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Older Adults and Anxiety : The Role of Natural Imagery in Anxiety Reduction

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Older Adults and Anxiety:
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Abstract

The present study aimed to examine whether visual contact with natural imagery would result in reduced levels of anxiety in older people, when compared with the effects of urban imagery. Thirty-three older adults between the ages of 61 and 91 participated in this study. Thirteen of the participants were male and 20 were female. In a partial replication and extension of the work of Ulrich et al. (1991), the participants were randomly assigned to one of three groups – a nature video group, urban video group or control group. All participants initially completed the state form of Spielberger's (1983) State-Trait Anxiety Inventory (STAI). Then seven-minutes worth of a nature video (depicting rainforests) or an urban video (depicting cityscapes) was shown to those in the experimental groups. Those in the control group were left in a room containing magazines for a seven-minute period. The state form of the STAI was then re-administered to all participants. A Kruskal-Wallis test was conducted on the data and indicated that no statistically significant differences existed between post-test STAI scores for the nature, urban or control groups ($p >$ .05). These results are in contrast to those found in the previous literature and suggest that limitations such as the small sample size, nature of the sample and the length of the video recordings may have been at least partly responsible for the non-significance of the results. Because of the potential for this area of research to improve the quality of life and health of older Australians, future research should concentrate on overcoming research limitations and methodological problems. Findings could then be applied for the benefit of older people in a wide range of environments, such as nursing homes, hospices, hospitals and retirement communities.

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Submitted: October 2001

Declaration

I certify that this thesis does not incorporate, without acknowledgment, any material previously submitted for a degree or diploma in any institution of higher education and that, to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.

Signature: _

Date: 6-2-2002

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Table of Contents

Introduction

Throughout history, humans have been surrounded by nature and dependent on it for food, water, medicinal materials and a host of other products (Batelli, 1998). People have also realised that contact with nature is essential for human health and well-being (Batelli, 1998) and cultures from all over the world have used nature as a restorative and therapeutic tool to promote physical, psychological and spiritual health (Batelli, 1998). For example, the ancient Chinese theories of Tao and Yin and Yang emphasise the importance of harmony and balance between humans and nature for optimal health (Chen, 1996). Likewise, in Ancient Egypt, doctors advised people suffering from psychological problems to take lengthy walks around nearby gardens and, in the Middle Ages, monks designed therapeutic gardens for the sick and infirm (Driedger, 1996). In short, "people in all walks of life, in sickness and in health, in good times and bad times, find in nature something that comforts and restores" (Kaplan & Kaplan, 1989, p. 175).

Nature Defined

There is, however, disagreement in the environmental psychology literature about how the concepts of nature and natural environments should be defined (Mausner, 1996). Early research tended to conceptualise nature as wilderness, that is, as a "physical environment that is not created or regulated by humans" (Dowdall, 1998, p. 18). Examples of nature defined in this way include mountains, forests, deserts and the ocean (Mausner, 1996). However, this definition of nature refers to areas that are inhospitable and rarely ventured into by humans (Mausner, 1996). Those areas that are still free from man-made objects but which experience human activity are referred to as "civilised natural environments" (Mausner, 1996, p.344). Mountains or forests with hiking trails would be included in this category (Mausner,

1996). Both wilderness and civilised nature represent natural environments in a relatively pure form. However, the majority of people spend very little (if any) time in environments such as these (Mausner, 1996). Therefore, there has been a move towards including everyday environments in definitions of nature.

Kaplan and Kaplan (1989) provide a broad definition of nature which places equal emphasis on distant natural areas that are relatively untouched by humans and nearby urban places that contain natural elements. The authors find it unhelpful and limiting to dichotomise nature, that is, nature should not be defined simply as wilderness or urban nature. Instead, the term should encompass the full range of natural settings and elements as urban nature provides important positive effects for nearby residents. Similarly, Wohlwill (1983) states that parks and gardens deserve to be included in conceptualisations of nature and natural environments because of the ability of such places to influence human behaviour and response. The present study will use a broad and inclusive definition of nature, as proposed by Kaplan and Kaplan (1989).

The Therapeutic Value of Wilderness

Benefits from time spent in natural wilderness have received increased research attention in recent years (Levitt, 1989). Groups such as children and adults with emotional problems and people with severe mental illness have been found to benefit physically, cognitively and psychologically from opportunities to experience the wilderness (Levitt, 1989). People without emotional or psychological problems have also expressed positive reactions to time spent in the wilderness.

Kaplan (1974) studied a group of ten teenage boys who spent two weeks on an outdoor challenge program and found that the participants frequently commented on the beauty of their surroundings. More specifically, when compared with a control

group, the group learned many new skills, felt challenged and experienced increased self-confidence and self-esteem (Kaplan, 1974). Similarly, Scherl (1989) believes that an individual's coping resources are strengthened by time in unfamiliar settings, such as the wilderness, so that a wider range of behaviours can be engaged in and greater personal freedom experienced.

Research also suggests that wilderness settings offer valuable opportunities for people to experience solitude, which is the withdrawal from complex social environments, not necessarily complete withdrawal from people. Absence of human influence on the environment, feelings of peacefulness and calmness, cognitive freedom and individual freedom (freedom from societal expectations and roles) are the most highly valued aspects of wilderness solitude (Hammitt, 1982).

The wilderness has also been credited with providing people with spiritual inspiration because spending time in such places provides a multitude of sensory information and promotes clarity of mind (Fredrickson & Anderson, 1999). Feelings of relaxation, freedom from societal expectations and roles, increased sensory perception and opportunities for contemplation when surrounded by nature frequently emerge in relation to wilderness experience (Fredrickson & Anderson, 1999; Mausner, 1999).

Although there are numerous studies that support the idea that contact with nature is beneficial to human health, there is some research that suggests that certain people may find nature "scary, disgusting and uncomfortable" (Bixler & Floyd, 1997, p. 443). More specifically, people may experience negative reactions towards wildlife, insects and the wilderness itself and may feel disgust and discomfort at being exposed to natural elements (Bixler & Floyd, 1997).

It appears that contact with nature may be immensely beneficial to human health and well-being. However, most people do not have regular contact with wilderness areas, which means that urban nature plays a more important role in the lives of many people. Burns (2001) states that it is possible to receive health-promoting experiences from near-by nature, rather than only from contact with distant expanses of pristine wilderness. Such near-by nature can include gardens, parks, vacant blocks, flower displays and urban nature reserves.

The Therapeutic Value of Gardens

The role of gardens and gardening in psychological health and well-being may have long been understood on a common sense level but it is only during the past 30 years that researchers have addressed the issue. Early work by Kaplan (1973) and Lewis (1979) demonstrated that gardens offer people respite from an ever-changing world and provide much needed daily nature contact. More specifically, Lewis (1979) has focused on examining the benefits of city gardens, such as those belonging to apartment blocks. Lewis states that "the healing quality of urban gardens, urban vegetation, and plants in buildings and on windowsills is real. In some way they fulfil needs not met by the brick, steel, and glass of our creation" (1979, p. 337). Furthermore, city gardens provide people with sensory stimulation and places to recover from the hectic routine of modern life (Lewis, 1992). Hence consistent findings that gardens are important for human health.

Recent research has focused on the benefits of gardens for people with illnesses or for those who are staying in hospitals (Whitehouse, 1999). Hospitals are recognised as being inherently stressful environments, often associated with feelings of pain and loss and requiring numerous coping mechanisms (Ghose, 1999; Whitehouse, 1999). While a patient's world may become limited to a single room,

the constant noise and unfamiliarity of the environment creates feelings of stress in many (Whitehouse, 1999). There is now a trend by hospitals towards total patient care and the creation of hospital healing gardens is being recognised as valuable in reducing patient stress and promoting relaxation (Whitehouse, 1999).

Going to the garden in order to escape the stressful hospital environment and time in the garden leads to patients feeling more positive about their hospital experience (Whitehouse, 1999). In addition, aspects of the garden, such as running water, which produce multiple sensory stimulation are most important for inducing positive mood changes (Whitehouse, 1999).

Similarly, for those individuals who are homebound or physically unable to go outdoors, indoor gardens and views to natural areas are beneficial in enhancing mood and overcoming feelings of grief and depression (McKee, 1995). Recovery from life threatening illness can also be aided by the presence of gardens. Unruh, Smith and Scammell (2000) used a qualitative methodology by conducting interviews with three women who had been diagnosed with breast cancer. The women were asked about the meanings they each gave to gardens and the process of gardening during a time of crisis. The women reported that gardening made them aware of the rhythms and fragility of life, as well as allowing time to think about the meaning of life. Such spiritual dimensions of gardening were combined with opportunities for stress reduction and relaxation in providing the women with enhanced coping resources during their illnesses (Unruh, Smith, & Scammell, 2000). It is, therefore, apparent that gardens have a vital role to play in promoting health and well-being in health-care settings and during recovery from illness.

Horticultural Therapy

Institutional settings, such as nursing homes and hospitals, have long made use of horticultural therapy with elderly populations (Riordan & Williams, 1988). Specifically, horticultural therapy refers to "the application of the activity of gardening, which can be selected and graded to suit individuals of all ages, interests and abilities" (Goodban & Goodban, 1990, p. 425). In a general sense, horticultural therapy allows some of the problems related to institutional life to be overcome, that is, being outdoors and involved in gardening activities can counteract feelings of passivity and isolation and can provide sensory stimulation (Goodban & Goodban, 1990).

Furthermore, horticultural therapy offers benefits that relate specifically to older people. Opportunities are available for creative expression, people are able to remain in contact with the living world, the environment offers enormous variety and change and the activities allow feelings of self-esteem and self-determination to be fostered (Burgess, 1990). In addition, horticultural therapy has been shown to reduce levels of anxiety and tension in elderly populations (Mattson, 1992).

One reason for this anxiety reduction is the level of physical activity required by many gardening tasks (Bassen & Baltazar, 1997). But for those who are not able to physically participate in horticultural therapy, simply being outdoors (Burgess, 1990) and being able to view nature are sufficient to reduce anxiety and improve one's psychological state (Driedger, 1996). With regard to older people residing in institutions, Lewis (1996) states that plants reduce anxiety because they require care and attention and, therefore, people are drawn out of themselves and can focus their attention on another living thing. Furthermore, people are able to feel a sense of control over the well-being of the plants so that they move out of the role of the

patient who is constantly "bombarded by medications, injections, thermometers, and treatments" (Lewis, 1996, p. 82). One reason could be that plants and humans are both living things that progress through a cycle from germination to death (Lewis, 1996). As a result, nature may help older adults deal with issues relating to loss, grief and their own mortality, that may otherwise cause great stress and anxiety. Plants "project a sense of peace and confer that sense of peace on those who work with them" (Lewis, 1996, p. 105).

The Value of Windows

With the continuing research efforts that aim to provide evidence of the types of environments that people prefer to live and work in, the importance of windows in the built environment has emerged (Heerwagen & Orians, 1986). Studies that investigate the beneficial nature of views from windows have commonly taken place in hospital and work settings. Such studies have generally tended to reach similar conclusions with regard to the importance of windows for psychological health. An early study by Keep, James and Inman (1980) investigated the recovery of two groups of patients – those who were placed in a windowless intensive care unit and those who were placed in a unit with translucent windows. The results of this study showed that those patients who were placed in a windowless hospital unit had poorer memory and orientation and a significantly greater number of hallucinations and delusions. The authors concluded that the sensory and perceptual deprivation caused by the lack of windows had detrimental effects on the recovery of the patients. In contrast, the existence of windows that were only translucent (and not transparent) provided the patients with some information about the outside world, such as time of day and weather conditions. Furthermore, the authors state that the existence of

transparent windows that offer an interesting view of the world could be of even greater benefit to the recovery of patients (Keep, James, & Inman, 1980).

A later study conducted by Verderber (1986) examined the preferences of hospital patients with regard to the views from their windows and patient behaviours in both windowed and windowless rooms. Patients expressed a preference for scenes containing trees and lawns and those staying in windowless rooms tended to use plants and calendars and pictures displaying nature content as a means of compensating for the lack of views from their rooms. Additionally, when participants were asked about their ideal view from hospital windows, scenes containing natural elements such as trees, water, gardens and sky were most popular (Verderber, 1986). In conclusion, Verderber (1986, p. 464) states that "on a fundamental level, the window symbolises freedom – a release, however brief, from the immediate world to a different, more expansive world".

The visual décor of people working in windowed and windowless offices has also been compared by researchers (Heerwagen & Orians, 1986). The authors visited offices at an American university and recorded the amount and content of visual material found in both windowed and windowless offices. It was found that people working in windowless offices overwhelmingly favoured visual material depicting natural landscapes rather than cityscapes and also that workers in windowless offices displayed four times more imagery than those in windowed offices (Heerwagen & Orians, 1986).

The results of this study seem to suggest that people have a need for visual contact with nature and, if this is not possible, there is a tendency for people to use 'nature surrogates', such as posters, calendars and paintings, to meet this need (Heerwagen & Orians, 1986). Therefore, contact with nature appears to be a strong

preference, need and desire for many people and may play an important role in psychological health (Heerwagen & Orians, 1986). These studies serve to illustrate the importance of visual contact with the natural world, whether people are viewing nature while being in a natural setting or simply viewing nature from a window in their home or office (Kaplan & Kaplan, 1989). Observing natural flora and fauna allows the mind to wander, provides feelings of satisfaction to people and offers opportunities for peace and quiet and stress reduction (Kaplan & Kaplan, 1989).

Many people need and seek out natural areas, such as gardens and parks in their everyday lives and receive numerous benefits from this contact with nature, whether it be physical or visual (Kaplan & Kaplan, 1989). While vast areas of distant wilderness undoubtedly have immense value, it appears that people need daily contact with nature which is easily accessible and conveniently located (Kaplan & Kaplan, 1989). Findings such as these form the basis of the Kaplans' theoretical contribution to this area of research.

The Kaplans' Theoretical Perspective

Kaplan's work has focused on the psychological benefits arising from contact with nearby or urban nature. These benefits are thought to come from two types of involvement – opportunities for directly viewing and observing nature and knowing that it is possible to view nature, even if not at the present time (Kaplan, 1992). People derive great satisfaction from opportunities to view nature in a wide variety of settings, such as prisons, hospitals, residential areas and work environments (Kaplan, 1992). In addition, research has shown that simply knowing that it is possible to view nature plays an important role in residential and work satisfaction (Kaplan, 1992; Ulrich & Addoms, 1981). This phenomenon is referred to "as 'thereness', an

appreciation of the natural setting by virtue of its availability, whether or not one partakes of it" (Kaplan, 1992, p. 129).

Kaplan's research has placed great emphasis on examining how everyday nature, such as backyards, gardens and indoor plants, can improve the psychological functioning of people (Kaplan, 1983). As a result of the numerous studies that have found people to prefer natural imagery to urban imagery, Kaplan and Kaplan developed a theoretical framework that takes an informational approach to understanding people's reactions to the surrounding environment (Kaplan, 1982). The basis of the Kaplans' theory, known as Attention Restoration Theory, involves the area of cognition and attentional processes (Kaplan, 1995).

Specifically, there are many activities in our day-to-day lives that cause feelings of mental exhaustion or fatigue and, which as a result, lead to attentional deficits. These deficits are believed to be caused primarily by directed attention, which is attention that is generally under voluntary control and involves a focused effort at inhibiting potential distracters (Kaplan & Kaplan, 1989). As an individual's directed attention mechanism is called upon more frequently, and experiences fatigue, a greater level of mental exhaustion may also result (Kaplan & Kaplan, 1989). In order for the directed attention mechanism to recover, Kaplan (1995) believes that the use of effortless or involuntary attention is necessary. When involuntary attention is able to be used, the surrounding environment is said to be restorative, because it has the power to allow the directed attention mechanism to be restored (Kaplan, 1995).

Specifically, Kaplan (1995) believes that a restorative experience involves four central components – fascination, being away, extent and compatibility. The component of fascination involves stimuli that are inherently interesting and able to

invoke involuntary attention (Kaplan, 1992). As a result, the mind is given the opportunity to think about other things (Kaplan, 1995). Being away refers to the act of physically moving to a different setting but it can also entail visual and conceptual changes in the way an individual's surroundings are perceived (Kaplan, 1995). In terms of extent, an environment must be rich enough and have a connectedness so that it can be viewed as an alternative world (Kaplan, 1992). The environment must be able to involve a person's senses and thought processes to such a degree that there is little room left for thinking about other things (Kaplan, 1995). Finally, the compatibility component refers to a balance between an individual and the environment, so that the environment is supportive of his or her needs and wants.

It is also possible to see how the four components of the restorative experience can be easily found in natural settings, such as forests, parks or gardens. Plants, animals and other natural objects hold an intrinsic fascination for many people and are seen as enthralling and engrossing. Furthermore, people often travel to natural areas for the sole purpose of getting away from the hassles and routine of their everyday lives and even a simple walk around the garden can have a refreshing effect (Kaplan, 1995). The component of extent is easily achieved in natural settings because people who are constantly surrounded by man-made buildings and objects tend to feel that nature is another world, to which he or she is instinctively connected. Such natural environments seem to allow people the freedom to function more easily and are, therefore, supportive of goal attainment (Kaplan, 1995).

The basis of the Kaplan's Attention Restoration Theory is that continual cognitive demands often result in directed attention fatigue which, in turn, can lead to feelings of being overwhelmed and stressed. However, it is possible to reduce and

even prevent the occurrence of stress through exposure to restorative environments, of which natural settings are a prime example (Kaplan, 1995).

A number of other authors have supported the Kaplans' theoretical position through their research findings and, therefore, this model has been successfully applied and empirically tested. Tennessen and Cimprich (1995) found all natural views were more conducive or led to more attention focus than other less natural views. A variety of other studies have used the four components of Attention Restoration Theory in their design and found that people's favourite places tend to be those containing water and greenery (Korpela & Hartig, 1996) and that such places provide opportunities for reflection (Herzog, Black, Fountaine, & Knotts, 1997) and aid in attentional recovery (Hartig, Mang, & Evans, 1991). Thus, it seems reasonable to conclude that "carefully constructed therapeutic environments may facilitate recovery from mental fatigue induced by certain of the demands of modern life" (Hartig, Mang, & Evans, 1991, p. 24).

It therefore appears as though the Attention Restoration Theory put forward by the Kaplans has received a high level of empirical support. This support is strengthened by the fact that these studies have employed a variety of methods and concentrated on nearby nature and wilderness areas. However, Attention Restoration Theory is not the only theory that is prominent in the field today. The work of Roger Ulrich offers an alternative perspective in environmental psychology.

Ulrich's Theoretical Perspective

In contrast to the Kaplans' cognitive approach to explaining the effects of contact with nature, Ulrich takes an affective approach (Gifford, 1997). The basic idea behind Ulrich's theory is that humans have evolved in natural settings for millions of years and, therefore, are better able to adapt to natural, rather than urban,

environments (Gifford, 1997). People are believed to feel a sense of belonging and familiarity when surrounded by nature and this in itself results in restoration from stress, increased positive affect and reduced physiological arousal (Ulrich, 1993). Ulrich's theory is termed biophilia and states that "if biophilia is represented in the gene pool it is because a predisposition in early humans for biophilic responses to certain natural elements and settings contributed to fitness or chances for survival" (Ulrich, 1993, pp. 74-75). In support of the biophilia position is the consistent finding that people from a diverse range of groups and cultures agree that settings containing water, greenery and flowers are the most preferred visual landscapes (Ulrich, 1993).

Furthermore, Ulrich's theory proposes that contact with nature first elicits affective responses, rather than cognitive responses, and that these emotions occur very rapidly (Ulrich & Parsons, 1992). These emotions are then responsible for cognitive and behavioural responses with respect to the environment. Research has shown that during exposure to natural elements, stress reduction can occur in a matter of minutes. For example, using measures of physiological stress, such as pulse rate, skin conductance and muscle tension, Ulrich and Simons (1986) (cited in Ulrich, Dimberg, & Driver, 1991) found that stress recovery occurred after viewing four to six minutes of a video recording of natural images. Such physiological methods are beneficial because they "can identify influences on well-being that may be outside the conscious awareness of individuals and hence may not be identified by verbal measures such as ratings or questionnaires" (Ulrich & Parsons, 1992, p. 99).

Ulrich has spent several decades examining the effects of natural imagery on human health and well-being, as compared to the effects of urban imagery. In an early study, participants were asked to view slides of nature scenes containing water, nature scenes containing mostly greenery or urban scenes without any natural

elements. An inventory of emotional reactions and measures of heart rate and brain electrical activity were taken before and after the slide presentation in order to determine what effect the various scenes would have on the participants, both emotionally and physiologically (Ulrich, 1981).

The results indicated that viewing urban scenes caused increased feelings of sadness and fear arousal, whereas natural scenes reduced these feelings. Furthermore, brain wave activity increased when participants viewed the natural imagery, indicating that natural scenes, and in particular those containing water, result in increased attention and interest being displayed. Although there were no significant effects of type of environment on heart rate, Ulrich (1981) concluded that both highly stressed or anxious people and those experiencing little stress could benefit much more from visual exposure to nature than from exposure to urban landscapes.

Honeyman (1992) extended Ulrich's (1981) work by including slides showing urban scenes containing natural elements with slides depicting purely natural or urban scenes. Focusing on emotional responses as measured by self-reports, four significant effects were found. Those participants who viewed the nature slides showed reduced levels of fear, while the urban slide group showed reduced positive effect. However, contrary to expectations, those participants who viewed the slides depicting urban scenes containing vegetation showed the most change, with reductions in feelings of fear and anger. The author, therefore, concluded that stress can actually be caused by the absence of natural elements in urban settings, so that the inclusion of vegetation in the urban scenes had a greater psychological impact than the total amount of vegetation shown (Honeyman, 1992).

Ulrich has also extended the range of urban and natural imagery used in his later work. In order to study whether people experience greater recovery from stress

following visual contact with natural settings, Ulrich et al. (1991) actively tried to induce stress by presenting a video recording depicting serious simulated injuries occurring in the workplace. Upon completion of this video, participants watched a video recording of one of six outdoor settings – natural with vegetation, natural with water, urban with heavy traffic, urban with light traffic, urban with many pedestrians, urban with few pedestrians. The results showed that the two nature video recordings (vegetation and water) produced significantly lower feelings of anger, aggression and fear and higher levels of positive affect than the four types of urban scenes. Furthermore, physiological measures of heart rate, blood pressure, skin conductance and muscle tension also indicated that greater stress recovery occurred following the presentation of the nature scenes. The authors concluded that the content differences of the video recordings were responsible for the effects found and that these effects provide support for Ulrich's notion of biophilia and its relation to stress reduction. In addition to laboratory-based studies, Ulrich has also conducted studies in a variety of naturally occurring settings, finding that nearby natural areas result in opportunities for escape from stressors (Ulrich & Addoms, 1981).

Ulrich's (1984) work extended to health-care settings. Records of surgical patients who had passed through a hospital over a nine-year period were examined so that the patients could be matched on the variables of "sex, age (within five years), being a smoker or non-smoker, being obese or within normal weight limits, general nature of previous hospitalisations, year of surgery (within six years), and floor level" (Ulrich, 1984, p. 420). Consultation of the records showed significant differences between those who viewed a brick wall and those who viewed some trees. As a group, the patients with a view of greenery spent less time in hospital, were less often rated by nurses as being upset or in poor spirits and required fewer

doses of moderate to strong medications. Ulrich states that the natural view appeared to be therapeutically beneficial to the patients, in terms of affecting their emotional state and rate of recovery. Notwithstanding Ulrich's caution that a view of a brick wall is quite monotonous and, therefore, that results may differ for urban views of a more lively nature, the study provides evidence of the importance of the surrounding environment for optimal health and well-being (Ulrich, 1984).

Australia's Ageing Population

Around the world there is a growing trend towards an ageing population and Australia is no exception. In 2000, the proportion of Australians aged 65 years and over was 11.7% (Australian Bureau of Statistics, 1998b). By 2020, this figure is expected to increase to 15.7% and by 2050, it is expected that 22.4% of Australia's population will be at least 65 years of age (Australian Bureau of Statistics, 1998a). This means that Australia's older population will double in numbers by 2050 (Australian Bureau of Statistics, 1998a). In addition, the highest rate of population increase will occur in the very old age group (Australian Institute of Health and Welfare, 1999).

The result of this increase in the population of older Australians will be that more people will require health-related services and long-term care in facilities, such as hospitals, hospices, retirement communities and nursing homes (Australian Institute of Health and Welfare, 1999). Therefore, research aimed at investigating possible methods of enhancing the health of older people is of vital importance, particularly in relation to the residences in which older people commonly reside.

Older People and the Environment

The quality of the environment is important for people of all ages, however, it is of particular relevance to many older people because of the types of residences that

typically house older people (Australian Institute of Health and Welfare, 1999). As well as independent residences in the community, older adults are accommodated in retirement villages, hostels, nursing homes, hospices and may also spend time in hospitals (Australian Institute of Health and Welfare, 1999). It is estimated that 91% of older Australians aged 65 and over live in private residences (Australian Institute of Health and Welfare, 1999). These people have the advantage of being able to control the immediate environment in which they live. However, those residing or staying in supported environments, such as nursing homes, hospices and hospitals, have very little control over the environment which surrounds them (Whitehouse, 1999).

Ideally, the physical environments of older people should allow for "privacy, security, independent accessibility and interface with the natural environment" (Bowen, 1997, p. 4) because of the importance of such things for well-being. When environments are perceived as being of a high quality, people typically experience feelings of relaxation, happiness, freedom and security and have fewer health problems (Daniel & Vining, 1983). Unfortunately, research has shown that nursing homes and hospitals often fall short of providing high quality environments for residents and patients (Baldwin, 1992; McKahan, 1993).

Baldwin (1992) has stated that nursing homes often have the appearance of an institution, which can cause the residents feelings of anxiety and tension. Specifically, the lack of sensory stimulation and loss of contact with the outside world are major sources of stress (Baldwin, 1992). McKahan (1993) notes that there are also similarities between hospitals and prisons, in that:

> each is assigned a uniform; each has to turn over his or her valuables; in many cases, each is given a strange "cell mate" and assigned a room

> and given a number; each has limited food choices; each is housed in bleak and colourless buildings; each is a "prisoner" of a system that deprives individuals of their sense of control. (p. 108)

As the importance of the environment for psychological health becomes more apparent, nursing home designers and administrators are beginning to make important changes. In order to give residents some degree of environmental control, gardens are being constructed for the residents' own use and space is often provided for residents to add personal items to the garden (Carstens, 1993). Additionally, gardens are being designed to provide maximum sensory stimulation, in the form of sights, smells, sounds and textures, to compensate for age-related sensory losses that residents may experience (Carstens, 1993). Ample space is also provided for people to view the gardens and natural areas from indoors and also to encourage those who are able to venture out into the garden (Carstens, 1993).

The value of gardens for particular populations of seniors, such as those with cognitive impairment, has also been shown in research. Alzheimer's patients' violence in facilities with gardens fell by 19% over a two-year period, while violent incidents increased by 681% in those facilities without gardens over the same period (Mooney & Nicell, 1992). The authors concluded that "benefits accrue to residents when they have access to an exterior environment...that allows freedom of movement, opportunities to avoid crowding and too much stimulation" because such environments will aid in reducing frustration, and thus minimise violent behavioural incidents (Mooney & Nicell, 1992, p. 29). Therefore, having some form of natural environment in close proximity has been shown to be beneficial for different populations of older people living in a variety of facilities.

Older People and Nature

While there have been numerous studies conducted in the area of contact with the natural world, few of these have specifically focused on populations of older adults (Browne, 1992). However, those researchers who have used samples of older people have generally found that contact with nature has numerous benefits to offer older adults.

In one study of the role of nearby nature in the lives of older apartment residents, the authors explored people's perceptions of nature, how nature impacted on the residents' quality of life and whether people engaged in compensatory behaviours (for example, growing indoor plants or viewing nature documentaries) when they were unable to go outdoors (Talbot & Kaplan, 1991). The 48 residents who were interviewed were predominantly white females, aged in their seventies and who had been widowed. The results indicated that nearby nature was perceived as very important by the residents (mean score of 4.2 on a five point scale), with areas for relaxing and viewing nature receiving particularly high scores (Talbot & Kaplan, 1991).

It was also found that residents commonly thought about the outside world and engaged in indoor activities related to nature. However, the participants did not view these activities as substitutes for contact with natural settings (Talbot & Kaplan, 1991). Perhaps most importantly, the findings showed that nearby nature was significantly related to the residential and life satisfaction of the residents. While the authors make note of the small sample size that was used in this study, they conclude that "the bond to nature certainly does not cease as one grows older. Rather this connection may reflect a unique psychological sustenance that strengthens as an individual ages" (Talbot & Kaplan, 1991, p. 128).

Similarly, research has shown that park visitation is an emotionally and psychologically beneficial experience for older adults (Godbey & Blazey, 1983). In particular, older people report feeling positive emotional and mental changes during park visitations (Godbey & Blazey, 1983) and express a preference for viewing vegetation, as opposed to common urban objects, such as cars, signs, poles and wires. Findings such as these tend to indicate that the psychological well-being of older adults is significantly related to the physical environment that surrounds them (Nasar, 1981).

Stress and Anxiety

The term anxiety has been used widely in the research literature despite some degree of ambiguity and confusion surrounding its use (Khalek, 1989). The work of Spielberger over many decades has been influential in clarifying the concept of anxiety and in developing the distinction between state and trait anxiety types.

The occurrence of anxiety may be the result of an event or situation that is perceived as being stressful by an individual (Kaplan & Succuzzo, 2001). In a general sense, anxiety is "an observable reaction..., an emotional state marked by worry, apprehension and tension" (Kaplan & Succuzzo, 2001, p. 511) and is commonly associated with the physical symptoms of increased sweating, increased heart rate and higher pulse rate. In this way, anxiety can be thought of as a symptom of stress (Kennedy, 1992).

While trait anxiety is defined as a relatively stable tendency for anxiety to be exhibited throughout the life span, irrespective of the situation an individual is in, state anxiety is a fluctuating state that is dependent on the situation (Spielberger, Sydeman, Owen, & Marsh, 1999). Spielberger (1985, p. 177) describes his model of state (S) anxiety as a process whereby "any stimulus or situation that is perceived or

appraised as threatening will evoke an S-Anxiety reaction, irrespective of the real (objective) danger".

If an individual perceives something in the environment to be threatening, he or she is likely to experience state anxiety (Spielberger, 1985). To reduce or control this anxiety, people can either avoid the situation that produces the anxious feelings or modify the environment in order to eliminate the source of the anxiety (Spielberger, 1985). Such methods of reducing anxiety have great significance if people are to cope successfully during this so-called "Age of Anxiety" (Khalek, 1989), which refers to the period in time in which we are living.

Stress, Anxiety and Older People

Research on the effects of stress has increased dramatically in recent years, however, there is still a lack of research concerned with stress and anxiety in older populations (Pearlin & Skaff, 1995). There are also common problems with studies that do examine older people. For example, little attention is paid to the types of stressful experiences an individual has experienced throughout his or her life course which may influence perceptions of, and reactions to, stressors in old age (Kasl, 1992). It has also been recognised that everyday hassles play an important role in creating feelings of stress and anxiety, however, researchers frequently ignore such realisations when studying older people (Chiriboga, 1992). Researchers additionally often fail to take into account the influence of variables, such as the quality of the environment (Chiriboga, 1992), the level of socio-economic resources available, gender and ethnicity, when examining the relationship between stress and old age (Pearlin & Skaff, 1995).

Current research appears to be emphasising the idea that ageing is not necessarily synonymous with feelings of stress and anxiety (Pearlin & Mullan,

1992). Unlike Cattell (1966), who stated that after age 65, people experience high anxiety levels similar to those found among adolescents, researchers today tend to acknowledge the heterogeneity of older populations (Pearlin & Skaff, 1995). However, while all older adults may not experience high levels of stress and anxiety, there are certain events and experiences that are more likely to occur in old age and that generally are appraised as being stressful (Pearlin & Skaff, 1995).

The death of a partner or friend is an event which almost certainly cause extreme stress and anxiety directly and also indirectly, in terms of financial problems, having to take on new roles and the contraction of an individual's social network (Pearlin & Skaff, 1995). Likewise, chronic illness and health related problems are more common with increasing age and are a potential source of stress and anxiety (Wykle, Kahana, & Kowal, 1992). Individuals often lose their independence as their frailty makes them dependent on others for their day-to-day care (Wykle, Kahana, & Kowal, 1992). Furthermore, experiencing illness personally or seeing friends and partners suffer from health problems can result in stress and anxiety as older people begin to question their own mortality (Kahana, 1992). The prospect and reality of having to leave one's home and relocate to a specialised care facility are also common sources of stress in older populations, due to the "disruption of one's normal environmental social structure" (Kahana, 1992, p. 155).

The environment can become a major source of stress and anxiety (Pearlin & Skaff, 1995). Even if individuals do not have to relocate to other residences, the environment surrounding them may come to be perceived as stressful because of their increased physical vulnerability, unfamiliar people moving into the area and deterioration of the aesthetic features of the neighbourhood (Pearlin & Skaff, 1995).

Therefore, while it may not be the case that people always experience feelings of stress and anxiety as they grow older, there are certain events that are commonly experienced by older adults and are generally perceived as stressful and anxiety provoking (Pearlin & Skaff, 1995). Of relevance to this research is the finding that the environment surrounding older people has the potential to be a source of stress, due to either relocation to unfamiliar surroundings or to changes in once familiar settings (Pearlin & Skaff, 1995).

Overview of the Experiment

The present study aimed to draw upon findings, which provide support for the idea that visual contact with nature is psychologically beneficial, and related them to those findings that acknowledge that old age is a time when specific age-related stressors may arise and produce feelings of anxiety. However, unlike the majority of past research which has used American university students as participants, the present study examined the effect of the physical environment on the anxiety levels of older Australians in the community.

The present study partially replicated and extended the experimental procedure used by Ulrich et al. (1991). This procedure uses visual material, such as slides, photographs or video recordings, to present images to participants as an alternative to conducting research in the actual environment. The visual representation procedure offers advantages over on-site research, in terms of reduced costs, ease of organization and a greater level of control over what participants are viewing (Bateson & Hui, 1992; Shuttleworth, 1980). Past research has found that people respond to photographs and slides of natural images in a similar manner as they would to the actual environment and, therefore, such simulations are ecologically valid (Bateson & Hui, 1992; Kaplan & Kaplan, 1989; Shuttleworth,

1980). In more recent work (e.g. Ulrich et al., 1991), video recordings have replaced photographs and slides and offer distinct advantages, in terms of the representation of movement and offering a more realistic visual experience because of the dynamic or changing views which can be presented (Bateson & Hui, 1992).

In addition, a pre test/post test design was used, so that the state form of the STAI was administered to each participant both before and after the video or control condition. Despite the danger of testing effects (such as socially desirable responding or reductions in anxiety due to increased familiarity with the testing environment) occurring in such research designs, a recent study by Sharpe and Gilbert (1998) found that no statistically significant changes occurred following the repeated administration of the state form of the STAI. Specifically, the participants in the study were repeatedly administered several measures of negative mood states and, although significant testing effects were found for measures such as the Beck Depression Inventory and the Profile of Mood States, the results of the state form of the STAI did not appear to be compromised after repeated administration (Sharpe & Gilbert, 1998).

The present study aimed to examine the effect of natural and urban environments on the anxiety levels of older people. Based on past research findings, it was hypothesised that people exposed to natural imagery would experience a reduction in anxiety, as measured by the state form of the STAI. In contrast, it was hypothesised that people exposed to urban imagery would experience a slight increase in anxiety, while those participants in the no-video (control) group would experience anxiety reduction but to a lesser degree than the nature video group.

Method

Participants

There were 33 participants in this study, with an age range of 61 to 91 years (mean age was 70.24 years). Thirteen (39.4%) of the participants were male and 20 (60.6%) were female. A table of random numbers was used to select the names of potential participants from a computerised database of people willing to participate in research belonging to the Positive Ageing Foundation.

Apparatus and Materials

A colour television set with a 20-inch screen and a video cassette recorder were used to present the two videos used in this study. The first video, entitled *Rainforests*, was selected because it predominantly contained images of forests, trees, plants and streams, with a small number of animals and insects being shown. No man-made objects or people were seen in this video. It was also an Australian film and, therefore, depicted natural scenery that would be familiar to the participants. Additionally, the video appeared to contain each of the elements that are thought to be necessary for a restorative experience – fascination, being away, extent and compatibility (Kaplan, 1995). The second video, entitled *The Central City*, was selected because it contained images of streetscapes, buildings, cars and people. A minimal amount of greenery was seen in this video. General interest magazines that were specifically chosen because of the absence of natural imagery were available for participants in the control group to read.

All participants in the study completed two state forms of the State-Trait Anxiety Inventory (STAI Form Y-1) (Spielberger, 1983). This inventory presents 20 statements that relate to how an individual is feeling at a specific moment in time (for example, I feel calm, I feel nervous, I feel content) and an individual must circle the

appropriate number which represents the level of their feelings at that moment (Spielberger, 1983) (see Appendix A). A score of 1, 2, 3 or 4 corresponds to the labels of not at all, somewhat, moderately so or very much so respectively, and total scores range from a minimum of 20 to a maximum of 80 (Spielberger, 1983).

The STAI has been found to be a valid and reliable measure of state anxiety. It has been used in more than 8000 studies of anxiety, with more than 10 000 individuals, including samples of older people such as older working adults, being examined during this time (Spielberger, Sydeman, Owen, & Marsh, 1999). Furthermore, the STAI has been translated into more than 58 different languages and has been successfully used in cross-cultural research, including Egyptian (Khalek, 1989), Dutch (Mook, Van Der Ploeg, & Kleijn, 1992) and Japanese (Iwata et al., 1998) populations.

In relation to construct validity, Spielberger (1983) demonstrated that scores on each of the state anxiety items increased when individuals were placed in stressful situations and decreased in relaxing situations, when compared with neutral situations. These results indicate that the state form of the STAI is measuring what it purports to measure and is, therefore, valid.

The state form of the STAI has also been shown to have high internal consistency, with alpha coefficients being .90 or higher (Spielberger et al., 1999). Because of the nature of state anxiety, that is, it is anxiety which varies according to the situation an individual is in at the time of testing, test-retest correlations are fairly low and are inappropriate to use because they do not provide a meaningful measure of reliability (Spielberger et al., 1999).

Procedure

The research proposal was first submitted to Edith Cowan University's School of Psychology Ethics Committee to ensure that it met the standards of a fair and ethical project. After this ethical clearance was obtained, a table of random numbers was used to select the names and addresses of 120 members of a database belonging to the Positive Ageing Foundation, on which 3095 older people were listed. Letters of introduction (see Appendix B) and reply-paid envelopes were then mailed to these individuals and those people who wished to participate sent back reply forms. Forty-five individuals responded initially, however, after telephone contact was made with the respondents, only 33 were willing to participate. Each of these 33 people was then assigned a number and a table of random numbers was again used to divide the participants into one of three groups – the nature video group, the urban video group or the control group.

The procedure for the nature and urban video groups was the same. Each participant was first seated at a desk in an enclosed room. An informed consent form (see Appendix C) was given to each participant for him or her to read and sign and then the first STAI (Form Y-1) was presented. The instructions at the top of the STAI form were read aloud to each participant to ensure that he or she understood what was required.

Upon the completion of the first STAI (Form Y-1), each participant was told that a seven-minute video would be shown and that the investigator would leave the room during this time. Because both videos had a narrator speaking as the images were shown, it was necessary to turn the sound off on the television set. Upon completion of seven-minutes worth of the video, the investigator re-entered the room

and stopped the video. Participants were then asked to complete a second STAI (Form Y-1) in the same manner as was previously explained to them.

The same procedure was used for the control group except that no video was shown. Instead the participants were told that they would be left alone for a short period of time. Three magazines had been placed on the desk before the participant entered the room and these were available for the participant to read if he or she so wished.

At the conclusion of the session, the rationale of the research was explained to each participant. Participants asked questions or made comments and the investigator asked if the participant would like feedback at a later time, when the research had been written up. The investigator then thanked each participant for his or her time and assistance. The length of each session was approximately 20 minutes. Each participant's STAI forms were then scored after he or she had left the room.

Results

The preliminary analysis of the data (see Appendix D) showed that lower mean anxiety scores occurred for the control (no video) group than for the nature video group, who in turn had lower scores than the urban video group. This trend was evident in both pre and post test mean scores (see Table 1).

Table 1

Pre and Post Test STAI[a] Scores by Condition

	Pre test score			Post test score		
Condition	M	SD	n	M	SD	n
Nature video	27.00	6.93	11	26.27	8.80	11
Urban video	28.55	8.14	11	27.64	7.51	11
Control	24.00	3.22	11	23.09	3.14	11

Note. Maximum score = 80.

[a]STAI = State Trait Anxiety Inventory.

The data were then screened to ensure that assumptions relating to the use of the ANOVA, that is, population normality and homogeneity of variance, had been met. The results of this screening showed that the assumptions had been violated and it was, therefore, necessary to analyse the data using a non-parametric test. Specifically, the Kruskal-Wallis test was used to examine possible differences in post test scores between the three conditions.

The results of this test indicated that there were no significant differences between post test STAI scores for the nature, urban or control groups, $H(2) = 1.382$, $p > .05$. Additionally, no significant results were found for age, $H(19) = 15.267$, $p >$

.05 or gender, $H(1) = .001, p > .05$. Because of the non-significance of these results, no further statistical analyses were conducted on this data.

Discussion

It was originally hypothesised that people exposed to natural imagery would experience a reduction in anxiety, as measured by the state form of the STAI. In contrast, it was hypothesised that people exposed to urban imagery would experience a slight increase in anxiety, while those participants in the no-video (control) group would experience anxiety reduction but to a lesser degree than the nature video group. However, the results do not support these hypotheses. Instead, it was found that there were no significant differences in anxiety levels between the three groups of participants, as measured by the second STAI.

There may be several reasons why the results of the present study were found to be non-significant. First, the small sample size may not have adequately represented the population of older people who belong to the Positive Ageing Foundation database. At the time that the sample was selected there were 3095 names on the database, of which only 120 were contacted and 33 were eventually tested. Furthermore, because potential participants were aware that the study was examining feelings of anxiety, it is unlikely that those suffering from moderate or severe anxiety would have volunteered to participate. This may have resulted in a biased sample of seniors, who had below-average base-line anxiety levels. Additionally, the sample consisted largely of white-collar, urban, relatively healthy older people, meaning that the sample is not truly representative of older adults as a population (McPherson, 1991).

In terms of the experimental procedure, perhaps seven-minutes worth of a nature video was not sufficient to reduce anxiety. Past research findings have shown that viewing even a few minutes of a nature video can reduce anxiety. For example, Ulrich and Simons (1986) (cited in Ulrich, Dimberg, & Driver, 1991) found that

stress recovery occurred after viewing four to six minutes of a video recording of natural images. However, these studies involved young university students as participants and used natural soundtracks in conjunction with the video recordings. The types of sounds present in a specific environment would undoubtedly be perceived as part of the environment and would contribute to the types of feelings people experience while in a setting. In the present study, the sound had to be turned off so that the narrator's voice was not audible and this may have lessened the effect of the video recordings.

Because the findings of the present study are in direct contrast to the vast majority of past research, it is important to interpret these findings with the above limitations in mind. Perhaps a larger, more representative sample of older adults or a modified experimental procedure would produce different results. Such a procedure might involve combining visual and audio stimuli so that a more realistic representation of the environment could be presented to participants.

Additionally, it would be interesting to specifically create video recordings for future research, perhaps using Kaplan's (1995) four-component model for a restorative experience as a means of selecting appropriate natural imagery. Video recordings of environments thought to contain the elements necessary for feelings of fascination, being away, extent and compatibility (Kaplan, 1995) could be rated by people in regards to the existence of each of the components before being used in an experimental study. Future research should also involve screening participants with regard to their anxiety levels, so that a more representative sample of older adults with a range of anxiety levels can be included in the research. Therefore, despite the findings of the present study being non-significant, additional research should be conducted in this important area.

Research examining the effects of the environment on stress and anxiety will come to be of even greater importance in future years. Perhaps Kaplan (1992) best describes the need for a shift in the way that people view nature when she says there is a

> serious misunderstanding of the role of nearby nature in human well-being. Nature is not merely an amenity, luxury, frill, or decoration. The availability of nearby nature meets an essential human need; fortunately it is a need that is relatively easy to meet. (p. 132)

As human populations continue to grow and the anxiety associated with urban life increases, greater numbers of people may attempt to 'get back to nature' to find temporary peace of mind in natural areas (McDonald, Guldin, & Wetherhill, 1989). Therefore, a careful balance will need to be struck between ensuring that natural areas are readily available for use by people seeking respite from the stresses and hassles of everyday life and that these areas are offered some protection from the degradation and exploitation which may come from over-use. This increased pressure on natural areas may result in the loss of those very characteristics that people seek from nature (McDonald, Guldin, & Wetherhill, 1989).

Furthermore, in light of the body of literature which has found people to receive numerous health benefits from contact with nature, preserving and increasing areas of natural vegetation would appear to be a relatively easy and inexpensive means of promoting well-being and enhancing the quality of life for a wide variety of people, including older adults (Kaplan & Kaplan, 1989; Kweon, 1998). It would appear as though research examining the effects of the environment on stress and anxiety will come to be of even greater importance in the near future and will

continue to provide fruitful and practical findings for the benefit of people everywhere.

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Appendix A

State-Trait Anxiety Inventory (Form Y-1) Questionnaire

(Spielberger, 1983)

	Not at all	*Somewhat*	Moderately so	*Very Much So*
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I feel strained	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel satisfied	1	2	3	4
9. I feel frightened	1	2	3	4
10.I feel comfortable	1	2	3	4
11.I feel self-confident	1	2	3	4
12.I feel nervous	1	2	3	4
13.I am jittery	1	2	3	4
14.I feel indecisive	1	2	3	4
15.I am relaxed	1	2	3	4
16.I feel content	1	2	3	4
17.I am worried	1	2	3	4
18.I feel confused	1	2	3	4
19.I feel steady	1	2	3	4
20.I feel pleasant	1	2	3	4

Appendix B

Letter of Introduction to Participants

Hello,

My name is Kate Griffiths and I am completing a Bachelor of Arts (with Honours) in Psychology at Edith Cowan University. You may remember me from one of the focus groups or volunteer meetings held by the Positive Ageing Foundation last year.

As part of my Honours year, I am completing a research project looking at anxiety in older people and possible factors that could influence anxiety. It is hoped that the project will offer insight into possible methods of enhancing the psychological well-being of older adults. I am writing to you to ask for expressions of interest in being a participant in my study.

Participation in this study will involve completing two paper and pencil tests and viewing a short seven-minute video. Completion of these tasks should take no more than 45 minutes of your time and will take place at the Positive Ageing Foundation building.

Participation in this study is entirely voluntary and responses will be strictly confidential. At no time will individual data be released. Refusal to participate will in no way affect the services you receive from the Positive Ageing Foundation. My research project has been reviewed by the Edith Cowan University School of Psychology Ethics Committee and has been deemed to be an ethical and fair project.

If you feel that you would like to be a participant in my research project, please complete the bottom portion of this letter, detach it and post it back to me in the enclosed envelope (NO STAMP REQUIRED). When I receive your reply, I will then contact you to arrange a suitable day and time for your participation.

If you have any additional questions, please feel free to contact me on 9402 7389 or by email at csgriffi_80@yahoo.com. Alternatively, you can contact my supervisor, Dr Moira O'Connor, on 9400 5593.

Yours sincerely,

Kate Griffiths.

Appendix B continued

Please complete the following details, detach and post back to me in the envelope provided (NO STAMP REQUIRED).

Name:

_____

Telephone Number:

_____

Email address (if applicable):

_____

Most convenient day(s) to participate:

_____

Most convenient time(s) to participate:

_____

THANK YOU.

Appendix C

Informed Consent Form

The experiment in which you are about to participate is designed to investigate possible methods of reducing feelings of stress and anxiety in older adults. You will be required to complete two pencil and paper measures of anxiety and to watch a short video. Your participation in this study will be required for approximately 45 minutes.

While it is unlikely that you will feel any negative emotions as a result of your participation, questions asking about levels of anxiety and certain video images may cause mild tension. If any negative feelings are experienced, contact numbers of professional counsellors will be provided.

It is hoped that this research will offer potentially beneficial means of enhancing the psychological well-being of older people who live in the community and also those who reside or stay for periods of time in places such as hospitals, hospices, nursing homes and retirement villages. You may also become aware of methods of reducing your own anxiety in times of stress.

Participation in this research is entirely voluntary and refusal to participate will in no way affect the services provided to you by the Positive Ageing Foundation. All information that is collected is confidential and at no time will your individual results be released to a third party. The individual data collected will be transformed into group data and will be released in the form of an Honours thesis. This thesis will be available for viewing at the Edith Cowan University Library and at the Positive Ageing Foundation.

Please understand that you are free to withdraw at any time during this study if you so wish and to remove any data that you may have contributed.

Any questions concerning this project can be directed to Kate Griffiths (Principal Investigator) on 9402 7389 or Dr Moira O'Connor (Supervisor) of the School of Psychology on 9400 5593.

I (the participant) have read the information above and any questions I have asked have been answered to my satisfaction. I agree to participate in this activity, with the understanding that I may withdraw at any time. I agree that the research data gathered for this study may be published, provided I am not identifiable.

_____ _____

Participant or authorised representative Date

_____ _____

Investigator Date

Appendix D

Participant Details and STAI Score Data

Participant	Age	Sex	Group	Pre Score	Post Score
1	80	m	nature	21	21
2	73	f	urban	33	25
3	82	f	urban	37	32
4	74	f	nature	20	20
5	65	m	control	26	20
6	68	f	nature	38	49
7	65	f	control	26	22
8	63	m	urban	21	21
9	68	f	urban	21	21
10	76	f	nature	36	33
11	65	m	urban	21	20
12	69	f	control	20	20
13	61	f	control	23	21
14	73	f	urban	23	21
15	69	m	nature	22	21
16	79	f	urban	25	34
17	67	f	urban	20	20
18	63	m	urban	41	38
19	62	m	nature	28	29
20	91	m	control	21	23
21	66	f	control	23	21
22	65	f	urban	33	37
23	78	f	control	22	26
24	73	f	nature	26	20
25	70	m	urban	39	35
26	71	f	control	27	28
27	61	m	nature	37	30
28	63	m	control	30	28
29	81	f	nature	26	22
30	77	m	nature	23	23
31	71	m	control	20	20
32	63	f	nature	20	21
33	66	f	control	26	25