I gained awareness of this position and the ways it could affect my interview style. For example, I am more likely to be impulsive and casual, more inclined to let the participant take total control and reluctant to use prompts to guide the interview process in the fear of leading them. I also became aware that during the analysis, I would be inclined to make more inferences about a participant's intra-psychic or subjective processes and might neglect interpretations surrounding the impact of cultural, relational and contextual factors impinging and influencing participant accounts. The process of reflexivity has heightened my awareness surrounding these matters. I have implemented reflexive strategies such as pre- and post-interview diary in order to monitor and minimise the impact of my inclinations, presuppositions and assumptions during the research process (Alvesson & Sköldberg, 2009; Finlay, 2002).

My epistemological stance means that I will be using the act of observation to establish focus on the phenomenon under scrutiny. I realise that the outcome of this research is somewhat dictated by my epistemological stance, presuppositions, chosen methodology and research questions. However, I propose that by adhering to qualitative and IPA research guidelines I can produce a study that provides a glimpse of one facet of the phenomenon from among a vast array of potentials. I believe each participant's observation and interpretation of their experience will be unique to them, and it is inevitable that the researcher and participants will make sense and draw meaning in different ways. However, I propose that through the act of two-way interpretation, the researcher and participant can co-construct viable knowledge concerning the phenomenon (Raskin, 2002; Smith et al., 2009).

Some argue that constructivist philosophies lead to 'solipsism' - only "my" experiences exist (Randrup, 2004). However, by synthesising constructivism with a unified theory such as holism we can see how several simultaneous, interrelated, yet distinct realities are possible. Thus, this researcher argues that such conceptualisations may provide a viable alternative or at least may complement individual experience and therefore provide an argument against solipsism (Randrup, 2004).

In accordance with my epistemological position of moderate constructivism, I believe in the possibility of understanding the underlying patterns of some real-world phenomenon through the process of observation and collaborative interpretation inherent in IPA. Thus from this stance, IPA is used to facilitate the unearthing of individual constructions and to distil a "consensus construction" (Guba &Lincoln, 1994: 111) by comparing and contrasting multiple individual constructions. It is believed that by approaching the phenomenon of interest in this way this study can produce a more elaborate and informed understanding of it than any of the preceding constructions (Alvesson &Sköldberg, 2009; Guba & Lincoln, 1994; Willig, 2013).

2.5.7 Rationale for a Qualitative Perspective

A qualitative approach was adopted for the current study because I was drawn to the way these methodologies require skills that are congruent with the Counselling Psychology profession, for example reflexivity, empathy, interpersonal skills, social advocacy, and interviewing. In addition, I was drawn to the way qualitative methodologies attempt to gather multidimensional knowledge via various methods about how our social world is constructed. In doing so, I

believe qualitative methodology produces the type of knowledge that is relevant to my epistemological beliefs (Smith; 2007; Willig 2013).

There were practical concerns that contributed to electing qualitative methodology. For instance, only a limited number of people have flown into space; out of this number, only a few are expected to be available and willing to take part in the study. In addition, there are limitations caused by cross-continent interviewing as I was based in the UK and potential participants are based in United States of America (USA). Quantitative methodology requires larger numbers in order to elicit data that can be generalised geographically or to other populations. However, qualitative methodology requires smaller but more focused samples in order to investigate the why and how's of a phenomenon and to develop a deeper understanding of it (Creswell, 2006; Smith, 2007) and therefore is more suited to the aims of this study.

Lastly, I was aware that I have presuppositions around the topic being studied. These beliefs influenced the trajectory and outcome of the research to some degree, whatever research approach I elected. Nonetheless, I wanted to consider in detail how they might influence my research and minimise the effect of these factors, and felt that qualitative methods accommodated this better than quantitative approaches (Willig, 2013).

2.5.8 Philosophical Underpinnings of IPA

The following segment briefly reviews the philosophical underpinnings of IPA, commencing with an outline of IPA's idiographic component followed by a discussion of how phenomenology synthesised with hermeneutics, identifying key people who have influenced this movement. This section concludes with a critical review of the features of IPA that are compatible with the epistemological underpinnings of this research.

The first major influence on IPA is ideography. Smith et al., (2009) suggest that the idiographic element is important because it enables a more intense focus on the individual in a personal and in-depth manner, which helps acquire a unique understanding of them. The idiographic stance means that it is important to preserve each participant's unique contributions by not making grand comparisons and generalisations that may corrupt findings. Nevertheless, Smith et al., (2009) alert us to the fact that each person's experience is always situated in relational and contextual basis, therefore, "to be wholly inductive is an impossible task" (Larkin, Watts & Clifton, 2006, p. 107).

Underpinning the experiential feature of IPA is phenomenology, particularly the works of Edmund Husserl, Martin Heidegger, Maurice Merleau-

Ponty, and Jean-Paul Sartre. It is difficult to define phenomenology as a philosophy because it is not a single unified approach; it has continuously modified and re-interpreted its own meaning, and some later advocates synthesise the two orientations, hermeneutics and phenomenology (Smith et al., 2009). Broadly speaking it is a philosophical approach that is concerned with how humans experience the world around them, how they grasp knowledge, and individually present themselves based on this knowledge (Eatough & Smith, 2008;Smith et al., 2009).

Husserl is recognised as one of the early influential figures in phenomenology. He promoted phenomenology as a tool to describe the world based on subjective experiences. He describes phenomenology as being more concerned with psychological processes such as perception, awareness, and consciousness. For Husserl, phenomenology does not create but only finds. He wanted to find the essence of every-day experience. To accomplish this he emphasised the need to step outside of our 'natural attitude', and responses (including all of our presuppositions, assumptions, and beliefs). He argued that by turning our gaze away from, for example, objects in the world, and engaging in deep reflection, we can direct our focus inward towards our perception of those objects in our consciousness. For Husserl, an extensive and thorough phenomenological account of the world as it is experienced would be an essential precursor to any further scientific account (Smith et al., 2009; Van Deurzen, 2015).

Heidegger developed Husserl's ideas but was more interested in exploring ontological questions surrounding existence itself. For Heidegger we are 'thrown into' a world. He used the term inter-subjectivity to refer to the shared, overlapping, and relational nature of our engagement in this world. Heidegger (1927/1962) suggested that knowledge was produced because of interpretation of people's meaning making which he felt was grounded in the lived world, including its relationships, objects, language, and culture. It was here that phenomenology began to raise the central questions around meaning making and hermeneutics (Halldorsdottir, 2000; Smith et al., 2009).

Merleau-Ponty (1945/1962) highlighted the importance of context or situation in understanding peoples' experiences and the role of our perception of the body in this. He described the subjective and embodied nature of our relationship to the world. He ascertains that we use our senses to perceive and communicate with the world around us and relates this to a subjective perspective of the world. For Merleau-Ponty, the body is conceived of as a

device that is used to communicate with the world. Sartre expanded on these ideas and suggested that people are evolving and 'existence comes before essence' (as cited in Smith et al., 2009), where an individual is always in the process of becoming. For Sartre, the absent things are as important as those that are present in defining who we are and how we define the world (Halldorsdottir, 2000; Smith et al., 2009).

IPA combines these phenomenological concepts and proposes that experience is not only individually situated and based on individual's embodied relationship to their world but also intrinsically bound up with and contingent upon relationships with others, shaped by time, society, culture and history (Eatough & Smith, 2008; Smith et al., 2009). IPA adopts the phenomenological stance and enhances it by incorporating the interpretative view of how we attach meaning from our experiences (and that of others), which leads us to the discussion of the interpretative process in IPA derived from theoretical underpinnings of hermeneutics.

Hermeneutics is the study of how we understand and interpret our worlds. Originally, hermeneutics was a completely distinct body of thought from phenomenology with its focus on interpretation of biblical texts. Heidegger was one of the first to describe phenomenology as hermeneutic. He pointed out the complex and interrelated relationship between the interpreters and interpreted. It is through his work that these philosophies began to synthesise. Schleiermacher was one of the first people to write systematically about hermeneutics. He felt that through detailed and holistic analysis of text one could understand the author better than he understands himself. He suggests the text or object is open and out there ready to be investigated.

Hermeneutic philosophers such as Friedrich Schleiermacher, Wilhelm Dilthey and Hans-Georg Gadamer played an influential role in the synthesis between phenomenology and hermeneutics (Larkin et al., 2006; Smith et al. 2009) which leads us onto a summary of the contributions of some of the prominent figures in this movement.

Paul Ricoeur felt increasingly more uncomfortable with Husserlian idealism and its association with intrinsic subjectivity, and placed emphasis on the interpretative influence of the researcher on the data (Halldorsdottir, 2000). He supported Heidegger's ideas and presented the 'hermeneutics of suspicion', which was his attempt to retain and balance the dialectics between the science and art of hermeneutics (as cited in Smith et al, 2009). He claims that phenomenology should go beyond the static description of experience towards

critical interpretation. IPA has adapted Ricoeur's 'hermeneutics of suspicion' to 'hermeneutics of questioning'. This is because although understanding, interpretation of participant beliefs and a degree of 'questioning' are considered beneficial to the depth of analysis, IPA ultimately accepts participants' stories (Smith et al., 2009).

Gadamer went further by stating that he did not believe we could fully uncover the author's intent, particularly after a considerable lapse of time. Instead, he proposed that the emphasis should be on understanding the meaning encrypted in the text (i.e., the participants' accounts). For Gadamer, the philosophy of hermeneutics requires one to explore our entire understanding of the world and all the various forms it may manifest. From this view, the act of observing is not neutral. Rather, human contemplation and interpretation affect in numerous ways the phenomenon that is scrutinized (Halldorsdottir, 2000; Smith et al., 2009; Willig, 2013).

In summary, IPA aims to get access to participants' personal experience (phenomenological) but also recognises that interpretation and meaning making play an important role for the researcher and participant in this endeavour (hermeneutics). As Smith et al. (2009) state "without the phenomenology there would be nothing to interpret; without the hermeneutics, the phenomenon would not be seen" (p. 37).

The Hermeneutic circle suggests that the whole can only be established after understanding the individual parts and each individual part by reference to the whole (Smith et al., 2009). Tappan (1997, p. 651) nicely translates how the hermeneutic circle applies to the role of the researcher:

> "The interpreter's perspective and understanding initially shapes his interpretation of a given phenomenon, and yet that interpretation, as it interacts with the phenomenon in question, is open to revision and elaboration, as the perspective and understanding of the interpreter (including his biases and blind spots) are revealed and evaluated".

Smith et al. (2009) outline layers of interpretation required in interpreting and understanding a phenomenon as involving the participant's meaning making (interpreting their own experience) and the researcher's sense making (interpreting the participant's account); this process is called 'double hermeneutics'. The circularity of this process (questioning, uncovering meaning, and further questioning) is referred to as the 'hermeneutic circle'. The final analysed account should offer a multi-layered interpretation of the phenomenon covering a descriptive, phenomenological level, which firstly conveys an empathic

understanding of the experience, and secondly a probing, more critical analysis based on the deeper interpretative work. This double-layered hermeneutic analysis in IPA is effective because it occupies the middle ground between the idealist "hermeneutics of meaning" where one adopts an unquestioning and essentially realistic acceptance of the status of participants' accounts and a hermeneutics of 'questioning' where one adopts an analysis of the structural influences underpinning a particular account (Smith et al., 2009).

2.5.9 What Is IPA

Interpretative Phenomenological Analysis is an approach to qualitative research developed by Jonathan Smith in 1996. It distinguishes itself from other approaches because of the unique way it utilises a combination of phenomenological, hermeneutics, and idiographic components, which form its philosophical basis. IPA explores how people in a particular context sharing a life experience (often, major life experience), personally make sense of it (linked to phenomenology) by looking at the process of participant and researcher meaning making (linked to hermeneutics). These experiences may include changes in health, ending a relationship, death, marriage etc. (Smith & Osborn, 2008; Smith et al., 2009).

The subjective and idiographic nature of IPA means it aims to capture personally salient accounts that are in-depth and rich. Its essence is in the analytic focus which is to direct our attention towards our participants' attempts to make sense of their experiences. As a result, IPA tends to have small sample sizes (usually a maximum of ten participants) and uses a homogenous sample by placing restrictions or specifications on the inclusion criteria which may be based on factors such as gender, mental health diagnosis or profession (Smith & Osborn, 2008; Smith et al., 2009).

Smith et al. suggest that interviews are one of the most effective data collection methods in IPA because they are more likely to elicit detailed accounts about participants' experiences and allow them the freedom to express their thoughts and feelings in a direct and open way with the aim of revealing novel insights. During an interview, the researcher has the opportunity to use their intuition to explore ambiguous and contradictory statements as well as to raise issues that are more sensitive. However, other techniques such as focus groups and diaries have also been used (Smith & Osborn, 2008; Smith et al., 2009). Once recorded, participants' accounts are meticulously analysed by the researcher. Analysis in IPA is said to be 'bottom-up'. This means that the researcher generates codes from the data, rather than using a pre-existing theory

to identify codes that might be applied to the data. Thus, IPA studies do not test theories but assist in the development of existing theories (Smith et al., 2009; Pietkiewicz & Smith, 2014).

2.5.10 Is IPA Compatible with Constructivism?

IPA acknowledges that the researcher's engagement with the participant's text has an interpretative element and respects subjectivity in the process of meaning making. Yet it assumes an epistemological stance during analysis that claims through careful, meticulous, and explicit interpretative methodology, it is possible to access an individual's cognitive inner world. Thus, on the one hand, IPA acknowledges the relativist position by proposing that there are some elements of construction on behalf of the researcher and participant, while on the other hand asserting that there is an empirical world that needs to be respected (Willig, 2013). The current research uses IPA to understand what the experience was like for the astronauts but it also aims to produce an accurate representation of how participants' construct meaning from that experience. This dual aspect of IPA creates some tension with relativist ontological paradigms and radical constructivist positions, which oppose the view that we are able to convey our participant's subjective world accurately because it would require what Hilary Putnam has called "the God's-eye view" (Putnam, 1981, Willig, 2013).

For practical purposes, I have used a moderate form of constructivism predominantly in the data-collection stage where I acknowledge that there are elements of construction on behalf of the researcher and that the same phenomenon can be constructed in different ways. My constructivist lens allowed me to consider the existence of multiple 'truths' and shaped my belief that the interactions with participants would not be neutral and my interpretations would inevitably influence my analysis. However, I also recognised that during the analysis stage it would be necessary to adopt at least in part, a realist stance in accordance with IPA's aim of accurately unearthing participants' interpretations and meanings. However, aspects of a constructivist position might also be useful at this juncture as this approach persuades the researcher to consider contextual factors that might shape or impinge upon participants' accounts. Thus, overall I deployed a position that was 'a more moderate form of constructivist epistemology' (Willig, 2013, p31). By acknowledging both sides of the dichotomy (realist vs. relativist) a synthesis of these seemingly contradictory positions occurred and this helped overcome the binary opposition and resulted in a deeper understanding of the phenomenon being investigated (Willig, 2016).

2.5.11 Rationale for IPA Methodology

I was drawn to IPA, because it is a multidimensional approach to research placing importance on embodiment and subjectivity whilst considering language. In addition, there is a lack of existing psychological research surrounding astronauts' experiences of seeing Earth from orbit or from the moon, making this an original study. Consequently, this study cannot empirically employ any existing theories or models of how astronauts are affected by their viewpoint of Earth. An inductive approach such as IPA was required to assist in the development of existing ecopsychological and existential theories and to observe if the data generates some kind of theory that might pave the way for future researchers to build on, refine or dispute (Creswell, 2006; Smith et al., 2009).

I considered several methodological approaches including Grounded Theory (GT) and Discourse Analysis (DA). Upon initial examination, I was attracted to GT because of the way it deploys the process of categorization, multilevel analysis (descriptive and interpretative) and the way it groups together events, processes and occurrences that share central features or characteristics (Willig, 2014). However, GT is more attuned to a realist ontology and positivist epistemology, which would mean a deviation from my personal orientation (Willig, 2014). I felt that this deviation would create a discrepancy and effect the integrity of the research. Finally, the current study is grounded in the psychological field because it aims to improve our insight and understanding in relation to astronaut experiences of seeing Earth from orbit or the moon, their thoughts, feelings, beliefs, and memories about this experience, and the meaning(s) they ascribe to it, which is better addressed by IPA. Furthermore, one of the main objectives in GT is to develop a viable theoretical model, and one of the techniques it uses to achieve this is conducting multiple interviews with participants where the researcher moves back and forth between data collection and analysis (Creswell, 2006). This was an attractive aspect of GT, however multiple interviews with the same participant in this research is impracticable. Without this element, GT would generate a systematic map of concepts and categories used by the respondents to make sense of their experience (Charmaz, 2008; Willig, 2013). Nevertheless, aspects of GT were considered useful and were adopted during parts of the analysis and discussion section. For example, GT uses 'negative case analysis' and this was deployed in the analysis, and specific assumptions about participants' individual experiences in relation to wider social processes were drawn upon during the write up of the analysis.

Foucauldian Discourse Analysis (FDA) was also considered. Willig (2013, p 117) defines FDA as being: "concerned with the discursive resources that are available to people, and the way discourse constructs subjectivity, selfhood and power relations". FDA was considered inappropriate to use in this study due to the fact that the research question "What is it like seeing planet Earth from space?" requires that the researcher to try and make sense of the different ways in which the participants observes and make sense of the phenomenon under scrutiny (Willig, 2013). Moreover, I consider the investigation of language/discourse only one aspect amongst several others that could be observed and interpreted. Thus, I was drawn to IPA because of the way it extends scope of discursive approaches. Furthermore, in order to develop a better understanding of how the participants make sense of their experience, the focus needed to be on the individual person as opposed to exclusively focused on the discursive resources available to that person and how these discourses construct subjectivity, self-hood and relationships. Finally, the phenomenon being investigated is unfathomable and involves complex dimensions of human experience (Willig, 2013) and IPA is particularly appropriate to use in such cases.

I considered IPA to be the best fit with the aims of the research, which are: to understand what the experience of Earth gazing was like for each of teh astronauts, to provide meaningful insights into how they construct meaning from and embody this experience and to gain a better understanding of the phenomena under investigation. Accordingly, IPA is concerned with the detailed examination of individual lived experience, how they make sense of that experience and the meaning it may hold for them (Eatough & Smith, 2008). Furthermore, I hoped that by choosing a qualitative research methodology that is rigorous, robust and well established, I could facilitate a more trustworthy study (Shenton, 2004).

Adopting IPA felt natural to me because it is consistent with my epistemological and ontological beliefs. Constructivists agree that there is no single valid methodology in science but rather a spectrum of different methods that help us understand phenomena and explore the complex and multifaceted nature of reality (Raskin, 2002), and IPA can be viewed as one of these methods. IPA is a multidimensional approach, it explores subjectivity, considers relational and contextual factors, as well as the role of language and cognition. Furthermore, it incorporates analytical, empathic and reflexive elements to get a glimpse into participants' internal worlds. These techniques underpin IPA and are in line with Counselling Psychology's pluralistic stance and moderate

constructivism. Indeed, they also compliment my professional skills and abilities as a trainee counselling psychologist.

The phenomenological and hermeneutical components of IPA agree that there are some elements of construction on behalf of the researcher and participant, but also respects the empirical world (Willig, 2013). These philosophies create a dual approach to research. They acknowledge my respect for different ontologies and epistemologies and serve to reduce the limitations that might arise from adhering to a single philosophy during the process of interpretation and understanding (Pinto, 2001; Willig, 2016).

Moreover, participants in this study were expected to have rich and complex accounts of their experience. Richer accounts are best captured with in-depth methodologies, presenting individual cases rather than bigger samples (Smith et al., 2009). The phenomenological observations and hermeneutical interpretation inherent to IPA allowed a detailed analysis of each case in order to produce meaningful accounts of each astronaut's experience, and allowed the researcher to focus on the meanings that they attached to this experience (Smith et al., 2009). Finally, although IPA cannot make generalisations, I was attracted to the possibility of searching for shared meanings, stipulating multiple interpretations of the phenomenon and the unveiling potential new ways of being (Smith et al., 2009).

2.5.12 Limitations of IPA

Some argue that the interpretation of experience is always shaped, limited, and enabled by language (Heidegger, 1962; Vandevelde, 2014). Although IPA enables some consideration of how language shapes experience, it is to an extent reliant on the representative validity of language. IPA does not permit a thorough analysis of the role of language in how an experience is represented, and how people construct themselves and others (Eatough & Smith, 2008; Willig, 2013). These criticisms are valid; however, they are inherent within other methodologies that focus exclusively on language.

The phenomenon explored in this study is complex and extraordinary, and the interviews are post-flight. Therefore, a more reflective memory will be involved which will mean there will be more distance from the original experience. A criticism here may be that post-flight data may not be entirely dependable as a veridical portrayal of the experience. However, I suggest that this approach may capture elements of the experience that may not have been clear during the mission, or shortly after due to the complexity of the experience and problems with assimilation (Bonner & Friedman, 2011; Gallagher et al., 2014; Smith et al.,

2009). In addition, it is expected that participants will find aspects of the experience difficult to convey, particularly in relation to the emotional reactions they may have had to what they observed. As a result, they may find it difficult to articulate their experience, particularly with people who have not shared the experience with them. I consider IPA as an extension of discursive approaches because of the unique way it incorporates analysis of language with embodiment and subjectivity (Willig, 2013). I am also aware of the difficulties surrounding gathering nuanced accounts that adequately capture lived experience. Willig (2013) argues that participants' creation of these accounts requires insight, personal strength and sophistication of understanding, which might be difficult to achieve for varied reasons when collecting data. However, the difficulty of achieving and accessing reflexivity, and of gaining nuanced accounts that adequately capture lived experience, is again not unique to IPA and exists in many qualitative approaches (Smith et al., 2009; Willig, 2013).

Besides the dependence on language, another criticism of IPA is that it adopts a phenomenological status yet is concerned with cognitions, this second element of IPA is considered, by some, as incompatible with aspects of phenomenology. Such criticisms stem from those who conceptualise cognitions as isolated information processing systems (Eatough & Smith, 2008). Eatough and Smith (2008) propose that cognitions are a central aspect of human existence, of lived experience and meaning making. They respond to critics by asserting that IPA offers an alternative understanding of human cognition, which is more in line with the original conceptualisation of cognitive psychology concerned with meaning and meaning making (Smith & Osborn, 2008). I acknowledge these limitations. My analysis strives to uncover perceptions which have previously not received conscious attention from participants as well as attending to the embodied cognitions with which an individual approaches a phenomenon (Smith et al., 2009; Willig, 2013).

A final limitation of IPA is how it embraces the tension that is intrinsic in the dialectical marriage between phenomenology and hermeneutics. Willig (2013) highlights that this tension might lead to a lack of clarity regarding the objective of the researcher; for example, whether he/she is attempting to construct reality or discover it. However, this tension is relevant and useful in answering my research question because it provides a dualistic stance that is in keeping with my own ontological and epistemological positions, yet also respects that of a positivist paradigm. By acknowledging that dual paradigms and philosophies can co-exist, IPA assumes a pluralistic stance that refutes

oversimplification of ontological and epistemological matters. As a result, it stimulates a favourable environment that promotes careful refutation and/or synthetisation of assertions, and serves as a platform for the process of contemplation and gathering viable knowledge (Pinto, 2001).

Having explored the main characteristics, parameters and advantages of using IPA the next segment presents the research methods adopted in the current study.

2.6 Research Methods

2.6.1 Sampling and Participant Recruitment

Smith et al. (2009) recommend that researchers should not necessarily aim for a specific sample size. Instead, they suggest that researchers should use past IPA studies as a means to set limits and consider factors such as length of time and degree of commitment, the richness of data and organisational constraints. It was expected that interviews would yield rich data and access to this group would be difficult due to their busy work schedules; therefore, a sample size of seven participants was settled on (Smith et al., 2009).

The only exclusion criterion for participation in the study was related to language ability; all participants needed to be proficient in English language so they could converse freely about their experience. No other restrictions were placed on the inclusion criteria such as age, gender, length of time on mission, where they saw Earth from (i.e., lunar landings or from orbit) or their professional role. The rationale behind not having a strict inclusion policy was to promote the collection of data from a variety of people who had the experience at different times in order to foster a wider spectrum of observations (Smith et al., 2009; Shenton, 2004). The aim was to highlight important facets of the phenomenon that may require further investigations for future researchers to focus on.

Due to the nature of the methodology, purposive sampling was adopted to recruit participants (Smith, 2007). I looked up Frank White on Google and came across ‘The Overview Institute’. I emailed him directly to inquire if he could assist in recruiting participants for my research, to which he expressed an interest and requested some further information. He agreed to assist and emailed several of the astronauts he interviewed in his book The Overview Effect (White, 2014) to inquire if they would be interested in taking part. Nine astronauts expressed an interest initially and White passed their email contact details to me. I emailed them directly introducing myself, and provided them with further information about the research (Appendix 8 & 9). In addition, I provided background information

about myself through a link to my Linked-In account. I felt this would make my research more credible and help build trust between us (Shenton, 2004).

Over a course of a few months, seven astronauts out of the initial eight responded, expressing an interest. The participants who expressed an interest in the current study all took part in interviews in *The Overview Effect* book and therefore it was possible to make several assumptions about this group of people. All of them acknowledge experiencing the OE and therefore, to one degree or another, consider it a valid and accurate portrayal of their space flight experience. It could be concluded that those who have been to space but have not had the OE experience were ignored in this study. This issue was reflected upon, however, past research, astronaut personal diaries and media interviews indicate that aspects of the OE phenomenon have been experienced by a significant number of American and European space travellers (NASA: Johnson Space Center, Astronaut Journals; Poole, 2008; White 2014; Yaden et al., 2016).

I responded to each of them by emailing consent forms and providing several suggestions for Skype interview dates (see Appendices 8 & 11). Each participant emailed back the signed consent forms. I completed the interviews as and when the consent forms were returned. The sample included six men and one woman (retired astronauts) ranging from ages 52 to 83. The sample, either presently or previously worked for NASA (United States government agency responsible for the civilian space program).

2.6.2 Situating the Sample

Brief demographic and spaceflight details that are relevant to the study can be found in Table 1 for each of the participants. Each participant is listed in the order the interviews were carried out. In general, this table serves to summarise relevant contextual information, to assist the reader develop an acquaintance with each of the participants involved and alongside other individual factors such as personality may point to potential explanations of variance in participant accounts.

Participant	Age	Occupation	Astronaut status	Ethnicity	Space flights	Days in space	Last time travelled to space
Jeffrey Hoffman	72	Scientist/ professor of aeronautics and astronautics	Retired	White/ American	5	49 days	1996
Gerald Carr	84	Naval aviator, engineer	Retired	White/ American	1	84 days	1974
Byron Litchtenberg	68	Engineer/retired Lieutenant Colonel, USAF	Retired	White/American	2	19 days	1992
Michael Lopez-Algeria	58	Captain, USN	Retired	White/ American	4	258 days	2007
Nicole Stott	53	Engineer	Active	White American	2	103 days	2011
Joseph Allen	80	Physicist	Retired	White American	2	13 days	1984
Ronald Garan	55	Fighter pilot	Active	White American	2	178 days	2011

Table 1: **Contextual Information**

2.6.3 Interview Procedure

I decided to use one-off semi-structured interviews based on Smith et al.'s (2009) recommendations for IPA. My decision not to complete follow-up interviews with participants was based on participants' busy professional lives and limited availability. I wanted to make the whole process as simple as possible and not place too many demands on them, which might lead to loss of engagement with me and the research. I was aware that this choice would create some limitations, such as not being able to explore further questions and having to build rapport quickly. Nevertheless, I felt the advantages outweighed the disadvantages.

Skype™ video was the most appropriate method to conduct interviews and was chosen instead of face-to-face interviews because of the geographical dispersion of astronauts (most live in USA), financial constraints and time limitations (Hamilton, 2014). One of the advantages of using Skype video is that it creates conditions that are more convenient for participants. This flexibility allowed me to reach more participants. Some have suggested that Skype can reduce the absentee rate and the need to reschedule interviews compared with face-to-face interviews (Deakin & Wakefield, 2013; Hamilton, 2014).

Limitations exist with Skype interviewing, for example, loss of connection and loss of available body language as only a head and upper body are visible. However, the relative anonymity of online interactions and the lack of a shared

social network may increase authenticity and openness compared with face-to-face interviews (Bargh, McKenna, & Fitzsimons, 2002; Ellison, Heino, & Gibbs, 2006; Janghorban, Latifneiad, Roudsari & Taghipour, 2014).

Interviews lasted approximately forty to seventy minutes. I chose the same non-disruptive environment to conduct the interviews (my dining room at home) and remained professional yet relaxed in order to promote concentration and constructive data gathering (Deakin & Wakefield, 2013). My laptop was used to 'video call' each participant who talked via their laptops/computers. Interviews were recorded using the computer-based recording alongside a separate digital recording device. The information sheet and consent form made all participants aware that video recordings were being used and informed participants of their right to withdraw from the interview process (see Appendix 9 & 11). I provided a contingency plan that consisted of contacting participants via audio Skype or telephone call in case we experienced a loss of internet/Skype connections. This plan was initiated twice where the video had to be deactivated and audio only option used due to problems with connectivity.

2.6.4 Interview Schedule and Questions

The process of creating the interview schedule started with looking at previous IPA interview questions to serve as a guideline. I then identified a broad area I wanted to focus on followed by a range of topic areas I wanted my interview to cover (how Earth looked visually, in darkness and light passes, what they thought and felt when they looked at Earth and the impact that this experience has had on them post-flight). Next, I used the funnelling approach to create an order to my questions (Smith et al., 2009). Questions that were designed to get respondents' general views went first, followed by concerns that are more specific. I wanted to give respondents the opportunity to air their own views before funnelling them into questions of particular concern to me. I used minimal probes such as "how did you feel about that?" and "can you talk to me a little more about that?" (Smith & Osborne, 2003).

By the end of this process, I had generated eight broad, non-directive open-ended questions and three prompting questions (see appendix 12) which guided discussions about astronauts' experiences of seeing planet Earth from orbit. I considered the relevance of the questions with peers in order to get impartial feedback and made some minor amendments based on their recommendations.

During the interviews, the participants' experiences of seeing Earth from space were explored, with any mention they made about the immediate and long-

term impact explored in greater depth paying particular attention to significant thoughts, feelings, events, and actions that arose. My aim was to gather detailed accounts so I tried to remain flexible and open in my approach, and at times, I would alter the order of the questions slightly in order to keep participants relaxed, aid the flow of conversation, and encourage them to talk at length about their experiences.

I also maintained a reflective diary. In the diary, I noted initial impressions, emotions or reactions during and after interviews and my interpretations of participants' reactions and interactions with me. In addition, I noted my own developing constructions, the patterns appearing to emerge in the data and the theories generated (Pietkiewicz & Smith, 2014). Finally, I reflected on the overall effectiveness of the interview and analysis techniques I had employed (see appendix 13).

2.6.5 Ethical Considerations

Brinkman and Kval (2007) argue that ethical issues are embedded in all stages of research, from conception to analysis. I have outlined some of those concerns in relation to this study below.

The proposal for this study was granted full ethical approval at the Department of Psychology of City, University of London (See Appendix 7). In addition, I considered the ethical implications of the proposed research in accordance with the British Psychological Society Code of Conduct, Ethical Principles and Guidelines (2001) and the Code of Human Research Ethics (2010): which require a researcher to act with care and sensitivity, and to respect the autonomy, privacy and dignity of persons.

I obtained Informed consent via email correspondence before the interviews took place. A section on the Consent Form asked participants to indicate if they fully understood the information provided and I reiterated this question at the start of the interviews. Within the Consent Form, informed consent was also requested to record the interviews. Before the interview could progress, the participants were required to sign the consent form digitally (see Appendix 11). The consent form explained and reiterated all information regarding supervisor contact details, the purpose of the study, anonymity, the right to withdraw at any time without penalty and my contact details. I reminded the participants that they had the right to refuse to answer any questions should they desire. Both participant and researcher kept a copy of the consent form. All signed material such as consent forms and other material pertinent to participants, such as contact numbers and demographic forms, have been kept

securely in a locked cabinet at my home and will be destroyed when the research has been fully completed.

The participants were not a vulnerable group, the nature of the interview questions was not sensitive, and I did not anticipate any physical risks to participants during the data collection stage. The risk of both physical and mental harm to participants was considered no greater than that in ordinary life. Nevertheless, after the interviews I carried out a brief verbal debriefing in order to discuss the experience of participating and to monitor for any unanticipated negative effects. Participants also received an electronic debriefing sheet (see Appendix 10) at the end of the interviewing process. The electronic debriefing sheet contained information regarding the nature of the study and research supervisor and my contact details should participants have wished to withdraw from the project or raise any other issues regarding the conduct of the interview. Participants were advised that they could withdraw their consent or participation at any point in the process, and that all relevant participant data and recordings would be destroyed if requested.

There were also some ethical dilemmas concerning conducting the interview via Skype. The first major ethical problem was lost internet/Skype connection. In order to keep participants informed I highlighted the risk of this taking place several times, including commencement of the interview, in the participant information sheets, and in email correspondence with them (see Appendices 8 & 9). I also provided a contingency plan if this was irresolvable by asking participants for their mobile phone numbers so that interviews could be conducted in this way if required.

Another important problem to consider was privacy concerns related to internet/Skype interviewing. The risks of Skype interviewing were fully highlighted in the consent forms and participants were asked to sign to confirm that they understood this (see Appendix 11). The participants did not constitute a vulnerable group and it was predicted that the astronaut accounts were not likely to include sensitive or private data (some of which can be found in books and other interviews), and they expressed a preference for their names being included in the study. Therefore, breaching confidentiality and anonymity was not a concern. I requested participants not to disclose personal details such as phone number/email address during the Skype interviews. I assured participants that I would discard personal information (shredding) after the research was complete but would include examples of transcripts (detailing mission information

and their names) in the final doctoral portfolio, which would be accessible to other academics and may be available on-line.

Finally, I opted to include the participant names in the current study, and this presented a few potential ethical dilemmas. My decision was guided by the fact that the participant pool was not a high-risk group, the participants indicated on the consent forms that they wanted their names included in the study, the participants are individuals who are in the public eye and the in-depth data generated in the current study meant that they would be easily identifiable and it was deemed that such information may be useful for those wanting to conduct follow up studies.

2.6.6 Trustworthiness

There are a diverse range of traditions and procedures that one can adopt to demonstrate a trustworthy qualitative study. I have adopted five principles of credibility, transferability, dependability, confirmability, and authenticity as a means to improve trustworthiness (Guba, 1981; Lincoln& Guba, 1986).

In order to promote a trustworthy study, I maintained a reflective diary (pre and post interviews). These notes helped me explore how my presuppositions and beliefs may affect, or may have affected, the content and style of discourse. My aim was to try capture epistemological and ontological considerations, monitor my actions, and consider the impact of my actions and beliefs on self and others. This process was carried out to encourage self-awareness and reflexivity. I also read around the area of space travel prior to the interviews. I wanted to familiarise myself with the phenomenon, the technical language astronauts might use and moderate feelings of admiration toward astronauts. The overall aim was to familiarise myself with the terms of reference participants used, to facilitate prolonged engagement and a relationship of trust (Smith et al., 2009). Lincoln and Guba (1986) consider this as critical in establishing credibility.

I was aware that my close involvement with the study could inhibit my ability to view things from a different perspective (Shenton, 2004). In order to overcome this, I used triangulation as a method of cross-checking data from multiple sources to search for regularities in the research data (Hussein, 2015; Lincoln & Guba, 1986; Ponterotto, Mathew, & Raughley, 2013; Shenton, 2004). The realist interpretation of triangulation assumes a single definitive account of the social world exists. However, I have used this method to add a sense of richness and complexity to my enquiry because I believe that my findings will be just one among many possible renditions of social life (Ponterotto et al., 2013; Willig, 2014).

I used investigator triangulation, which involves multiple researchers in an investigation (Shenton, 2004). I achieved this by discussing my contemplations and thematic analysis with my supervisor in order to crosscheck some of the themes. I also presented preliminary findings in an online article and asked the participants to read it and provide provisional feedback. Shenton (2004) suggests that these methods might enable the researcher to refine methods, develop a greater explanation of the research design and strengthen arguments in the light of the comments made.

In order to promote trustworthiness, I used theory triangulation, which involves using more than one theoretical scheme in the interpretation and understanding of the phenomenon (Hussein, 2015; Lincoln & Guba, 1986; Ponterotto et al, 2013), in this instance ecopsychological and existential approaches. In addition, IPA is based on two complimentary yet distinct theories and this dialectical stance assists in achieving theoretical triangulation.

Through the process of reflexivity and self-interrogation, I had to challenge and reflect on some of my pre-existing ideas of the world. This forced me to make decisions about what assumptions are relevant and how they apply to my research. As a result, this process has helped navigate a fresh perspective and synthesised logic and emotion which some suggest assists in producing knowledge that is more viable (Kincheloe, 2008).

Transferability should be approached with caution because it is unlikely that we can ever produce a study that meets this criterion. Furthermore, transferability disregards the importance of context, which plays a central role in IPA (Shenton, 2004, Smith et al., 2009). Nevertheless, I have outlined a clear account of research design and implementation, methodological process, commentary on how I operationalised data gathering, and evaluated the process of enquiry taken. In doing so, I optimised the chances of this study being dependable and to a degree repeatable (Guba, 1981, Shenton, 2004). This in-depth coverage also allows the reader to assess the extent to which proper research practices have been followed and to develop a thorough understanding of the methods and their effectiveness (Shenton, 2004; Smith et al., 2009).

2.6.7 Digital Recording and Transcriptions

The interviews were digitally recorded on a Dictaphone. As a contingency plan, I also recorded the interviews on my computer. Each interview was transcribed verbatim in preparation for the analysis. Smith et al. (2009) describe the aim of IPA as primarily to interpret the meaning and content of a participant's account, and so a detailed transcription of the prosodic features of an interview

(such as pauses or non-verbal utterances) is not essential. However, I felt some of these details were necessary in order to work from a transcript that was as close to the original dialogue as possible and in order to conduct an informed linguistic and psychological analysis. Therefore, I included significant non-verbal behaviour such as laughter, noticeably long pauses and extraneous words such as “umm” and “you know” within square brackets (Willig, 2013).

2.6.8 Analytical Strategy

I have presented a description of the step-by-step approach to data analysis advocated by Smith and colleagues (Smith et al., 2009; Smith & Osborn, 2008). During analysis, I utilised IPA’s analytical, empathic, and reflexive elements to get a glimpse into what the experience was like for each astronaut, to explore how they construct meaning, and the affect this has on how they make sense of the phenomena (Pietkiewicz & Smith, 2014; Smith et al., 2009).

Analysis was conducted using principles from the hermeneutic circle. I created a constant dialogue between the parts of the whole and the whole (Smith et al., 2009). According to van Manen (2016), the researcher must look for both universal meaning (i.e., the ontological meaning that is general to the situation) as well as particular meaning (i.e., the ontic meaning that is specific to that person/situation). My aim was to be flexible, and engage in an iterative and inductive cycle that encourages the coming-forth of a phenomenon. This cycle also improves researcher ability to adapt to the changes in the research, in each of the participants, and the data generated (Eatough & Smith, 2008; Willig, 2013).

During the analysis process I sought to ‘bracket’ (Heidegger, 1962) some of my prior assumptions and submerge myself in the experience of that particular account. However, I am aware that one can never entirely detach prior knowledge and assumptions from the world that one belongs to and are part of when trying to understand phenomena (Smith et al., 2009). In addition, Smith et al. highlight that 'bracketing out' of prior knowledge is inconsistent with interpretive approaches such as IPA because access to participants’ experiences are dependent upon the researcher’s own conceptions (Smith et al. ,2009). Based on this premise, ‘bracketing’ was used as a reminder to be mindful of my presuppositions and their potential impact on the data.

The following segment provides a detailed explanation of the analytical stages.

2.6.9 Stage 1: Reading/Rereading and Initial Notes

The first step of analysis involved listening to the audio-recording several times, and reading and re-reading the transcripts. Next, I wrote down initial thoughts and noted any developing constructions. Here I also commented on my

immediate emotional responses, my interpretations of participant's reactions and their interactions with me. I compared these notes with diary extracts I had made shortly after I conducted the interviews. The final step involved writing a summarising paragraph on what I felt the text communicated about the participant's experience of seeing Earth from orbit and meaning-making (see appendix 13) (Pietkiewicz & Smith, 2014). This process helped develop familiarity with the transcript, facilitated an appreciation of how rapport can develop during the interview, and highlighted the location of richer and more detailed sections, as well as apparent contradictions and paradoxes.

2.6.10 Stage 2: Line By Line Analysis

The next stage involved analysing accounts using a multi-layered interpretation of the phenomenon. Here the analysis involved a descriptive, phenomenological level which conveys an empathic understanding of the experience, and a probing, more critical analysis based on the deeper interpretative work (see appendix 16) (Smith et al., 2009).

First, I read the transcripts in detail, asking myself what each sentence revealed about the phenomenon. To assist in this endeavour I wrote detailed descriptive comments describing the content of what the participant had said. This included noting key words, explanations, objects of concern such as relationships, processes, events, values, and principles (Smith et al., 2009). I particularly looked out for assumptions, sound bites, acronyms, figurative language, idiosyncratic figures of speech, and emotional responses (both in the participant and myself). As outlined by Smith et al. (2009), this process helps identify how a participant talks about, understands and thinks about an issue. With time, the reading and note taking steps merged.

Next, I explored how and why my participants had these concerns and wrote down comments on the specific use of language. Some of the things I attended to included pronoun use, pauses, laughter, functional aspects of language, repetition, tone and degree of fluency (articulate or hesitant) and metaphors (see appendix 16)

The final step involved engaging in a more interrogatory and conceptual level where the focus was on capturing more abstract ideas. The aim here was to capture participant's implicit and overarching understanding of the matters under discussion. I reflected on how I felt as I was analysing the data to gain a deeper understanding into the phenomena. I compared my own thoughts, feelings and experiences to that of the participants, and tried to place myself in their shoes, to see if I could identify with their explanations. Next, I identified

similarities and differences between my experience during the interview and my perception of the participant's experience, and finally I inferred some kind of conclusion about any findings that I felt were pertinent. As Finlay (2003) recommends, I asked myself "how do I feel?" and "What is the source of these emotions?". These wider more abstract interpretations always remained grounded in the participant's accounts (Pietkiewicz & Smith, 2014; Smith et al., 2009).

2.6.11 Stage 3: Development of Emerging Themes

Here I worked primarily with the initial notes I had made instead of the transcripts. I began to make concise statements about what I felt was important about the various comments I had made. In some instances, I highlighted and expressed these as phrases or words. During this point, I attempted to capture any relevant synergies between the descriptive and interpretative comments. The theme's significance within the whole account was also considered. Finally, I ordered the themes chronologically. These themes drew on the participants' words as well as my own psychological interpretations, balancing description and interpretation (see appendix 13 &16).

2.6.12 Stage 4: Searching for Connections

My aim at this stage was to generate a deeper interpretation of the data and map how the themes fit together (Smith et al., 2009). Here I typed all the themes in a chronological list. To ensure trustworthiness, the data relevant to each category were identified using processes of 'abstraction' (placing together themes that represented similar understandings) and polarisation (exploring differences between themes). I then named the new cluster. Next, I used contextualisation to consider connections in emergent themes, such as key events or particular narrative moments, and clustered them together. I went on to evaluate the frequency with which a theme was supported in the transcript, referred to as 'numeration' by Smith et al. (2009) in order to gain an indication of their relative importance and relevance to the participants.

Finally, I explored the specific function of the emergent themes within the transcript. I organised some themes by their positive and negative presentation. Here I used negative case analysis (i.e., looking for cases that seem to contradict the emerging explanations of the phenomena under study) to ensure data credibility. Any themes that I felt were irrelevant to the research question I discarded. After this review, I compiled a representation of the super-ordinate themes that best represent the meanings within the participants account. If a recurrent theme was present in over half of the sample then it was grouped under

broader themes for the entire data set called 'superordinate themes' (Smith et al., 2009). Under each superordinate theme, I recorded supported themes and these were annotated with page and line references and a short quote from the participant. Alongside this, I held regular meetings with my supervisor to discuss the emerging themes, asked her to co-analyse some of them, and to check that the interpretations were appropriately grounded in the data.

2.6.13 Stage 5: Moving to the Next Case

I reviewed the first transcript in its entirety before turning to the second account, in line with the ideographic process advised by Smith et al. (2009). Stages described in the above sections were repeated for each successive transcript.

Analysis of the data involved a continuous cycle of going back and forth between the stages to re-examine data in light of new emerging themes. After analysing each transcript in succession, the results were considered as a whole to gain greater insight in how participants' construct reality and meaning based on their internal worlds, and how this affects the sense making process.

2.6.14 Stage 6: Identifying Patterns

To consider patterns across accounts, I repeated the processes of 'moving to the next case' described above and reflected on the power of each of the themes. At this stage, I used frequency of re-occurrence across cases to determine which themes to consider as overall super-ordinate themes. This analysis resulted in a collective table of super-ordinate themes for the group (see Appendix 14), which indicated how themes were nested within group super-ordinate themes, with evidence from individual participants for each theme. The analytical process ended when there was a coherent understanding of the phenomena (Smith et al., 1996). Finally, the process of the analysis of accounts was written up.

The next segment, in accordance with the principle of methodological reflexivity identified earlier (Johnson & Duberley, 2003, Willig, 2013), will review some of the limitations and strengths in relation to the methods and procedures deployed.

2.6.15 Methodological and Procedural Reflexivity

One way to promote trustworthy research is for qualitative researchers to clearly articulate the research procedures and process and reflect upon these aspects of research (methodological reflexivity) (Lincoln & Guba, 1986; Johnson & Duberley; 2003; Willig, 2013). The following segment will summarise some of the challenges that arose as a result of the methodology and methods deployed.

Seeing Earth from space is an extraordinary experience. It is an experience that falls beyond my frames of reference. I am certain that if I had direct experience of space flight my approach to the research, my interview style, and schedule would have been different, along with my assumptions and expectations of the interviews themselves. However, the more I immersed myself in the research and talked with the participants, the more I developed my understanding of the topic. This cyclical process to data gathering cultivated the ability to ask questions that I had not considered earlier. I felt this process captured the essence of IPA and allowed me to understand the philosophy surrounding the hermeneutic circle in practical terms.

An issue that arose unexpectedly was the effort it took to try to engage some of the participants, and reflect in the moment during interviewing. Several factors contributed to this. Primarily, all participants are busy professionals who had other engagements to attend to shortly after our interviews, which added, time constraints. I also noticed that aspects of our conversation shared similarities with previous recorded interviews or conversations with journalist. Furthermore, the astronauts had written about the phenomenon under scrutiny in books and spoken about it during other interviews. During the first interview, I found this somewhat frustrating, and would attempt to delve deeper or divert participants away from such accounts. However, I soon realised that these accounts are insightful within themselves, and instead of trying to alter the trajectory of what the participants were trying to divulge, I tried to remain attentive and explore topics that these accounts would give rise to, and expand on them in more detail.

I found myself completely immersed and mesmerised by the topic. I tried to use this sense of awe to instigate a deeper connection with the participants. The way this manifested itself during the interviewing process was that I kept observing in myself feelings of admiration toward the participants. At times, I was rendered speechless by their accounts. Although I endeavoured to take a passive role with minimal input throughout the interviews, I suspect that these intense feelings may have manifested through my prompts and the material I decided to follow up at the time. I acknowledge this because my behaviour would inevitably have affected the participants' responses, thus influencing the findings (Finlay, 2003). In this way, I could not help but bring myself into the research. Finlay describes this perfectly as she says, "New understanding emerges from a complex dialectic between knower and known, between the researcher's past pre-understandings and the present research process, between the self-

interpreted co-constructions of both participant and researcher" (Finlay., 2003, p. 208).

The analytical process was also lengthy and required greater commitment than initially anticipated. I underestimated the time and energy required to invest in such an endeavour. The process required continual perseverance and dedication on my part. There were times I felt completely exhausted and overwhelmed by the task and this induced a sense of disillusionment with the whole process. It is likely that these feelings influenced the emerging themes. In order to address this problem I attempted to remain self-aware during the research process and reminded myself to withdraw from the work when I felt exhausted or overwhelmed.

The analysis process was arduous and I felt, at times, the technical nature of IPA contaminated the data. I felt enmeshed with the participants' accounts, and perhaps emotionally connected to their stories. I found it a challenge to select and separate-out representative extracts from the vast body of data generated. I worried that individual experiences of the astronauts would be lost in this process. Initially I was not prepared to sacrifice some of the finer details of participants' accounts. However, in order to overcome this obstacle,' I reminded myself of the research aims and question and reflected upon what the essence of each of their stories were. In the end, I had to accept that some aspects of the astronauts' stories might be lost in the interpretation process.

The forthcoming section will detail the findings of the current study.

2.7 Research Findings

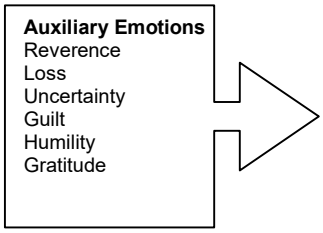
Analysis of the transcripts generated rich and extensive material that encompassed a wide spectrum of astronaut experiences in relation to being in space. In this section, I have selected material that conveys the personal and individual stories of the astronauts. In order to facilitate a thorough and representative analysis I maintained my focus on the key research aims of understanding what salient features of the experience were like for the astronauts and how each of the participants made sense of seeing Earth. A further aim was to explore commonalities between the participant accounts. In so doing I hope to capture a more holistic understanding of the phenomenon and the group and to provide some insight into a topic that has had very little empirical attention.

The analysis revealed that the experiences could be divided into several categories; the way the participants interpreted planet Earth's configuration; its aesthetic features; what the experience represented to each of them; their affective response; and finally the attitudinal and behavioural consequences of

the experience. Accordingly, these facets have been integrated into three superordinate themes entitled: 1) Deeply Impactful Perceptions of Earth, 2) Profound and Unexpected Emotional Impact and 3) A Space Odyssey. I have presented and discussed segments of the emergent themes under these superordinate themes. The first superordinate theme, 'Deeply Impactful Perceptions of Earth', uncovers salient features of the astronaut's visual encounter with planet Earth from orbit. This superordinate theme aims to capture how the astronauts made sense of the visual encounter during and immediately after seeing planet Earth, paying particular attention to visual aspects that were considered significant about the encounter. The next superordinate theme, 'Profound and unexpected emotional impact', seeks to highlight the central emotional impact of this experience that emerged from the astronauts' narratives. These emotions have been used as qualifications of the unfolding experience. Emotional effects were observed to be paramount and continually emerged among the group of astronauts interviewed. I have therefore included them as a discrete cluster of themes. Emotional effects varied, but specific emotions were universal and interrelated to other superordinate themes; and therefore discussed across the themes in the manner that they arose. The final theme is called 'A Space Odyssey'. The name 'odyssey' is symbolic of the astronaut's experiential journey of discovery; it represents the attitudinal and behavioural adjustments and transformations that are associated with the experience, such as a deeper understanding of the astronaut's place on Earth and reinforcement of the desire and urge to protect it. Thus, this superordinate theme seeks to explore the impact that the experience has had post-flight. Under this category I will discuss my understanding of how this experience has shaped the astronaut's perception of self and the world, interpersonal relationships (e.g., closer connections and increased compassion and giving to others), and philosophy of life (e.g., reorganised priorities and appreciation of life).

I have provided a table representing the superordinate themes below. These themes have been created for clarity of presentation for the reader and are not presented as a comprehensive account. Note that they are not necessarily distinct; rather, there is considerable overlap between and within the themes.

Deeply Impactful Perceptions of Earth	Profound & unexpected emotional impact	A Space odyssey



A phantasmagorical spectacle with a sobering contradiction	The development of a strong emotional attachment to Earth	We are all connected: Universal values
Fragile oasis and the existential awakening	A divine cosmic order: Spirituality and significance	Inter-subjectivity and Solidarity
Earth coming alive in darkness and light	Otherworldly: A surreal and awe-inspiring experience	

Table 2: Superordinate themes

Psychology is deeply ingrained in my sense of identity, the vocabulary I am accustomed to and how I process information. Furthermore, I am aware that the process of interpretation will require an analytical and psychological mindset and some psychological theory will inevitably filter through in the analysis section. However, the reader can turn to the discussion section for a more detailed theoretical review.

2.7.1 Theme One: Deeply Impactful Perceptions of Earth

The participant accounts reveal that they were mesmerised by the beauty of Earth. The astronauts faced remarkable views; their eyes had to adjust to the versatility of the landscape and depth of colours as well as the unfamiliar and dynamic landscape before them. The new environment meant that they were not able to draw from normal points of reference. Therefore, the experience was filled with complex stimuli that would involve rich emotions, and complex cognitive and psychological processing systems. These observations and the way in which they processed them shaped and informed the intensity of the emotional impact and the extent of impact post flight. Therefore, the opening superordinate theme is entitled 'Deeply Impactful Perceptions of Earth'. Within the compasses of this superordinate theme are a further three sub-themes which will be discussed below.

2.7.1.1 Phantasmagorical Spectacle with a Sobering Contradiction

I use the word 'phantasmagorical' to represent the fantastic and incongruous imagery that astronauts described. This featured wild and shifting images and colourful patterns that were continually moving and changing. The data revealed an interesting mixture of experiences surrounding their response to the aesthetic sight. Earth conveyed universal and personal meanings to each of the participants. However, the feeling and perception of beauty was a common experience to the astronauts. It appears that seeing Earth's beauty from the vantage point of space served as a catalyst for deeper contemplation. Therefore,

one must explore the affect and how the experience is processed. Thus, this theme attempts to explore how the astronauts made sense of the visual encounter and the process of objectification that followed.

Below are two excerpts from Michael:

> "You're seeing this magnificent blue planet out there that is at once exactly what you expect and at the same time it's magical, and it's stunning. Earth seems tranquil, peaceful, and beautiful out there in space" (Michael 3, 122).

> "The view of our planet from space is nothing short of breath-taking...and spectacular" (Michael 6, 247).

Michael is clearly enchanted by Earth's enigmatic beauty. It appears that the surreal vividness of the scene and the intense emotions he experienced surprised him and it is clear that he faced something that did not conform to his existing beliefs. His account conveys his sense of wonder and awe.

Other astronauts, such as Nicole, are also taken back by the magnificence of planet Earth. Nicole comments on Earth's unremitting 'glow' and appears to draw meaning from it.

> "I don't know if I told you this before when we talked, but it glows, even at night, it's just this beautiful and it's crystal clear, it really and truly is just this beautiful thing" (Nicole 11, 499).

During our conversation, Nicole on several occasions spoke of the magnificent and enigmatic beauty of Earth. One interpretation might be that that this 'glow' depicts an image of a halo, the light representing vitality, and radiating warmth, which shines forth in the void and darkness of space. This appears to be a nurturing and comforting source for Nicole. Below are extracts from Joseph, which illuminate his visual experience.

> "I've known every cosmonaut and every astronaut…without exception, every one of them cannot get over the beauty of seeing planet Earth. It just takes your breath away and [pause] you just

> cannot take your eyes off the Earth. It just is so beautiful" (Joseph 4, 183).
>
> "You could be in a gondola in the sky and just having the Earth turning for your viewing pleasure" (Joseph 4, 208).

Joseph's extracts depict how he was left awestruck and breathless. His immediate response to Earth's beauty did not involve a rational contemplation but was a visceral reaction. The phrase 'takes your breath away' implies a sense of urgency. His portrayal depicts Earth as a spectacle that performs for his viewing pleasure and transports him into a state of rapture where he is compelled to pay attention. This state is likely to cultivate a deeper connection and value for Earth.

All the astronauts commented on the dynamic state of flux they observed. I have selected two extracts from Nicole and Ronald because the shifting patterns, motion, and dynamic appearance of Earth gave them both a sense that Earth had an arresting vitality.

The extracts below from Nicole illuminate how the visual scenery was constantly shifting and altering and how this gave the planet the appearance of vitality and life

> "It surprises you every time you look out, even if you are looking at the same place that you flew over before. This kind of very dynamic, ever-changing appearance of the place that gives it the appearance that it's alive" (Nicole 6, 184).

In the extract below Ronald neatly sums up the endless variety of observation of the details of Earth and the various facets of the visual scenery that change, giving him a sense that "we live on a living, breathing organism":

> "It's constantly changing, the colours, the shadows, the terrain, everything is changing and all this motion, colours and light really gives you the sense that we live on a living, breathing organism...When you're up there for months at a time you can actually see the ice breaking up in the harbour, you can see this line that represents the changing leaf colours slowly march from south to north, to north to south, And those long term seasonal changes, when you put them together with the routine day to day

> changes, again give you this impression that we all live on a living, breathing organism, this living thing that we call Earth, a living biosphere" (Ronald 9, 457).

The world from this panoptic perspective exists as flux and flow and Ronald's account depicts a coming-to-be and passing-away of the changes. The motion, rhythm and change appear to illuminate the inherent structure and stability of all life processes and thereby the unity of the planet. Motion, energy, and flux can be considered as characteristics essential for life and for Ronald and Nicole are some of the features that make Earth look 'alive'. My understanding is that Ronald construes Earth as an animate, organic entity, as a living organism in and of itself. This interpretation will strengthen his emotional connection with his home planet and enhance its value and significance for him.

The speed at which the world below is passing and changing is also significant in Ronald's account. This panoptic perspective means that phenomena beneath him shrink and time accelerates on Earth. However, because the experience is emotionally salient Ronald's perception of time on the space station is likely to slow down. This means that there would be an interval between the speed at which he perceives time passing on planet Earth and his own perception of time on the space station. Thus, his normal understanding of time is distorted and he is physically detached from Earth. However, being physically separated from his home planet also means that he is no longer immersed in everyday problems and more able to take a bird's-eye view or a distanced-analysis approach where he can analyse Earth comprehensively and in its entirety.

Planet Earth holds some of the astronauts in its thrall by presenting a tension where the force of raw pleasurable beauty initially experienced operates against a sense of malaise and dejection felt when contemplating some of the visible destruction on the surface and injustices beneath the surface of that beauty. All the astronauts talked about this tension directly or indirectly. Jeffrey and Ronald made several direct comments relating to this tension.

> "And so you see both the beauties and wonders and the more disturbing aspects of the environmental damage that humans have caused, the deforestation of the Amazon and the other jungle areas, desertification in Africa, and all of the other places which is very worrying" (Jeffrey 6, 266).

Jeffrey's account illuminates that when he scrutinised the visual scene the environmental exploitation and the destruction of the planet caused by human beings became discernible. Jeffrey's concern is predominantly focused on the welfare of Earth and its environment and it appears that he believes human beings are culpable for these problems.

Ronald's account also draws attention to a conflict of emotions that arises when observing Earth's beauty.

> "I was really almost immediately struck with a sobering contradiction between the beauty of our planet on one hand and the unfortunate realities of life on our planet, for a significant portion of its inhabitants on the other hand" (Ronald 5, 269).

> "I feel terrible that billions of people don't have access to clean water, all the conflict and the poverty, the injustice" (Ronald 6, 275).

It appears that this unique perspective allowed Ronald to 'take a step back' to experience a shift in scale from an individual and local to a more global focus. As a result, he experienced a different permutation and way of knowing the world. Ronald seems to be wrestling with the realisation surrounding the contradiction between Earth's beauty and the inequality, injustice and exploitation of some people on it. There are tones of guilt and shame within his narrative. I get a sense that this encounter educed conflicting feelings. One possibility might be that the subjective guilt and discomfort he feels alert him to the injuries of our world and is one of the factors that propel him to respond.

Comparing Jeffrey and Ronald's narratives, the reader might infer that Jeffrey is slightly more concerned with the destruction of natural phenomena and the state of the planet whereas Ronald's focus appears to be directed more towards the inequality and suffering of people living on the planet.

2.7.1.2 Fragile Oasis and the Existential Awakening

The theme 'fragile oasis and the existential awakening' depicts how planet Earth appears to be a small, lonely and fragile haven amidst the harshness and void of space. It appears that for many of the participants Earth gained significance because it symbolised something rare that nurtures and protects them from the trouble and chaos of an unforgiving universe.

The extract below summarises how Jeffrey's relationship with Earth changed after his experience.

> "I think that it is very important to see the Earth as a planet, the ability to see the Earth as finite, to see the Earth as an oasis that nurtures life in a basically hostile universe. So it definitely increases your appreciation of planet Earth as our home, but we definitely see it...as in need of protection. You look down and you see the atmosphere this thin, little blue line, and it's so different from being on the surface (Jeffrey 8, 349).

Jeffrey perceives the universe as uninviting, malevolent and dangerous, and within this context, Earth represents a sanctuary and its resources a commodity. Jeffrey's account suggests that his notion of home expanded to include Earth, which further strengthened his affinity towards it. I get a sense that the qualities of permanence and constancy usually associated with the words 'planet' and 'home' are challenged because many of the nurturing and comforting features associated with it, such as the atmosphere and life are perceived as fragile and vulnerable. This level of uncertainty surrounding the fate of his home planet can create a degree of angst or uncertainty, which appears to be implicitly communicated in Jeffrey's narrative.

Michael also comments on how fragile Earth looks from this perspective.

> "The Earth seems tranquil, peaceful, and beautiful, but it also seems fragile at the same time. Air pollution is visible as are depletion of forests and shrinkage of bodies of water. When one travels completely around the only Earth we have in 90 minutes things like sustainability gains importance" (Michael 8, 327).

Michael and Jeffrey's accounts share similar features. For example, Michael also draws my attention to environmental factors such as air pollution, depletion of forests and shrinkages of bodies of water. Michael's extract illuminates how travelling round the planet in ninety minutes forced him to face the reality that Earth and its resources are finite and made what once were distant, abstract threats immediate and concrete. One interpretation might be that this visual encounter extended his awareness of his own mortality outward to that of our planet.

Below, Ronald is surprised by the discrepancy between what he expected to see and the visual scene he witnessed.

> "From space Earth is a fragile oasis and for me the first time I saw the planet without a question of a doubt the first thing that I noticed and looked remarkable was the thinness of the atmosphere. It's really sobering to think that that little paper-thin layer is the only thing keeping every living thing on our planet alive and separating us from the void" (Ronald 6, 324).

This new perspective transformed what was once a distant abstract threat into a concrete and looming danger. It seems Ronald realised that everything he knows and depends upon for survival is protected by this ethereal "paper thin" atmosphere, which was disconcerting. I get the impression that the experience set off a primal feeling of internal panic or alarm. The intensity of his emotions regarding this observation is illuminated when he uses the word 'sobering' which conveys how the experience cultivated a more solemn and serious attitude regarding the planet's fate.

In the extract below, Joseph is also clearly taken aback by how fragile the atmosphere looks from space.

> "You look at the Earth there is a very thin line that is actually the atmosphere. If we humans were to do something to the atmosphere to cause it to be very badly polluted, everything on Earth would die, there would be no hope for any of us. Everything. [Pause] so we humans must take very, very good care of it because we are playing with danger if we continue to pollute it" (Joseph 8, 442).

Joseph's account illuminates how this perspective highlighted the immediacy of the crisis and there is a sense that he perceives the threat of danger as imminent, cataclysmic, and menacing and this threat is appraised in the broader context of how it impacts all life on the planet. It is evident that this realisation has imbued a strong affective and moral response. There is a sense of personal and collective responsibility from Joseph's narrative. He attributes the cause of the damage to collective human processes, which may foster feelings of guilt, shame, and sadness.

2.7.1.3 Earth Coming Alive In Darkness and Light

Each orbit allowed the astronauts to observe the dark and light sides of the planet many times and these encounters appeared to shape how they made sense of the phenomenon. Different layers contributed to this, for example, perceptions of natural, raw, built, and aesthetic aspects of the phenomenon and the associated affective responses to the visual scene before them.

In the extract below Jeffrey observes the contrast between the way Earth looks during darkness and light passes and this appears to be significant in making sense of the experience.

> "What the Earth looks like during the day and what the Earth looks like at night are completely different… it's basically a very, very different world" (Jeffrey 2, 77).

> "When you're looking out towards the horizon you don't see human civilisation during the day, you just see planet Earth, by and large. Whereas at night the lights of the cities are visible, you can see all the way out to the horizon, and so you really see the spread of human civilisation over the planet much better at night...and the planet somehow seems much more alive when you look at it at night, which is kind of a little bit counterintuitive" (Jeffrey 2, 84).

Jeffrey comments how "you just see planet Earth", as if it is unveiled in a way that is more authentic. Jeffrey states that during the day you only see the signatures of human beings such as environmental damage. It appears that the visual absence of human beings enables Jeffrey to focus on the consequences of their actions on the planet. This observation appears to strengthen his awareness regarding the fragility of our planet, but also allowed him to reflect on a deeper level surrounding human nature and on the fate of Earth.

The use of the word 'counterintuitive' indicates that the impression that Earth was more alive in darkness was not in accordance with what he expected or assumed. I get the sense that the darkness constructed an image of Earth as alive in a more animated and artificial way. His account suggests that Earth is still perceived as 'alive' during the day passes but in a more natural and organic way.

During our interview, it became clear that Jeffrey is concerned with how humans have damaged our planet. With this in mind, I wonder if Jeffrey, by using

the word ‘spread’, is implicitly comparing humans to a virus or disease, spreading, multiplying, and consuming natural resources and disrupting the natural equilibrium of the surrounding environment.

The following extract from Gerald illuminates his experience of seeing Earth in darkness and light;

> “I had two episodes or doses. One was looking down at the Earth in the daylight and seeing the beauty of the Earth and seeing the black space beyond. I’ve come to the realisation that boundaries can’t be seen, the only boundaries that are available to us to see are the natural ones like rivers and oceans, beaches, and that sort of thing. And so suddenly you get this feeling that boy, we’re all in this thing together on this planet of ours” (Gerald 7, 288).

Gerald uses the word ‘dose’ or ‘episode’ – one interpretation may be that the experience was medicinal, almost a remedy, and that the experience put something right or evicted something undesirable in him. He observes the contrast between how Earth appears during darkness and light. During the day, Earth is seen as a universal system. He states that from this vantage point, human barriers and borders that separate us are no longer visible. This appears to have triggered a feeling of connection with all humans, “a universal feeling” and this interpretation appears to imbue his life with more purpose and meaning.

The signatures of human civilisation captivate Byron’s attention during the light side of orbit.

> “It’s two very different worlds during day and night. So during day...You could see areas of buildings, kind of the grey, you didn’t see individual buildings but you’d see the grey areas of cities. I remember looking down and just seeing a lot of dust and smudge and smut on the ground over Russia, because they were burning probably coal fire plants or wood-burning stoves. So you see the evidence of human civilisation but you don’t see individuals or individual buildings” (Byron 8, 344).

Byron’s description is more concerned with the here and now; he describes Earth in concrete terms and in a pragmatic way as opposed to in abstract terms or in an all-encompassing way. Specific pieces of evidence grab

his attention; he does not make general assertions and inferences. He draws our attention to the regional and collective environmental damage in the present moment, for example, to people burning coal fires. Byron recalls that from space he did not see buildings as distinct objects but as grey washes of colour found in areas people congregate. I get a sense that Byron finds places where nature is subject to human intrusion as dreary and unexciting. Interestingly during our conversation, Byron commented that his space flight experience involved reaching the upper atmosphere as appose to low orbit and therefore he felt it was not as impactful compared to those who travelled farther.

In the extract below, Ronald contemplates seeing Earth in darkness and light. He reflects on these two sides and how each in its own distinctive way makes Earth look "alive".

> "As you go into the dark side of the orbit the Earth just comes alive...and you see all the evidence of human activity" (Ronald 8, 406).

> "One side of the line is night time, on the other side of the line is day time, and then you can contemplate the difference in human activity on both sides of the line. At night you're not looking at human activity against the grandeur of the Earth in its full illuminated glory if you will [laughs], you're looking at it against blackness...it's beautiful but in a different way...amongst that darkness you see lights and those lights represent humans and human activity...they come on gradually and they start to twinkle, and it's a very beautiful scene actually to see the Earth come alive on the dark side of the orbit. I mean obviously the Earth is alive on the day time side of the orbit too but you only see the beauty of Earth and the damage human civilisation has done to the Earth, and the human contribution to that aliveness is not as apparent in the day time as is at night" (Ronald 8, 411).

There is a sense that, for Ronald, Earth is revealed in a more organic and authentic way during the light side of the orbit. Earth is unveiled in "its full illuminated glory" and its magnificence obscures our ability to see human activity. However, the damage and destruction that human beings have caused is apparent, which makes Earth appear more fragile. Earth in daylight serves as a

stark reminder of the plight his global home is in and therefore represents a more sombre facet of the visual experience.

Paradoxically, Ronald's description of the night-passes stirs up a beautiful image of Earth and human civilisation. I get a sense that the presence of human activity in the night passes triggers a sense of hope and optimism in him in contrast to the light side of orbit.

In the extract below, Ronald describes seeing hurricanes as they occurred. This perspective cast a bird's-eye view on the actual development of the hurricane, giving him the power of foresight.

> "Those are ominous and scary even from space, and you can look right down into the eye of the hurricane. The other thing that was really eerie is you can see the calm before the storm" (Ronald 9, 490).

Ronald's narrative illuminates two opposing forces, one the calmness before the storm and the other the chaos that represents the storm. Ronald use of the word 'eerie' to express how unnerving he found the calm before the storm. It seems that the hurricane induced a palpable feeling of menace and threat and that Ronald humbly yields and prostrates to this force of nature. On the one hand, the view provides him with foresight which can be empowering, yet he is debilitated because he cannot change the course of events that are about to unfold. Ronald appears to ascribe an intrinsic value to hurricanes and therefore nature. He states that hurricanes are "ominous" and "scary" from space, and that he found being a passive spectator somewhat alarming and unsettling.

Both Nicole and Ronald comment on witnessing lightening from space, which is more visible during the dark side of the orbit.

> "When you look at thunderstorms from space, it's like this little network of a nervous system and that little storm in Houston is just one piece of this whole string that's going across the whole planet" (Nicole 10, 434).

Nicole perceives the thunderstorms as a force of nature that is active, intelligent, purposeful, and interconnected to other forces of nature. To convey this Nicole compares thunderstorms to a nervous system, which implies she

perceives nature as functioning as an organised, interconnected, and active living structure.

In the extract below, Ronald compares seeing lightening on Earth from space to “a ballet of light”.

> “lightning looks different from space because we’re seeing so much more of it...from space you’re seeing hundreds of miles, you’re seeing the storm in its entirety...and it’s like a ballet of light that is continuous” (Ronald 10, 504-517).

The use of the phrase “ballet of light” invokes an image of an artistic, rhythmical, dramatic, and choreographed dance. It seems that Ronald uses the concept of dance as a vehicle to describe the energy, vitality, and purposeful force of the thunderstorm.

2.7.2 Theme Two: Profound and Unexpected Emotional Impact

The second superordinate theme attempts to illuminate the key emotions that prevailed because of witnessing the phenomenon. Interestingly, the three distinct states identified from the data were significance, awe, and belongingness. However, the analysis of the transcripts revealed other auxiliary emotions such as, reverence, loss, uncertainty, guilt, and humility, which have been noted and discussed throughout the emerging themes.

It is clear from the participants’ accounts that this experience was something that did not reside in everyday experiences and was profound and emotive. These intense emotions are likely to impact the astronauts psychologically and have consequences for their everyday behaviour – and therefore warrant further exploration.

2.7.2.1 The Development of a Strong Emotional Attachment to Earth

The experience allowed each of the participants to interact with Earth in a more personal manner. They each forged a unique attachment by defining and ascribing meanings, values, and feelings that they associated with Earth. Factors such as intense emotional response, familiarity, dynamicity, motion, beauty, and fragility appear to serve as an entryway to the formation of a closer bond with their home planet. Under this sub-theme, various feelings were indicative of this attachment: reverence, guilt, anticipated loss, detachment, humility, gratitude, and awe. All the participants referred to the feeling of awe (implicitly or explicitly) and therefore awe is an emotion that warranted its own sub-theme under ‘Profound Emotional Impact’. The following extracts highlight significant

incidences that illustrate the theme of 'The development of a strong emotional attachment to Earth'

Gerald's extract below highlights how the panoptic view of the planet helped him forge a more reverent attitude towards it.

> "It gives me comfort to know Earth is our home, how it takes care of us and I recognise that, and I've spent a lot of time over the years talking to people and trying to get them to understand how important it is that we take an attitude toward our Earth as a more reverent attitude and do more to take care of it" (Gerald 10, 433).

Overall, it was clear that Gerald referred to a greater order to life and the universe. For Gerald, Earth had transformed into an object that symbolised something fragile yet great. In this instance, Earth signifies stability; comfort, security, and familiarity and these meanings strengthen his sense of attachment his home planet. He expresses a reverent attitude towards Earth. Reverence involves a humbling of the self in respectful recognition of something perceived to be greater than the self. The term reverence can be used for things beyond human control and has religious connotations. Thus, one interpretation may be that Earth takes on a divine status and is transformed into a deity figure to be revered. His commitment over the years demonstrates his enthusiasm and belief in caring for Earth and the phrase "get them to understand" and his tone of voice indicates frustration, concern, and urgency.

Nicole feels that she is part of an interconnected and interdependent system and it is apparent that this insight prompts a deep feeling of respect.

> "They have to be respectful of it (using an analogy of Earth as a space-craft) just like we do our planet. I mean, it's not going to take care of you if you don't take care of it" (Nicole 8, 352).

Nicole's personifies Earth and the focus of her duty is clear. Her relationship with Earth is reciprocal "it's not going to take care of you if you don't take care of it". A reciprocal relationship is one in which each being bears a responsibility for the welfare of the other and, thus, each has certain rights. The stability of the relationship comes from the extent to which those rights and responsibilities are balanced. Her narrative conveys her sense of injustice and frustration surrounding this one-way relationship.

Jeffrey's account below reveals that familiarity was an important aspect of his experience and helped cultivate a more meaningful connection with his home planet. It seems that he developed a stronger sense of place and home at the global level, which is indicative of a global form of belonging.

> "And so this familiarity definitely increases your appreciation of planet Earth as our home" (Jeffrey 8, 354)

Analysis of language style can also serve as a psychological window into participants' worlds and their relationships. During Gerald's interview, he used the grammatical construction "this Earth of ours" several times. This depicts his sense of belonging to and perhaps dominion over his home planet. Below two extracts are detailed, out of several occurrences to demonstrate this.

> "We have a responsibility to take care of this Earth of ours" (Gerald 10, 432).

> "War is probably the most important human factor in terms of polluting this Earth of ours" (Gerald 10, 450).

This extract illuminates that Gerald feels a deep sense of personal and collective responsibility for the long-term wellbeing of Earth. The grammatical use of language implies that Earth is something capable of being possessed, which denotes a sense of dominion. In this instance, Gerald uses the word 'ours', which indicates he believes all individuals, have a degree of dominion (control, and/or influence) over the fate of our planet and therefore responsibility.

Michael's account below depicts the glaring difference between natural and manmade phenomena and initially his sense of belonging comes from searching for familiar places of interest and manmade objects.

> "These natural phenomena are beautiful and in stark contrast to the dull grey of the buildings and roads of urban centres, but as those cities are less appealing to the eye, it is they that catch our attention, our home town, where we attended university, where our mother and father were raised, significant places in human history. We marvel that we can see with the naked eye manmade

> objects...The connection we feel with places of importance overrides the undeniable raw beauty of nature" (Michael 6, 251).

Michael acknowledges the undeniable beauty of Earth in its natural state and uses the phrase "in stark contrast" to compare it to manmade objects. He describes manmade objects as "less appealing to the eye". Nevertheless, Michael uses the word 'marvel', which captures his sense of wonder and astonishment searching for the places that are familiar to him. It appears he is confused as to why the familiar is favoured over the novel. One explanation for this preference is that he has an emotional connection to familiar place. In turn, this prompts the stimulation of past memories and instigates a sentimental or nostalgic response. As highlighted by the extract below, Michael experiences the polar opposite when he is outside on a spacewalk, where he finds himself more drawn to nature.

> "A...faceplate is all that separates our eyes from the void...I cannot imagine any other experience that could approach this one. Curiously, I found that when outside I was much more moved by nature and less drawn to particular places. The perspective is so much greater that zooming in on a city seems uninteresting" (Michael 6, 251).

The darkness envelopes Michael during the space walk and as a result he experiences it in literal and visceral terms. This permits Michael to enter into a modeless and bare state of being. His narrative depicts how the dialectics of nature distinctly present themselves. On the one hand, the void represents a desolate margin of emptiness, obscure, unintelligible, mystical, and vast. On the other, Earth represents an object that is familiar, bountiful, and perceived as an anchor and a sanctuary. From my understanding of the text there appears to be mediation between these two distinct realities. The abyss of darkness appears to serve as a backdrop for the manifestation of Earth in its entire resplendent form where its unrivalled richness is apparent and this appears to stimulate a deeper affective response and attachment to Earth and nature.

It is clear from the above extract that the experience stirred intense emotions. Michael's account gives the impression he felt somewhat tender and helpless. There is affection and desire in his tone of voice when he recounts his experience of seeing nature in its raw form. My understanding of the text is that

the experience allowed Michael to attune himself to the wholeness of Earth and all the lives and patterns that manifest upon it, which instigated a sense of closeness to nature.

Ronald's account below reveals that his experience of being physically detached from Earth changed how he mentally perceived it, which was one aspect of the experience that engendered a positive emotional attachment to Earth.

> "The most amazing part of it was...seeing our planet from space. And I said seeing, but experience our planet from space because to me it was much more than just a visual experience, it was a feeling of detachment...from the only home that I've ever known...it impacted me emotionally in a big way" (Ronald 5, 265).

Ronald draws our attention to the fact that he did not only see Earth but experienced it in a different way. This suggests that the encounter was profound and multifaceted, involving reason and imagination and corporeal, visceral and affective responses. Ronald was no longer enmeshed with Earth physically or perceptually, that is to say he was no longer connected to the environment in a physical sense or by gravity. My understanding of Ronald's account is that he felt disjointed and displaced from his home planet, which served as an indicator of the strength of his bond to it. This panoptic view, presents Earth in a new light, as a separate whole object. This distance allowed Ronald to 'objectify' Earth and as a result, the mental representation of Earth changed.

In the extract below, Ronald talks more about this sense of detachment.

> "So if you are looking at a beautiful scene on Earth...gravity is pushing you down into that scene. You are a part of that scene, you're connected to your focal point... But when we looked at the planet from space we're completely detached from it, there's a void of nothingness, there's a vacuum separating us from the beauty that we're seeing...it made me feel deeply interconnected to our planet and every living thing on it, there was a feeling that I was part of something much greater than my mere self and I found that comforting" (Ronald 6, 295).

Ronald has the opportunity to be a spectator and observe the harmonious and concurrent action of various forces of nature and the way natural phenomena coexist in interdependent relationships and ecosystems. His account directs my attention to issues surrounding space, distance, and connection.

Ronald describes space as a "vacuum" and a "void of nothingness", which conjures an image of a barren, vacant and empty place. It appears that he perceives this void as an obstacle separating him from his "home". However, I do not get a sense of loneliness or despair; instead, the experience appears to have stimulated a sense of wonder and place of contemplation that takes him beyond himself to see something new.

In the extract below, Ronald describes how he felt when he landed on Earth in 2001 after being away for six months:

> "I looked out the window and I saw a rock, a flower and a blade of grass, and I remembered thinking to myself, I'm home...And so to me, at the moment, my home was not just Houston where I live with my family, my home was Earth" (Ronald 7, 363).

It is clear from the extract above that Ronald shifts his focus and is now immersed and attuned to the qualities and moments associated with discrete features of nature. In temporal terms, his focus appears to have shifted forward to the present moment also. There is a sense that this state is enhanced by the insight he gained from witnessing the connections of the different powers and forces of nature from a panoptic perspective. His account depicts his happiness and relief to be "home" in the sanctuary of nature. In this instance, nature serves as a secure base and his account communicates a deep-felt experience with Earth and nature that holds important value for him.

2.7.2.2 A Divine Cosmic Order: Spirituality

Analysis revealed that many of the participant's narratives touched on the theme of spirituality and significance. I have selected extracts from Nicole, Gerald and Joseph's transcripts as they made direct references to spirituality. Their narratives reveal that encountering a new and completely unknown environment as well as experiencing the interface between planet Earth and space heightened their awareness surrounding the finite and fragile nature of life and our planet. However, this awareness does not appear to fill them with existential uneasiness. On the contrary, it allowed them to make sense of the interrelated and interconnected nature of our planet in the context of a coherent

whole. This worldview appears to make Earth more valuable and in some of the participants bolsters a sense of symbolic immortality and significance.

Initially Gerald describes how during the dark pass of the orbit his feelings of insignificance intensified.

> "So that's the experience that you have at night, and that's when you really get the feeling of insignificance, of the fact that the Earth is so alone and far away from anything else in the unknown universe that it's just remarkable" (Gerald 7, 310).

> "So yeah, this book even adds to my feeling of the fact that the Earth is absolutely insignificant in the whole scheme of things" (Gerald 7, 322).

The feeling of insignificance reminds Gerald of a book by Carl Sagan entitled 'The Varieties of Scientific Experience (Sagan & Druyan, 2006). This book explores questions surrounding the relationship between religion and science and is a personal search to understand the nature of the sacred, which appears to be symbolic of Gerald's own search. The book suggests that we should interpret the world with a scientific and rational mind-set. It acknowledges how small we are and how vast the universe is, and how sublime all of our surroundings truly are.

Experiencing Earth in darkness has resonated with Gerald and has allowed him to gain a deeper understanding of our insignificance. Initially I interpreted this insignificance as a 'negative' feeling. However, Gerald's narrative depicts a deep acceptance of this condition and the phrase "in the whole scheme of things" conveys that Gerald feels we are part of a much larger force. The universe is described as though it has an omnipotent quality and is perceived as the source that permits our creation, existence, and evolution. This understanding of the universe elevates his grasp on our purpose and appears to bring him solace.

In the extract below Gerald emphasises that the word 'insignificant' is not about a personal feeling of insignificance but a rational realisation that our planet is infinitesimal in comparison to the infinite and grand universe.

> "I don't have a feeling that I'm insignificant or that we people are insignificant, it's just that relatively speaking with all of space the Earth is next to nothing" (Gerald 9, 401).

Soon our conversation about insignificance takes a different trajectory.

> "And so if you're willing to accept that then the next thing you need to be willing to accept, I think, is that there's probably some kind of intelligent life on one of those planets" (Gerald 9, 409).

Gerald's appears to alleviate this condition of insignificance by directing his attention toward the opportunities an infinite universe presents, such as contact from extraterrestrial beings and exploration of the unknown universe and this appears to inspire hope and wonder. His account conveys contradictory feelings and desires, namely to cling to and love Earth or to leave and escape from it. Although his account suggests there is a degree of willingness to accommodate the ambiguity or uncertainty that arises from this challenge, I suspect that the situation presents a degree of tension or angst, for there is always the looming threat of danger from a universe that is infinite and indifferent to us.

> "One of the things that struck me when I looked out there is, I said to myself, there is an order to things that I don't understand...and so they put a name to it. In some places of the world the name is Allah, in some it's God...And so it makes me sound like an atheist but I don't feel like an atheist, I'm like a person that believes in God" (Gerald 7, 324).

Reading Gerald's narrative it is clear that he is engrossed in existential matters. There is a sense that he is trying to determine just what the sacred is and what his relationship to it is. He mediates this sense of insignificance by balancing it with the belief that the cosmos is meaningfully ordered and omnipotent. There is a sense he has surrendered to the existential struggle that may arise out of not knowing the answers to why we are here. The experience appears to involve a relationship with the unknown or metaphysical level of

existence and therefore assumes a spiritual dimension. Gerald's belief in this cosmic order appears to work as a substitute for a god or deity.

In contrast to Gerald, participants like Nicole experienced a feeling of intense significance and purpose when contemplating the universe and Earth.

> "I felt like it became this idea of real significance too, feeling that we were where we were and people are where they are on that planet for a reason. That even though it is this tiny little speck in the grand scheme of the Universe, it doesn't equate to insignificance. It is not an insignificant thing that our planet is where it's at and does what it does for us...I think it's a very significant thing" (Nicole 5, 188).

For Nicole, Earth symbolises life, security, comfort, and strength. As a result, Earth manifests into something that is extremely precious and valuable, symbolising something sacred. Nicole appears to mediate and counterbalance the looming threat of insignificance and futility that an infinite universe presents by ascribing significance and value on our planet's cosmic location and the way it sustains life. Nicole's interpretation is an uplifting view of the human condition and appears to fill her with hope and gratitude.

Nicole makes further sense of the experience by contemplating existential issues related to significance and insignificance.

> I started to think even more about this idea of planet Earth being significant and how it played into everything...you can start to think that it might not be, because that black seems to go on forever...the idea of this planet we live on...it's not that big in the grand scheme of things, that's where you start to think maybe we aren't all that significant and that can be frightening. And then there's this weird, at least for me...that it is impressive and significant that our planet is in the position it is and distance from the sun is exactly right and how it takes care of us and that makes you feel part of something much bigger than just you" (Nicole 11, 505).

Nicole appears to make sense of the experience by construing Earth as unified and purposive and she sees herself as part of that system. The interface between the darkness of space was sharply juxtaposed with the light and warmth of Earth and the contrast between the two scenes brought existential matters to the forefront of Nicole's mind. Her account invokes a positive association with space that seemingly embraces the unknown or otherness associated with it and she makes sense of such matters by drawing meaning in a way that imbues her life with more optimism and purpose.

Joseph also refers to a deity or divine being in the extract below.

> "And every individual, including me, without exception [pause], has a feeling of religion and or very deep philosophy that there is an order to the cosmos and a wonderful maker of the Earth. In some places it's God, in my own case it's just a deep philosophy [pause] but it's just a wonderful creation, so beautiful" (Joseph 4, 187).

> "Earth becomes a source of comfort too not just because it is beautiful, or harbours life but because somehow you feel part of something bigger and that fills me with hope" (Joseph 8, 459).

Joseph's account conveys an acceptance that we belong to a meaningfully purposive cosmic order. It symbolises the process of merging with "something bigger" and the presence of something otherworldly, holy, and sacred is distinctly known and felt. Within his narrative, Joseph implies that this connection with Earth and the cosmos has a salutary effect. The experience appears to involve a stepping away from ego-boundaries where Joseph experiences an undifferentiated unity according to which he feels at one with other people, Earth, the universe, and the divine. It appears from his extract that the experience has strengthened his belief in a higher power, purpose, and order in the universe outside of his control.

There appears to be a contrast between Gerald's sense of insignificance in the presence of a vast universe and his appreciation of a divine cosmic order and Joseph's sense of an ordered universe and our role in fulfilling a divinely ordained purpose.

Below Joseph expresses a sense of awe, wonder, and optimism regarding human beings' collective achievements, capabilities, and potential.

> "It's a strange combination because you feel so small and insignificant but nonetheless you're very impressed by the collective human intelligence that has been able to build these machines and take us off the surface of the Earth" (Joseph 10, 541).

The extract above illuminates Joseph's sense of insignificance as he highlights that humans represent something "small and insignificant". However, this feeling insignificance appears to be mitigated by a sense of admiration and optimism surrounding man's collective intelligence, advancements, and achievements.

2.7.2.3 Otherworldly: A Surreal and Awe Inspiring Experience

The experiences evoked a range of intense feelings in the astronauts, the response common to all of these is best summarised by the words awe and wonder. Many of the astronauts also described the experience of seeing Earth from space as surreal. These responses are grouped together under this sub-theme because they interrelate. Awe can be defined as "an emotional response to perceptually vast stimuli that transcends current frames of reference" and involves wonder and amazement and often a degree of fear and uncertainty (Piffet al., 2015, p. 1). Such moments are often disorienting, and may feel hallucinatory or dreamlike and therefore can be experienced as surreal in nature. Such intense emotions are likely to have meaningful consequences for everyday behaviour (Gallagher et al; 2015) and therefore warrant further investigation.

In the extracts below Jeffrey explains how the first time he encountered Earth from space is engrained in his memory.

> "And so yeah, that view of the, coming up over the west coast of Africa is surreal and something I'll never forget" (Jeffrey 3, 130).

> "The whole experience was surreal, the view of what it looked like and those feelings I had looking at the Earth, they're still with me and the experience is part of who I am today" (Jeffrey 9, 382).

The extracts above describe the moment Jeffrey realises a life-long dream which fills him with happiness and joy. His account reveals a sense of gratifying involvement and emotional union with the internalised experience, which

demonstrates how salient the experience was. This internalised experience appears to be significant because it has not been regressively abandoned over the years or lost altogether and appears to remain stable over time.

In the extract below, Gerald also describes the experience as surreal.

> "I certainly can't feel what I felt at that moment but I recall that it's surreal. You know what the planet looks like...but to actually see it with your very eyes it just feels, it is just incredible and takes you to a different place." (Gerald 3, 106).

Gerald's account suggests that the intense feelings he felt during the experience cannot be summoned at will. The extract above indicates a degree of dissociation from the intense amalgam of complex and unfamiliar feelings, perhaps as a means to assimilate the complex experience. There is a sense that the experience somehow bypasses the logical grounds of language and is therefore difficult to relay. As a result, he diverts focus away from feelings to a perceptual description of the experience by using the word 'surreal'. Later, Gerald pauses and is at a loss for words when he states "it just feels"...He goes on to use the word 'incredible' and the phrase "takes you to different place" to capture how extraordinary the experience was. Likewise, in the extract below Michael also describes his experience of being in space as having no semblance to life on Earth.

> "I describe being in space and being on Earth as being parallel existences. They don't have much intersection, and it's hard to now go back and feel what that was like, just as it was hard when I was up there to be an Earthling again" (Michael 2, 86).

Michael's account illuminates how being in space and living on Earth are two starkly distinctive worlds or parallel realities. This experience provided a glimpse into the vast range of possibilities that exist beyond normal human perception/understanding. There is juxtaposition between the surreal and real worlds and their two distant realities. The relationship between the two juxtaposed realities is distant and true, which makes the memory of being in space more impactful and surreal and therefore more emotionally powerful. He is aware of both realities and his psyche shifts according to which alternate world he enters.

Nicole was the only female participant, and her narrative exposes the surreal nature of her experience. Interestingly, Nicole's deploys a more nuanced vocabulary and approach. Compared to other participants she uses more symbolic, emotive, and descriptive language. Her tone and language are more informal and she appears to use more expressive utterances and language to describe her feelings. Nicole's vocabulary and language carries more referents and associations to feelings of awe compared to other participants.

In the extract below Nicole's sense of awe is captured as she describes her first opportunity to see the Earth.

> "I do remember having that first opportunity...to look out the windows. I just remember thinking wow is this a dream, and I think it's like the whole experience, I remember kind of just being overwhelmed. [Laughs] You know, almost like you can't process it" (Nicole 2, 71).

The word "overwhelmed" suggests Nicole was overwhelmed in the mind and by her emotions. Her statement "almost like you can't process it" suggests that the experience challenged her typical frames of reference. She compares the experience to a dream and therefore attributes an otherworldly quality, which is at odds with the reality on Earth. It is as if the experience of being in space has allowed the two seemingly contradictory states of dream and reality to merge.

In the extract below, Nicole attempts to describe how she felt during this first encounter with Earth and it is apparent that the experience was emotionally enlivening.

> "I think numb would not be the word to use. Maybe, I don't know, initially I guess just kind of shocked by it all but I think that's not even the word. I think it's just impressed in a way that I hadn't felt before" (Nicole 3, 137).

Nicole is hesitant and uncertain how to convey the force of her emotions. Her narrative conveys a gradual emotive elevation marking the intensity of her emotions. It also illuminates how the experience was numinous and overpowering in quality. The experience was so profound that there appears to be a delay in integrating the outer lived life with her inner world. Initially she uses the word 'numb', which represents an ambiguous state of astonishment and

blank wonder. She moves on to use the word 'shocked', which suggests that the impact of the experience was unexpected.

The value Nicole appears to place on the experience is evident in the extract below

> "I don't know how, this is a weird way to describe it, but I think seeing planet Earth in that way and the whole experience has not only changed aspects of me, but it's in me. I think it's just part of who I am now and I am really, really thankful for it" (Nicole 13, 590).

Nicole's account suggests that she has embodied the experience, that there is an emotional and contemplative involvement with the experience that has continued upon her return. The integration of the experience with her identity can be construed as symbolic of a psychological death (perhaps of aspects of her identity) and a psycho-spiritual rebirth.

In a similar way to Jeffrey and Nicole, Ronald's account below depicts a sense of gratifying involvement and emotional union with the internalised experience, another indication of his close identification with it.

> "The experience is incredible, you have all this motion and colours and light that really gives you the sense that we live on a, a living, breathing organism and the experience is undeniable yet surreal, it remains very much part of who I am today" (Ronald 8, 410).

Joseph also comments on how surreal the experience was.

> "Seeing planet Earth and being in space was such a surreal experience, you just can't imagine how amazing it was. And I still dream about looking at Earth and I feel great happiness during these dreams. And the whole experience was wonderful; it really changed my life forever and remains very much part of who I am today"(Joseph 5, 280).

The dream in this instance represents a rendition of the 'surreal' experience. It appears to serve a restorative, reliving, and processing function. Joseph relives the experience through his fantasy world. The dream itself is affect loaded and is a comforting source that brings Joseph pleasure and joy. It

appears this recurring dream serves to alleviate his nostalgia and compensate for the perceived loss. Joseph describes the experiences as 'surreal' and I suspect that the dreams he has also serve a function to assimilate the complex information related to the initial experience.

2.7.3 Theme Three: A Space Odyssey

Another aspect of the study was to explore the participants' perceptions of how this extraordinary experience and related emotions impacted their behaviours and thoughts when back home. The astronauts' accounts reveal that they all experienced a positive change and growth as a result of the experience and attention is drawn in particular to this thread that traverses the two forthcoming themes. Thus, the final superordinate theme is called 'A Space Odyssey' in order to reflect the culmination of learning and self-discovery resulting from their journey.

2.7.3.1 We Are All Connected: Universal Values

All participants directly or indirectly made some reference to universal values. Therefore, universalism emerged as a central outcome of the experience. In this instance 'universal values' broadly refers to the realisation that nothing exists of its own accord but only in co-dependence with other things. Thus, the term refers to the unity of humankind, coupled by a feeling of oneness, as well as a care and concern for other people and Earth. Its core characteristics include an understanding, appreciation, tolerance, and protection for the welfare of all people and for nature (Schwartz, 1992). Universal values manifested in various ways for each participant. However, a common thread amongst the narratives was feelings of alarm and guilt, in particular in association with climate change and other environmental issues.

Jeffrey's account below illuminates how experiencing two seemingly distinct episodes of the same phenomenon from two different perspectives was surprising and strengthened his sense of universalism.

> "There was a dust storm that we saw blowing off the west coast of Africa, and we landed a week later and that dust was coming down on our cars in Houston. So that was quite surprising and it brings back, a kind of worldwide nature of the global environment, that things that happen in Africa or China actually impact us in the US and in Europe" (Jeffrey 6, 266).

During the first sighting of the dust storm Jeffrey was physically separated from it, however the second sighting involved association by contiguity; that is to say Jeffrey was immersed in the environment where the dust storm was located and was therefore tied to it. The first episode provides a more detached spectator experience of the dust storm and the second episode gives a more direct, personal, immediate, and visceral experience. The juxtaposition of these two perspectives is apparent and each of them prioritises specific insights and aspects while marginalising others. The interplay between the two episodes of the dust storm appears to be significant for Jeffrey in making sense of the experience. Jeffrey's account indicates a form of mental mapping taking place where episodes one and two connect. This process appears to give rise to a particular mode of experience wherein Jeffrey no longer perceives the dust storm as an independent, static, isolated, and extraneous occurrence in Africa but as a continuous and dynamic entity that directly impacts him, his city and country. The experience appears to have forged causal linkages between climate change and local events that affect humans. Thus, it appears that this appreciation of the "worldwide nature of the global environment" has generated a more precautionary stance in Jeffrey.

In the excerpt below Jeffrey's language and tone of voice reflects his frustration surrounding people's lack of concern over biospheric and environmental issues.

> "You definitely realise that if humanity, we can't just keep pumping all our waste products willy nilly into the atmosphere and expect that it's not over the long term going to have some impact on our planet, which in fact it seems to be having now" (Jeffrey 8, 359).

Jeffrey appears alarmed by the way humans exploit the planet and there is a sense that we take the planet for granted. It is clear that he believes that the prognosis for our home planet is acute and grave and that he holds human beings culpable.

It seems that for Gerald one of the factors that give him this sense of universalism is the realisation that boundaries are not observable from space.

> "The only boundaries that are available to us to see are the natural ones like rivers and oceans, beaches...And so suddenly you get this feeling that boy, we're all in this thing together on

> this planet of ours, and you can't see the barriers that one group of humans puts up against another group of humans, and so you get this universal feeling of universality amongst people down on the Earth, that we are all in one Earth as sort of a universal perception that is so much more than people as individuals" (Gerald 7, 292).

For Gerald, this experience made manmade borders and boundaries pail into insignificance and heightened the grandeur of nature. Gerald's account also signifies the removal of internal boundaries between the world, self and other. It is apparent that he recognises the unity of consciousness and his narrative conveys a deep personal connection with a higher order of a form of 'cosmic intelligence'. This theme of 'connection' in his narrative suggests that he transcends his identification with self-body-ego. Moreover, his account illuminates how this event has influenced the way Gerald relates to the world and other people. Thus, it appears that this instance was emblematic of the removal of conceptual territories and the heightening of his sense of universalism.

In the excerpt below, Michael acknowledges that the experience has changed him. He explains that the change is subtle yet noticeable. In a similar way to Gerald, he comments on how many manmade objects and issues that concern us on Earth are obscured from sight, which engenders a feeling of universality.

> "When I came back from my first mission I felt like I was a changed person, and I had been privileged to see this view. Then after a couple of weeks...I realised this really didn't change me...But since then, I've had a different formulation, and I do think that there is a subtle but noticeable change, and I think it has to do with having seen that view and having had that experience. I think I have a more tolerant, global, and probably more geared towards sustainability, view of the world. So I think that there is a more benevolent, well, I think tolerant is probably the best word...I think because of this broader perspective we're all moved to some degree in the same direction of universality and globality" (Michael 4, 172).

Michael's account depicts how the experience inspired him to question, negotiate, and revise his interpretation of the world. This meaning-making process after the experience appears to be cumulative and adaptive in and of itself. There is evidence from his narrative that there has been some adjustment to his internal model of the world. This has allowed him to construe a new understanding of the world and himself at an ontological level and enhanced his level of engagement with global issues where he is more geared (to one degree or another) towards universal values and acts such as environmental sustainability, tolerance and benevolence.

Michael appears to experience a palpable sense of uneasiness and uncertainty regarding the fate of Earth, which appears to play a central role in determining his engagement with environmental issues exemplified by the extract below.

> "The view of the Earth where the entirety of human history has occurred, from the vantage point of space has seemed to give me a different perspective, both the literal and figurative meaning of the word...Sustainability gains importance when one travels completely around the only Earth we have in 90 minutes" (Michael 7, 320).

Michael saw Earth as a vulnerable, valuable, and impermanent object. This shift in perspective appears to have inspired the emergence of new possibilities in relation to his sense of self, perceptions of his relationship to the world, and way of being in that world. Although Michael perceives the change to be subtle, the narratives expose a personal transformation and on some level a transition from a personal to transpersonal identity.

In a similar way to Michael, Nicole observes that the change in her is subtle but noticeable.

> "Yeah, I think day-to-day it has changed me, I think the change is subtle, but you definitely think about what you're doing more and the impact it has on others and the world" (Nicole 6, 318).

> "I think the experience has helped me think about how I can, I know it's going to sound hokey, how you can make things better here on Earth for other people" (Nicole 8, 373).

Nicole indicates that the experience has promoted self-monitoring, self-regulation and reflection; she thinks about the consequences of the choices and actions she takes both on a personal and global level. In the second quote, she states that the experience has made her reflect on how she can make things better here on Earth for other people. Her focus here is solely on taking care of 'other people' and less on taking care of Earth.

In the excerpt below, Nicole communicates that the experience afforded her a synoptic perspective, which in turn added to this feeling connection.

> "It certainly made me think about where I live a little bit, it's made me think less about just my neighbourhood and made think more about the planet as a whole [Laughs] " (Nicole 6, 235).

Nicole's account reveals how her focus on the world zooms out and with it there is a shift in thinking surrounding environment from local to global. In the extract below Nicole compares Earth to a spaceship and people to astronauts.

> "And then you start thinking even more about and others have used this word about Earth being a spaceship itself... [Laughs] So yeah it makes me feel like we're all kind of astronauts flying in space and have to look after and protect the mother ship" (Nicole 12, 528-531).

The initial and obvious interpretation of the phrase "mother ship" is that planet Earth represents a mechanical vehicle that requires maintenance to keep in good working order. Through this analogy, Nicole is expressing her concern over the limited resources available on Earth and the statement is encouraging everyone on Earth to act as a harmonious crew working towards the greater good and survival of the "mother ship". One interpretation is that Nicole believes we should take a more interventionist and managerial role in relation to our relationship with Earth. However, the phrase "mother ship" appears to be used as a means to communicate a deeper connection with Earth. For Nicole Earth symbolises more, it is the first object of attachment she encounters in space, and it nurtures and answers her needs in a seemingly omnipotent way. In a similar way to Nicole, Ronald deploys a spaceship analogy.

> "We have so much more in common than we have that separates us, and we tend to miss that reality. It's not that you go to space and you have a different perspective, you're seeing the real perspective of our planet. And the real perspective of our planet is that we are all living together on this biosphere that we call Earth and that we're all riding through the universe together" (Ronald 7, 367).

> "The experience made me realise even more that the meaning of life is love, the meaning of life is for us to care for the fellow crew mates on Spaceship Earth, and for each other, and to seek to reduce suffering that we have helped create and everything else, that's the only thing that makes sense to me" (Ronald 16, 879).

Ronald's narrative suggests a metanoia; a spiritual conversion or a fundamental shift in how he makes sense of the world. For Ronald, Spaceship Earth symbolises how we are all in the same predicament and share the same problems. He believes that love is the answer to reducing human suffering. He indicates that the suffering is a violation caused by humans upon all life-forms and the planet. He appears to be motivated by benevolence, guilt and compassion. There is a duty to do the morally right thing.

The two extracts below further summarise how the experience strengthened Ronald's universal values and feelings of interconnectedness.

> "I definitely think I had an expanded idea of the kinship of Earth, of who's in my tribe if you will, and my tribe rapidly became humanity" (Ronald 5, 268).

The word 'tribe' defines a link by social, economic, religious or blood ties between families and communities. Ronald explains that the experience extended his notion of tribe and his sense of duty from family and community to humanity. His account depicts a deep bond and a sense of empathy and affinity with other people and planet Earth.

In the extract below, Gerald explains that the experience has improved his relationships with other people.

> "Well, I would say it's probably put me more at peace and at ease in my relationships with other people. I am much more tolerant of situations, I have more understanding...I was pretty much a conservative kind of a person...since the mission I've become much more liberal" (Gerald 11, 470).

Gerald states that he is not as self-conscious as he once was and how this makes it easier to relate to others. He feels he is not as fixated on differences and as a result is more willing to tolerate the differences that exist between people.

In the extract below, Byron reflects on the commonalities between self and world and it is evident from his account that the experience has had an impact on his worldview. He reflects that the change is an internal one, which has changed the way he perceives and thinks about things; however he states that this internal mental shift has had little impact on his behaviour and the way he acts.

> "The change is subtle but I'm certainly more conscious of certain things. I don't know that it's changed the way I act necessarily but you tend to feel more connected to everything and are more conscious of things and you think about them more in relation to the whole" (Byron 10, 455).

In the extract below, Joseph describes how the experience has changed him.

> "Well, it literally changes your life forever, it's the most wonderful, wonderful experience. You become more tolerant of others; you care about humanity more, and more about our planet" (Joseph 4, 203).

For Joseph it is clear that the change in him is profound and has given him a new perspective on life. He articulates that the experience has created more purpose and meaning in his life and allowed him to have a renewed sense of personal identity that is more altruistic and benevolent.

2.7.3.2 Inter-subjectivity and Solidarity

Sub-theme two is called 'inter-subjectivity and solidarity' because participant accounts revealed that the astronauts united through a collective

shared experience and developed a strong sense of group identification and loyalty. Many of the participants were clear about how fundamental and integral this was in making sense of the experience. The ethos of this group is to protect humanity and their 'fragile oasis' Earth. The members of the group attend meetings, which represent the coming together of these individuals and they take part in associated 'rituals' such as celebrating Earth day. These factors appear to serve as a bridge between the personal and the shared, the self and the other. Furthermore, their shared beliefs and values reinforce their ideas and forge relationships that are more meaningful. Overall, this group mentality appears to have served as a means to build and sustain momentum for change and promoted a form of collective intentionality.

In the extract below, Gerald recalls an event he attended and participated in with other astronauts at a United Nations conference in 1990 to celebrate Earth Day. The Committee invited a total of forty astronauts and cosmonauts to participate in this celebration.

> "They chose six people, English, Spanish, French, German, Russian, and Arabic speakers, and each one of them was to go up and in one minute tell what the hell they felt. Well...Mary (Mary Cleave NASA astronaut) took the podium and talked about how beautiful and fragile the Earth looks, and how based on distant pictures that she had seen she had a feeling that it was all alone" (Gerald 4, 152).

> "I came down off the podium and walked down to my wife...my wife looked at me with tears in her eyes and she said, you won't believe this but they all said the same thing. That moment really strengthened the bond I felt with those people and somehow made it all seem more real" (Gerald 4, 178).

This Earth Day conference was something that created a spreading of sentiment and social connectedness. For Gerald, seeing his beliefs and emotions resonate with the other attendees induced an empathic alignment or bond, and a sense of collective solidarity within the group. This event served to reinforce the internalisation of values in relation to the experience and served as a springboard in strengthening Gerald's motivation to commit to the shared interests and purpose of the group. Gerald uses his wife's emotional expression

as a signal that elicits or reflects his own emotional response and serves as a cue to his own appraisal of the situation. One interpretation might be that significant events such as this build rapport and contribute to the emergence of a shared identity and initiation of collective behaviour.

Byron attended a different conference. He realised that he and the other space veterans shared an enhanced appreciation for the Earth because of their space flight experience.

> "it really wasn't until I started hearing some of their experiences that it really hit home to me that going in space and seeing the Earth from space...it's a very cross-barrier experience and realisation. And it didn't matter if it was a US senator or a Russian test pilot, or a Vietnamese fighter pilot, or a Mexican scientist, or a Saudi prince, or me, we all talked in very similar terms about how we felt about the Earth and we felt that we became global citizens and that started to hit me all the way through in the last 30 years" (Byron 7, 313).

Byron's account affirms the significance of this event. It suggests that the conference exemplified awareness about other group members' emotions and an understanding that many of them shared a similar set of meanings in relation to the experience. The statement "it really hit home" represents an emotional arousal or a charging up of emotional energy and denotes how this event strengthened Byron's beliefs further. Moreover, the idiom suggests that Byron may have been surprised or impressed by the fact that many space travellers drew meaning from and made sense of the experience in a similar way and this realisation is salient for him. It is clear that the event served to intensify initiating emotions. Byron's comment that "we became global citizens" indicates a strong sense or feeling of membership within the group and to the world.

For Nicole this sense of solidarity is with her counterparts as well as with close friends and family with whom she has shared the experience. She appears to feel inspired by the experience; her account relays positive emotions such as pride and gratitude.

> "I'm thankful to have had the opportunity to have had this experience, a small group of us have shared this extraordinary experience and I was surprised that many of us came away with

> similar impressions and feelings about our planet and the people on it. And part of it for me has been sharing the experience with not only the public, but close friends and family and watching their response" (Nicole 8, 355).

Nicole expresses her surprise that her impressions and feelings in relation to the experience resonated with other astronauts. She highlights that transmitting or relaying the experience to others and seeing their response has been an important part of making sense of it.

2.7.4 Negative Case Analysis

The emergent picture revealed the complex nature of the experience. To varying degrees, the participants felt that the phenomenon under scrutiny was inextricable from factors such as realising a life-long dream, the launch, the extraordinary environment, and weightlessness. These factors as well as contextual issues such as, the perspective, i.e., lunar landing or from sub-orbital or low orbit, number of space missions and mission length, as well as individual differences such as culture, personality and age invariably informed and influenced the way each of the participants encountered the phenomenon and made sense of it. It would not be feasible to conduct an additional analysis to account for all of these variables and the interplay between them in this qualitative study. However, In order to moderate the effects of this I have provided recommendations for future research in the discussion section. In addition, in the forthcoming segment I have used 'negative case analyses as a means to identify the central anomaly (weightlessness) that emerged from data analysis, using examples from participant accounts in order to provide the reader with a more detailed overview.

Two of the participants, Michael and Jeffrey, nicely sum up this interplay between the phenomenon and events that preceded it in the extracts below. Reading their accounts it becomes clear that the launch and weightlessness had a strong emotional impact and shaped their interpretation of the phenomenon.

> "The launch is a pretty dynamic and exciting event, as you can imagine…So everything that occurs in that first day is very magnified by the launch experience and the fact that most of us have realised a lifelong dream" (Michael 2, 77).

> "I went through the launch, which is an absolutely overwhelming experience…. It's just so much power and vibration and noise, it takes about eight and a half minutes then all of a sudden it gets very quiet and I feel myself starting to float out of my seat, I'm weightless" (Jeffrey 3, 123).

In the extracts above, both Jeffrey and Michael, describe feeling overwhelmed by the launch experience. It appears the experience evoked a range of feelings, from exhilaration, excitement, and anxiety during the launch, to the calmness, serenity, and silence of weightlessness after.

In the following extract, Jeffrey explains his experience of weightlessness.

> "I was just floating in front of the window and listening to music, it was late at night…and I was just getting more and more relaxed, and all of a sudden I felt as though my body was becoming encased in a cocoon, and I gradually felt like I was losing any contact with my body" (Jeffrey 7, 308).

The use of the word 'cocoon' represents being enveloped in a protective or comforting way and symbolises re-birth or growth, or perhaps a personal metamorphosis. In this transcendent mode of being, Jeffrey retreats into his own mind and appears to find comfort in the separation from mind, body and some of the normal senses associated with them. In this moment it appears Jeffrey did not rely on his body as a vehicle to encounter the world and was able to experience another way of 'being in the world'.

Nicole and Jeffrey each encounter and make sense of the experience of weightlessness in different ways. Below two extracts have been selected that exemplify the varying degrees to which weightlessness affected each of them.

> "It makes you realise that the realms of human experience are so much wider than what we normally experience in daily life, and the experience of living without any weight is such a completely different experience of your own body that it really has, I think, a deep psychological effect" (Jeffrey 4, 144).

Jeffrey describes weightlessness as an experience that is impossible to normalise. The experience has had lasting psychological impact on him. It has

expanded perceptual boundaries and taught him that he can manipulate and engage his mind and body in extraordinary ways. Thus, Jeffrey ascribes personal meaning to the experience of weightlessness. As a result, it played more of a central role in making sense of the phenomenon under scrutiny.

For Nicole, weightless is something that became ordinary.

> "And there are certainly aspects of the whole experience that become kind of normal to you, I mean the way your body floats around becomes normal. But seeing our planet does not become normal or boring, it doesn't become routine" (Nicole 4, 179).

For Nicole weightlessness and Earth gazing were experiences on the opposite end of the spectrum, that is to say weightless became ordinary and Earth gazing remained extraordinary. One explanation might be that weightlessness is a physiological state that is constant which means space travellers are more likely to adapt to such a condition, whilst Earth gazing is a perceptual state and a visual encounter experienced more periodically, which may be a factor that sustains its novelty.

These accounts provide a glimpse into some of the contextual and experiential factors that influence how the participants make sense of the phenomenon. It is clear that weightlessness is a factor that heightened the astronauts' experience of being in space and Earth gazing. However, the extent of the impact varies between participants. Overall, the analysis revealed that for most, weightlessness was something that became routine and any mention of it was mostly in connection with the phenomenon. This finding is consistent with astronaut diaries (NASA Johnson Space Center Astronaut Journals) and recent research (Gallagher, Reinerman-Jones, Sollins, & Janz, 2014), that suggest weightlessness is perceived by most space travellers as novel at the beginning of the mission and is something that is addressed in a pragmatic fashion with the main concern involving movement and being able to control action.

2.7.5 Summary of Findings from Analysis

The analysis attempted to interpret the participant accounts by exploring the meaning making process, what the experience was like, and how the experience was perceived, and lived. Using IPA, I was able to construct a picture of the astronauts' subjective experiences related to the experience of seeing planet Earth from orbit. Overall, it appears the process of psychological adjustment post flight involved a proactive approach and drawing meaning from

the experience in a 'positive' and personally meaningful way. Although the sense making process was subjective and unique to each participant, several noticeable commonalities seemed to emerge between participants. Based on the observed commonalities three superordinate themes were identified and used to categorise the findings: 1) Deeply Impactful Perceptions of Earth, 2) Profound and Unexpected Emotional impact, and 3) A Space Odyssey.

Deeply Impactful Perceptions of Earth

Within the first superordinate theme a number of features dominated the participant accounts such as appreciation and perception of beauty, the significance of motion and dynamicity in making sense of the visual experience, seeing Earth "come alive" in dark and light passes, and perceiving our home planet as a fragile oasis. The fragility and beauty of the Earth were features that all of the participants commented on. These features served as a catalyst that propelled the participants to contemplate the problems below the surface and helped cultivate the desire to protect Earth. Various levels of fragility emerged, for example, all the participants commented on how thin the ozone layer looked and reflected on what this meant for the fate of humanity. Earth also appeared alone in the darkness of space, it seemed vulnerable, and humanities future survival seemed under threat. There were some divergences in how the fragility affected the astronauts. For example, Michael and Jeffrey talked more passionately about environmental issues they observed from orbit, such as air pollution and deforestation whilst others, like Ronald, appeared more focused on injustices that humans beings faced, such as poverty, war, and hunger beneath the surface. Almost all the participants placed significance on motion and dynamicity of the Earth, which appeared to be one of the features that gave participants like Nicole and Roland the sense that Earth was an object imbued with its own life force.

The participants spoke how manmade borders disperse from and described witnessing interconnected natural forces such as weather systems. These observations played a central role in instilling a sense of interconnection with nature and life. With the exception of Nicole, all participants perceived space as a void, and as somewhat uninviting and malevolent. In this context, Earth symbolised the only body that appeared alive. Amidst the darkness, Earth gained value for the participants because it symbolised a sanctuary, a place of safety that nurtures and protects human beings from the trouble and chaos of a universe that is unforgiving. However, the object that protected them from an

unforgiving universe also seemed small, fragile, and vulnerable and this induced uncertainty surrounding Earth and humanity's fate.

Profound and unexpected emotional Impact

The second superordinate theme mapped aspects relating to the immediate and long-term emotional effects of the experience. The astronauts' accounts conveyed a complex mix of emotions, some of which were unexpected. The common and more explicit emotions that regularly surfaced were a sense of interconnection, belonging, reverence, humility, gratitude, significance, and awe. It appears that for many of the participants the experience was awe inspiring but also sobering. The participants' narratives indicate they experienced other emotions such as guilt, uncertainty, and perceived loss (more discretely) simultaneously alongside the aforementioned emotions. Interestingly, it appears these mixed and at times conflicting feelings (cognitive dissonance) led to a confrontation with former conceptual schemas of self, other people and the world (Yaden et al, 2016).

A space odyssey

The final superordinate theme concentrated on the embodied dimension, how the experience was lived in relation to the self and the world, and how the experience translated in the participants' daily inclinations and behaviour. It is clear the experience is embedded and inextricable from the participants' life-worlds and involved an ongoing process of engagement and meaning making years after they returned to Earth. The participants all relayed that the experience provided a different reality compared to that of everyday experience through which they could relate to themselves and the external world. Overall, it altered and for some, transformed personal constructs related to the concept of self and other. For example, it appears to have enhanced their belief in the interdependence and interconnectedness of all life and as a result increased their sense of connection with other people, nature, and Earth. It seems the astronauts united through a collective shared experience and developed a strong sense of group identification and loyalty, which strengthened the momentum for change.

The narratives revealed a sense of personal growth and reconnection with life, including an altered worldview that was more holistic. This worldview appeared to scrutinise humanity's choices on a more global level and was a stance that made the participants acutely Earth's future fate. These shifts in values played an important role in the process of the re-evaluation of priorities. In particular, the experience reinforced previously held views surrounding

environmental issues and strengthened astronauts' universal values. As their values and worldview shifted, so did their interrelatedness with other people. Analysis revealed two groups; the first group appeared to be more reactive and actively involved with environmental issues and humanitarian causes.

2.7.6 Analytical Reflexivity

In this segment, I return back to the question of how valid is this research and its claims to knowledge. Alvesson and Sköldberg (2009) add a final layer of reflexivity. They advise qualitative researchers to complete 'interpretation of interpretation' during and after the analysis process. Accordingly, in this segment I will reflect further on some of the procedural and analytical challenges faced.

Based on my ontological and epistemological positions I believe that several simultaneous and distinct realities can be possible, reality is relative and dependent on the position and state of the observer, therefore the knowledge we produce is only representative of an aspect of one reality amongst innumerable realities. However, I adopted the four principles of credibility, transferability, dependability, confirmability, and authenticity (Guba, 1981; Lincoln, & Guba, 1986) and the four layers of reflexivity (Alvesson & Sköldberg, 2009; Finlay, 2002; Johnson & Duberley, 2003, Willig, 2013) in order to improve trustworthiness.

Methods in the current study to enhance trustworthiness include description of the context of the study and characteristics of the researcher, the conceptual framework of the study, contextual factors impacting the researcher and participants and a consideration of how this may impact the interpretation of the phenomenon, review of the research paradigms and traditions and the rationale for choosing IPA, clear outline of research goals and questions, as well as IPA data collection methods and procedures, and coding and data management processes. These components are in accordance with Guba's (1981) criteria for a trustworthy study and in a manner that is congruent with IPA. The segment below considers some of the challenges I faced in the current study and my attempts to overcome them.

I maintained a reflective diary (pre and post interviews). The reflective diary assisted in helping me explore how my presuppositions and beliefs may affect, or may have affected, the content and style of discourse. I found that the best time to capture the essence of my interpretations and thoughts was immediately after the interview, which was not always practical. I also found that my assumptions only truly emerged and became clear to me through my developing understandings of the astronauts' experience. I familiarised myself

with the phenomenon by reading around the topic, with the overall aim of understanding participants' terms of reference and facilitating prolonged engagement (Smith et al., 2009; Lincoln &Guba,1986). However, it became apparent that the scale of the experience is so vast that it is almost incomprehensible and recounting was clearly difficult for some of the participants because at times the vocabulary was not always available to them. Some of the participants struggled to describe the experience and their emotions without stumbling on words, using utterances, and deploying long pauses. At first, this worried me, however, with guidance from my supervisor I learned to use utterances, pauses, and body language as expressions within themselves in the interpretation process. For me as researcher the interpretation was arduous particularly because I did not have the vocabulary to convey my interpretations. In a sense, I was trying to talk about and think about a subject placed outside of not only my experience but also human experience in general.

I have realised the importance of interpretive enquiry and the need to delve deeper and beyond the surface level when trying to understanding people's life worlds. At first, I was apprehensive about attempting this for fear of getting it wrong. In addition, I found that by focusing too closely on the astronauts' experience meant that at times I lost some focus on my psychological processes.

Nicole was the only female participant, and her narrative exposes the surreal nature of her experience. Interestingly, Nicole used vocabulary that was full of nuance, adding depth and richness to our conversations. Compared to other participants Nicole uses more symbolic, emotive, and descriptive language. Her approach, tone, and language are more informal and she deploys expressive utterances and language to describe her feelings. All participants used language that captured their sense of awe and wonder, but Nicole's vocabulary and language carries more referents and associations to feelings of awe compared to other participants. With the exception of Ronald, Joseph, and Nicole, the other participants in the current study used more objective, neutral and somewhat scientific discourse. The interviews with this group of participants were not loaded with emotive language and when pressed for more introspective answers this group would find it more difficult to convey their felt sense. I used these instances as a gateway into the participants' worlds; I reflected on what these issues said to me about each individual and began to consider professional, social, and cultural contexts that might have impinged on their responses. Thus, as predicted, language presented some limitations in and of itself. This problem is inherent within IPA (Willig, 2014), as well as a challenge that many other

methodologies have to deal with. Merleau-Ponty (1962 p.133) argues, “There is a world, there is meaning”. However, language can never fully capture the meaning of the world and so there must be a constant dialectic between language and our pre-reflective sensing.

Initially I had naïve preconceptions that astronaut experiences of seeing Earth would profoundly affect their life and values. However, I gradually realised that their experience encompassed a much broader experience than just how they felt about the phenomenon. I realised multiple factors shaped the way they interacted with that experience, for example personality, subjective processing and embodiment of that experience, the launch, weightlessness, distance from Earth and length of time away from it, and of course realising a life-long dream. At the end of the interviews, I noticed that each participant attributed different degrees of change. Although the experience appears to be transformative, largely speaking it appears to have strengthened existing attitudes, inclinations, and urges towards certain types of behaviour rather than instigate entirely new ones. This broader conceptualisation of the experience led to minor adjustments to the aims and research questions. Reflecting back, I realise how naïve I was at the beginning of this process and how one-dimensional my original view was of this extraordinary experience. However, the process of critical introspection and analysis has facilitated insightful reflection and allowed me to develop and progress as a researcher.

My passion surrounding the topic and involvement with the study initially left me awestruck and with tunnel vision. This worked to inhibit my ability to remain relaxed during interviews and view things from a different perspective (Shenton, 2004). In order to overcome this, I used triangulation (Hussein, 2015; Lincoln & Guba, 1986) as a method of cross-checking data from multiple sources to search for regularities in the research data (Hussein, 2015, Shenton, 2004). Furthermore, with time I was more able to relax and rely on my professional self during the interviews. This may mean that the interviews improved as my confidence grew. Fortunately, the interviews were collaborative from the beginning, and although I guided the participants through the interviews, my non-directive stance actually served as a positive force that allowed participants to tell their story without too many unnecessary interruptions and researcher influence.

Awe was a central feature of the experience. The state of awe often overlaps with a range of states including fear and anxiety. I was intrigued that there was little sense of negative affect or emotions expressed directly during the interviews. I wondered if the participants suppressed their softer emotions from

me. One explanation may be that the astronauts in the current study were reluctant to confide about certain personal matters and may have refrained from speaking candidly about emotions during interviews. Perhaps certain personality traits are not seen as desirable or essential to the professional group, and the participants may have been trying to convey what they interpreted as valuable to that group and to the public. Astronauts are a group of people who largely are not accustomed to talking about their feelings. The profession is predominantly masculine and astronauts are popular and prestigious figures in the public eye. This suggests that there is a chance that the participants did not divulge details of the experience they consider as 'negative' or emotions and traits that are considered a sign of 'weakness'. There may also be an in-group conformity and consensus on the meaning and impact of the experience, which has been cultivated via group rituals and attending talks, conferences and meetings. This may have prompted a suppression or alteration of some personal views that might have diverged from the shared norms and beliefs, perhaps because of an underlying worry of being ostracised or isolated from the group.

During the selection process astronauts and cosmonauts are screened for the desired characteristics, for example optimism and the ability to perform under stressful conditions (Suedfeld et al., 2010). The astronauts' narratives in this study were optimistic and demonstrated considerable self-reflection and introspective agency. The astronauts in the current study contemplated existential matters, but did not allow themselves to engage with more pessimistic and defeatist philosophical outlooks surrounding humanity or the meaning of life. It may be that these characteristics prompted astronauts to adopt a more curious and positive stance when faced with profound awe-inducing stimuli compared to groups of people on the opposite end of the personality spectrum who might respond with higher levels of fear and anxiety. The participants attempted to draw meaning from the experience in a way that imbued their life with value. Indeed, their level of self-awareness is such that they appear to be conscious of which ideology and discourses they were engaging with or choosing to reject (Kanas et al., 2009). In hindsight, it may have been beneficial to use pseudonyms even though the inclusion of names was something that was advocated by the participants. Anonymity would perhaps allow the participants to reveal more of their authentic selves and reduce the risk of emotion suppression.

Another issue I faced surrounded my approach to analysis and the accuracy of my interpretations. All participants requested a summary of the findings and conclusions. I have made interpretations that, although grounded in

the data, may go beyond the self-understanding of the participants. I felt anxious regarding how the astronauts would respond to my interpretations of their stories, and wondered how I would manage disparity. To try and overcome this, I cross-checked the themes with my supervisor and a peer. My supervisor made some minor suggestions, which allowed me to see things from multiple perspectives. Alongside of this I informed the astronauts about a radio interview I took part in and an article I wrote in relation to the current research and asked them to provide feedback. Four out of the seven astronauts interviewed responded and stated that they felt these published and broadcast pieces were representative of their experience. I found the process of dual contemplation helpful because it allowed me to step outside of my own preconditioned beliefs and ideas and consider alternative views.

The forthcoming discussion section will draw conclusions from the study, discuss the implications of the findings for Counselling Psychology, and recommend future avenues of research.

2.8 Discussion

A key finding of this study, and reflected in the literature, is that engaging with natural phenomena in a meaningful way has therapeutic potential at an individual, social, and societal level.

The most prominent aspects of the astronauts' reported experiences in the current study include:

a) Appreciation of beauty and fragility of Earth/nature
b) Awe and wonder (including reverence, humility and gratitude)
c) Guilt, uncertainty and anticipated loss
d) Increased sense of connection to other people, nature, and Earth (spirituality and universalism)
e) A sense of solidarity with other astronauts and cosmonauts.

The aims of the study are: gain a richer understanding of what the experience was like, to explore the participant's noetic, philosophical, and emotive understanding of seeing Earth and natural phenomena from space, to explore the participant's lived experience (the impact and benefits post-flight), to extrapolate commonalities between participants accounts. One of underlying objectives of the current study is to explicate some of the central features of the OE phenomenon (Yaden et al., 2016), and instigate academic discussion and research in this area with the view that such efforts may contribute to the development of a theoretical framework that aims to clarify some of the central features. A further objective of this study is to theorise findings and to consider how we can simulate nature based awe-inducing experiences. With these findings and aims in mind, this Discussion section will use the thematic categories identified in the Analysis section to guide the interpretation of findings and place them alongside current psychological theories.

2.8.1 Beauty, Vastness and Fragility

The perception of beauty and ensuing feelings of joy and pleasure were common responses across all the astronauts in this study. However, vastness of space was the backdrop for Earth's beauty and made Earth seem vulnerable, soft, and fragile. The juxtaposition of beauty, vastness, and fragility exposed sentiments of tenderness and affection. These sentiments served as a catalyst for deeper contemplation. For example, it probed some of the participants' underlying anxieties surrounding the fate of Earth and humanity. As a result, emotions such as joy and pleasure emerged simultaneously alongside feelings of malaise, guilt, and uncertainty. These conflicting emotions and beliefs evoked a feeling of discrepancy and resulted in a state of tension psychologists refer to as

cognitive dissonance (Festinger, 1957). Over time, the unpleasantness of dissonance motivates the individual to decrease the cognitive discrepancy usually by promoting one belief over another or integrating the beliefs. Reducing the discrepancy reduces the negative feeling of dissonance. The action-based model of cognitive dissonance proposes that these opposing beliefs create a shift in attitudes that primes or motivates people to commit to a course of action (to translate their intended behaviour into effective action) (Harmon-Jones & Levy, 2015). All participants in the current study reported that the experience strengthened their pro-environmental attitudes and inclinations to act on environmental and humanitarian causes. Thus, the conflicting emotions that initially de-settled the participants' became one of the key driving forces that motivated them to act on these inclinations (Festinger, 1957; Harmon-Jones & Levy, 2015).

The 'comfort zone expansion' model argues that optimal growth occurs only when we challenge individual needs or when we are outside of our comfort zone and we overcome the stressful or challenging situation (Brown, 2008; Flood, Gardner, & Cooper, 2009). Thus, from this basis, Abraham Maslow's hierarchy of needs (Maslow, 1964) need not only to be met but also balanced between satiation and stress to promote the process of self-actualisation or transcendence. One explanation of the observed changes related to the participants in the current study is that the experience and conflicting feelings and cognitions produced just the right balance between stress, and satiation for optimal growth to occur.

In support of the comfort zone model, some research suggests that people can actually derive positive and meaningful experiences from threatening natural encounters (Kaplan & Kaplan, 1989). This is consistent with past research that suggests that extraordinary and sometimes threatening natural settings can promote intense emotions such as wonder, fear and anxiety as well as a sense of vitality and awe (Kaplan, 1984; Kaplan & Kaplan, 1989; Fredrickson & Anderson, 1999; Hartig et al., 1991; Talbot & Kaplan, 1986; Williams & Harvey, 2001). Theories on posttraumatic growth also argue that positive spiritual growth and existential revaluation can occur after existential trauma (Calhoun & Tedeschi, 2014; Khanna & Greyson, 2015; Laubmeier et al., 2004). This implies that the existential component, or the 'meaning making' implied by a spiritual orientation, can play an important role in the positive psychological health outcomes.

The theories discussed suggest extraordinary environments that provide the perfect balance between stress and satiation are powerful motivators that can

challenge people and impel them to triumph over the discomfort and fear that often accompany behavioural change.

2.8.2 Detachment Reinforcing Attachment

The participants in the current study were physically detached from their natural habitat. This appears to have played a central role in transforming how they saw Earth and natural phenomena. It allowed them to see Earth and nature from a distant vantage point as a separate object in space. In this way they developed a personal familiarity with Earth, and their minds were imprinted with new signals of what Earth is, its affordances, value, and vulnerabilities. From this unique perspective, they were able to observe collective identities and see the global impact of human civilisation on nature. This allowed them to make the link between the past, present and future. They were able to see in concrete terms, the consequences of environmental damage and this created a tangible image for the future filled with uncertainty. Thus, the detachment was a driving force in engendering a sense of "solastalgia" (existential/emotional distress caused by environmental damage) (Albrecht et al., 2007).

The term 'break off' refers to a dissociative anomaly that some people experience while flying at high altitudes. Break off is characterised by a feeling of complete detachment from Earth and all human beings. One study conducted in 1957 explored break off effect by interviewing 157 jet aviators. The researchers found a significant number of the participants felt peaceful, exhilarated, and euphoric. However, over a third of the participants felt anxious and experienced a sense of panic (Clark & Graybiel (1957). The interest in the break off effect has diminished over the years. However, break off remains an unofficial space syndrome, which can manifest in people differently, can elicit both positive and negative emotional extremes, and can vary in levels of intensity. Perhaps break off is not a discrete space syndrome, but rather it is a characteristic of the OE.

Dubos (1980) has argued that active engagement with the natural environment rather than passive observation may awaken the dormant biophilic tendencies. In support of this, extant research has found that people are more likely to reap the benefits of active engagement with natural environments compared to passive engagement (Frumkin, 2001; Goto et al., 2014; Kahn, 1997; Lohr, & Pearson-Mims, 2005). However, it seems that passive observation allowed the participants in the current study to step away from their typical environment and see nature and their world in its entirety. This finding suggests that occasionally passive engagement with nature can instigate behavioural,

cognitive, or attitudinal change just as effectively as active engagement with nature.

The physical detachment experienced by the participants in the current study corresponds with the second and third central properties of restorative environments highlighted by ART, namely 'being away' and 'extent/fascination' (Kaplan & Kaplan, 1989). ART asserts that restorative environments provide an escape from everyday environments and a separation from mental activity. It emphasises that this sense of being away may occur from a different perspective or by a physical change in locations. The third component 'extent', refers to the degree and level of fascination the stimuli provides. Earth gazing provided a high level of fascination where the participant could witness his or her own world from another world (Kaplan, 1995; Kaplan & Kaplan, 1989). This is important because Gonzalez et al. (2010) study concluded that 'being away' and 'fascination' were active components in green interventions for clinical depression.

Whilst on the ISS some of the astronauts senses are modulated or limited (e.g., hearing and tactile stimulation). Simultaneously, other senses are stimulated, such as sight. Furthermore, much of the perceptual input is incongruent. When immersed in nature whilst on Earth we hear the sounds of nature, for example water flowing, thunderstorms, or tree rustling in the wind. However, the ISS is a sterile and mechanical environment, thus the sounds the astronauts hear carry limited or no information on the nature of the visual target (natural phenomena and planet Earth) (Capelle, Trullemans, Arno, & Veraart, 1998). Furthermore, astronauts have a demanding schedule of routine tasks and chores, which require concentration and mental reasoning and will induce a degree of directed attention fatigue. The participants reported that Earth gazing was a relaxing and calming activity and the ART can provide one explanation for this. Perhaps the activity of Earth gazing provided the astronauts with moderate levels of arousal and mental activation, and high levels of fascination, which created a balance between too much and too little arousal. Grof (2000) suggests that sensory deprivation (a reduction of some/all meaningful sensory stimuli or being immersed in a dark and soundproof space) can be considered a method that can facilitate higher levels of consciousness. Thus, one understanding of the experience might be that the sensory modulation helped the astronauts decrease sensory overstimulation intensifying the visual experience (Grof, 2000; Suedfeld, 1975).

2.8.3 Earth's Affordances and Value

In many ways, the physical separation allowed Earth to become an object endowed with instrumental value (value of usefulness for human needs and survival). Koffka (1935) refers to these as "demand character" and Gibson (1979/1986) calls them "affordances". The affordances of the environment are what it offers the animal, what it provides and these can be abstract and/or tangible. In this instance, Earth was valued holistically as an object that provides shelter, life, food, water, materials and chemicals. More importantly, however, Earth represents abstract qualities such as safety, order, balance, unity, and harmony. All of the participants described Earth using metaphorical language, talking of Earth as though it were a sentient entity, increasing its value. For some Earth was seen as an organism or biosphere, imbued with vitality and life, whereas for others Earth transformed into an entity with some form of consciousness (Lovelock 1991). These qualities meant that Earth's value increased significantly, which allowed the astronauts to develop a closer relationship to it. Many of the participants also used affective and possessive language and some referred to Earth as "this Earth of ours", or "her". In many ways, their descriptions are reminiscent of the way one might describe a loved one. On a more symbolic level, the detachment from Earth allowed the participants to construe it as a metaphorical mother figure, similarly, it is the first object of attachment the astronauts encounter in space, seen as an omnipotent figure, protecting nature and life from the void of space and ensuring survival. Thus, the astronauts relate to Earth partly out of that need. There are some parallels between attachment theory (Bowlby, 1958) and aforementioned development of attachment to Earth. In attachment theory, an emotional bond with a caregiver provides a safe environment from which infants can explore their surroundings. In the same way, Earth and nature symbolised safety and security and provided a literal and imagined secure base for the participants to retreat.

These ideas can provide further insight to the biophilia theory. It is logical to assume that some natural environments are more likely to trigger biophilic tendencies compared to others. The biophilia theory proposes that "specific sensory cues can elicit…innate affective or emotional meaning" (Blascovich & Mendes, 2000. p. 71). Similarly, the Prospect-refuge theory (Appleton, 1975) argues environments that have characteristics that are more attractive and offer optimal features for safety, shelter, and subsistence are more likely to elicit a more intense emotional response and sense of connectedness (Heerwagen & Orians, 1993; Orians & Heerwagen, 1992). Drawing from these theories, one

explanation as to why the participants were emotionally drawn to Earth might be that it represented both 'prospect' and refuge' and therefore evoked intense positive emotions (Wekerle & Egan, 1991). On the one hand, Earth was the only object in space that they could identify with, and this strengthened their sense of belonging to it (Higley & Milton, 2008; Maller et al., 2008; Vining et al., 2008). On the other hand, seeing the signatures of human civilisation, in particular the environmental damage humans have caused elicited vivid and startling images of humanity's fate. The juxtaposition of simultaneously feeling a sense of security and threat, safety and risk, connection and perceived loss, acted as cues that elicited intense emotional meaning and responses and strengthened the participants attachment (Ulrich, 1983; Wilson, 1984).

Seeing Earth as an object and place with its own unique qualities allowed the participants in the current study to form a deeper attachment. Schroeder (1991) called this form of attachment 'place attachment', which is described as an emotional bond between person and place. Place attachment theory highlights connections among living beings can occur with different organisms or objects, and on many different levels. Thus, an individual can feel connected to family, friends, and community, and with animals, plants, and even inanimate objects. Tuan (2013) coined the term 'topophilia' to describe the love that people feel for particular places. Extending on this, Florek (2011) highlighted that an attachment based on a meaningful encounter is stronger than an attachment based on preference because meaningful attachments involve a synthesis of thoughts, feelings, memories and interpretations evoked by a landscape. Kaiser and Fuhrer (1996) explain that we form place attachments to places that fulfil our emotional needs and this serves to develop and maintain our identities. Indeed, favourite places seem to afford emotional recovery and restorative experiences (Korpela, 1996; Korpela & Hartig, 1996).

The Tripartite Model outlines the central aspect of place attachment as the 'person, process, and place' (Scannell & Gifford, 2010). This model argues that people experience stronger attachments to places that they can identify with or feel proud to be connected with. This place connection relies upon a combination of affective, cognitive, and behavioural responses. The most common emotions associated with people-place bonding are positive, such as happiness and love (Scannell & Gifford, 2010). The cognition element incorporates the knowledge, memories, and meanings that people or groups associate with places of attachment. Some researchers have suggested that familiarity is one of the central cognitive elements in place attachment (Fullilove, 1996; Scannell &

Gifford, 2010). Behaviour is the physical manifestation of place attachment. Place attachment theory might provide additional insight into the findings in this study. Perhaps seeing Earth from space optimises the ideal biophilic activity because of the multiplicity of natural features, the newfound familiarity the astronauts gained, and the intense emotions they experienced.

2.8.4 Time, Existence and Uncertainty

Heidegger (1927/1962) argued that existence involves three revolving temporal dimensions, the past, the present and the future. Building on this idea, van Manen, (2016), highlights that temporality is an important part of existence and the future plays an important role in motivating us to realise possibilities. Time was an important feature of the experience in the current study. The panoptic view allowed the participants to see the impact of humanity's past on its present (environmental damage) and in a tangible way conceive of the future fate of humanity and Earth. This created mental images that threatened the future of all life, culture, security, and identity, yet the problem was no longer located in the future or in remote locations. It seemed that the experience allowed them to face and mourn the perceived losses associated with climate change as well as challenge some of their fundamental views about nature and humans' relationship to it. This brush with existential matters and the uncertainty of their fate meant that the participants were able to gain a deeper appreciation of and value for life and the blessings, meanings, and lessons that it provides (Frankl, 1969; Yalom, 1980). Thus, the question of time and issues surrounding uncertainty were in the forefront of their minds both during and after the experience.

Although the astronauts in the current study did not directly communicate existential anxiety, it was apparent that the experience occasioned an intimate existential encounter related to the finite quality of our planet and time. Moreover, their accounts conveyed a fear of loss. The fear of loss was in relation to broader concepts such as Earth, nature and humanity as opposed to personal death. However, this fear of loss highlighted the impermanence of life and played an important role in driving the sense making process (van Manen, 2016). Thus, uncertainty was implicitly implied, for example, through their preoccupation with the fate of the planet and humanity. One possible interpretation is that the participants surrendered control and accepted this uncertainty. In this sense, uncertainty is not a limit but becomes an expression of the boundless creativity inherent in the universe. Nobel laureate Ilya Prigogine (1997, p. 55) states that in this state "Chance, or probability, is no longer a convenient way of accepting

ignorance but rather part of a new, extended rationality". As suggested by Laubmeier et al. (2004), perhaps this existential component and meaning making is a crucial aspect of the experience that promotes psychological growth. Grof supports this view and suggests that death encounter is central to the emergence of transpersonal comprehension (Grof, 1975, 1985).

According to Heidegger (1927/1962), confronting the reality of death and the finitude of time allows a man to confront the nature of being. Such 'being-towards-death' and the uncertainty surrounding it simultaneously manifests as a psychic expression of anxiety. He asserts that this anxiety is an essential state of being that keeps the constant threat of death before us and promotes an authentic existence (Gordon, 2003). This is in contrast to an inauthentic attitude that numbs man and serves to dilute the nature of being (van Deurzen, 2015). Thus, for Heidegger, death must be grasped, cultivated, anticipated, and endured (Gordon, 2003) in order to live an authentic life. From an existential positive psychology perspective, death anxiety is a precursor for personal and spiritual growth, which provides another explanation surrounding the strengthening of certain values and beliefs for the participants' in the current study (Wong, 2009).

Perhaps a typical response to death and the threat of chaos is an instinctual drive to impose order and regain control (Gordon, 2003). This idea may provide further insight into the participant's sense making process. In many ways, the participants' were on the edge of chaos. They could either make sense of the vastness and uncertainty in a way that imposed order and control and imbued their lives with meaning and purpose or invite the chaos into their psyches. It seems the participants coped with uncertainty by deconstructing time by seeing the universe as an omnipresent emergent, purposive system of exquisite complexity, continuously evolving within an interconnected web of co-creative relationships (Goerner, 1999; Laszlo, 1995). Thus, another interpretation might be that the participants negotiated and processed existential concerns surrounding chaos and death by creating a story that allowed them to see how time might be experienced freed from the shadow of chaos and death. From an existential perspective, this interpretation implies that on some level the participants avoided facing the supposed finality of death (Heidegger1927/1962).

It appears that the experience of seeing Earth from orbit is essentially paradoxical; on the one hand, the participants in the current study faced the vastness of a seemingly uninviting universe and the somewhat bleak fate of their home planet. This brought to the forefront of their minds issues surrounding uncertainty, chaos, and mortality to process and manage. On the other hand,

each of them individually and collaboratively makes sense of these existential matters by processing and interpreting them in a positive way that imbues their life with hope, significance, purpose, and meaning. Thus, the experience allowed the participants to engage on a deeper level with the spiritual dimension of being (van Deurzen, 2015) and as a result, they discovered a paradoxical respect for life that occurs in response to the realities of existence and facing the possibility of death or annihilation, identified by Frankl (1969) as "finality meanings". Thus, overall, each of the participants' personal relationship with the world manifested in a more spiritual way of being in the world during and after the experience (Laubmeier et al., 2004). Spirituality was another central concept that arose in the current study. Accordingly, the next section will focus on the theme of spirituality.

2.8.5 Spirituality

The participants' understanding of the experience involved a continuous process of sense-making years after their missions. In many ways, the experience heightened death awareness in relation to Earth and therefore themselves. Yet, this close conceptual encounter with death and uncertainty provoked an altered philosophy of life that appeared to heighten the participants' spiritual beliefs. This awareness enabled the participants to experience the world and makes sense of it in what van Deurzen (1997) refers to as the 'spiritual dimension'.

It seems Earth gained value beyond its form, usefulness, and affordances; and transformed into multiple identities and attachment objects, a mother, a life force, and a sacred object worthy of respect and honour, love and compassion. Directly or implicitly all the participants named the Earth as a sacred object and this strengthened the bond with their home planet and for some humanity. These complex levels of engagement allowed the participants to appreciate the reciprocal relationship with Earth, thereby strengthening their loyalty and impetus to protect it. The participants were able to see the way humans devalued, damaged, and threatened the balance of nature. The experience meant that they also developed an abhorrence of these vices. It seems the participants not only faced and mourned the anticipated losses associated with climate change but the experience challenged some of their fundamental views about nature and human beings relationship to it.

The experience allowed the participants to face the vastness of the universe and the 'unknown' of existence (Van Deurzen, 2015). In order to grasp and integrate this uncertainty it seems the astronauts embodied an expression of

existential meaning (Radley, 2000, Yalom, 1980). Many of the participants attempted to make sense of life by acknowledging an all-encompassing plan to life and seeing themselves as part of a larger omnipresent, emergent, purposive system of exquisite complexity (Goerner, 1999; Laszlo, 1995). They also perceived the universe as purposive and having a numinous quality suggesting some may believe in a universal spirit, or perhaps a higher consciousness or power. The participants were not necessarily describing such concepts with reference to a religion or a higher being. However, this understanding provided them with a sense of continuation, that is to say, they felt as though they were part of something immense and powerful, which gave them strength. It seems that in this way death and uncertainty were not construed as something terrifying because the participants gained a sense of immortality by seeing themselves as connected to life, nature and the cosmos (Adler, 1970). According to Yalom, cosmic meaning invariably refers to some spiritual ordering of the universe and is concerned with the way people create meaning from the overall pattern of the universe. Thus, overall the experience occasioned the opportunity to contemplate on a deeper and more meaningful level our place and purpose in the universe and incited a deep sense of reverence. Moreover, this heightened sense of 'cosmic spirituality' allowed them to make sense of the experience in a way that imbued their life with meaning and purpose.

In accordance with Naess' (1988) concept of 'ecological self', the participants in the current study relayed a deep sense of identification with the Earth (Naess, 1988) and this appeared to elicit a deeper emotional resonance with it. This played an important role in converting a desire to protect and care for Earth into a need, which in turn increased environmentally responsible attitudes and behaviour. The participants perceived Earth as part of themselves, and so protecting and caring for the Earth became a form of self-interest (Naess, 1988; Bragg, 1996). This increased sense of connectedness can also be linked to the observed increases in altruistic and empathic responses post-flight.

Past research suggests that spirituality in the form of an ecological self can provide a sense of purpose and meaning and therefore is associated to eudemonic wellbeing (Capaldi et al., 2015; Dossey et al, 2005; McCoubrie & Davies, 2006). In addition, there is growing evidence that ecological self is associated to pro-environmental behaviour (Higley & Milton 2008; Hartig et al, 2003; Mayer & Frantz, 2004). Alder (1964, 1979) and Ken Wilber (2000b) both describe human beings as socially embedded beings that have an innate need for connection. They ascertain that this relatedness can extend out to everything

outside of the self and other people (e.g., animals, nature, and the cosmos). They both ascertain that this connection can cultivate a sense of oneness with life, extending empathy towards things that lie beyond us. Furthermore, they suggest that this mindset is so powerful that it has the potential to diminish societal problems such as war, prejudice, injustice and discrimination (Adler, 1964).

The experience of the self involves a continual process of becoming and transforming over time (van Deurzen & Arnold-Baker, 2005). In many ways, the participants in the current study had to let go of aspects of the self. Their sense of self became more fluid, and their worldview expanded. In some cases, this change in personal outlook altered their perspective on their own personal life (political views, relationship with others), in others this change occasioned, to varying degrees, a transcendence or expansion of self. These altered beliefs and views of the world meant that they had a renewed sense of purpose and different ways of being-in-the-world. Merleau-Ponty (1962) suggests that the physical body is how we `belong to the world' and it is clear that the participants felt as if they were no longer in the world the same way that they used to be.

Psychologists have identified various distinctions and subtypes of transcendent experience (Fischer, 1971; Levin and Steele, 2005; Maslow, 1964; McCraty, Atkinson, Tomasino & Bradley, 2009). These classifications highlight how spiritual transcendence can occur through various encounters, may be transitory or enduring, and vary in degrees of intensity. Furthermore, they serve to unite similar phenomena (e.g., peak, aesthetic, spiritual, and mystical experiences) and form a body of work describing common features. The different types of transcendent experience raise the possibility of a developmental continuum relating to different levels and types. Indeed, for all the participants in the study, to varying degrees and levels of intensity, the experience involved transcendence of personal identity/development of a higher self, or a merging or identification with a cosmic order, or the absolute (McCraty et al., 2009).

A central question in psychology remains what constitutes healthy spirituality (path) as opposed to psychotic states (pathology). How we process, respond, and interpret spirituality can determine if it serves as a positive or negative force in our lives (Elmer et al., 2003). Culture, personality, and environmental factors play a central role in how an individual interacts and responds with the concept of spirituality. This question is also relevant to this study. Past research and astronaut journals indicate that Earth gazing from space is a peak experience that can strengthen a sense of ecological/cosmic

spirituality or trigger self-transcendence (Gallagher et al., 2015; NASA: Johnson Space Center Astronaut Journals; White, Yaden et al., 2016). However, not everyone will respond to the same phenomenon in the same way. Some when faced with such profound stimuli may experience a heightened sense of insignificance, malaise, anxiety, or dread. Furthermore, perhaps the sense of oneness may transpire as dissolution of ego boundaries and may be difficult to comprehend or process. Indeed some transpersonal experiences, such as the dissolution of ego boundaries vaguely resemble pathological conditions such as psychosis (Grof & Grof, 1989; Wilber, 1977, 1980). This highlights the importance of exploring further the impact of extraordinary awe eliciting natural phenomena with different groups and populations. However, recent research involving psychedelics administered during clinical trials suggests that escaping the confounds of the ego and exploring consciousness in novel ways can be beneficial for some groups of people, such as those facing existential crises (Carhart-Harris et al., 2016; Carhart-Harris et al., 2014).

The next segment in the discussion section will discuss findings in relation to awe and wonder.

2.8.6 Awe and Wonder

Research suggests that there is a unique association between feelings of awe and spirituality (Saroglou et al., 2008; Shiota et al., 2007; van Cappellen & Saroglou, 2012). The experience induced an immediate and visceral response of awe, which was a universal response amongst all the participants in the current study. Data also revealed auxiliary states associated with awe such as a sense of vitality, surprise, wonder, reverence, and humility. These emotions helped elevate the immediate feeling of awe into something that is lived and felt in the participants' daily lives. It is not within the remit of this discussion to review all of these emotions. Thus for keeping this review relevant and concise, herewith, the area of interest has been refined down to focus on the emotion of awe.

The findings of this study are in accordance with findings from Gallagher et al (2015); Reinerman-Jones et al (2013) and Yaden et al (2016) studies. Similarly, what appeared to be common across all the participants in the current study was a perceptual and conceptual contemplation of vastness. The perceptual contemplation surrounded the beauty, activity, and visible signatures of human civilisation. The conceptual elements were related to contemplations surrounding the fragility and vitality of our planet, the vastness of space, and the significance of Earth and humankind life. The participants witnessed perceptually vast stimuli that transcended everyday frames of reference. In

turn, this seems to have shifted their focus from an inward concern to an outward concern. They were able to step outside of themselves and broaden their perspective. This shift in focus and concern, allowed them to develop a meaningful involvement with something larger (The cosmos, Earth, nature, and humanity). Thus, awe played an important role in changing the way the astronauts view themselves, other people and the world around them (Algoe & Haidt, 2009; Bonner & Friedman, 2011; Shiota et al., 2007; Gallagher et al., 2015). In this way, awe can be seen as playing a central role in strengthening participants' determination to express and act on associated eudaimonic virtues (pro-environmental, transpersonal, and humanitarian pursuits) (Gallagher et al., 2015; Keyes & Annas, 2009; Keyes, Shmotkin, & Ryff, 2002; Passmore & Howell, 2014a). In turn, the participants' subsequent pursuit of eudaimonic strivings post-flight rewarded them with eudemonic vitality, and reinforced and promoted their virtuous dispositions (Piff et al, 2015). This is consistent with past research that suggests the feeling of awe can diminish our sense of individual self, and can strengthen universal and pro-social attitudes (Kaplan & Kaplan, 1989; Kaplan, 1984; Piff et al., 2015; Yaden at al., 2016).

Over time, the feeling of awe dissipated, yet it appears that remnants of it in the form of wonder remained with the participants. However, initial feelings of guilt, reverence, and uncertainty gained momentum with time and contemplative practices. The memory of the beauty and vastness the astronauts in the current study saw coupled with the feelings that followed added to the cognitive dissonance, which appears to be another factor that pushed the participants beyond their comfort zone and perhaps encouraged them to act on environmental and humanitarian inclinations (Brown, 2008; Flood et al., 2009).

The experience of awe can vary in levels of intensity, on the higher ends of the spectrum, one can simultaneously experience both elevated positive emotions alongside emotions associated with fear (Gallagher et al., 2015). The participants in the current study directly commented on the euphoric aspects related to awe (pleasure, joy, and vitality), yet their accounts also conveyed implicit tones of reverence, guilt and uncertainty. Similarly, the participants experienced cognitive dissonance, which in many ways had similar impact on them. Experiencing mixed and at times conflicting emotions and beliefs simultaneously resulted in powerful contemplations and deliberations. Such cognitive efforts and intense emotions only heighten and add conviction to act on inclinations and urges upon their return (Harmon-Jones & Levy, 2015).

Past research has highlighted that different emotions can produce different responses. For example, Haidt's (2003) study suggests that moral transformations are associated with moral emotions such as gratitude, elevation, awe, and admiration. Based on his study he suggests that some emotions are more powerful in motivating change compared to others. For example, he associated reverence to moral transformations, where the elevation is so powerful that it can wipe out feelings of cynicism and replace them with feelings of hope, love, and optimism, and a sense of moral inspiration. Perhaps psychologists should focus their attention on identifying several prototypical awe eliciting natural environments, investigate their impact on wellbeing, and then consider how we can occasion or simulate such environments. With emerging research on the positive effects of awe on wellbeing (Griskevicius et al., 2010; Keltner & Haidt, 2003; Piff, et al., 2015; Stellar et al., 2015); the experience of Earth gazing deserves greater focus in psychological and wellbeing research.

The next segment will focus on universal value and solidarity.

2.8.7 Universal Values and Solidarity

Another aspect of the participants' experience concerns the impact and benefits they noticed post-flight. For some, the experience reinforced pre-held values and caused them to review what mattered to them. For others the experience changed their outlook on life and existence. It seemed as though their thoughts about the state of the world reflected their reduced need for individual meaning and instead increased their desire to think about collective meaning. To varying degrees they were able to stand outside of their situation and make choices about how to be-in-the-world (Merleau-Ponty, 1962). The increased sense of connectedness to nature exercised the participant's virtuous dispositions and elicited a real sense of conviction to participate in more humanitarian and pro-environmental acts (Gallagher et al., 2015; Ihle et al., 2006; Yaden et al., 2016). For Yalom (1980), acts of courage and heroism can signify an attempt to qualify for a better fate. Keynes (1932) suggests that the 'purposive man' is always trying to secure a spurious and delusive immortality for his acts by pushing his interest in them forward in time' (p 370). Both Yalom and Keynes argue this is a reflex of death terror, a compulsive attempt to transcend death and nothingness.

Research suggests the way individuals see the relationship between humans and nature plays an important role in determining pro-environmental attitudes and beliefs (Higley & Martin, 2008; Mayer & Frantz, 2004). A recent study supports this view and found Positive experiences in natural environments

may promote ecological behaviour (Hartig et al, 2003). There is also evidence that positive feelings or an affinity towards nature is a better predictor of pro-environmental behaviour than cognitive beliefs (Kals, Schumacher & Montada, 1999). In support of this, others have found that there is a positive relationship between environmental concern or a pro-ecological orientation to pro-environmental beliefs, attitudes, and behavioural intentions (Dunlap, van Liere, Mertig, & Jones, 2000).

This idea of relatedness is an essential part of the kin selection perspective, which provides another explanation of why this experience is likely to promote the astronauts to act on altruistic inclinations. The strengthened attachment with Earth meant that the participant's sense of kin extended out from family to humanity, nature and for some Earth as a whole. It appears that the benefits of taking care of the welfare of their home planet (pro-environmental and humanitarian acts) far outweigh the costs (annihilation). Furthermore, the participants could clearly see that preservation of Earth meant preservation of self, kin and the affordances Earth provides for example safety, security, order, life, food, shelter and water (Milton, & Gillies, 2007; Trivers, 1971).

Proximity-maintaining behaviours are common behaviours among people who have attachment of place, similar to those who have interpersonal attachments. For example, some people unknowingly experience the effects of place attachment through homesickness, which can transpire as nostalgic reflexes (Scannell & Gifford, 2010). In this way, people carry our proximity-maintaining behaviours to satisfy their desires to relieve the experience (Cieraad, 2010). What appeared from the narratives was that the astronauts' experience was reinforced further because it was relational in nature, simultaneously embedded within their life-world and embodied. The participants actively attended trips, took part in conversations and conferences related to the experience. This seems to have enhanced their place/Earth attachment because these rituals allowed them to develop a shared appreciation for Earth (Scannell & Gifford, 2010). Thus, solidarity, social bonding, and factors such as hope, excitement, inspiration, caring, camaraderie and a sense of urgent purpose served to solidify the experience and became a vehicle for building and sustaining momentum for change. For some, this nostalgic reflex manifested through dreams. For example, Joseph experienced reoccurring dreams about Earth and this brought him a sense of happiness and pleasure. Ronald personified the experience, and stated he was able to pan out and gain the panoptic perspective in his mind's eye. This process of recalling specific

memorable stimuli can be understood as a "sense-making ritual". The reinvention of environments has been coined as reconstruction of place and is notable place attachment behaviour (Cieraad, 2010; Scannell & Gifford, 2010).

The changes manifested in each of the participants in different ways. At the very least, the experience helped all the participants-frame their troubles and worries. The participants reported that the experience and the memory of it continued to elicit positive feelings in them. The experience strengthened their understanding of the interconnected nature of life and this awareness to varying degrees helped moderate their mood during difficult times. This is consistent with the SRT (Ulrich, 1983), according to which, contact with nature stimulates positive emotions which can protect us against negative moods. However, participants in the current study continued to reap the benefits of Earth gazing long after the experience had ended.

The following segments detail the central psychological theories that explain some of the underlying processes and outcomes related to the phenomenon and details why this study is relevant to Counselling Psychology.

2.8.8 Theorising Findings

The findings of the current study demonstrated that seeing Earth from orbit was a meaningful and positive experience for the astronauts. All the participants came away with a stronger and improved relationship with Earth and nature. In accordance with past research, this study found that altered states of consciousness and a sense of interconnection with nature are responses that can be associated to the overall OE experience. It seems the mysterious nature of the Earth gazing experience is also a powerful prototypical awe elicitor (Gallagher et al., 2015; Shiota et al., 2007). However, it appears the OE phenomenon is complex, and includes other features that previous studies have largely failed to mention, for example, the existential component, cognitive dissonance, comfort zone expansion and the important role physical detachment plays in intensifying the overall experience and instigating attitudinal change.

It seems Earth gazing cultivates or strengthens a stronger affiliation with Earth and nature. This is important because from an ecopsychological perspective a sense of connectedness to nature promotes wellbeing (Kellert & Wilson, 1993; Shepard, 1982; Ulrich, 1983). Another reason Earth gazing is therapeutically unique is because of the way it engenders soft fascination which can aid recovery from cognitive stress (attention fatigue) (Kaplan & Kaplan, 1989; Kaplan, 1993; Kaplan, 1995). Furthermore, past research and astronaut accounts suggest that Earth gazing on board the ISS is an environment that

meets the four restorative components of ART, namely fascination, being away/escapism, extent and compatibility (Kaplan, 1995). This is important because past research suggests that these components characterise restorative natural environments (Korpela et al., 2001). Moreover, 'being away' and 'fascination' are central aspects of the Earth gazing experience, and have been identified as active components in effective green interventions for clinical depression (Gonzalez et al., 2010). This suggests that the Earth gazing experience can be considered as a viable green intervention for combating symptoms of stress and depression.

SRT postulates that natural environments can aid recovery from many forms of stress by automatically eliciting positive emotions that have a restorative effect on stress (Ulrich, 1983). The Earth gazing experience triggers emotions such as awe, reverence, gratitude, and humility which is promising because these emotions are associated with eudemonic wellbeing (Capaldi et al., 2015; Howell, et al., 2011; Laubmeier et al., 2004; Passmore & Howell, 2014a, 2014b). Other aspects of the Earth gazing experience resemble features that are associated with a state of 'flow'. Past research suggests that regular engagement in flow-inducing activities can increase positive affect and promote wellbeing (Nakamura & Csikszentmihalyi, 2014). It appears that hedonistic emotions are related to immediate wellbeing, while eudaimonic emotions are associated with wellbeing over time (Cohen et al., 2010; Huta, 2013; Kamitsis & Francis, 2013; Laubmeier et al., 2004; Steger; Deci & Ryan, 2008). This finding is important because it implies not only that Earth gazing has positive impact on immediate wellbeing but also can promote wellbeing over time.

Overall, it seems Earth gazing promotes wellbeing by inducing soft fascination and positive emotions. However, it seems extraordinary or sometimes threatening natural environments that induce conflicting emotions and challenge an individual's perceptions of safety needs can also lead to positive psychological change (Brown, 2008; Higley & Milton, 2008). In view of this, one argument is that extraordinary nature-based experiences that allow people to step outside of their usual comfort zones, such as Earth gazing, can lead to greater positive psychological change compared to everyday natural environments (Kamitsis & Francis, 2013). This is important because it differentiates between the extraordinary and every day natural environments and suggests that the latter is more transformative and therefore, in some instances, has greater therapeutic value.

In accordance with past research on nature and wellbeing, it seems the experience of Earth gazing fosters a more meaningful engagement with existential issues (Passmore & Howell, 2014a, 2014b) and can promote healthier forms of spirituality (Capaldi et al., 2015; Dossey at al. 2005; Howell et al., 2011; Kamitsis & Francis, 2013). Facing existential issues surrounding existence, death, and mortality is essential for psychological growth, which strengthens the argument that the Earth gazing experience is therapeutically valuable and can serve as a viable therapeutic intervention. Wong (2009) argues,

> How we react to death will impact how we live . . . and this link represents the last frontier of Positive Psychology. . . we can use our capacity for meaning, spirituality and narrative construction to transform death anxiety. (pp. 367–368).

To summarise it seems Earth gazing is therapeutically valuable because it can 1) diminish stress (cognitive and emotional), 2) engender or strengthen ecological self and expand sense of connectedness to one another and nature, 3) promote hedonic and eudaimonic wellbeing 4) balance existential anxieties of identity, happiness, isolation, meaning in life, freedom, and death. To conclude, it seems Earth gazing is therapeutically valuable because it has the potential to create an active pathway to hedonic, eudemonic and chaironic emotions and strivings. This has important implications, because not only does it suggest that interacting with nature in this way can combat symptoms of stress (Kaplan, 1995; Korpela & Hartig, 1996; Ulrich, 1983) but that it can promote the three forms of 'mature happiness' as identified by Wong (2009).

The next segment will consider the relevance and implications of the findings in relation to Counselling Psychology.

2.8.9 Relevance to Counselling Psychology

The findings of this study have several implications for Counselling Psychology in relation to 1) theory, 2) therapeutic technique, and 3) service development.

Firstly, the contribution of this study to Counselling Psychology is the rich subjective and inter-subjective description of a transformative and extraordinary experience. The value of knowledge gained from this study draws on traditions such as humanistic, existential and ecopsychology. By highlighting relevant psychological theories and connecting them with the findings of this study, I have delineated their contemporary and heuristic value in Counselling Psychology.

Furthermore, the study unearthed some of the subjective qualities associated with the OE (Yaden et al., 2016). By developing this broader conceptualisation of the OE and relating it to general psychological wellbeing, I have placed it in a psychological arena rather than exclusively in more specialist fields such as the space programme.

Secondly, the current study extended our understanding of some of the meanings and processes involved in the development of emotional ties between the astronauts, Earth, and nature. Past research has found that a sense of connectedness to nature is important in promoting eudemonic wellbeing. In some instances, it can also promote pro-environmental attitudes. With this in mind, the current study provides insight into how Earth gazing could be used to cultivate a deeper connection with nature as well as how to strengthen pro environmental attitudes and inclinations. In addition, the findings suggest that Earth gazing can promote hedonistic and eudemonic wellbeing. Promoting wellbeing is at the core of the Counselling Psychology, making the current study relevant to the profession. It is important for our profession to challenge how we understand human beings and broaden the ways in which we promote wellbeing.

Thirdly, the Introduction section of this study highlighted that within the UK and across the world, there is a need for safe, effective, and inexpensive psychological interventions that can complement conventional approaches. A growing body of ecopsychological research suggests green prescriptions and interventions are effective in reducing stress and promoting wellbeing (Gonzalez et al., 2010; Milton, 2016). In view of this, green interventions provide viable alternatives to current psychological interventions (Milton, 2016). With the growing popularity of nature-based interventions, the current study recommends a collaborative effort to produce a categorised and comprehensive list of nature-based interventions that target different aspects of mental illness and/or wellbeing. This endeavour will assist in making Earth gazing and other green interventions a viable alternative in healthcare.

From the findings of the current study and past research, it is clear that nature based extraordinary awe-inducing experiences such as Earth gazing offer comparable, demonstrable and perhaps enhanced benefits to every day nature based interventions in terms of feelings of eudemonic wellbeing and connectedness. These findings are important because they suggest that Earth gazing is an experience that has a range of therapeutic and social benefits. In view of this, I recommend that psychologist evaluate the therapeutic applications

of the wider use of Earth gazing in order to work towards including it as a viable green intervention.

The next section will focus on the final objective of this paper, which is to consider how we can harness, simulate, and utilise the pro-social and growth-enhancing aspects of the Earth gazing experience. By proposing practical interventions, the current study hopes to instigate greater academic inquiry and research, and strengthen the position of Counselling Psychology within the psychological arena.

2.8.10 Applications to Practice

The current study suggests Counselling Psychologists should consider Earth gazing as a nature-based intervention, with its associated benefits. In view of this, it is important to explore novel ways we can conceptualise, adapt, and simulate this experience. This might include guided imagery work, therapeutic workshops, meditation, existential work on meaning and purpose, art therapy, nature based interventions, and finally via simulating virtual awe-inducing natural worlds via positive technologies. The therapeutic strength and impact of the intervention will be dependent on how accurately the experience is portrayed and the emotions that are activated. I argue that the aforementioned Earth gazing interventions have the potential to promote eudemonic wellbeing and reduce emotional and cognitive stress with different groups in various settings (see table).

Setting	Targeting	Promoting +	Population /group
Recreation and leisure e.g., health centres, retreats and museums	Disconnection Lack of purpose	Societal hedonistic and eudaimonic wellbeing, cohesion, environmental attitudes and behaviour	General public
Healthcare settings	Existential crises Depression	Eudemonic wellbeing	Terminal illness Palliative care
Occupational/corporate settings	Employee burnout Conflict resolution	Employee performance, work ethic, and team mentality.	Work force
Clinical setting	Depersonalisation Disconnection Dissociation	hedonistic and eudaimonic wellbeing,	Depression Trauma
Educational setting	Disconnection Lack of purpose	hedonistic and eudaimonic wellbeing, mindfulness, stress management, pro environmental attitudes.	Children/adolescents
Political settings	Conflict negotiations Disconnection	Eudemonic strivings, mindfulness, stress management , diplomacy	Home grown terrorism
Penal settings	Disconnection Lack of purpose Aggression	Eudemonic mindfulness, purpose	Prisoners
ISS Interplanetary space missions	Disconnection, Boredom Panic Depression	Eudemonic wellbeing Mindfulness, Crew morale	Space Travellers

Table 3: Earth gazing intervention: Appropriate settings and groups

The next segment provides three examples of Earth gazing interventions/techniques, namely, guided Imagery, nature based interventions and virtual reality. These methods can complement existing mental health interventions or serve as an alternative and provide empowering, accessible, non-invasive, cost-effective, and time efficient methods of therapy.

2.8.10.1 Stargazing

A nature-based activity that captures some of the qualities of the Earth gazing experience is stargazing. For example, Stargazing can cultivate a sense of cosmic awareness and allows people to connect with the world beyond their immediate frame of reference. A recent study identified stargazing as an activity that can promote transcendent thoughts, personal growth, positive emotions and new experiences and skills (Bell, Irvine, Wilson, & Warber, 2014). Bell et al (2014) study suggests that people who engage in stargazing are more likely to develop a stronger connection to nature. With this in mind, Counselling Psychologists can use stargazing as an ecopsychological intervention to promote a deeper connection with nature and to help build positive emotions such as awe and wonder of the natural world (Bell et al., 2014). Studies such as this provide a framework on how one might implement nature based interventions into existing therapeutic approaches and during clinical practice. It is important to combine stargazing and talking therapy during psychotherapy and the justification for the use of nature-based interventions should be based on the client's individual needs as well as psychological theories.

2.8.10.2 Guided Imagery and Mindfulness

The effectiveness of mindfulness meditation in promoting wellbeing is recognised within contemporary healthcare (Astin, Shapiro, Eisenberg, & Forys, 2003). The Earth gazing experience can be conceptualised via guided imagery, mindfulness meditation, and insight meditation. Visualisation of the Earth gazing can facilitate the exploration of modes or characteristics of existence such as suffering, connection, and impermanence. Mindfulness insight work alongside visualisation of Earth gazing, can facilitate bringing to the forefront existential matters and anxieties (Loizzo, 2000). Guided imagery is another meditation technique that is used by a significant number of mental health professionals. Guided imagery is a technique that can be utilised with our clients on a one-to-one basis or with a group. It is an intervention where meditative techniques are used to focus the mind by evoking mental images that simulate or re-create the sensory perception of sights, sounds, tastes, smells, movements, and images (Arbuthnott, Arbuthnott, & Rossiter, 2001). Past research demonstrates that

guided imagery is an effective stress management and relaxation tool (Kwekkeboom & Bratzke, 2015; Beck, Hansen & Gold, 2015). Research has shown that imagined experiences in nature can evoke intense feelings of awe and connectedness, as well as the feeling of being in the presence of something greater (Shiota et al., 2007). In view of this, therapist can use guided imagery as a technique to direct focus and attention onto Earth from space to induce relaxation and reduce distress or pain. There may be preliminary homework involved for the participant to generate initial images of Earth from space, for example watching NASA or ESA Earth footage.

2.8.10.3 Virtual Reality

Earth gazing is powerful experience; almost no other experiences known to us are as growth enhancing and transformative. If people on Earth were able to experience what astronauts experience during missions, and as a result develop this deepened connection to Earth, we would likely live in a society that has a more meaningful and thoughtful relationship to nature and one another (Aanstoos, 2014).

Positive technologies provide a range of interactive systems, environments, and mechanisms that have the potential to target psychological and behavioural change, alongside existing treatment options in engaging ways. Increasingly positive technology interventions for healthcare are focusing on experience-driven design of technology that can result in meaningful experiences such as Earth gazing (Hassenzahl, 2013). This is promising because research has linked meaningful experiences with wellbeing (Cohen et al., 2010; Hassenzahl, 2013; Kamitsis & Francis; 2013; Laubmeier et al., 2004; Capaldi et al., 2015).

There is some conflict of interest between ecopsychological approaches and the idea of positive technology for health. For example, ecopsychology ascertains that technology has exacerbated human beings dissociation from nature (Milton, 2016). However, this study argues that we cannot dissociate from technology because technology is part of the very fabric of our lives. The Influential psychologist Lombardo (2006) sees the future involving “a reciprocity” relationship with technology (pp. 399) where humans and technology will co-evolve. He argues that we cannot avoid technological advancement and our conjoined relationship with technology. Lombardo argues these developments have the power to create an evolution of values, of human mind and spirit. Research suggests that our wellbeing, to a degree, is dependent to our relationship with nature. Perhaps to reconnect and restore our relationship with

our environment we need to use technology to our advantage. In view of this, perhaps the next frontier for ecopsychology is to play an active role in designing ethical and positive technological programmes that promote human connection, flourishing, and growth to compliment traditional therapeutic approaches.

Emerging research is demonstrating the effectiveness of positive technologies such as VR as an adjunctive pain control (Faber, Patterson, & Bremer, 2013; Hoffman, Doctor, Patterson, Carrougher, & Furness, 2000; Wiederhold & Wiederhold, 2007). For example, the case of cancer, VR has been employed to manage pain and anxiety associated with painful medical procedures (Botella et al., 2012; Eshelman, & Guzzetta, 2007; Gershon, Zimand, Pickering, Rothbaum, & Hodges, 2004; Windich-Biermeier, Sjoberg, Dale, Eshelman & Guzzetta), as well as to handle distress symptoms during chemotherapy (Schneider, Prince-Paul, Allen, Silverman, & Talaba, 2004; Schneider, Kisby, & Flint, 2011). Research has also found that VR interventions can facilitate mindfulness mediation Nararro-Haro et al., 2016) and can reduce stress and anxiety (De Kort et al., 2006; North & North, 2017). In addition, a combination of CBT treatments with VR exposure treatment techniques for agoraphobia have been found to be as effective as CBT alone (Castro et al., 2014). VR has also been found to enhance emotional skills for children with autism spectrum disorders (Lorenzo, Lledó, Pomares, & Roig, 2016) and improve job interviewing skills among people with severe mental illness (Smith et al., 2015). Limitations exist with these studies, for example, limited study numbers, the use of a single coder, a lack of more in-depth analyses of various VR interventions, and the omission of presence as a moderating factor (Turner & Casey, 2014). However, overall the findings look promising. In support of this, Turner and Casey (2014) completed a recent meta-analysis review, and summarise VR interventions to be efficacious forms of psychological treatment and a promising addition to existing treatment options.

Earth gazing VR interventions (EGVRi) should centre on three aspects of the experience. The first of these is how to recreate the restorative environment. The VR experience needs to focus on ‘fascination’ and ‘being away’, in order to provide a detached visually fascinating spectator view. The second involves association by contiguity, whereby clinicians encourage individuals to immerse in the VR environments as well as the natural environments directly. The juxtaposition of these two perspectives is important because each of them prioritises specific insights and aspects while marginalising others. For example, one provides a direct, immediate, and visceral experience, while the other

provides a visually fascinating spectator perspective. The interplay between the two will provide a form of mental mapping that connect the two episodes, where natural incidents are no longer perceived as independent, static, isolated, and extraneous occurrence, but as continuous and dynamic entities that have direct impact on them. The final aspect is to create an immersive VR programme that enables the individual to go on a spacewalk as opposed to largely remaining in the confines of the space station. This approach will create an emotionally impactful and thought provoking experience. Finally, EGVRi should incorporate audio mindfulness meditation and music customised for the targeted population focusing on eliciting the aforementioned emotions. The findings of the current study and past research can guide those who wish to design pilot trials of Earth gazing VR programmes promoting eudemonic wellbeing for healthcare and education.

2.8.10.4 Mission Planning: Interplanetary

Psychological insight into astronaut health can play an instrumental part in mission planning and success (Stuster, 2010). This study recommends that the activity of Earth gazing should be regularly scheduled into astronaut's leisure time during long duration missions in order to help them recover from the stresses and challenges of the environment and space work. Adapting the Earth gazing experience through VR applications may provide one way to offset the risk of mental health difficulties on interplanetary missions to Mars where Earth is no longer visible. A recent study conducted an experiment that simulated mission to Mars. Astronauts were isolated for 500 days and their psychological and physiological responses monitored. One of the experiments involved monitoring participant responses to VR nature scenes. The results show VR technology to be useful for inducing positive moods (Botella et al., 2016). The findings of the current study, coupled with past research can serve to guide those interested in designing VR Earth gazing programmes that promote morale and wellbeing during interplanetary space missions.

2.8.11 Limitations

The findings of the current study contribute to existing literature by advancing our understanding of the meanings and processes involved in the development of the emotional ties with Earth and nature as well as the psychological, personal, and social advantages of connecting with nature in this way. However, this study reflects certain limitations; this segment will outline some of these.

As highlighted by past research, culture, personality, and identity play an important role in how each individual interprets this experience, therefore future researchers should consider such factors. The sample in this study was purposive and essentially self-selected from a pool of NASA astronauts likely to belong to a particular social-economic and educational status. Furthermore, the group was small and homogenous, and all the participants previously identified with the OE phenomenon. However, almost 600 people have travelled to space, which means the sample in this study represents over 1% of the population. Still, caution is warranted, as this sample is not entirely representative of the overall population of space flyers and therefore is not generalisable. Indeed, it would be interesting to examine these issues in other groups of astronauts and cosmonauts of different professional and mission status, cultural and ethnic backgrounds, and gender, in order to investigate differences and commonalities in their experiences.

Frank White interviewed astronauts for his book, The *Overview Effect,* and used these contacts to help me recruit the sample in the current study. The participants therefore identified with the experience of the OE. In view of this, it is likely that the participants had a positive space flight experience and identify with the phenomenon, which may mean there was a degree of bias. However, I mitigated the effects of this by scrutinising historical reports and studies. Overall, it seems that a significant number of space travellers report space travel as a positive experience, minimising the risk of bias.

A significant number of participants in the current study used objective, neutral, and somewhat scientific discourse, perhaps because the cohort was made-up of scientists, engineers, and pilots. Similarly the experience was extraordinary and did not resemble anything in their usual frame of reference, and therefore, at times, the participants did not have the language or vocabulary to fully capture the experience or relay their felt sense in relation to it. Thus, as predicted, language presented some limitations in and of itself (Willig, 2014). This problem is a challenge that many methodologies have to deal with. However, to minimise this limitation, future researcher should conduct follow up interviews that focus more on body language, utterances, and pre-reflective sensing. In addition, revealing the interview questions to the participants a few days prior to the interview would minimise the language bias because participants would have more time to reflect upon complex memories, feelings and cognitive processes.

The participants demonstrated high levels of self-awareness and self-reflection. However, the topic of the interview was something that they had discussed in previous interviews or conferences or written about in books and articles. As a result, aspects of our conversation resembled comments or statements made in previous books and interviews. In view of this, perhaps a single interview for each participant was restrictive. Conducting follow up interviews would allow the researcher to develop greater rapport and gather more in-depth data. However, due to the participants' busy professional lives this was not feasible.

The next segment provides recommendations for future researchers wanting to pursue research in this area.

2.8.12 Suggestions for Future Research

The resulting findings, considerations, and theoretical insights will, I hope, inform and guide future researchers on areas to explore. Perhaps one approach to overcome some of the aforementioned limitations is to conduct interdisciplinary studies that integrate practices from psychology, neuroscience, and phenomenology. In this way, researchers can employ the strengths of each method. Other suggestions to overcome the limitations of the current study include conducting cross-cultural and comparison follow-up studies.

Stuster's (2010) study found that Earth gazing and Earth photography can help astronauts adjust to the physical and behavioural conditions of life on board the International Space Station (ISS) and facilitate relaxation. This suggests that astronauts find the activity of Earth gazing relaxing and stimulating but also that it has the potential to facilitate recovery from attention fatigue during missions. Future researchers should explore how to harness the positive effects of Earth gazing to buffer against the harmful psychological and physiological effects of long duration space missions. For example, it is important to understand how effective Earth gazing is at reducing cognitive overload, boosting energy, mood, memory, motivation, crew moral and cohesion during flights.

It is also important for psychologists to play an active role in debating, researching, designing, and implementing various positive technology programmes for healthcare (Wiederhold, 2012) focusing on this unique experience. The hope is that with this allied effort, psychologists will help design ethical, impactful VR strategies, and programmes that produce positive and lasting psychological outcomes in individuals and play an important role in promoting wellbeing in societies (Coyle et al., 2014). Finally, future researchers

should focus on hedonic and eudaimonic outcomes. Excluding one over the other can lead to biased conclusions (Huta, 2013).

2.8.13 Concluding Comment

I would like to finish by thanking the seven participants who took time to share their experiences with me. Your stories truly imbued my life with wisdom and humility. I hope that I have represented you accounts well and this study fulfilled your expectations. I have come away from this experience, a little more humble, and a little more eco friendly and aware of my relationship with nature and Earth. I hope those who manage to venture through these pages find the study stimulating and can gain from it also. I end this study with a Poem by Renè Daumal that Jeffrey read to his crewmates at the end of their mission and recited at the end of our interview.

> You cannot stay on the summit forever; you have to come down again. So why bother in the first place? Just this: What is above knows what is below, but what is below does not know what is above. One climbs, one sees. One descends, one sees no longer, but one has seen. There is an art of conducting oneself in the lower regions by the memory of what one saw higher up. When one can no longer see, one can at least still know. Renè Daumal.

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3 Publishable Piece : Frontiers in Ecopsychology

...The Overview Effect and Virtual Reality

3.1 Abstract

This paper considers Earth gazing as an atypical method of engaging with the natural environment, but one that still offers demonstrable and similar benefits in terms of feelings of wellbeing and connectedness. The paper commences with a brief research review highlighting the benefits of interacting and connecting with nature. Next, it argues that extraordinary natural environments can promote wellbeing and presents research surrounding the salutogenic effects of space flight, paying particular focus on the Earth gazing experience. The paper then reports on a study exploring astronaut experiences of Earth gazing. The study utilised an Interpretative Phenomenological Analysis (IPA) research method to explore; what the experience of Earth gazing is like and the subsequent impact it has had on the participants post-flight. The paper then considers what aspects of this experience are beneficial for individual wellbeing and society. Finally, this study proposes the pro-social and growth-enhancing aspects of Earth gazing can be harnessed, simulated, and utilised via virtual reality (VR) and such interventions can complement existing mental health and wellbeing treatments.

3.2 Introduction

Human-Nature Relationship and Wellbeing

Central to ecopsychology is the principle that a strong connection to the natural world is innate to human beings and is an important contributor to wellbeing (Wilson, 1984). Two theories attempt to explain our relationship to nature. The first is attention restoration theory (ART) (Kaplan & Kaplan, 1989), which suggests that nature is restorative because of the way it can aid recovery from cognitive stress. The second theory is the stress recovery theory (SRT) (Ulrich, 1983), which postulates that we are attracted to natural environments because they trigger a variety of stress-reducing psycho-physiological responses, specifically positive emotions, which in turn aids recovery from many forms of stress.

The evidence supports ART and has found, contact with nature as opposed to built environments aids recovery from cognitive stress and can improve concentration and long-term memory (Berman, Jonides, & Kaplan 2008; Berman et al., 2012; Berto, 2005; Li et al., 2016; Ochiai et al., 2015; Pilotti, Klein, Golem, Piepenbrink, & Kaplan, 2015). Many studies have demonstrated how positive emotions can promote wellbeing (Bushnell, Čeko, & Low, 2013; Cohn, Fredrickson, Brown, Mikels & Conway, 2009; Dunn & Schweitzer, 2005; Rainville, Bao, & Chrétien, 2005, Rowe, Hirsh, & Anderson, 2007). It seems that natural

environments are therapeutically important because of the way they induce positive emotional responses in people, in turn promoting wellbeing (Capaldi, Passmore, Nisbet, Zelenski, & Dopko, 2015; Passmore & Howell, 2014a, 2014b). Of course some limitations exist with the aforementioned studies, for example, many involve non-clinical populations, small sample sizes, and have investigated brief exposure to nature and short-term effects. Nevertheless, the evidence is compelling and suggests nature has a positive impact on our wellbeing.

Two streams of research dominate the area of subjective wellbeing, the hedonic and eudemonic approaches. Hedonism focuses on 'feeling good' and is concerned with high levels of positive emotions, low levels of negative emotions and pain avoidance. The eudemonic tradition focuses on the 'good life' and focuses on cultivating and expressing inner virtues. Within eudemonic wellbeing, constructs such as meaning, autonomy, vitality, and feelings of transcendence are important (Keyes & Annas, 2009; Keyes, Shmotkin, & Ryff, 2002). Some argue eudaimonic strivings are unique because they create an upward spiral of continuous and therefore renewable wellbeing. Research appears to support the view that hedonic pursuits are associated with greater immediate wellbeing and happiness that dissipates (Frederick & Loewenstein, 1999), while eudaimonic pursuits are associated with long-term wellbeing (see review by Huta, 2013; Steger, Kashdan & Oishi, 2008; Waterman, 2007). Wong (2009) supports the view that eudemonic virtues promote what he calls 'mature happiness'. Mature happiness encompasses authentic happiness (being an authentic person), eudemonic happiness (doing virtuous deeds and chaironic happiness (being in touch with our spiritual nature). Passmore and colleagues extend Wong's work, and suggest a felt connection to nature promotes mature happiness and diminishes existential anxiety (Capaldi et al., 2015; Howell et al., 2011; Passmore & Howell, 2014a, 2014b).

Some argue that another reason natural scenes are therapeutically valuable is because they are prototypical awe elicitors (Cohen, Gruber, & Keltner, 2010). For example, Keltner and Haidt (2003) found that the common sights and sounds of nature (birds, waterfall, and trees) are some of the most common elicitors of awe; others have found similar results (Forsythe & Sheehy, 2011; Richards, 2001; Shiota, Keltner, & Mossman, 2007; Terhaar, 2009). Shiota et al., (2007) state panoramic photographs of nature are a "prototypical awe elicitor" (p. 951). In support of this finding, other studies have found that even imagined experiences in nature (Shiota et al., 2007) and mundane and extraordinary images of nature (Joye & Bolderdijk, 2014) can evoke intense feelings of awe

and connectedness. These studies suggest that both extraordinary and every day natural sights and sounds, as well as direct and passive exposure to nature, can elicit various awe responses. The association between nature and awe is important because it seems that awe is a powerful emotional response that can promote psychological wellbeing (Griskevicius, Shiota, & Neufeld, 2010; Keltner & Haidt, 2003; Piff, Dietze, Feinberg, Stancato, & Keltner, 2015). From a psychological perspective, this makes nature-based interventions therapeutically impactful, and their scope for application wide.

Emerging research has also found that interacting with nature can have a positive impact on symptoms of depression, for example it can improve mood and increase concentration (Berman et al., 2012; Berman, Jonides, & Kaplan, 2008; Eko, 2015; Gonzalez, Hartig, Patil, Martinsen, & Kirkevold, 2010). Berman and colleagues found depressed people reported higher levels of concentration and improved mood after walking in a natural setting compared to their non-depressed counterparts. This finding is important because it suggests spending time in nature may be more beneficial for people experiencing depression compared to non-depressed individuals. Gonzalez et al (2010) based on their study, conclude that nature has the potential to diminish symptoms of depression and green interventions for clinical depression should focus on the 'being away' and 'fascination' components of restorative environments.

Extant research also suggests there is an association between spirituality and nature. For example, a number of qualitative studies have found nature can be a source and context for people to experience a sense of spirituality (Diessner, Solom, Frost, Parsons, & Davidson, 2008; Dossey, Keegan, & Guzzetta, 2005; Heintzman, 2003; Passmore & Howell, 2014a, 2014b; Powch, 1994; Saraglou, Buxant, & Tilquin, 2008). There appears to be less quantitative research in this area, perhaps because of the subjective nature of the topic. Kamitsis and Francis (2013) framed their quantitative study within the theoretical context of ecological self. They found that engagement with nature, through both direct sensory exposure and a sense of connectedness related to better psychological health. In addition, a stronger spiritual orientation was positively associated with higher levels of nature exposure and connectedness to nature. An interesting finding in this study was that exposure to nature outside of participants everyday environments was more strongly associated with psychological wellbeing compared to 'everyday' nature exposure. Extant research seems to support the view that a stronger spiritual orientation can provide a buffer against existential crises (Capaldi et al., 2015; Elmer, MacDonald

& Friedman, 2003; Laubmeier, Zakowski, & Bair, 2004); negative life circumstances (Burkhardt, 1994) and promotes subjective wellbeing (Capaldi et al., 2015; Dossey et al., 2005).

A spiritual affiliation does not necessarily provide protection against mental disorders (King, Weich, Nazroo, & Blizard, 2006; King et al., 2013), and personality differences and personal beliefs play a role in whether spirituality manifests in healthy or distressing forms (Elmer et al., 2003). It also appears that the existential component, or the 'meaning making' implied by a spiritual orientation, plays an important role in the positive psychological health outcomes (Capaldi et al., 2015; Howell, et al., 2011; Passmore & Howell, 2014a, 2014b), particularly during existential crises (Laubmeier et al., 2004). Considering the evidence, there appear to be various pathways to spirituality. It seems that the quality and type of spiritual orientation is important. One argument might be that a connection with nature promotes positive engagement with existential matters (Howell, et al., 2011; Passmore & Howell, 2014a, 2014b) and the ecological self orientates people towards a transcendent and healthier form of spirituality (Dossey et al., 2005; Kamitsis & Francis, 2013).

Overall, the findings are promising and suggest that nature has the potential to restore cognitive and emotional stress, nature is a prototypical awe elicitor, nature promotes healthier types of spirituality, and finally that nature-based interventions are effective in managing some of the symptoms of depression.

The next segment focuses on salutogenic effects of spaceflight, with a particular focus on findings surrounding impact of Earth gazing. This study considers Earth gazing from space an atypical and extraordinary way of interacting with nature.

Earth Gazing: Atypical Way of Engaging with Nature

The Overview Effect (OE) describes the psychological effects of viewing natural landscape from an expansive vantage point and seeing Earth from space is the epitome of this experience (Yaden et al., 2016). Some common aspects of the experience are seeing Earth as a tiny, fragile ball of life, a profound feeling of awe, an understanding of the interconnection of all life, and a renewed sense of responsibility for taking care of the environment (White, 2014).

In support of the OE, past research has found that awe and wonder are salient characteristics of the space flight experience, establishing it as prototypical awe elicitor (Gallagher, Janz, Reinerman, Bockelman, & Trempler, 2015; Yaden et al., 2016). Not surprisingly, research has also found that Earth

gazing from orbit is a valuable and beneficial activity for astronauts whilst on board the International Space Station (ISS) (Stuster, 2010). Perhaps more importantly, from a psychological perspective, it seems the experience can affect the structure of space travellers' values. In particular, research has demonstrated that the experience can strengthen spirituality and universalism (an understanding, appreciation, tolerance, and protection for welfare of all people and for nature) (Suedfeld, Legkaia & Brcic, 2010; Suedfeld & Weiszbeck, 2004). Research has also found that the experience can enhance the appreciation of Earth's beauty and fragility (Ihle, Ritsher, & Kanas, 2006; Suedfeld, Brcic, Johnson, & Gushin, 2012), and increase astronaut's involvement with environmental causes (Ihle et al., 2006). Overall it seems the space flight experience has potential to imbue a space traveller's life with a sense of meaning and purpose (Yaden et al., 2016), to strengthen a connection to nature and promote virtuous dispositions (Gallagher et al., 2015; White, 2014; Yaden et al., 2016).

Although commonalities exist between space travellers in the way they make sense of the experience and how it influenced their actions post flight, factors such as culture and length of mission appear to create some variances in degree and type of change. For example, Suedfeld, et al, (2012) recruited 20 retired Russian cosmonauts and the data suggests higher levels of self-reported personal growth among cosmonauts who had spent less than a year in space compared to those who spent more than a year in space. Furthermore, respondents reported change in the categories of 'perceptions of space' and 'perceptions of the Earth'; however, changes in values related to benevolence, universalism, and spirituality were not reported.

Brcic and Della-Rossa (2012) employed thematic content analysis and looked for references to Schwartz's well-established value markers in narratives (media interviews, journals, and pre-flight interviews) of seven Canadian astronauts. They then compared the results to the values of National Aeronautics and Space Administration (NASA) and Russian Space Agency (RKA) astronauts. The most frequently mentioned values for all the participants were achievement, universalism, security, and self-direction. Universalism was significantly higher among the Canadian astronauts compared to American and Russian space travellers. In Suedfeld et al.'s (2012) study the Russian cosmonauts expressed less change related to universalism or at least were less inclined to talk about this value. Conversely, in Brcic and Della-Rossa's (2012)

study Canadian astronauts appear to relate to universal values more post-flight compared to NASA and RKA astronauts.

The discrepancies related to value changes could be due to cultural differences between the veteran cosmonauts and the American and international astronauts or because of the quantitative measurement methodology. Interestingly, the changes observed in values were also significantly higher than values in Ihle et al.'s (2006) subjects who were active space fliers. The variance could also be due to the delay accommodating and integrating the extraordinary experience (Keltner & Haidt, 2003). It is clear from the review of research above that astronauts attribute short- and long-term emotional benefits to the space flight and Earth gazing experiences (White, 2014; Stuster, 2010). However, astronauts are screened for specific personality traits suitable for the role, for example agreeableness, self-motivation, and optimism; therefore they are more likely to derive short-term and sustained health benefits from their space flight experiences (Gallagher et al., 2015; Kanas et al., 2009).

These studies emphasise that it is not only typical natural settings that can affect a person's eudemonic strivings and beliefs, boost mood or reduce stress but also extraordinary natural settings such as seeing Earth and natural phenomena from the vantage point of space. Furthermore, to date there is little in the way of research investigating different ways that people can experience nature, for example when viewing natural elements or landscapes from a distance or in VR setups. The following review demonstrates the benefits of interacting and engaging with nature in extraordinary ways. It also suggests that Earth gazing is activity that can cultivate a more meaningful connection with nature and therefore can enable or promote a sense of personal and societal wellbeing.

3.3 Research Method

3.3.1 Research Design and Question

This qualitative study used semi-structured interviews to gather data from a homogenous sample of astronauts. IPA was chosen to explore the research question 'What is it like to see Earth from orbit, and how has it impacted you?

3.3.2 Participants and Procedure

The study interviewed seven retired NASA astronauts (using semi-structured interviews) in order to explore their experience of seeing Earth from orbit. The overall aim was to understand what the experience was like, to learn if the experience had been enriching, promoted psychological wellbeing and if it was used in any way to offset the challenges of daily life back down on Earth.

Skype™ video was the most appropriate method to conduct interviews and was chosen instead of face-to-face interviews because of the geographical dispersion of astronauts (most live in USA), financial constraints and time limitations (Hamilton, 2014).

3.3.3 Data Analysis

The interviews were analysed using IPA and the step-by-step approach to data analysis advocated by Smith, Flowers, and Larkin (2009). The data generated several interconnected themes. During analysis, IPA's analytical, empathic, and reflexive elements were utilised to get a glimpse into participants' internal worlds. Analysis also used the principles from the hermeneutic circle. A flexible approach to data analysis was deployed, using an iterative and inductive cycle that encouraged the coming-forth of a phenomenon (Smith et al., 2009).

3.4 Findings

The analysis revealed several noticeable commonalities; which have been integrated into three superordinate themes. The first superordinate theme entitled 'Deeply Impactful Perceptions of Earth' aims to capture how the astronauts made sense of the visual encounter during and immediately after seeing planet Earth, paying particular attention to visual aspects that were considered significant about the encounter. The second superordinate theme is entitled, 'Profound and unexpected emotional impact'. This superordinate theme seeks to highlight the central emotional impact of this experience that emerged from the astronauts' narratives. The final theme is called 'A Space Odyssey' and represents the attitudinal and behavioural adjustments and transformations that are associated with the experience. To keep the section concise, I selected several extracts that depict the essence of each theme together with a summary of the overall findings in a story format.

Earth came alive in different ways for the participants. However, almost all the participants placed significance on the motion and dynamicity of the Earth, which appeared to give participants the sense that Earth was an object imbued with its own life force.

> "It surprises you every time you look out...This kind of very dynamic, ever-changing appearance of the place that gives it the appearance that it's alive" (Nicole 6, 184).

Earth transformed into a valuable object endowed with instrumental value. Earth was valued as an object that provides shelter, life, food, water, materials

and chemicals as well as abstract qualities such as order, balance, unity, harmony, and a place of safety that nurtures and protects human beings from the trouble and chaos of an unforgiving universe. However, the object that protected them from an unforgiving universe also seemed small, fragile, and vulnerable and this induced uncertainty surrounding Earth and humanity's fate. All of the participants described Earth using metaphorical language, talking of Earth as though it were a sentient entity. For some Earth was seen as an organism or biosphere, imbued with vitality and life, whereas for others Earth transformed into an entity with consciousness. Many of the participants also used affective and possessive language and some referred to Earth as "this Earth of ours", or "her". In many ways, their descriptions are reminiscent of the way one might describe a loved one. On a more symbolic level, the detachment from Earth allowed them to construe it as a metaphorical mother figure, similarly, it is the first object of attachment the astronauts encounter in space, seen as an omnipotent figure, protecting nature and life from the void of space and ensuring survival. These interpretations and perceived qualities meant that Earth's value increased significantly, which allowed the astronauts to develop a closer relationship to it.

During the light passes Earth was construed as coming alive in a more organic and authentic way and the fragility and beauty of the Earth during light passes was something that all of the participants commented on. Environmental issues became obvious during these instances, for example deforestation, pollution, and shortages of water. This fragility served as a catalyst that propelled the participants to contemplate the problems on a deeper level. The participants described the way manmade borders dispersed from this perspective and observed natural interconnected forces such as weather systems. These observations played a central role in instilling a sense of interconnection with nature and life. There were some divergences in the way the astronauts described and made sense of the experience. For example, some talked more passionately about environmental issues they observed, such as air pollution and deforestation, whilst others appeared more focused on the injustices that some people faced below the surface, such as poverty, war, and hunger.

> "I mean obviously the Earth is alive on the day time side of the orbit too but you only see the beauty of Earth and the damage human civilisation has done to the Earth, and the human contribution to that aliveness is not as apparent" (Ronald 8, 411).

Conversely, during the dark passes, Earth was vibrant and animated and human activity became more obvious. The juxtaposition between these two settings revealed on the one hand the damage and injustices inflicted to the land and environment by humans and on the other the capacity for human growth, innovation, and creation.

The emotion of awe was implied or referred to directly in all of the participant narratives. What appeared to be common was a perceptual and conceptual contemplation of vastness. The perceptual contemplation surrounded the beauty, activity, and visible signatures of human civilisation. The conceptual elements were associated to contemplations surrounding the fragility and vitality of Earth, the vastness of space, and the significance of Earth and humankind life. The participants witnessed perceptually vast stimuli that transcended everyday frames of reference. In turn, this seems to have shifted their focus from an inward concern to outward concern. As a result, they developed a meaningful involvement with something larger (the cosmos, Earth, nature, and humanity).

The participants experienced other emotions such as guilt, uncertainty, and perceived loss (more discretely) simultaneously with feelings of awe. On the one hand, Earth was the only object in space that they could identify with, and this strengthened their sense of belonging to it. On the other hand, seeing the signatures of human civilisation, in particular the environmental damage humans have caused elicited vivid and startling images of humanity's fate. The juxtaposition of simultaneously feeling a sense of security and threat, safety and risk, connection and perceived loss, acted as cues that elicited intense emotional meaning and responses and strengthened the participants attachment.

Time was an important feature of the experience in the current study. The panoptic view allowed the participants to see the impact of humanity's past on its present (environmental damage) and in a tangible way conceive of the future fate of humanity and Earth. The participants were able to see the way humans devalued, damaged, and threatened the balance of nature. This created mental images that threatened the future of all life, human aspiration, culture, and security, yet the problem was no longer located in the future or in remote locations. It seems the participants not only faced and mourned the anticipated losses associated with climate change but the experience challenged some of their fundamental views about nature and humans' relationship to it.

> "You look at the Earth there is a very thin line that is actually the atmosphere. If we humans were to do something to the

> atmosphere to cause it to be very badly polluted, everything on Earth would die, there would be no hope for any of us. Everything (Joseph 8, 442).

This fear of loss highlighted the impermanence of life and allowed the participants to engage on a deeper level with concepts relating to spirituality. As a result, the participants discovered a paradoxical respect for life that occurs in response to the realities of existence and facing the possibility of death.

> "I felt like it became this idea of real significance too, feeling that we were where we are on that planet for a reason. That even though it is this tiny little speck in the grand scheme of the Universe...It is not an insignificant thing that our planet is where it's at and does what it does for us" (Nicole 5, 188).

It seems Earth gained value beyond just its form, usefulness, and affordances; and transformed into multiple attachment objects, a mother, a life force, and a sacred object worthy of respect and honour, love and compassion. This strengthened their loyalty and impetus to protect Earth. It seems In order to grasp and integrate the uncertainty, the participants perceived the universe as purposive and having a numinous quality suggesting some may believe in a universal spirit, or perhaps a higher consciousness or power. The participants were not necessarily describing such concepts with reference to a religion or a higher being but this understanding provided them with a sense of continuation, that is to say, they felt as though they were part of something immense and powerful, which gave them strength.

In many ways, the participants in the current study had to let go of aspects of the self. Their sense of self became more fluid, and their worldview expanded. In some cases, this change in personal outlook altered their perspective on their own personal life (political views, relationship with others), in others this change occasioned, to varying degrees, a transcendence or expansion of self. These altered beliefs and views of the world meant that they had a renewed sense of purpose and different ways of being-in-the-world.

For some, the experience reinforced pre-held values and caused them to review what mattered to them. For others the experience changed their outlook on life and existence. It seemed as though their thoughts about the state of the world reflected their reduced need for individual meaning and instead increased

their desire to think about collective meaning. The increased sense of connectedness to nature appears to have exercised the participant's virtuous dispositions and elicited a real sense of conviction to participate in more humanitarian and pro-environmental acts.

> "...you can't see the barriers that one group of humans puts up against another group of humans, and so you get this universal feeling of universality amongst people down on the Earth, that we are all in one Earth as sort of a universal perception that is so much more than people as individuals" (Gerald 7, 292).

The strengthened attachment with Earth meant that the participant's sense of kin extended out from family to humanity, nature and for some Earth as a whole. It appears that the benefits of taking care of the welfare of their home planet (pro-environmental and humanitarian acts) far outweigh the costs. Furthermore, the participants could clearly see that preservation of Earth meant preservation of self, kin and the affordances Earth provides.

Solidarity, social bonding, and factors such as hope, excitement, inspiration, camaraderie, and a sense of urgent purpose served to solidify the experience and became a vehicle for building and sustaining momentum for change. The participants actively attended trips, took part in conversations and conferences related to the experience. This seems to have enhanced their attachment to Earth. These rituals allowed them to develop a shared appreciation for Earth. Some had nostalgic reflexes, which manifested through dreams. For example, Joseph experienced reoccurring dreams about Earth and this brought him a sense of happiness and pleasure. Ronald personified the experience, and stated he was able to pan out and gain the panoptic perspective in his mind's eye. All the participants had internalised the experience in one way or another.

> "I came down off the podium and walked down to my wife...my wife looked at me with tears in her eyes and she said, you won't believe this but they all said the same thing. That moment really strengthened the bond I felt with those people and somehow made it all seem more real" (Gerald 4, 178).

The changes manifested in each of the participants in different ways. At the very least, the experience helped all the participants-frame their troubles and worries. The participants reported that the experience and the memory of it continued to elicit positive feelings in them.

Next the discussion section will theorise some of the findings of the study and consider how the pro-social and growth enhancing aspects can be harnessed, simulated, and utilised.

3.5 Discussion

This study unearthed some of the subjective qualities associated with the OE. By developing this broader conceptualisation of the OE and relating it to general psychological wellbeing, I have placed it in a psychological arena rather than exclusively in more specialist fields such as the space programme. In accordance with past research, this study found that altered states of consciousness, a sense of connectedness to nature and life, and the feeling of awe are typical emotional responses that can be associated to the OE experience. Yet, what appears to be unique about this experience is the way it motivates attitudinal and behavioural change. It seems one-way this experience encourages change is by the way it creates the ideal balance between satiation (the state of having needs and desires satisfied to the point of excess) and stress (Brown, 2008; Harmon-Jones & Levy, 2015; Kaplan & Kaplan, 1989). The astronauts in the current study experienced existential angst and guilt alongside feelings of awe, elevation, and euphoria. Past research tells us that positive emotions are good for us and can promote wellbeing. On the opposite side of the debate, research also suggests that people can grow and derive beneficial outcomes from traumatic experiences. The current study suggests that an environment that creates the right balance between stress and satiation is more likely to create positive psychological and behavioural change. Past research supports the idea that extraordinary natural environments (that provide stress and satiation) are more impactful in promoting wellbeing compared to everyday natural environments (Kamitsis & Francis, 2013). This is important because it differentiates between extraordinary and every day natural environments capacity to promote wellbeing and suggests that the latter environment is more growth enhancing and transformative.

The astronaut accounts and past research suggest that Earth gazing meets the four restorative components of natural environments as outlined by ART, namely fascination, being away/escapism, extent and compatibility (Kaplan, 1995). It appears that restorative environments can motivate change by inducing

relaxation and the capacity to reflect and contemplate (Korpela, Hartig, Kaiser, & Fuhrer, 2001). Furthermore, 'being away' and 'fascination' are central aspects of the Earth gazing experience, and have been identified as active components in effective green interventions for clinical depression (Gonzalez et al., 2010). The view of Earth and space was highly fascinating and caused time to slow down. These aspects are all factors that define a state of 'flow'. Past research suggests that regular engagement in flow-inducing activities can increase positive affect and promote wellbeing (Nakamura & Csikszentmihalyi, 2014). This implies that several central components of the experience of Earth gazing can have positive impact on wellbeing.

The findings of the current study contribute to existing literature by advancing our understanding of the meanings and processes involved in the development of the emotional ties with Earth and nature as well as the psychological, personal, and social advantages of connecting with nature in this way. Past research has found that spirituality in the form of an ecological self can provide a sense of purpose and meaning and therefore is associated to eudemonic wellbeing (Capaldi et al., 2015; Dossey et al, 2005; McCoubrie & Davies, 2006). In addition, there is growing evidence that ecological self is associated to pro-environmental behaviour (Higley & Milton 2008; Hartig, Evans, Jamner, Davis, & Gärling, 2003; Mayer & Frantz, 2004).

From an eco-existential positive psychology perspective this paper suggests that Earth gazing from orbit has the potential to,1) expand sense of connectedness to one another and nature, 2) restore attentional fatigue; 3) promote positive emotions and 4) help balance existential anxieties of identity, happiness, isolation, meaning in life, freedom and death. It is proposed that the experience triggers eudemonic emotions (awe, reverence, gratitude, and humility) and existential meaning which can promote eudemonic well being which research suggests can promote wellbeing (Capaldi et al., 2015; Howell, et al., 2011; Laubmeier et al., 2004; Passmore & Howell, 2014a, 2014b).

What appears to be unique about the experience is that it created an active pathway to hedonic, eudemonic and chaironic emotions and states. This has important implications, because it suggests that interacting with nature in this way not only has the potential to reduce stress and fatigue but also promote the three forms of 'mature happiness' as identified by Wong (2009). Past research supports the view that hedonistic emotions are related to immediate wellbeing, while eudaimonic emotions are associated with greater wellbeing over time (Cohen et al., 2010; Huta, 2013; Kamitsis & Francis, 2013; Laubmeier et al.,

2004; Steger et al., 2008). This is important because it suggests that Earth gazing can be used to promote wellbeing with individuals within a clinical context but also to foster social cohesion and promote and sustain wellbeing within communities and societies.

From the findings of the current study and past research, it is clear that nature based awe-inducing experiences such as Earth gazing offer comparable, demonstrable and perhaps enhanced benefits to every day nature based interventions in terms of feelings of eudemonic wellbeing and connectedness. In view of this, I recommend that psychologist evaluate the practical application of the wider use of Earth gazing in order for it to be included as a viable green intervention.

3.5.1 Applications to Practice

The cost of modern mental health treatment, particularly pharmaceutical medicine is increasing due to the growing worldwide population, higher prevalence of mental distress and the complexity and sophistication of current treatments. There is a need within the UK and across the world, for safe, effective, and inexpensive psychological interventions that can complement conventional approaches. Some are arguing conventional psychotherapeutic and pharmacological treatments appear to be partially effective in managing what Loizzo (2000) calls “diseases of civilization” (pp34). In light of this, it is appropriate to consider alternative treatment approaches to address the rising challenges postmodern mental health pose.

A growing body of ecopsychological research suggests green prescriptions and interventions can be effective in reducing stress and promoting wellbeing and therefore provide viable alternatives to current psychological interventions (Gonzalez et al., 2010; Milton, 2016). Although nature-based interventions are gaining popularity as one potential solution to some of the mental health challenges we face, the increase in working hours and urbanised living mean that the average person does not have extended periods to devote to nature-based activities. Research by Passmore and Howell (2014b) suggests that people who are successful or thriving in their personal lives are more likely to experience a sense of connectedness with nature and therefore are more likely to reap the benefits, which suggests those from lower economic strata’s in society are less likely to reap the benefits of engaging with nature. Furthermore, many of us do not have direct access to awe inducing environments such as the Grand Canyon, Sahara desert or seeing Earth from space. Finally, specific life circumstances mean that some groups of people have limited access to natural

environments for example, people with severe disability, terminal illness, people who are incarcerated, and those going though end-of–life transition. This leaves a conundrum, how can we prescribe extraordinary awe eliciting nature-based interventions that research demonstrates are impactful and promote psychological growth? The current study suggests Earth gazing, with its associated benefits can be adapted and simulated and used as a therapeutic tool. This might include guided imagery work, meditation, art therapy, nature based interventions, and finally via simulating Earth gazing via positive technologies such as VR.

As a result of the association between meaningful experiences and wellbeing (Cohen et al., 2010; Hassenzahl, 2013; Kamitsis & Francis; 2013; Laubmeier et al., 2004), there has been more interest in how we can use positive technologies to create meaningful experiences (Hassenzahl, 2013; Yoo, 2010). Turner and Casey (2014) completed a recent meta-analysis review of over 20 studies on VR for healthcare, and based on their findings suggest VR interventions are efficacious forms of psychological treatment and a promising addition to existing treatment options. This suggests that VR has potential to promote mental health. In view of this, the next segment focuses on Earth gazing VR (EGVRi) interventions.

This paper argues that EGVRi interventions can enhance wellbeing in engaging ways and can provide a range of interactive systems and mechanisms that can target psychological and behavioural change (Botella et al., 2012). However, there remain some conflicts with the ethos of ecopsychology and positive technology. Ecopsychology argues that technology has exacerbated the dissociation of human beings with nature. However, Lombardo (2006) highlights that we cannot dissociate from technology or stop technological advancement. For Lombardo (2006) the answer is for humanity and technology to form “a reciprocity” (pp. 399), with humans and technology co-evolving. He argues that the future will not only continue to advance technologically but will also see an evolution of values, human mind, and spirit. In view of this, Counselling Psychologists and allied professionals should work towards designing ethical and impactful VR ethics and programmes targeted towards mental health that produce positive and lasting psychological outcomes in individuals and play an important role in promoting wellbeing in societies (Wiederhold, 2012).

3.5.2 Limitations

The findings of the current study contribute to existing literature by advancing our understanding of the meanings and processes involved in the

development of the emotional ties with Earth and nature as well as the psychological, personal, and social advantages of connecting with nature in this way. However, this study reflects certain limitations; this segment will outline some of these.

As highlighted by past research, culture, personality, and identity play an important role in how each individual interprets this experience, therefore future researchers should consider such factors. The sample in this study was purposive and essentially self-selected from a pool of NASA astronauts likely to belong to a particular social-economic and educational status. Furthermore, the group was small and homogenous, and all the participants previously identified with the OE phenomenon. However, almost 600 people have travelled to space, which means the sample in this study represents over 1% of the population. Still, caution is warranted, as this sample is not entirely representative of the overall population of space flyers and therefore is not generalisable. Indeed, it would be interesting to examine these issues in other groups of astronauts and cosmonauts of different professional and mission status, cultural and ethnic backgrounds, and gender, in order to investigate differences and commonalities in their experiences.

Frank White interviewed astronauts for his book, The *Overview Effect,* and used these contacts to help me recruit the sample in the current study. The participants therefore identified with the experience of the OE. In view of this, it is likely that the participants had a positive space flight experience and identify with the phenomenon, which may mean there was a degree of bias. However, I mitigated the effects of this by scrutinising historical reports and studies. Overall, it seems that a significant number of space travellers report space travel as a positive experience, minimising the risk of bias.

A significant number of participants in the current study used objective, neutral, and somewhat scientific discourse, perhaps because the cohort was made-up of scientists, engineers, and pilots. Similarly the experience was extraordinary and did not resemble anything in their usual frame of reference, and therefore, at times, the participants did not have the language or vocabulary to fully capture the experience or relay their felt sense in relation to it. Thus, as predicted, language presented some limitations in and of itself (Willig, 2014). This problem is a challenge that many methodologies have to deal with. However, to minimise this limitation, future researcher should conduct follow up interviews that focus more on body language, utterances, and pre-reflective sensing. In addition, revealing the interview questions to the participants a few

days prior to the interview would minimise the language bias because participants would have more time to reflect upon complex memories, feelings and cognitive processes.

The participants demonstrated high levels of self-awareness and self-reflection. However, the topic of the interview was something that they had discussed in previous interviews or conferences or written about in books and articles. As a result, aspects of our conversation resembled comments or statements made in previous books and interviews. In view of this, perhaps a single interview for each participant was restrictive. Conducting follow up interviews would allow the researcher to develop greater rapport and gather more in-depth data. However, due to the participants' busy professional lives this was not feasible.

The next segment provides recommendations for future researchers wanting to pursue research in this area.

3.5.3 Suggestions for Future Research

The resulting findings, considerations, and theoretical insights will, I hope, inform and guide future researchers on areas to explore. Perhaps one approach to overcome some of the aforementioned limitations is to conduct interdisciplinary studies that integrate practices from psychology, neuroscience, and phenomenology. In this way, researchers can employ the strengths of each method. Other suggestions to overcome the limitations of the current study include conducting cross-cultural and comparison follow-up studies.

Stuster's (2010) study found that Earth gazing and Earth photography can help astronauts adjust to the physical and behavioural conditions of life on board the International Space Station (ISS) and facilitate relaxation. This suggests that astronauts find the activity of Earth gazing relaxing and stimulating but also that it has the potential to facilitate recovery from attention fatigue during missions. Future researchers should explore how to harness the positive effects of Earth gazing to buffer against the harmful psychological and physiological effects of long duration space missions. For example, it is important to understand how effective Earth gazing is at reducing cognitive overload, boosting energy, mood, memory, motivation, crew moral and cohesion during flights.

It is also important for psychologists to play an active role in debating, researching, designing, and implementing various positive technology programmes for healthcare (Wiederhold, 2012) focusing on this unique experience. The hope is that with this allied effort, psychologists will help design ethical, impactful VR strategies, and programmes that produce positive and

lasting psychological outcomes in individuals and play an important role in promoting wellbeing in societies (Coyle et al., 2014). Finally, future researchers should focus on hedonic and eudaimonic outcomes. Excluding one over the other can lead to biased conclusions (Huta, 2013).

3.6 References

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Appendix 7: Ethics Release Form

Ethics Release Form for Student Research Projects

All students planning to undertake any research activity in the School of Arts and Social Sciences are required to complete this Ethics Release Form and to submit it to their Research Supervisor, **together with their research proposal clearly stating aims and methodology**, prior to commencing their research work. If you are proposing multiple studies within your research project, you are required to submit a separate ethical release form for each study.

This form should be completed in the context of the following information:

- An understanding of ethical considerations is central to planning and conducting research.
- Approval to carry out research by the Department or the Schools does not exempt you from Ethics Committee approval from institutions within which you may be planning to conduct the research, e.g.: Hospitals, NHS Trusts, HM Prisons Service, etc.
- The published ethical guidelines of the British Psychological Society (2009) Guidelines for minimum standards of ethical approval in psychological research (BPS: Leicester) should be referred to when planning your research.
- **Students are not permitted to begin their research work until approval has been received and this form has been signed by Research Supervisor and the Department's Ethics Representative.**

Section A: To be completed by the student

Please indicate the degree that the proposed research project pertains to:

BSc M.Phil M.Sc **D.Psych** n/a

Please answer all of the following questions, circling yes or no where appropriate:

1. Title of project

Astronaut experiences of the Overview Effect

2. Name of student researcher (please include contact address and telephone number)

Annahita Nezami

3. Name of research supervisor

Julianna Challenor

4. Is a research proposal appended to this ethics release form? **Yes** No

5. Does the research involve the use of human subjects/participants? **Yes** No

If yes,

a. Approximately how many are planned to be involved?

6

b. How will you recruit them?

I have contacted Mr Frank White who wrote the book The Overview Effect. In his book he interviewed 16 astronauts. Mr White agreed to contact the astronauts who participated in his book to ask if they will be interested in my research. 5 people have already expressed an interest to take part. I am waiting to see if any more will be interested. I am hoping that I will also recruit some participants through snowball sampling.

c. What are your recruitment criteria?
(Please append your recruitment material/advertisement/flyer)

Professional astronauts or retired astronauts who have been into space or on lunar landings who identify experiencing The Overview Effect. I will use the book the Overview Effect to identify those who have suggested experiencing this phenomenon

d. Will the research involve the participation of minors (under 18 years of age) or vulnerable adults or those unable to give informed consent? Yes **No**

d1. If yes, will signed parental/carer consent be obtained? Yes **No**

d2. If yes, has a CRB check been obtained? Yes **No**
(Please append a copy of your CRB check)

6. What will be required of each subject/participant (e.g. time commitment, task/activity)? *(If psychometric instruments are to be employed, please state who will be supervising their use and their relevant qualification).*

Each participant will be required to read information sheet and sign consent form if they agree to terms of research. I will use Skype to interview participants. The interviews will take approximately one hour and will be tape recorded. I may require follow up interviews with selected participants if richer data is required

7. Is there any risk of physical or psychological harm to the subjects/participants? Yes **No**

If yes,

a. Please detail the possible harm?

b. How can this be justified?

c. What precautions are you taking to address the risks posed?

8. Will all subjects/participants and/or their parents/carers receive an information sheet describing the aims, procedure and possible risks of the research, as well as providing researcher and supervisor contact details?

Yes **No**

(Please append the information sheet which should be written in terms which are accessible to your subjects/participants and/or their parents/carers)

9. Will any person's treatment/care be in any way be compromised if they choose not to participate in the research?

Yes No

10. Will all subjects/participants be required to sign a consent form, stating that they fully understand the purpose, procedure and possible risks of the research?

Yes No

If no, please justify

If yes please append the informed consent form which should be written in terms which are accessible to your subjects/participants and/or their parents/carers)

11. What records will you be keeping of your subjects/participants? (e.g. research notes, computer records, tape/video recordings)?

Research notes, tape recordings, computer records, and consent forms.

12. What provision will there be for the safe-keeping of these records?

I will keep all files and paper documents related to this research in a secure place. All computer files will be protected by a secure code and all paper files will be kept in a locked filling cabinet. I envisage that because of the nature of this research most participants will not mind some information being available such as their name in the final thesis. It is important to note the limitations that on-line interviews such as Skype may pose to confidentiality such as accessibility of data. This will be discussed at full in my thesis, made clear on the consent form as well as at the start of the interview.

13. What will happen to the records at the end of the project?

Records will be kept for 5 years in relation to good practice guidelines.
The data will be stored securely, access will be strictly controlled, and that anonymisation and encryption will be used if appropriate to protect personal data.

14. How will you protect the anonymity of the subjects/participants?

I will keep personal information safe, the data coded numerically, pseudo names created and personal information altered slightly such as date of birth for those participants who tell me they want to remain anonymous.

15. What provision for post research de-brief or psychological support will be available should subjects/participants require?

I will debrief all participants via Skype and provide them with a debrief letter providing information and some contacts of relevant people/organisations.

(Please append any de-brief information sheets or resource lists detailing possible support options)

If you have circled an item in **underlined bold** print or wish to provide additional details of the research please provide further explanation here:

Signature of student researcher -- [redacted] ---------- Date 16/10/2014

CHECKLIST: the following forms should be appended unless justified otherwise

Research Proposal
Recruitment Material
Information Sheet
Consent Form
De-brief Information

Section B: Risks to the Researcher

1. Is there any risk of physical or psychological harm to yourself? Yes (No)
If yes,

a. Please detail possible harm?

b. How can this be justified?

c. What precautions are to be taken to address the risks posed?

Section C: To be completed by the research supervisor

(Please pay particular attention to any suggested research activity involving minors or vulnerable adults. Approval requires a currently valid CRB check to be appended to this form. If in any doubt, please refer to the Research Committee.)

Please mark the appropriate box below:

Ethical approval granted

Refer to the Department's Research and Ethics Committee

Refer to the School's Research and Ethics Committee

Signatur[redacted] ---------- Date 16/10/2014

Section D: To be completed by the 2nd Departmental staff member

*(Please read this ethics release form fully and pay particular attention to any answers on the form where **underlined bold** items have been circled and any relevant appendices.)*

I agree with the decision of the research supervisor as indicated above

Signature [redacted] ---------- Date 16/10/14

Appendix 8: Email(s)

My name is Annahita Nezami; I am a therapist and a third year student on the Professional Doctorate in Counselling Psychology at City, University of London. I am writing to you because Mr Frank White kindly helped me recruit participants and expressed that you might be interested in taking part in my Doctoral research surrounding human spaceflight and the Overview Effect. If you wish to review my professional background, my LinkedIn Profile is: Annahita Nezami; [redacted]

Firstly, may I thank you for your time in reading this email and thinking about taking part, I think this is an exciting research topic that may contribute to applied Counselling Psychology. I have attached an information sheet for you to read and if you have any questions I will be happy to answer them for you.

Below are some potential dates in October/November 2014 for interviews. If after reading the information sheet you remain interested in taking part please go ahead and check if any of the dates outlined are suitable and email me back your availability. Please also let me know the time(s) you are free, take note that there will be a UK/America time zone difference to take into account. Where possible I would like to conduct interviews no earlier than 6:30am or later than7pm UK time. If the dates below are NOT suitable please email me dates & times that might be better for you from October 2014 - February 2014 and I will endeavour to work around them. When choosing your own dates please take into consideration that I am available for interviews on the following days/times:

Mondays (all day), Fridays (all day) and weekends (if required due to participants professional commitments & Busy schedules). I may also have availability on Tuesdays (after 3pm your time) if required.
The provisional dates for the interviews I have scheduled are as follows:

Friday	24	October	Saturday	8	November
Saturday	25	October	Monday	10	November
Monday	27	October	Friday	14	November
Friday	31	October	Saturday	15	November
Saturday	1	November	Monday	17	November
Monday	3	November	Friday	21	November
Friday	7	November	Saturday	22	November

Once you have outlined the dates you are free I will forward you more information and a short consent form for you to fill out and email back to me. If you think any of your colleagues might be interested in this research please feel free to pass on my details or give me their email address with their consent.

I look forward to hearing from you.
Yours sincerely

Annahita Nezami
BSc Psychology, MSc Forensic Psychology,
DPsych Counselling Psychology (In Training)
Email: [redacted] / [redacted]

Appendix 9: Information Sheet

Participants Needed!
Research: 'Exploring astronaut's experiences of seeing planet Earth from space'
Are you an astronaut/retired astronaut who has seen planet Earth from space? I am a final year Counselling Psychology Doctoral student at City, University of London looking to recruit between 10-20 participants for the purpose of this research.
The overall goal of this study is for astronauts to reflect on their experiences of seeing planet Earth from space and to think about their actions, thoughts and feelings during those times as well as if this experience has had any impact on their life after. The purpose of this research is to provide participants with an opportunity to share stories of their lived experiences and interactions. By participating in the study you will broaden our understanding of this experience and help us explore implications for applied psychology. The study will also afford participants an opportunity to reflect on their experiences and to offer insight into what they have learned and how these experiences may have transformed them.
After you have expressed interest in participating in this research you will be involved in a face-to-face or Skype interview where you will have the opportunity to talk about your experience. This interview will last approximately 60 minutes. Because we cannot forecast how extensive the conversation will be; subsequent opportunities for dialogue may be scheduled with participant consent. These sessions will be audio-taped and transcribed. Due to the nature of Skype on-line interviewing i.e., private/public domain, there may be some limitations to full confidentiality. If you would like to minimise this risk please do not divulge any private information such as address/mobile number during the Skype Interview. All the data that is gathered will be treated with respect kept in a safe place and if participants specifically request their responses will be coded in a manner that will keep their name anonymous in the final research. All private information provided by the participants to me during previous correspondence such as Skype user details, telephone number(s), or address will at all times remain completely confidential, for my use only and will not be mentioned in any part of the research. The City, University of London ethics committee has reviewed the proposal for this research and has consented for it to continue. Please feel free to contact me or my department regarding any questions you may have in relation to this research:

If you are interested in participating in this study, please contact me via email and include Planet Earth from space in the subject-line. Additional information regarding guidelines and consent will be forwarded once initial contact is made with researcher.

Annahita Nezami
Email: [redacted]
[redacted]
City, University of London, School of Art and Social Sciences –
Psychology Department,
Northampton Square,

Appendix 10: Debrief Sheet

Thank you for taking part in this research. All confidential information/data will be kept safe, no private details such as addresses or phone numbers will be revealed. However, as indicated on the Consent Form, the research will include your names.

If you have any questions or feel that you require support after the research is completed please do not hesitate to contact me or my supervisor Dr Julianna Challenor.

Research Supervisor
Dr Julianna Challenor
Department of Psychology
City, University of London
Northampton Square
London EC1V 0HB
email: [redacted]

Researcher
Annahita Nezami
email: [redacted]

Appendix 11: Consent Form

Please read the consent form and sign if you agree to the terms surrounding the research titled: The Overview Effect and Counselling Psychology: Astronaut experiences of Earth gazing.

The following document is a consent form which needs to be signed, it is related to specific rights you have as a participant and information of how the data that you provide in this research will be used, therefore please take the time to read it carefully before signing.

I agree to take part in the above City, University of London research project. I have had the project explained to me and/or I have read the Explanatory Statement, which I may keep for my records. I understand that agreeing to take part means that I am willing to:

- ✓ Be interviewed by the researcher either by Skype or face-to-face for approximately one hour
- ✓ Allow the interview to be audiotaped

The information gathered will be held and processed for the following purpose(s)

- ✓ Used for analysis
- ✓ Written up in Counselling Psychology Doctoral study
- ✓ Data may be shared with other academics
- ✓ Research findings may be printed in academic and professional journals

I understand that any information I provide will be treated confidentially, Private data such Skype user details, address, email address or telephone number will remain confidential at all times and will not be published or shared with any other person or organisation. However, unless indicated, details such as space missions, profession and name, will be included in the research. PLEASE DO INFORM ME IF YOU DO NOT WISH YOUR NAMES TO BE INCLUDED IN THE FINAL RESEARCH PAPER. If risk of harm to self or others is suspected during interviews, other professionals may be notified in order to pertain to health, safety and duty of care responsibilities.

I am aware of the limitations that exist when conducting on-line/internet interviews like Skype such as keeping data fully in the private domain. In order to reduce the risk of personal details becoming accessible on-line please do not mention personal details such as address or mobile numbers during the Skype interview. This is because content from the internet is often viewed as an easily accessible database.

I agree to City, University of London recording and processing this information about me. I understand that this information will be used only for the purpose(s) set out in this statement and my consent is conditional on the University complying with its duties and obligations under the Data Protection Act 1998.

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.

I have read and understood the form and fully agree to participate in the research that is being carried out and for the data to be used as outlined above.

Name: (CAPITALS) Skype User Name:
Email:
Signature Date: (City & Zip code):

NOTE: These forms will be kept in a safe place, separate from other data such as questionnaires and interview transcripts in order to protect your anonymity. Please feel free to contact me for further information if required.

Appendix 12: Interview Schedule

1) Please tell me your name and briefly describe your role(s) within the space programme and your current occupation?
2) Approximately how many hours did you spend in space and during these times did you get some time to Earth gaze
3) When was the last time you were in space?
4) Can you describe the first time you saw planet Earth from space? (i.e., leading up to the experience and what you saw when you looked at our planet)
5) Can you recall some of your immediate thoughts, feelings, and memories?
6) Can you talk a little bit about what it is like seeing Earth in darkness and light? What it is like seeing Earth against the vastness of space?
7) Do you think this experience has had any impact on your life? Do you draw from it in any way? How do you make sense of this experience, how do you see the world around you? (relationships, existentially, noetically/philosophically, spiritually, physically, dreams)

Appendix 13: Initial Notes and Impressions

Initial impressions, emotions and reactions

This was my first interview. I was nervous. Although I had completed relevant reading and had attempted to familiarise myself with the language and the phenomena I felt in awe of the participant. I felt the astronauts were the experts and I the novice. My first impression of the participant was he wanted to relay a message to me. I felt he was eager to get this message across and resume back to life. He was in his office at work, and although it was private he had other duties to return to after the interview. I felt the pressure of time and had a sense of urgency to get the information I required. However, as the interview progressed I learned to expose more of myself and to accept that I was a novice. I tried to approach the interview and the participant with curiosity, because ultimately, it was he who was the expert.

Listening to the recording of this interview, I noticed that my nerves came through at the beginning. I wanted to impress my participant. I wanted to leave him with a good impression. I was eager to extract an nuanced experiential account of seeing Earth from space, and from the onset worried that I would not able to do this well and was self-critical. I used sarcasm to build rapport and ease my nerves. Factors such as these interfered with the flow of the interview because they reduced my ability to attentively listen. At times I was slow to respond and delve deeper. I hoped that with each interview my nerves would diminish. Making notes and remaining reflective throughout the interview process allowed me to develop my interviewing skills and accumulate proficiency through the course of the interviews.

My interpretations of participant's reactions and their interactions with me

I noticed from the start of the interview that this topic was close to the respondent's heart, and he acted as an ambassador conveying the wisdom he had learned. Nevertheless, during some parts of the interview I felt the some of the answers sounded scripted. I think this is because accounts were retrospective and because there has been a lot of journalistic interest on the impact of seeing planet Earth from space, which meant the respondent had written and reiterated his thoughts about this issue in books, magazines and interviews. Therefore, it would be appropriate to assume that some of his responses had been reiterated previously. Moreover, the respondent was an astronaut, a scientist, and currently a professor at MIT, he had an analytical mind set which I found difficult to bypass. I found it difficult to surpass the respondent's analytical evaluation to gain insight into the emotional impact. Alongside of these factors unavoidable power dynamics existed between the respondents and myself. I was the novice interviewer in awe of the respondent who is a notable, highly intelligent professor who was an astronaut for NASA.

At first these factors interfered with the interview process because they induced a degree of uncertainty within me. I craved novel descriptions and accounts that surfaced from deep reflectivity regarding emotions and thoughts but doubted my own aptitude to gain deep and meaningful accounts from my participants. Whenever I perceived I was not getting the 'right' answers I would respond, stutter my words and use sarcasm. I examined my initial impression. I decided to use this reflection as learning in order to grow. I felt that if I could learn with each interview I would develop more confidence. I wondered if the final respondent would get the best of me as an interviewer.

Developing constructions

AMBASSADOR
SALVATION
Heroes
Ambassadors
Salvation
Heaven
Awe
The overview
Bliss & Emptiness
Deity
Mother Earth
Sentient Earth
Reverence
Epiphany
Humility

Summarising paragraph of participant's experience of seeing planet Earth from space

Jeff felt his experience of the phenomena was blissful and awe-inspiring but it was intertwined with the excitement of the launch, tranquillity of weightlessness, and seeing the vastness, emptiness and hostility of space. Jeff circled the planet at low-Earth orbit every 90 minutes and saw sixteen sunrises and sunsets every day. This encouraged a sense of geographical familiarity with Earth coupled with a deeper appreciation of the Earth's dynamic state of flux. His observations concerning the contrast between how the Earth looked during darkness and light were significant in making sense of his experience. During the day, the planet was seen as fragile and alive with an organic enigmatic beauty, and only traces of human civilisation such as environmental damage were evident. At night mother Earth fades in to the background and the 'spread' of human civilisation becomes apparent, the Earth is still beautiful and alive but in a more animated and artificial way. Seeing planet Earth from this global perspective and getting re-acquainted with it as an integrated living system instigated a relationship with it that is more empathic and compassionate. This relationship has caused a shift from an abstract awareness of the environmental damage humans have caused to a deeper, more in tuned empathic understanding of the damage we have caused. The direct impact of this experience has been implicit in day-to-day behaviour. Jeff feels that the experience has become part of him. He feels a sense of nostalgia for seeing planet Earth from space and experiencing weightlessness, which he has tried to re-capture back on Earth without avail.

Development of emergent themes

CELESTIAL
SYMBOLISM
DYNAMIC STATE OF FLUX
DARKNESS & LIGHT
AWE-INSPIRING
REVERENCE
INTIMACY
PRESERVATION
WEIGHTLESS COCOON
UNIVERSALISM
NOSTALGIA
FRAGILE OASIS
HOSTILE UNIVERSE
AMBASSADOR OF EARTH
THIN BLUE LINE
AWE-INSPIRING
SOLIDARITY

THE BIG LEAD UP TO SEEING PLANET EARTH

ROOKIES
LIVING THE DREAM
THE EXHILARATING LAUNCH
SILENCE
COCOONED IN WEIGHTLESSNESS
CRITICAL

Development of emergent themes 2

VISUAL IMPRESSION

PHANTASMAGORICAL
FRAGILE OASIS
PLANET EARTH IN DARKNESS & LIGHT

EMOTIONAL IMPACT

REVERENCE
NOSTALGIA

INTIMACY
BELONGING
INSIGNIFICANCE VS SIGNIFICANCE
PERSONIFY – GROK INEFFABLE EXPERIENCE
THE VAST REALMS OF HUMAN EXPERIENCE
AWE-INSPIRING CELESTIAL SYMBOLISM
TRANSMISSION THROUGH POETRY
A SPACE ODYSSEY
perception of the self (e.g., increased self-reliance or autonomy and self-efficacy)
interpersonal relationships (e.g., closer connections and increased compassion and giving to others),
philosophy of life (e.g., reorganized priorities, appreciation of life, sense of meaning, and spiritual development).

UNIVERSALISM
BENEVOLENCE
ENVIRONMENTAL PRESERVATION

Appendix 14: Theme Table and Quotes

Superordinate Theme 1 DEEPLY IMPACTFUL PERCEPTIONS OF EARTH	**Participant**	**Page/line**	**Key words**
Sub-theme 1 Earth a phantasmagorical spectacle with a sobering contradiction	Nicole	11.499	it's just this beautiful and it's crystal clear
	Michael	6.248	The view of our planet from space is nothing short of breath taking
		8.327	The Earth seems tranquil, peaceful and beautiful l
	Ronald	6.281	I took…this beautiful picture of the Mediterranean…it's just a beautiful picture
	Joseph	4.183	you just cannot take your eyes off the Earth. It just is so beautiful"
	Jeffrey	2.78	The visual environment changes completely…it's basically a very, very different world
	Nicole	6.186	It surprises you every time you look out…there is something different about it that you didn't see before
	Ronald	8.404	Some of the things that strike you is that it's constantly changing, the colours, the shadows, the terrain, everything is changing
	Jeffrey	6.263	And so you see both the beauties and the more disturbing aspects of the environmental damage that you can see from space,
	Ronald	5.269	I was really almost immediately struck by the sobering contradiction between the beauty of our planet on one hand and the unfortunate realities of life on our planet, for a significant portion of its inhabitants on the other hand
Sub-theme 2 Fragile oasis & the existential awakening	**Participant**	**Page/line**	**Key words**
	Jeffrey	8.349	I think that's very important, the ability to see the Earth as a planet, the ability to see the Earth as finite, to see the Earth as an oasis in a basically hostile universe.
	Gerald	4.152	talked about how beautiful and fragile the Earth looks, and how based on

			distant pictures that she had seen she had a feeling that it was all alone
	Michael	8.327	Earth seems tranquil, peaceful, and beautiful, but it also seems fragile at the same time
	Ronald	6.324	that little paper thin layer is keeping every living thing on our planet alive
Sub-theme 3 Earth in darkness & light	Jeffrey	2.77	what the Earth looks like during the day and what the Earth looks like at night are completely different
	Gerald	7.288	I had two episodes you might say, or doses, or whatever you want to call it. One was looking down the Earth in the daylight and seeing the beauty of the Earth and seeing the black space beyond
	Byron	8.337	You look down and you can see some cars and trucks on the highway, you can see buildings and things, and then you go into orbit and you still see the results of human civilisation
	Ronald	8.411	And talking about going from day time to night time, that's an interesting thing too, that we all get a sunrise and a sunset every day, we get 16 of them a day
	Nicole	10.434	But when you look at thunderstorms from space, it's like this little network of a nervous system and that little storm in Houston is just one piece of this whole string that's going across the whole planet.
Super-ordinate Theme 2 PROFOUND & UNEXPECTED EMOTIONAL IMPACT	**Participant**	**Page/line**	**Key words**
Sub-theme 1 The development of a strong emotional attachment to Earth	Gerald	10.433	being able to get into a position where you could look down and see all this, it's a very special kind of experience that very, very few people have ever had, and I recognise that
	Gerald	10.435	I've spent a lot of time over the years talking to people and trying to get them to understand how important it is that we take an attitude toward our Earth as a more reverent attitude and do more to take care of it
	Nicole	8.352	their place is this Station going around Earth but they have to be respectful of it just like we do our planet

	Michael	8.329	Sustainability gains importance when one travels completely around the Earth's, completely around the only Earth we have in 90 minutes
	Jeffrey	6.259	we got it, definitely got a familiarity with our own planet just because we flew over all parts of it
	Michael	6.261	Curiously I found that when outside I was much more moved by nature and less drawn to particular places. The perspective is so much greater that zooming in on a city seems uninteresting
	Byron	4.152	The Earth filled up most of our visual sphere. So we still felt connected to it
	Ronald	5.265	being detached from the planet made me feel deeply interconnected with everybody on it
Sub-theme 2 **A divine cosmic order: Spirituality and Significance**	Gerald	7.310	So that's the experience that you have at night, and that's when you really get the feeling of insignificance, of the fact that the Earth is so far away from anything else that it's just remarkable
	Nicole	5.188	even though it is this tiny little speck in the grand scheme of the Universe, it doesn't equate to insignificance. It is not an insignificant thing that our planet is where it's at and does what it does for us and all that kind of thing
		7.289	if you look at us on this grand scale of this tiny little place in the universe, it's like we need to get our act together globally. [Laughs] And that's what I think hits me more
	Gerald	7.311	the fact that the Earth is so far away from anything else that it's just remarkable
Sub-theme 3 **Otherworldly: A surreal and awe-inspiring experience**	Michael	7.314	For me the experience it seems surreal. I feel I, I have lived two lives
	Gerald	3.106	I certainly can't feel what I felt at that moment but I recall that it's surreal
	Nicole	13.587	there is this surreal nature of it that almost, it just almost, I think it's because I just can't believe I've been blessed, fortunate enough to be able to do it,
	Jeffrey	3.123	all of a sudden it hit me, after all these years of dreaming about it, I'm finally in space. And so yeah, that view of the, coming up over the south, the west coast of Africa is something I'll never forget

	Nicole	2.71	I think it's like the whole experience, I remember kind of this, just being overwhelmed, You know, almost you can't process it
Super-ordinate Theme 3 A SPACE ODYSSEY	**Participant**	**Page/line**	**Keywords**
Sub-theme 1 Universal values	Jeffrey	6.266	it brings back the, kind of a worldwide nature of the global environment,
	Gerald	7.292	so you get this universal feeling of universality amongst people down on the Earth
	Gerald	10.428	we're all in one Earth as sort of a universal perception
	Michael	8.373	you're a little bit more tolerant, a little bit more eco friendly, and a little bit more globally aware
	Byron	7.313	we felt that we became global citizens. We started from our little town, to our state or province, to our country, and then really branched out to be global.
	Nicole	6.235	It certainly made me think about where I live a little bit, it's made me think less about just my neighbourhood and more about the planet as a whole
	Nicole	12.529	So we're all kind of astronauts flying in space"
	Ronald	5.268	I really can't explain, being detached from the planet made me feel deeply interconnected with everybody on it
	Ronald	7.369	the real perspective of our planet is that we are all living together on this biosphere that we call Earth and that we're all riding through the universe together
	Gerald	7.324	one of the things that struck me when I looked out there is it's, I said to myself, there is an order to things out there
	Nicole	7.288	I don't think there's insignificance to why we're here just because we're this small little place in the universe. But if you look at us on this grand scale of this tiny little place in the universe it's like we need to get our act together globally

Sub-theme 2 Inter-subjectivity and solidarity	Jeffrey	8.359	You definitely realise that you, if humanity, we can't just keep pumping all our waste products willy nilly into the atmosphere and expect that it's not over the long term going to have some impact on our planet, which in fact it seems to be having now
	Gerald	10.424	So in terms of significance, I think the fact that we can understand that relationship, it makes it more important for us to be able to look down at the Earth and live on the Earth responsibly. And that's been my main thing as I talk with people ever since the mission, is that we need to be responsible and feel responsible for this Earth of ours
		11.470	Well, I would say it's probably put me more at peace and at ease in my relationships with other people. I am much more tolerant of situations, I have more understanding
		5.194	And the title of the exhibit is Our Fragile Home. But anyway, that's exactly what I felt, and come to find out after talking with a lot of cosmonauts and other astronauts, I'd say 95% of us all had the same kind of reaction
	Michael	4.180	And I think we have a more tolerant global, probably sustainable, or geared more towards sustainability, a view of the world than we did before, each of us did do. And I, so I think that there is a more benevolent, well, I think tolerant is probably the best word.
		8.329	Sustainability gains importance when one travels completely around the Earth's, completely around the only Earth we have in 90 minutes
		9.378	part of my work at the Commercial Spaceflight Federation is trying to democratise access to space so that not only 500 people will have had the chance to do it but others will, and I think one important by product of all that will be that more people will have this slight tweak to their worldview, which is a positive thing, and maybe that helps be a better place
	Byron	8.374	I mean it goes through this day. My wife and I adopted two daughters from China
		10.455	I'm more conscious of it. I don't know that it's changed the way I act necessarily but you tend to be more conscious of it and you think about things more

		7.312	it really hit home to me that going in space and seeing the Earth from space and realising it's an hour and a half around the whole world, it's a cross barrier experience and realization.
		8.366	I became a lot more multicultural I would say, and just had a different outlook I think on the different countries and different cultures. So it solidified all that
	Nicole	5.194	I think it's why we develop relationships with other people and why we try to do good things and hopefully why we try to take care of the planet
		8.359	it makes me really, really sad and very upset that I know about the kind of relationship we can have with each other and about the very creative and complex things we can do, work together on and solve our problems about and here we are with this other stuff not really being able to get it
	Ronald	7.354	I definitely think I had an expanded idea of the kinship of Earth, of who's in my tribe if you will, and my tribe rapidly became humanity
		7.372	that picture of Libya, what that said to me is that these people are fighting for a teeny, tiny little slither of an apparent paradise and that, and all of a sudden the things that we argued about, the things that we fight about, the things that we kill each other over seem so stupid and trivial when you see the reality, the real perspective that you get from space

Table 5: Theme table and quotes

Appendix 16: Jeffrey Transcript