Measuring Anxiety in the Elderly

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Abstract

The present study investigated the measurement of anxiety across age, with particular attention being paid to old older adults (75+ years). Comparisons of scores from the Beck Anxiety Inventory (BAI), trait scale of the State-Trait Anxiety Scale (STAI-t), and the Adult Manifest Anxiety Scale for the Elderly (AMAS-E) were made across three age groups: Adult (35-54), Young older (55-74), and Old older (75+). The relationship between anxiety and depression was also investigated with the inclusion of the Beck Depression Inventory (BDI) and Geriatric Depression Scale (GDS) for comparison with the anxiety measures. It was found that BAI scores increased with age, with older adults having mean scores near the mild anxiety cutoff. The BAI also had poor correlations with, and different standardized scores to, other anxiety measures, indicating poor construct validity for the BAI with this non-clinical sample. The BDI poorly correlated with the GDS and with anxiety measures with Old older adults, indicating that it may not be the effective measure it is with younger adults. The present findings suggest that the presentation of anxiety may be different in adults over 75 years old compared to younger adults. Furthermore, some of the current self-report measures that are commonly used in clinical practice and research are not as effective assessment tools with this age group as they are with younger groups.

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Anxiety and anxiety disorders are among the most prevalent mental disorders that people face, greater or equal in number to substance abuse and mood disorders (Craske, 1999). This also appears to be true for older adults (55 years and older) yet there has been very limited research into anxiety in this age group (Alwahhabi, 2003; Segal, 2000). This thesis adds to the growing literature on anxiety in the elderly by investigating the relationship among some of the more popular self-report anxiety measures with older adults. A general overview of some theories of anxiety is provided, one aim being to help define anxiety. Possible differences in the presentation of anxiety in older and younger adults are discussed. Then, some of the self-report measures used to assess anxiety are described, with an emphasis on their use with older adults. Finally, the overlap between anxiety and depression is covered.

Theories of Anxiety

Due to the number and complexity of the factors that cause and maintain anxiety, there is no clear and complete understanding of its aetiology (Kowalski, 2000). Anxiety has been studied under theories of emotion, personality, and clinical disorders (Eysenck, 1997). These various views have primarily focused on different factors of anxiety (Eysenck, 1997) within four main theoretical frameworks: psychoanalytical, behavioural, biological, and cognitive (Kowalski, 2000).

The Psychcoanalytical View

The psychoanalytical view of anxiety originated with Freud, and although it has not developed much since, remains influential in some current thinking (Strongman, 1995). Freud saw anxiety as both a normal phenomenon and as a way of explaining

problems (Strongman, 1995). Freud's realistic anxiety is toward real objects and is what most people nowadays would call fear. Neurotic anxiety is free-floating and not necessarily attached to real objects (Strongman, 1995). In general, these theories suggest that anxiety is a defence mechanism that results from intrapsychic conflicts (Josephs, 1994). Within Freud's theories, anxiety is either inherited or learned at birth, but can be added to later in life (Strongman, 1995). This view has come under some criticism yet underlies a lot of the theoretical framework used for looking at anxiety today (Barlow, 2002).

The Behavioural View

Under the behavioural view comes learning theory where it is proposed that organisms learn to avoid aversive stimuli through some form of mediating mechanisms, which we identify as fear or anxiety (Strongman, 1995). Generally, the learning theories involve a two-stage view of anxiety or fear with the two terms often being used interchangeably (Emmelkamp & Scholing, 1994). The first stage involves an aversive unconditioned stimulus being paired with a conditioned stimulus. The resulting conditioned response is fear or anxiety. The second stage of the theory involves anxiety modifying behaviours to prevent or avoid the now aversive stimuli (Emmelkamp & Scholing, 1994; Strongman, 1995). This theory has come under criticism and is thought to be inadequate as a general theory of anxiety. However, it is still thought that the behavioural view has an important role to play in anxiety when integrated with biological and cognitive views (Emmelkamp & Scholing, 1994).

One such theory that combines behavioural and biological views is that of Hans Eysenck (1967). In his theory, anxiety depends on two dimensions,

extroversion/introversion and neuroticism/stability (Barlow, 2002; Strongman, 1995). It is thought that neuroticism is due to inbuilt features of the autonomic nervous system (ANS), making it inherited (Strongman, 1995), while introversion is thought to be learnt, although people with higher levels of neuroticism are thought to be more susceptible to becoming introverted (Eysenck, 1967, 1981).

Biological views

One of the most substantive physiological theories of anxiety is that proposed by Gray (Barlow, 2002; Strongman, 1995). Under this theory there are two different systems in the brain controlling anxiety and fear. The behavioural inhibition system (BIS) on one hand and the fight-flight system (FFS) on the other (Barlow, 2002). The BIS consists mainly of the septo-hippocampal system (SHS), which includes the septal area, hippocampus, and the Papez circuit (Barlow, 2002; Strongman, 1995). The SHS is seen as a comparator, which receives inputs about the world along with the expected state of the world. It produces an output when there is a mismatch between actual and expected events. The SHS produces an output to other brain systems, which will stop the current action and modify future actions (McNaughton & Gray, 2000). It is this overactive SHS that leads to an excessive perception of threat, and an increase in the number of associations made with negative stimuli. This is thought to be the basis for generalized anxiety disorder (McNaughton & Gray, 2000). Different areas of the brain are primarily responsible for different behaviours, with the SHS being key for anxiety and the amygdala key for fear, although the two areas are interconnected (Gray & McNaughton, 2000). Under this view, fear is an autonomic behaviour that allows an animal to leave a dangerous situation, whereas

anxiety is a behaviour that allows an animal to enter a dangerous environment (McNaughton & Gray, 2000).

Cognitive views

In more recent times, most theories of emotion and anxiety have attempted to add in a cognitive component (Barlow, 2002; Strongman, 1995).

Spielberger (1972) proposed a model that included two constructs, state anxiety and trait anxiety. State anxiety is a short-lived emotional state, with the likelihood of experiencing this state anxiety depending on one's personality trait (trait anxiety). Under this model, external and internal stimuli are cognitively appraised in a way that can either produce state anxiety or not. A person's level of trait anxiety will effect this appraisal with high trait anxiety more likely to produce state anxiety (see Figure 1).

A further theory of trait anxiety, which incorporates a cognitive component, is that proposed by Michael Eysenck (1997). Eysenck attempts to draw on learning, biological, and cognitive perspectives in developing a theory of trait anxiety (Eysenck, 1991). According to this theory, people with high and low trait anxiety have different cognitive biases. Highly anxious individuals have selective attentional biases, attending to threat-related stimuli rather than neutral stimuli, along with interpretation biases (interpreting stimuli as threatening) and negative memory biases for threat-related information. This accounts for why some people respond anxiously to a situation whereas others do not (Eysenck, 1997).

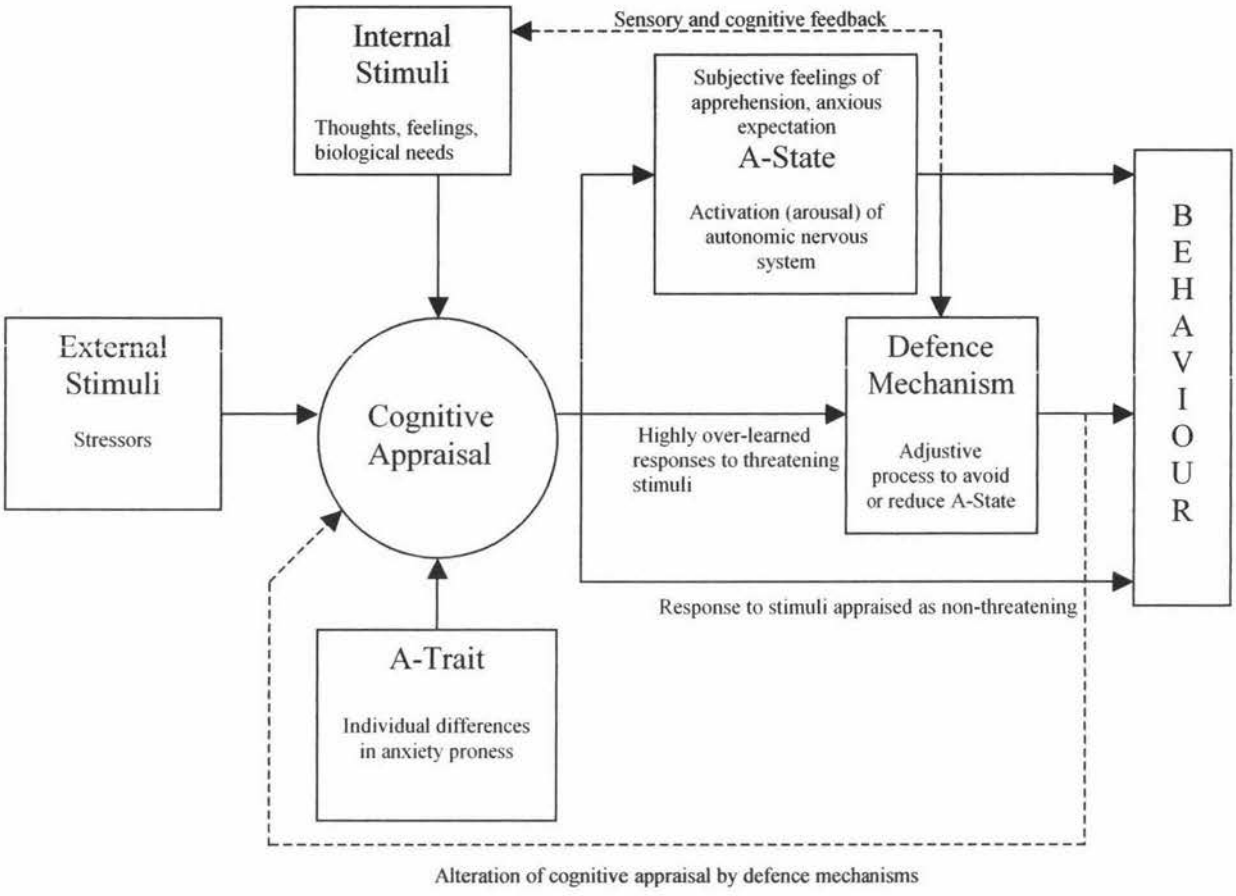

Figure 1. The state-trait model of anxiety. This shows the relationship between state and trait anxiety, external and internal stressors, cognitive appraisal of threat, and psychological defence mechanisms. From Spielberger (1972).

Eysenck (1997) has furthered this view to create a four-factor theory of trait anxiety, based on four assumptions:

1. That there are four sources of information that affect the level of anxiety experienced: cognitive appraisal of the situation; perceived level of behavioural anxiety; perceived level of physiological anxiety; and negative cognitions stored in long-term memory.
2. The effects these sources have on the level of anxiety depend on attentional and interpretive biases, usually operating below the level of consciousness.

3. These biases increase as state anxiety increases.
4. Schemas, or patterns of organized knowledge, in long-term memory affect these cognitive biases.

Under this theory, highly anxious individuals have varying attentional and interpretive biases. These biases cause highly anxious individuals to exaggerate the threat of the external and internal stimuli. These biases are towards the cognitive appraisal of a situation, along with the processing of information about their physiological activity, action tendencies, and behaviours, as well as cognitions, as seen in Figure 2 (Eysenck, 1997). Along with highly anxious individuals are low-anxious individuals without these cognitive biases, and repressors with opposite biases to the highly anxious individuals not attending to any threatening stimuli.

Defining Anxiety

The overlap of the terms, fear and anxiety, and a lack of a clear theoretical view of anxiety have led to confusion about what anxiety is, and how it differs from fear and worry (McNaughton, 1996). Part of the difficulty in differentiating between fear and anxiety is that they seem to produce similar physiological responses (racing heart and muscle tension to name a few).

Freud differentiated between fear and anxiety using the terms 'objective anxiety' for fear and 'neurotic anxiety' for anxiety. Freud's views lead some to differentiate fear and anxiety based on the presence of an external object about which the person is frightened (Lazarus & Monat, 1979). That is, fear is to be afraid of something such as

seeing a lion, where anxiety would be a fear of going to Africa where a person may come across a lion.

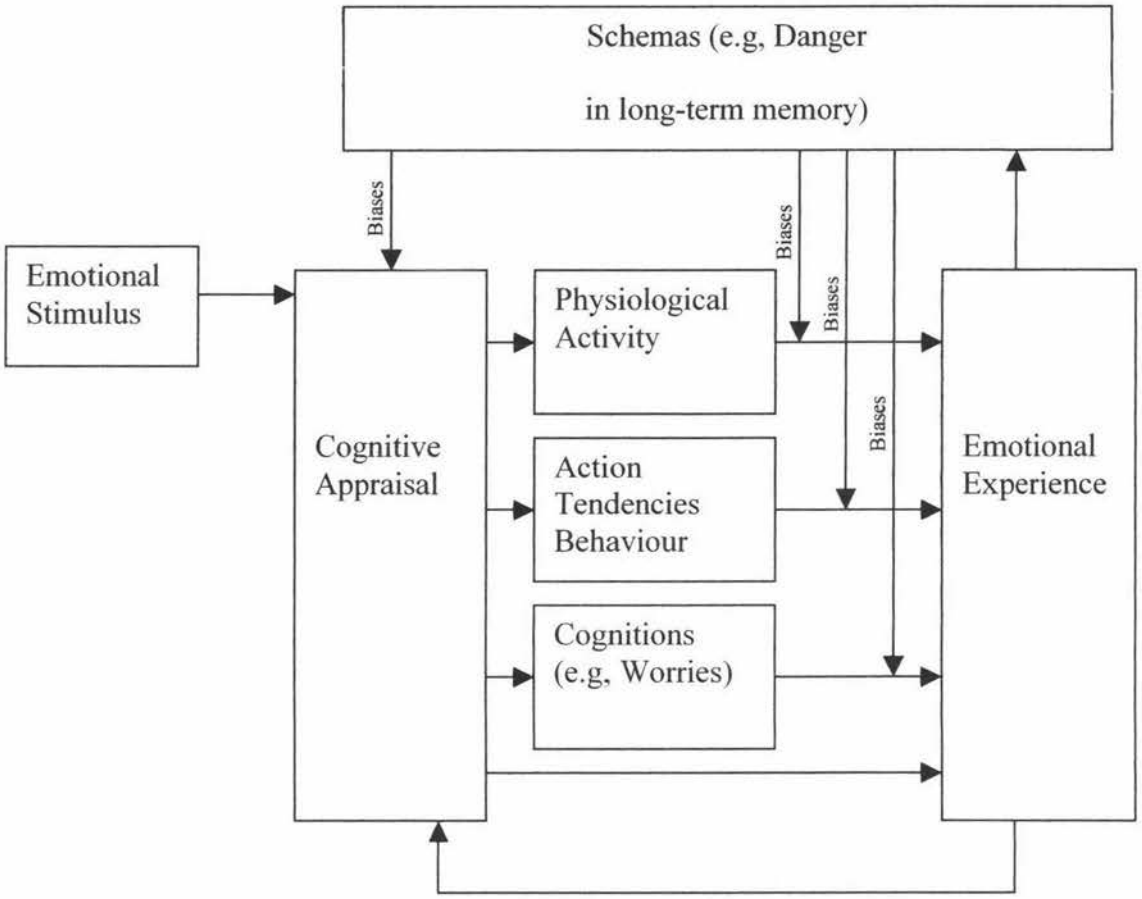

Figure 2. Eysenck's four-factor model of anxiety. From Eysenck (1997).

Izard (1992) sees fear as a basic emotion, free from cognitive processing. It is a primitive alarm to danger, activated through physical stimuli or environmental changes. Anxiety, however, is believed to involve some cognitive processing, as seen in more recent theories of anxiety, and presents as a combination of basic emotions with fear being the primary one (Izard, 1992). Barlow (2002) also defines anxiety as a cognitive-affective structure in which the uncontrollability of possible future threats and negative events leads to feelings of helplessness. This negative affect is combined

with a shift of attention inwards. This attention shift leads to preoccupation with one's own vulnerability, and an awareness of one's own level of physiological arousal. The awareness of one's vulnerabilities causes further physiological arousal in an attempt to prepare for these potentially negative events.

Fear, then, is a response to imminent threat or danger whereas anxiety is a focus on future threats. So, how does anxiety differ from worry?

Interest in separating worry and anxiety came about in the 1970's, within the test anxiety literature (Mennin, Heinberg, & Turk, 2004). Worry was originally thought to be the cognitive component of anxiety; however, research looking at trait anxiety and worry have found the latter to be independent of anxiety (Mennin et al., 2004). Mennin et al. found that, although there were high correlations between trait anxiety and worry, the differences found were accounted for by unique sources of variance (Craske, 1999).

Thomas Borkovec (1994) proposed that as worry is verbal in nature, it interferes with the experience of fear and leads to a suppression of autonomic arousal and fear (Craske, 1999). There is a great deal of evidence to support this idea (Barlow, 2002). It is presumed that worry allows humans to prepare for future threats by decreasing autonomic arousal, to allow cognitive planning and possible preparation for upcoming threats to take place, giving an illusion of control over seemingly unpredictable and uncomfortable events (Barlow, 2002; Craske, 1999; Mennin et al., 2004). This reinforcement allows worry, when it works as intended, to protect the

individual from future threats and anxiety. However, when anxiety increases and becomes chronic so, too, can the process of worry (Barlow, 2002).

From the above we can see that worry and fear work to help an individual avoid danger and threat. Worry works distally guarding us from potential threats, whereas fear is more hardwired working on immediate and more proximal threats (see Figure 3) (Barlow, 2002; Craske, 1999). This figure shows how the three terms relate over different levels with worry being towards more distal threat, and fear towards the more imminent threats. Worry is future-orientated with a large cognitive component involved. Anxiety has a cognitive component along with some physiological arousal. Fear is characterised by an imminent threat and involves very minimal cognitive activity, with strong physiological arousal as the body prepares to deal with the threat. This model shows clearly how worry is towards distal threats and involves a large cognitive component with little autonomic arousal. Fear is opposite to worry, with little cognitive activity and a large amount of autonomic arousal involved to deal with more imminent threats. Anxiety falls in between fear and worry, incorporating similar aspects of both, such as increased physiological arousal of fear and the future orientation and cognitive aspects of worry. It is this combination and similarity to these other terms that has probably led to some of the confusion over defining anxiety (Craske, 1999).

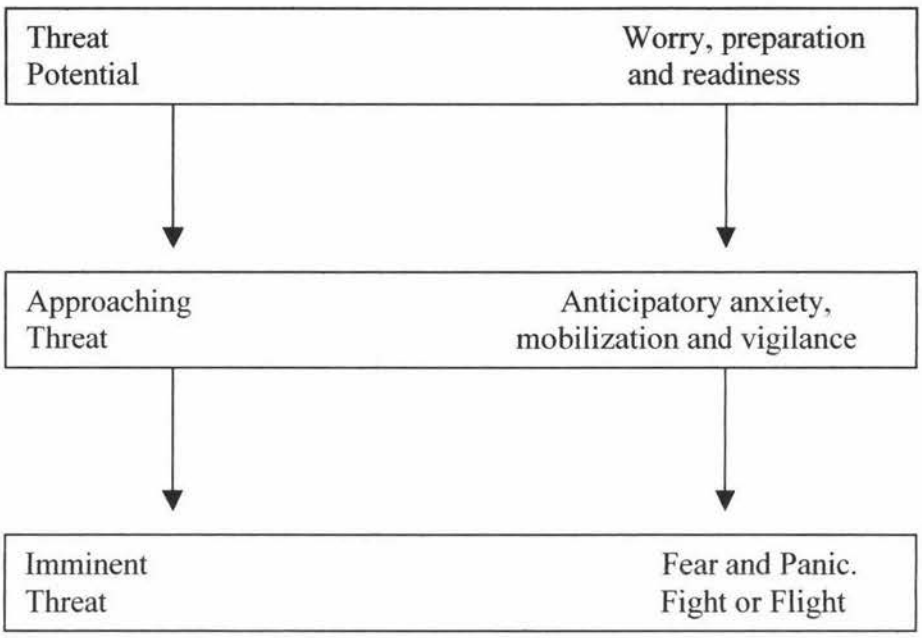

Figure 3. Relationship between worry, anticipatory anxiety and fear. From Craske (1999).

Clinical definition

The Diagnostic and Statistical Manual (DSM-IV) defines anxiety as an "apprehensive anticipation of future danger or misfortune accompanied by a feeling of dysphoria or somatic symptoms of tension" (American Psychiatric Association, 2000, p.820). This definition includes the future orientation of worry, along with somatic symptoms often associated with fear, highlighting the confusion and difficulty in differentiating anxiety from fear and worry. The clinical definition fits in with the cognitive theories of anxiety, possibly incorporating some aspects of the biological theory as well.

Operational definition of anxiety

From the above section it can be seen that there is no clear definition of anxiety that allows the amount of anxiety to be measured. There are a number of different theories of anxiety, but still no one clear definition of how anxiety differs from fear and

worry. How, then, is one to assess the level, or amount, of anxiety? There are a number of self-report measures purporting to measure anxiety. Although it is a far from being a satisfactory solution, until we develop a clear theory of anxiety, it is necessary to work with an operational definition, defining anxiety in terms of the tools used to measure it (Bridgeman, 1928). Whether these tests truly measure anxiety cannot be guaranteed, but they have received a considerable amount of support through their use in both clinical and research practices (Kabacoff, Segal, Hersen, & Van Hasselt, 1997).

Assessment of Anxiety

Clinicians have a number of different methods for assessing levels of anxiety and other mental illnesses. One method used in clinical practice is self-report measures (Antony, 2001). These measures require a person to indicate their level of a target construct based on responses to a standardised inventory and allows important subjective information, otherwise unavailable, to be gathered (Antony, 2001; Krueger & Kling, 2000). The use of self-report can be traced back to Francis Galton, whose survey asking scientists about their views lead the way to the modern-day opinion polls (Krueger & Kling, 2000). The use of self-report further developed in psychological testing during World War 1, when Woodworth developed the Personal Data Sheet to help identify army recruits unfit for duty (Krueger & Kling, 2000). This assessment was prone to dissimulation (concealing of true feelings) and led to the development of modern tests that assess both psychological symptoms and potential dissimulation (Krueger & Kling, 2000). More recently, the issue of validity has been raised as a stumbling block for self-report measures. There were some suggestions that the self-report tests measured response styles, such as a person's tendency to say

"yes" or give socially desirable answers, rather than the construct they were developed to measure. This issue is important for test development, and it is because of this that psychometric data, such as construct validity, have become so important in the development of the tests (Krueger & Kling, 2000). Despite these problems, self-report measures are frequently used as it is difficult, if not impossible, to assess the level of depression, or the level of anxiety, without self-report data. One reason for this is that states such as depression and anxiety are largely subjective (Montorio & Izal, 1996).

Psychologists have developed a wide range of self-report measures that are used to measure varying types of anxiety disorders (see Roemer, 2001 for a more complete list of anxiety self-report measures). Along with specific anxiety tests are tests that measure a more generalised anxiety, such as the Beck Anxiety Inventory (BAI:Beck & Steer, 1993) and the State Trait Anxiety Inventory (STAI: Spielberger, Gorsuch, & Lushene, 1970). These tests, developed for different purposes, are commonly used in practice and research as a measure of anxiety (Kabacoff et al., 1997).

Both the STAI and the BAI have been shown to have good psychometric properties. The STAI has good reliability and convergent validity with other anxiety tests in both clinical (Fydrich, Dowdall, & Chambless, 1992) and non-clinical (Creamer, Foran, & Bell, 1995) settings. The BAI also has good reliability and convergent validities in clinical (Beck, Brown, Epstein, & Steer, 1988a; Beck & Steer, 1993) and non-clinical (Osman, Kopper, Barrios, Osman, & Wade, 1997b) settings. The two tests show good convergent validity with each other in a non-clinical sample (Creamer et al., 1995;

Osman et al., 1997b). Based on these psychometric properties and the fact that these tests are popular in research and practice, they will be used in this current research.[1]

In summary, self-report is an important method for collecting subjective information useful in assessing anxiety. Two of the more commonly used anxiety tests are the STAI and the BAI. Both these tests have been shown to have good psychometric properties when used with an adult population. Despite this, there has only been limited research looking at the use of these tests in an older adult population. As the next section shows, the experience of anxiety in older adults might be very different from that experienced by younger adults.

Anxiety in older adults

As modern health technology develops, the number of older adults steadily grows (Beck & Stanley, 2001). In this growing population, diagnosable mental illnesses affect approximately 23% of the population (aged 65 years and older) (Kogan, Edelstein, & Mckee, 2000). Of these, anxiety is among the most prevalent illnesses that older adults face, with 5.5% of this population meeting diagnosable anxiety criteria, and an estimated 20% with anxiety symptoms (Alwahhabi, 2003; Kogan et al., 2000). Despite this, the amount of research in this area is limited with only 71 papers found on anxiety compared to 610 papers on depression in the elderly and 218 reports about dementia (Segal, 2000). Although anxiety is one of the most prevalent mental illnesses for the older age group, the prevalence rate is lower than that of younger adults (7.3%). This has led some to conclude that there is a cohort effect with anxiety disorders (and other psychiatric disorders) increasing over more recent

[1] As these tests will be used in this present research, more detailed reports on their development and psychometric properties can be found in the Method section.

generations (Alwahhabi, 2003; Krasucki, Howard, & Mann, 1998). This view has been challenged by a number of different researchers, citing a number of different factors (see below) that might affect these epidemiological figures (Alwahhabi, 2003; Kogan et al., 2000; Krasucki et al., 1998).

Failure to disclose anxiety symptoms

The reluctance of older adults to report negative psychological symptoms can affect the prevalence of anxiety disorders (Kogan et al., 2000; Krasucki et al., 1998; Lawton, Kleban, & Dean, 1993). Lawton et al. (1993) found that older adults reported fewer negative emotions when compared with younger and middle aged adults. This was thought to be due to older adults either experiencing affect differently or interpreting affective terms differently, either of which would affect the epidemiological data for anxiety in this age group. Changes that occur in the central nervous system as a person ages could help explain why these differences in the experience and presentation of anxiety occur (Kogan et al., 2000). These changes involve an increase in norepinephrine with age, which raises blood pressure. Older adults also have a greater response (increase in plasma catecholamines) to stressors and take longer to return to baseline than younger adults (Kogan et al., 2000). Misattribution of anxiety symptoms to physical problems or illness could account for a failure of older adults to disclose anxiety symptoms (Krasucki et al., 1998; Stanley & Beck, 1998).

There appears to be a big overlap between anxiety and physical illness, with high rates of anxiety being reported among older adults with cardiovascular and other like illnesses as well as those living more sedentary lives (Stanley & Beck, 1998).

However, older adults with anxiety disorders also report higher levels of physical complaints and demonstrate considerably more physical symptoms (De Beurs et al., 1999; Stanley & Beck, 1998). There is a clear overlap between the two phenomena. Although it is not clear if one causes the other, both must be taken into consideration when assessing an older adult for anxiety (Stanley & Beck, 1998).

Changes with age effect presentation of anxiety

As people age, what constitutes normal functioning may change, causing anxiety symptoms to present differently (Krasucki et al., 1998). These differences could mean that older adults may not meet DSM-IV criteria for an anxiety disorder yet still have their lives disrupted by the anxiety symptoms from which they suffer (Kogan et al., 2000). De Beurs and colleagues (1999) investigated the impact of anxiety disorders and symptoms on a person's activeness, well-being, and health services use. They found that not only older adults with diagnosed anxiety disorders but also those with anxiety symptoms alone were affected in their functioning and health care use. Both groups were found to have increased disability, a diminished sense of well-being, and utilized health care providers more than a control group free from any form of anxiety or its symptoms.

Another factor that can effect the presentation of anxiety is the overlap with depression and dementia. This overlap may disguise some of the symptoms of anxiety (Kogan et al., 2000; Krasucki et al., 1998; Stanley & Beck, 1998). While anxiety and depression often co-exist, the overlap between these two disorders in older adults is generally higher than in the younger age group (Krasucki et al., 1998; Wetherell, Gatz, & Pederson, 2001). One possible explanation is that as people age the anxiety

symptoms may become overshadowed by those of depression (Krasucki et al., 1998; Stanley & Beck, 1998). However, the number of individuals diagnosed with depression does not increase as would be expected if anxiety disorders were being masked by depression (Krasucki et al., 1998). Therefore, the lower rates of anxiety in the elderly cannot be accounted for by the masking effect of depression. People suffering from dementia appear to have anxiety symptoms. However, it is unknown whether these symptoms are due to anxiety disorders or are features caused by the challenges associated with dementia. An example of these challenges is agitation, which is part of the behavioural presentation of dementia (Kogan et al., 2000; Krasucki et al., 1998).

Finally, the content validity of the assessment instruments is of concern, as it appears that the experience and presentation of anxiety in older adults may be different from that of younger adults, as is evidenced above. As a result, tests developed for use with younger adults may not adequately assess some of the different anxiety symptoms shown by the aged (Kogan et al., 2000). Examples of these differences include increased worry over being a burden to others, and health worries that may not be covered in current anxiety tests (Kogan et al., 2000; Wetherell, Gatz, & Roux, 2003).

In sum, current anxiety measures may not assess the anxieties or symptoms of anxiety that older adults present with. An example of this could be an older adult that worries about becoming senile and being a burden on their family. These symptoms may cause the person sufficient distress to affect their functioning through excessive worry and frequent checkups at the doctors. Despite the problems that this might cause, current anxiety tests may not pick this up.

The experience and presentation of anxiety appears to change with age. Changes include a decrease in elderly people's willingness to report negative psychological symptoms resulting in confusion when attempting to distinguish between anxiety symptoms and physical illness. It also appears that anxiety symptoms below a diagnosable level may affect a person's functioning and often co-occur with depression and dementia. These differences, coupled with the fact that elderly people's worries may be very different to those of younger adults, means that the content validity of self-report measures comes into question. As the next section shows, research into the use of these current anxiety measures has mixed results on an older adult population.

The assessment of anxiety in older adults

The ability of measures developed for a younger adult age group to effectively measure anxiety in older adults appears to be a main focus of research (Beck & Stanley, 2001). Findings are mixed, but the general conclusion is that most well established self-report measures are adequate in evaluating anxiety in older adults (Beck & Stanley, 2001).

Two of the more well-established and commonly used anxiety self-report measures are the BAI and the STAI (Kabacoff et al., 1997). A number of studies have investigated the use of these measures with clinical and non-clinical older adult populations. Research looking at the properties of the STAI and then the BAI with older adults is presented below.

The STAI has been looked at in a clinical (Kabacoff et al., 1997; Stanley, Beck, & Zebb, 1996) and in a non-clinical population (Stanley et al., 1996). Kabacoff and colleagues (1997) investigated the use of the STAI and the BAI with 217 outpatients 55 years and older (mean age 66 years). They found that the STAI had good internal consistency for both the state and trait subscales along with moderate support for convergent validity when correlated with the BAI. The trait subscale was shown to have concurrent validity as it revealed differences between those with and without anxiety disorders; the state subscale did not (Kabacoff et al., 1997). Kabacoff et al. (1997) also found that the two sub-scale factors (state and trait anxiety) did not emerge in this study but instead items loaded onto factors made up of positively scored items and negatively scored items (Kabacoff et al., 1997). This indicates a lack of construct validity for the STAI with older adults, with method factors measuring response style rather than the expected anxiety factors.

Stanley et al. (1996) examined some of the psychometric properties of the STAI in a clinical sample of people diagnosed with generalized anxiety disorder (GAD) and a non-clinical control group. The age range for the clinical sample was 55-81 years of age with an average age of 68. The control sample had an age range of 55-82 years with an average age of 67.5 years. They found moderate convergent validity for the non-clinical group and very low convergent validity for the GAD sample. Internal consistency was good for both groups and the test-retest reliability was good for the trait subscale, but only modest for the state scale. The authors compared these scores to scores obtained on the measures in control samples of younger adults and younger adults with GAD from previous studies. They found that the scores for the Normal control group were lower in older adults than in younger adults. Only the trait sub-

scale was compared in the GAD group and it was found that scores for both younger and older adults were similar. A replication of this study was conducted with people aged 60-80 years of age (mean age, 66 years old). The replication study produced similar results except that the scores for the STAI were significantly higher (Stanley, Novy, Bourland, Beck, & Averill, 2001).

An investigation into the use of the STAI with older adults found that older adults took longer to respond, failed to answer some questions, had difficulty in reading the items, and difficulties remembering the choice options and deciding between them (McDonald & Spielberger, 1983). To counter this the STAI was adapted by increasing the type size, moving the choice options so that each choice was written next to the question rather than numerical choices, and including the time frame that has to be considered for each question (Bouchard, Ivers, Gauthier, Pelletier, & Savard, 1998; McDonald & Spielberger, 1983). They found that this modified test had good test-retest outcomes (similar to those found with the original STAI). The scores obtained were much lower than those found in Kabakoff et al. (1997) yet much higher than those found in Stanley et al. (1996), but similar to other adapted versions of the STAI (Bouchard et al., 1998). These differences could be due to sampling but also may reflect the problems that were identified when using the original test in an older adult group. Bouchard et al.'s (1998) study with the modified test also found that item number 24 ("I wish I could be as happy as others seem to be") failed to correlate with the other items. Attempts to re-word this question also proved unsuccessful and Bouchard et al. recommend that the item should be removed and the average of the remaining anxiety present items should be used.

Kabacoff et al. (1997), in their research described previously, found good internal consistency for the BAI, moderate convergent validity with the STAI, and good concurrent validity with significant differences between anxiety and non-anxiety groups. Factor analysis of the BAI revealed two factors, somatic and subjective, with both showing some concurrent validity. The subjective subscale showed slightly higher concurrent validity than the BAI total score or the somatic subscale, suggesting that subjective/cognitive aspects of anxiety may be more valid indicators then somatic subscale items.

Morin et al. (1999) looked at the psychometric properties of the BAI in a non-clinical group of community dwelling older adults aged 55 years or more (mean age 70). The BAI showed good internal consistency with scores slightly increasing with age, and females scoring higher than males. The BAI showed moderate to high convergent validity with the Hamilton Anxiety Rating Scale and the Brief Symptom Index Anxiety Scale. Factor analysis of the BAI revealed six factors. Of these six factors, two were subjective symptoms and the rest related to somatic-type symptoms. As with other studies of the BAI, the somatic distress factor accounted for the largest portion of variance in BAI scores. This shows either a tendency for older adults to express emotional distress through somatic symptoms, or that the BAI may be subject to confounding with medical problems in an older adult population (Morin et al., 1999).

In the studies reported above the age that constitutes a cut off into the older adult age groups seems to vary. Many of the studies had a cut-off age of 55 years, with mean ages being between 65 and 70 years (Kabacoff et al., 1997; Morin et al., 1999;

Stanley et al., 2001). This cut-off is different from that reported by many demographic reports released by government agencies in which the age of 65 years old, retirement age, is classified as elderly.

Also of concern when using anxiety measures developed for a younger adult population with an older adult age group, is a lack of normative data for most of the self-report measures commonly used (Morin et al., 1999; Owens, Hadjistavropoulos, & Asmundson, 2000). Owens et al. (2000) investigated whether the BAI should have separate norms for older adult populations. They found that scores on the BAI were inversely related to age for males, leading them to recommend that separate norms should be used with different age and sex groups. A study by Knight, Waal-Manning, and Spears (1983) collected normative data for the STAI across the adult life span. They also found that scores were inversely related to age, indicating the need for specific and appropriate norms for assessing anxiety. Stanley et al. (1996) found that older adults scored lower than younger adults on the STAI. The findings of this study are limited, though, as the younger comparison group was taken from a separate study in which the group was made up of university students, possibly not a true representation of a younger adult age group (Owens et al., 2000).

A second approach to assessing anxiety in older adults is to develop measures specifically for this age group (Beck & Stanley, 2001). There have been a small handful of instruments developed for the elderly, such as the worry scale for older adults (Beck & Stanley, 2001). One measure developed specifically to measure anxiety in an older adult population is the Adult Manifest Anxiety Scale–Elderly Version (Reynolds, Richmond, & Lowe, 2003).

Adult Manifest Anxiety Scale- Elderly Version

The Adult Manifest Anxiety Scale-Elderly Version (AMAS-E) was developed from the Revised Child Manifest Anxiety Scale (Reynolds et al., 2003). The questions in the AMAS-E were developed based on relevant literature and clinical experience, with all items being reviewed by relevant experts.[2] The test ended up with four factors: Physiological anxiety, fear of aging, worry/oversensitivity, and a lie scale (Lowe & Reynolds, 2000; Reynolds et al., 2003). The AMAS-E is designed for use with people 60 years and older.

The AMAS-E has shown good internal consistency and adequate test-retest reliability. Moderate convergent validity with the STAI has been found, but it has not been compared to the BAI (Lowe, 2005, Personal communication; Lowe & Reynolds, 2006)[3]. The mean age of participants that took part in the normative study of this test was 79, which is higher than the previously mentioned studies investigating the assessment of anxiety in older adults

Research that has looked at the use of current self-report anxiety has produced some limited support for their use. However, the ages of the participants in some of these studies have been quite low which raises the question of how generalizable the results are to the older adult population. The AMAS-E has been developed recently for use with the older adult age group. However, this test is fairly new and as such there is very limited research to examine the psychometric properties and practicability of this test. As noted previously, there is a high comorbidity with anxiety and depression in

[2] For more detail on the development of the AMAS refer to the method section.
[3] See Appendix A for correspondence with Patricia Lowe, co-developer of the AMAS-E.

later life. With this overlap, the ability of measures to differentiate between the two is important. The following section examines a model that has been found to differentiate between anxiety and depression in younger adults, and research that has looked at the use of this model with older adults.

Relationship between Anxiety and Depression

Differentiating anxiety from depression is a major concern in the assessment of anxiety, as the two disorders are highly comorbid, especially in later life (Clark, Steer, & Beck, 1994; De Beurs et al., 2001). Clark and Watson (1991) developed the tripartite model, which explained that the high correlation between depression and anxiety was due to the measures assessing a large non-specific distress, common to both disorders, called negative affect (NA). NA is characterized by negative views of oneself and tendencies to be worried, anxious, or self-critical. Positive affect (PA) is characterized by well-being, energy, adventurousness, and one's level of pleasurable engagement with the environment (Clark et al., 1994). Through the tripartite model, depression can be distinguished from anxiety through symptoms that indicate low PA, and anxiety can be distinguished from depression through the presence of physiological arousal.

Clark et al. (1994) and Steer, Clark, Beck, & Ranieri (1995) investigated the tripartite model with a group of clinical and non-clinical participants using the BDI and BAI. The non-clinical participants in Clark et al. (1994) were college students with a mean age of 19 years. The clinical participants were psychiatric outpatients with a mean age of 36 years in Clark et al. (1994) and 42 years in Steer et al. (1995). They found some support for the model. However, although low PA indicated depression, it was by no

means unrelated to general distress. Physiological hyperarousal was similarly found to be good indicator of anxiety yet also had modest loadings onto general distress. They concluded that NA might account for a lot of the shared variance between the BDI and the BAI. Although items on the BDI that indicate low PA were found to be specific to depression, and physiological hyperarousal items on the BAI were specific to anxiety, they were not pure markers unrelated to general distress (Clark et al., 1994; Steer et al., 1995).

Anxiety and depression in older adults

More recent studies have begun to investigate the differentiation of anxiety and depression and the use of the tripartite model in older adults. So far, the findings have been mixed (Cook, Orvaschel, Simco, Hersen, & Joiner, 2004). Shapiro, Roberts, and Beck (1999) and Wetherell et al. (2001) investigated the affective dimensions of anxiety and depression on non-clinical populations of older adults with mean ages of 74 and 61 years, respectively. In these studies, anxiety and depression self-report measures all had moderate correlations with each other. Despite the correlation between the two, results from these studies suggest that cognitive and affective underpinnings of anxiety and depression are different in later life. Shapiro et al. found that, as in younger adults, NA was related to both anxiety and depressive symptoms, but low PA was not useful in differentiating between the two. Wetherell et al. also found that low PA was not as specific to depression in older adults as it was in younger populations. This suggests that the tripartite model, which explains these differences in younger adults, is not as useful with older adults. Beck et al. (2003) in their research with a clinical sample of generalized anxiety disorder patients (average age of 66 years; range 60-80 years) also found that the tripartite model may not

account for differences in anxiety and depression in older adults. The study by Cook et al. (2004) investigated the tripartite model with a group of elderly psychiatric outpatients aged between 55-87 years (average age 64 years). They found some support for the model with low PA being more highly related to depressive than anxiety symptoms.

Wetherall and Arean (1997) investigated the psychometric properties of the BAI and its ability to discriminate anxiety from depression in participants aged between 55 and 92 years (average age 68 years). They found that the BAI was moderately correlated with both the BDI and the geriatric depression scale (GDS). Further analysis indicated that the cognitive factor of the BAI correlated better with depression than the somatic anxiety factors. They also found that when the combined tests were put through a principle components analysis restricted to two factors, most of the BAI items loaded onto an anxiety factor while most of the BDI and GDS items loaded on to a depression factor (Wetherell & Arean, 1997). This indicated that the BAI was measuring a construct distinct from that measured by the depression measures.

In summary, research into differentiating anxiety and depression has produced mixed findings, but generally it appears that models developed for younger adults might not be totally applicable to older adults. With the exception of Shapiro et al. (1999), studies, like most of those reported on anxiety measures earlier, have participants that are young older adults, with average ages in the mid 60's. All the research reported so far has also used previous studies as the younger comparison group. To address the lack of control group and the young older adults used in elderly research so far, the present study included older adult age groups and a control younger adult age group.

The Present Study

As the research on anxiety in older adults increases, it is becoming clear that the presentation of anxiety in this population could be different from younger adults (Beck & Stanley, 2001). Current literature assessing the use of anxiety self-report measures in older adults has lead to mixed support for their use (Kogan et al., 2000). While a few studies have looked at the psychometric properties of some of these tests using older adults, differences that occur over age have only been examined through comparisons taken from different samples at different times. This could be potentially problematic as there could be a number of differences between the populations from different studies that could have influenced scores, and as such, influenced any difference or lack thereof in the differing populations. Scores obtained 10 years ago could have changed due to changes in society over that time, and these changes could affect a comparison with current scores. Also, comparing scores from one population to a different population, obtained using a different method, could be exposed to a number of confounding variables, such as differing recruitment process, differing cultures from city to city or country to country, and differing motivations for taking part in the study. By comparing scores from participants gathered from the same population, using the same recruitment process, and in the same era, one can rule out any differences in scores being due to population differences. To counter the problems outlined above, a cross sectional sample of participants was used in the present study.

Also of concern with much of the previous research looking at the measurement of anxiety in older adults is the age of the participants used. Many of the studies reported in this thesis had the older adults age group starting from the age of 55 years with

most of the average ages being in the mid 60's (Beck et al., 2003; Cook et al., 2004; Kabacoff et al., 1997; Stanley et al., 1996). This could be potentially problematic as the older adult age group covers a very wide range of ages, yet a majority of the research has a population towards the younger end of this group. Research into cognition and aging has started to look at old older adults (75 years and over) and found changes in some cognitive processing in people over this age (Backman, Small, Wahlin, & Larsson, 2000). Given this, and the other changes that have been noted in the presentation of anxiety in later life, it is worth investigating the measurement of anxiety across the older age group. To do this, participants over 55 were divided into two groups: Young older adults (55-75) and Old older adults (75+).

Another interest of the current study was the overlap between anxiety and depression measures across the different age groups. It appears that the two disorders have a higher comorbidity in older adults (Krasucki et al., 1998; Wetherell et al., 2001). Research so far has shown that models that explain the overlap in younger adults may not be applicable to the older population (Beck et al., 2003; Shapiro et al., 1999). However, as with anxiety, there have not been any cross sectional studies comparing the two constructs or looking specifically at adults 75+.

In this current investigation, the relationship between some of the more common anxiety and depression measures was examined across the older adult age group. This was achieved by splitting the older age group into 'young old' and 'old old', and then comparing scores between these two groups. These scores were also compared with an Adult age group (35-55 years old) from the same population. It was of interest to see how normative data from a New Zealand sample compares to overseas samples.

Also, the finding that item 24 does not correlate well with the overall STAI trait scale in older adults from a Canadian sample (Bouchard et al. 1998) was investigated in the present New Zealand sample.

The main aim of the present study was to investigate anxiety across age, and to examine the relationship between anxiety and depression across age groups, with particular attention being paid to any difference in the 75+ group. Of critical interest in the older groups was the relationship between the anxiety and depression tests developed specifically for this age group compared with the tests developed for younger adults.

Hypotheses

Hypothesis 1

It was predicted that the scores on the anxiety measures would change with age. Based on previous research, it was predicted that the STAI scores would decrease with age (Knight et al. 1983; Stanley et al., 1996). It was also predicted that the BAI scores would decrease with age (Gillis, Haaga, & Ford, 1995; Owens et al., 2000). With regard to depression, it was predicted that the scores on the BDI would not change with age (Bleecker, Bolla-Wilson, Kawas, & Agnew, 1988; Bolla-Wilson & Bleecker, 1989). It was predicted that scores on the GDS would decrease slightly with age (Knight, McMahon, Green, & Skeaff, 2004). There has been no research looking at the effect of age on the AMAS-E, as this test was developed for older age groups and has not been used on younger adults. It was predicted that scores on these tests would differ for the younger and older groups, although the direction of the difference could not be predicted.

Hypothesis 2

A comparison of scores on anxiety measures will be made within each age group. It is predicted that there would be no difference among the scores, as all of these tests purport to measure the same construct (anxiety). There has not been any previous research that has examined the standardised scores across all three of the anxiety measures used in the current study.

Hypothesis 3

The relationship between the tests was investigated by looking at the inter-test correlations across the different age groups. Based on previous findings, it was predicted that the anxiety measures will show moderate to strong correlations in all age groups (Creamer et al., 1995; Osman et al., 1997a; Shapiro et al., 1999; Stanley et al., 1996).

Hypothesis 4

The relationship between anxiety and depression was investigated. It was predicted, based on previous research, that, the depression scores would show moderate correlations with the anxiety scores (Creamer et al., 1995; Fydrich et al., 1992; Shapiro et al., 1999; Wetherell & Arean, 1997). Standardized scores on anxiety and depression measures were compared and it was predicted that there would be a smaller difference between scores for the older age groups because the two disorders tend to overlap more in older adults (Krasucki et al., 1998).

Method

Design

A quasi-experimental, cross-sectional study was conducted. Community dwelling adults of varying ages completed five self-report questionnaires, three assessing anxiety and two assessing depression.

Participants

The sample for this present study was made up of three different age groups. In previous research, the older adults' cut off age has been 55 years, with mean ages being in the mid 60's (Kabacoff et al., 1997; Stanley et al., 1996). In the present research, how anxiety may change within the older age group was investigated. To do this, the older adult group was divided into two groups: a 55-74 year old group (younger old) and a 75+ year old group (older old). The 75+ group was the main focus of the research as there had been very little previous research on this age group. A 35-54 year old age group was used as a comparison to the older age groups. This age range was chosen so that there were no gaps in age and the spread in age groups was kept even. A non-clinical sample was utilised, taken from the general population. All participants were community dwelling, with their own home, apartment, or flat. The demographic information for the three groups can be seen in Table 1.

The younger adult group comprised of 20 people, 10 (50%) were female and 10 (50%) were male with a mean age of 44.95 years (SD = 4.65). The younger old group also consisted of 20 people, 13 (65%) were female and 7 (35%) were male with a mean age of 69.2 years old (SD = 4.65). The older old group consisted of 20 people,

12 (60%) were female and 8 (40%) were male with a mean age of 80.5 years (SD = 5.5). The overall sample consisted of predominantly Pakeha/European/New Zealanders but, as Table 1 shows, there was a small number of participants from other ethnic groups.

Table 1.
Demographic information

Group	Adult (N = 20)		Young older (N = 20)		Old older (N = 20)	
	N	(%)	N	(%)	N	(%)
Gender						
Male	10	50	7	35	8	40
Female	10	50	13	65	12	60
Ethnicity						
Pakeha	7	35	13	65	9	45
New Zealand European	7	35	2	10	5	25
New Zealander	2	10	5	25	5	25
Maori	3	15				
Other	1	5			1	5
Chronic Illness						
Yes	1	5	4	20	9	45
No	19	95	16	80	11	55

Prospective participants were not included in the study if they were currently diagnosed with anxiety, depression, or any other mental illness, currently taking any psychotropic medication, or had a neurodegenerative disease. If participants had previously been diagnosed with anxiety or depression they were asked when, and

were only excluded if they were still diagnosed with either. Participants were asked if they had any chronic illnesses and to specify these if they did, but were not excluded from the study based on this. These illnesses were ongoing ones, such as asthma and diabetes, and it was thought unlikely that having such illnesses would confound confound the test scores for anxiety and depression.

Measures

Two of the more commonly used anxiety measures, the BAI and the trait scale of the STAI-t[4], were used in the present investigation. The AMAS-E was also used as a comparison, being the only self-report test developed specifically for an older adult age group. Two depression measures were used to assess the overlap between anxiety and depression; these were the BDI and the GDS. The BDI was chosen because its sister test, the BAI, was developed to differentiate anxiety from depression as measured by the BDI. It was of interest to find out if these BDI/BAI differences were constant across age. The GDS is a measure developed specifically for the use with older adults. Once again, it was of interest to establish whether younger and older mentally healthy adults produced different scores on the GDS.

Beck Anxiety Inventory (BAI)

The BAI was developed by Beck and colleagues as a tool to help differentiate between anxiety and depression (Beck & Steer, 1993). Items were generated from three self-report instruments: the Anxiety check list, Physicians desk reference, and the Situational check list. From these, a list of 86 items was generated, and with factor

[4] Only the trait scale of the STAI was used in the current study. The reason for this was while applying for ethical approval, the ethics committee were concerned over the time involved for older adults to complete the test battery. To reduce the time, the state scale of the STAI was removed. This subscale was removed because the aim of the study was to see how anxiety in general changes with age, and the other anxiety tests were thought to better predictors of general anxiety.

analysis, the list was reduced to 21 items (Beck & Steer, 1993). Factor analysis of the BAI revealed two highly correlated factors, somatic and subjective. Following centroid cluster analysis four symptom clusters emerged: neurophysiological, subjective, panic, and autonomic symptoms (Beck et al., 1988a). The 21-item BAI was developed for clinical samples and has since been used in both clinical research and practice as an anxiety measure that purports to differentiate anxiety from depression (Creamer et al., 1995; Kabacoff et al., 1997).

Beck et al. (1988a) examined the BAI correlations between the cognitive checklist – anxiety scale (CCL-A) and the Hamilton Anxiety rating scale-revised (HARS-R) on a group of outpatients with anxiety as the predominant diagnosis. They found that the BAI had higher correlations with these tests measuring related constructs compared to unrelated constructs, indicating good convergent validity (Beck et al., 1988a).

Steer, Ranieri, Beck, and Clark (1993) compared the BAI with the Symptom Checklist 90 (SCL-90-R), a broad spectrum self-report measure, on a group of outpatients with a variety of diagnoses, including anxiety and depression. They found moderate convergent validity, with the BAI having a higher correlation with the anxiety subscale of the SCL-90-R compared to other subscales, although all sub scale correlations were significant (Steer et al., 1993).

Fydrich et al. (1992) found further evidence of convergent validity for the BAI, with moderate correlations with the STAI and the Daily diary ratings. The BAI also showed some discriminant validity with some of the depression measures.

Osman et al. (1997a) and Creamer et al. (1995) further investigated the BAI in non-clinical groups. Creamer and colleagues found the BAI and STAI to be moderately correlated (convergent validity) when tested on a group of undergraduate students. They also found a higher correlation between the BAI and trait subscale compared to the state subscale. Osman et al. (1997a) compared the BAI with the STAI, CCL-A, and the Brief Symptom Inventory Anxiety subscale, on a group of undergraduate psychology students. They found that the BAI correlated significantly with all of the anxiety self-report measures. Similar to Creamer et al. (1995), they found that the BAI correlated higher with the trait subscale of the STAI. However, when symptoms of depression were controlled for the BAI correlated higher with the state subscale.

State Trait Anxiety Inventory (STAI)

Spielberger began the development of the STAI in 1964 with the idea of developing a test that would measure both trait and state anxiety (Spielberger, Gorsuch, & Lushene, 1970). During this time, he found that, due to the psycholinguistic properties of different items having strong state or trait connotations, that two tests were needed, one for state and one for trait (Spielberger et al., 1970).

The STAI was initially developed from the IPAT Anxiety Scale, the Taylor Manifest Anxiety Scale, and the Welsh Anxiety Scale. From these tests, 177 items were collected and re-written. Then, through a series of tests, carried out using mainly college and high school students, 40 items were kept to become the first version of the STAI (Spielberger et al., 1970). This form of the test was later revised in 1979 with weak items, or those closely related to depression, being replaced. Normalization

and standardization was carried out on a more diverse adult population (Spielberger et al., 1983).

The resulting STAI (Form Y) is a 40-item test, with 20 items measuring trait anxiety (how people generally feel) and 20 items state anxiety (how people feel right now) (Spielberger et al., 1983). The two-factor solution for the STAI found two clear factors, state and trait anxiety. The four-factor solution found state anxiety-absent and trait anxiety-absent items as well as state anxiety-present and trait anxiety-present items (Spielberger et al., 1983). This test has been used extensively in both research and clinical settings.

Tanaka-Matsumi and Kameoka (1986) investigated the correlations between four anxiety and five depression self report measures. They compared the STAI with the Taylor Manifest Anxiety Scale, the Zung Self-rating Anxiety Scale, and the S-R Inventory of Anxiousness, the latter using two anxiety-provoking situations. The STAI showed good convergent validity, with all anxiety measures having significant correlations (Tanaka-Matsumi & Kameoka, 1986). This study showed that, although there were significant correlations between these anxiety self-report measures, there were also significant correlations between the depression self-report measures and anxiety. This finding supports the view that there may be a strong overlap between anxiety and depression, based on self-report

A study by Fydrich et al. (1992) further investigated the STAI comparing it to the BAI and daily diary ratings of anxiety on a group of outpatients. The STAI showed some convergent validity. The state subscale of the STAI correlated moderately with

other anxiety measures. The trait subscale showed significant correlations with the state subscale and BAI but did not correlate with the daily diary anxiety ratings.

Adult Manifest Anxiety Scale for the Elderly (AMAS-E)

The Adult Manifest Anxiety Scale for the Elderly (AMAS-E) was developed from the Revised Child Manifest Anxiety Scale (RCMAS) (Reynolds et al., 2003). The AMAS includes three tests to cover differing ages, the AMAS-C for college students, AMAS-A for adults (aged 19-59 years old) and the AMAS-E for the elderly (aged 60+ years). All of these tests were developed using the 100 trial items used for the RCMAS, although re-written to be appropriate for the age group they were going to be used for. The changes made to each of the three tests were based on the available literature and clinical experience, with all items being reviewed by relevant experts.

The AMAS-E contained 118 items following the changes made according to the literature and expert advice. The responses of participants from a standardised sample were collected for the 118 items and analysed to identify the factors of the scale. Items that were found to be redundant or those that only added little power to the test were eliminated. The AMAS-E test ended up with four factors: physiological anxiety, fear of aging, worry/over sensitivity, and a lie scale (Lowe & Reynolds, 2000; Reynolds et al., 2003). The AMAS-E has shown good internal consistency and adequate test-retest reliability. Moderate convergent validity with the STAI has been found, but it has not been compared to the BAI (Lowe, 2005, personal communication; Lowe & Reynolds, 2006). The mean age of participants that took part in the normative study of this test was 79 years, which is higher than the previously mentioned studies investigating the assessment of anxiety in older adults

Beck Depression Inventory (BDI)

The original BDI, developed in 1961, was based on typical descriptive statements given by patients with depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). Over time the BDI was revised in 1979, and with the release of the DSM-IV the BDI was modified to produce a test consistent with depressive symptoms characterised by the DSM-IV, the BDI-II (Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report measure that assesses the severity of depressive symptoms. The items are common symptoms of depression, each with four response options of increasing severity. Individuals are asked to choose one of the four responses for each item that best describes how they have felt with regards to the symptoms over the past week.

A meta-analysis of the BDI found that it had very good internal consistency (Beck, Steer, & Garbin, 1988b). In the review by Beck et al. (1988b) they found that most researchers seemed unaware that there were revised versions of the BDI and did not specify which version they used, making it difficult to determine if the original BDI or the revised BDI-II was being used. The outcome of the meta-analysis by Beck and colleagues (1988b) was that the BDI[5] had good internal consistency with both clinical and non-clinical populations, along with moderate to good concurrent validity when compared with other depression self-report tests such as the Hamilton Rating Scale for depression. The BDI also showed reasonable construct validity with higher scores being obtained by people diagnosed with major depression compared to those with

[5] For the rest of this document BDI will be used in reference to the BDI-II. Unless otherwise stated, it will be assumed that research carried out after 1979 used the revised BDI-II.

GAD, although both depression and anxiety self-report measures were moderately correlated (Beck et al., 1988).

Investigation in to the psychometric properties of the BDI was found to have higher internal consistency than found in the meta-analysis of the earlier versions of the test (Beck et al., 1996). The BDI was found to have good stability with a significant test-retest correlation of 0.93 (Beck et al., 1996). The BDI has good content validity as it was developed especially to assess depressive symptoms as listed on the DSM-IV (Beck et al., 1996). The BDI also has good convergent and discriminant validities (Beck et al., 1996; Osman et al., 1997a). Comparison with the Hamilton Rating scales of depression and anxiety (HRSD-R and HRSA-R) indicate convergent and discriminant validity with the BDI correlating higher with the depression scale than the anxiety scale (Beck et al., 1996). The BDI also has moderate correlations with the BAI. Osman and colleagues (1997a) found further support for the construct validity of the BDI, having a strong relationship with depressive symptoms, over and above that with anxiety symptoms. The BDI has psychometric properties that are highly congruent with the original BDI, and was found to have a stronger factor structure leading to the conclusion that it is a stronger test of depression than its predecessor (Dozios, Dobson, & Ahnberg, 1998).

Geriatric Depression Scale (GDS)

Due to errors that occurred through the use of self-report instruments in measuring depression in elderly subjects, such as respondent's desire to present in a favourable way, or problems such as health concerns confounding somatic complaints, a depression measure was developed specifically for the elderly (Montorio & Izal,

1996). To develop a test specifically for the elderly, researchers and clinicians involved in geriatric psychiatry and gerontology selected 100 items that had been shown to be useful in distinguishing between elderly depressed and normal patients. This 100-item measure was then administered to 100 elderly volunteers living in the community, and the 30 items that showed the highest correlation with the total score were kept to form the GDS (Yesavage et al., 1983). There were no somatic items in this final 30 meaning that one of the major problems, the confusion between somatic symptoms and physical problems common with old age, is avoided (Montorio & Izal, 1996).

The GDS (Yesavage et al., 1983) is a 30-item self report depression measure that asks about symptoms over the past week. The questions are read verbally to the individuals and they then give a yes or no response, more easily comprehensible than the four option scales of other self-report measures. Yesavage and colleagues (1983) validated the GDS by comparing it to scores of two other depression measures, the Zung self-rating scale for depression and the Hamilton Depression Rating scale. The study was carried out with 60 depressed elderly participants and 40 elderly participants not affected by depression. They found that all three had significant correlations indicating concurrent validity. They also found that the GDS, Hamilton Depression Rating scale and the Zung self-rating scale (to a lesser extent) differentiated between levels of depression as classified by the research diagnostic criteria (Yesavage et al., 1983).

Hyer and Blount (1984) investigated the GDS compared to the BDI. In their study they compared the two tests in a sample of 61 inpatients, 30 with depression and 31

without depression. The outcome of the research indicated that there was a large amount of overlap between the two tests with a correlation of 0.73, yet there was also a substantial amount of independence. The GDS was more reliable in differentiating between depressed and non-depressed groups than the BDI and was also more accurate giving less false-positive and false-negative rates than the BDI (Hyer & Blount, 1984). Research comparing the BDI and GDS has also showed support for the view that the GDS is simpler to complete for older adults (Olin, Schneider, Eaton, Zemansky, & Pollock, 1992).

Procedure

Ethical Approval

Ethical approval was sought from the Massey University Human Ethics Committee before any recruiting or administration of the tests took place. After receiving ethical approval (HEC: PN Application 05/40) data collection began.

Recruitment

Contact was made with a number of different organizations in the community and permission was asked to advertise in their clubs. These organizations included the Returned Services Association (RSA), local bridge clubs, and a Rotary club. Some groups, such as The University of the Third Age, allowed advertising in their local newsletter asking for volunteers. In these advertisements, potential participants were given some general background on the research, including its rationale, what it would involve them in, and how to go about volunteering (see Appendix B). If people were interested in participating then they were able to make contact with the researcher. Upon contact, potential participants had any other questions they had answered before

a time and a place to meet for them to complete the tests was arranged. Potential participants were advised that data collection could either take place at their house or at the university, depending on their preference. They were also advised that they could bring along a support person if they wished. The participants were then sent a copy of the information sheet (see Appendix C), for them to read over before the tests were administered.

Testing Procedure

First, any remaining questions, or concerns, that participants had were dealt with. If participants were still willing to take part, then a consent form was signed (see Appendix D). A health-screening questionnaire (Appendix E) was then administered to determine if the person met the inclusion criteria for the research. It they were currently diagnosed anxiety depression or any other mental illness, taking any psychotropic medication or had a neuro-degenerative disease, then they were excluded from the research, although the data were still collected. Information about any chronic illnesses the participant may have along with demographic information was collected.

The test order was restricted such that a depression test always followed an anxiety test. Two anxiety or two depression tests were never successively administered. This lead to 12 different test orders, with each of the 12 orders being used at least once in each group. Due to there being 20 participants in each group, it was not possible to use each combination an equal number of times. However, each order was used once per group with a random selection of the 12 used for the remaining eight per group.

This was done to control for the effects one anxiety test might have on responses to items of different anxiety tests.

The responses to the suicidal ideation question in the BDI were checked and if any one had answered that they had thought about suicide within the last two weeks then the researcher would talk to them about this further and pass on numbers of support services available to help them with this. Because all participants were chosen to be mentally healthy, it was thought highly unlikely that any of them would indicate any high suicidal ideation. However, a clinical psychologist from Massey University was available for the researcher to consult if there were any concerns over participant responses. This happened on only one occasion. Following completion of the tests, participants were informed that they could contact the researcher at any time if they had any questions, or would like to withdraw from the study. They were also informed that a summary of the results would be sent out to them once all data had been collected. All the marked tests were kept in a locked filing cabinet and the consent forms kept in a separate secure cabinet.

Results

Missing data and data management

There were two cases where participants did not meet the inclusion criteria, and the data from these tests were not used in the final analysis. Of the data collected, missing item responses from tests were dealt with in the following ways:

1. For the Trait scale of the STAI, the mean score for the items answered was obtained and multiplied by 20 to get the overall score (rounding up). If more than three item responses were missing, then the test was not used (Spielberger et al., 1983).
2. Missing item responses for the BAI and the BDI were given the average item score. This was obtained by dividing the total score by the number of items answered. If three items were missing the test was not considered valid.[6]
3. Missing data on the AMAS-E were not replaced. If the test had more than six items incomplete then it was not used (Reynolds et al., 2003).
4. Missing items on the GDS were not replaced. Tests that had more than 5 items missing were not used.

Two test scores had too many missing responses and did not meet the criteria for a valid score. These test scores were not used in the data analysis. Both these scores were from participants in the Old older age group. One was for the AMAS-E and the other for the GDS.

[6] Information could not be found on how to deal with missing data for the BAI, BDI, and GDS, so the percentage of missing data allowed for valid responses was based on the percentages allowed in other tests used in this research.

Data analysis

Test scores were entered into a Statistical Packages for the Social Sciences (SPSS) spread sheet for statistical analysis (SPSS version 12.01 for Windows, 2003).

Hypothesis 1:

The scores on the BAI, STAI-t, AMAS-E, BDI, and GDS will change across the different age groups.

The descriptive statistics for the raw scores of the BAI, STAI-t, BDI, AMAS-E, and the GDS can be seen in Table 2. The Trait scale of the STAI-t yielded very similar mean scores for the Adult and Young older group, but a slightly lower mean score for the Old older group. However, univariate Analysis of Variance (ANOVA) revealed that these differences were not statistically significant, $F<1$.

Table 2.
Descriptive Statistics for the Raw Scores of the Tests.

	Adult group		Young older group		Old older group	
	Mean	S.D	Mean	S.D	Mean	S.D.
STAI-t	30.60	6.09	30.20	7.67	28.35	6.33
AMAS-E	9.20	6.34	9.40	6.47	7.58	5.43
BAI	2.90	2.34	5.56	6.29	6.50	6.96
GDS	3.00	2.38	3.45	2.91	3.16	2.75
BDI	4.90	3.71	5.85	5.25	5.35	3.30

The AMAS-E showed a very similar pattern of means to the STAI-t with the lowest score being for the Old older group. However, once again, these mean differences failed to reach statistical significance, $F<1$.

Turning now to the BAI, a test of equality of variance across the three age groups showed them to be unequal (Levene's test, $p = 0.007$). However, because the groups had roughly equal numbers, ANOVA is considered robust under such circumstances (Tabachnick & Fidell, 2001). Scores for the BAI in the Adult group were considerably lower overall than those of the two older groups. The mean of 2.90 is 2.66 lower than that of the Young older group and 3.60 lower than that of the Old older group. Surprisingly, these differences did not reach statistical significance, $F(2,57) = 2.24$, $p = 0.12$, $\eta^2 = 0.07$, power = 0.44. The η^2 value indicates a moderate effect size (Kinnear & Gray, 2004), though the power to detect the effect was low (0.44).

Mean scores on the BDI and the GDS were all reasonably similar, and ANOVAs for both these test indicated that there was no difference across age groups, $Fs<1$.

Overall, hypothesis 1 received little or no support.

Hypothesis 2

There will be similar standardised scores on all anxiety tests within each age group.

As the scores on the BAI, STAI-t, and AMAS-E had different total values it was not possible to compare the scores directly. To allow comparisons among scores on the different tests, standardised T-scores were obtained. T-scores were used for the

comparison as they allow for easier computation than *z* scores, all scores being positive (Guilford, 1965). The following formula was used to calculate the T-scores.[7]

T-score= $10/\sigma$ x I - ($10/\sigma$ x μ - 50).

Where: σ = The standard deviation (SD) for a test over the whole sample

μ = The mean score for the test over the whole sample

I = Individual test score

The mean scores and SD used for each test were obtained from the entire sample and then applied to individual scores.

Following the T-score conversion, the overall averages for the tests can be seen in Table 3. All means and SDs are close to 50 and 10, respectively. The slight differences in the scores are due to the effects of rounding to two decimal places.

Table 3.
Standardised means and SDs for the Overall T-scores

	STAI-t	BDI	BAI	GDS	AMAS-E
Mean	50.15	50.01	50.01	50.00	50.04
S.D.	10.04	10.01	10.01	9.99	10.03

The descriptive statistics for the T-scores of the BAI, STAI-t, BDI, AMAS-E, and the GDS can be seen in Table 4.

[7] Equations used for each test can be seen in Appendix F.

Table 4.
Descriptive Statistics for the T-scores of the Tests.

	Adult group		Young older group		Old older group	
	Mean	SD	Mean	SD	Mean	SD
STAI-t	51.45	9.14	50.93	11.50	48.08	9.49
AMAS-E	50.71	10.46	51.29	10.75	48.03	8.96
BAI	46.37	4.11	50.95	11.02	52.71	12.25
GDS	49.23	8.99	50.93	10.97	49.83	8.76
BDI	48.92	9.02	51.10	12.78	50.01	8.01

In the Old older group the scores on the BAI are higher than those of the STAI-t and the AMAS-E by 4.63 and 4.68, respectively. The variability of the BAI scores is higher than other anxiety measures with a SD of 12.25 compared to 9.49 for the STAI-t and 8.96 for the AMAS-E. A repeated measures ANOVA showed that there was no significant difference between the BAI and the STAI, $F(1,19) = 3.04$, $p = 0.10$, $\eta^2 = 0.14$, power = 0.38, and the BAI and AMAS-E, $F(1,18) = 1.38$, $p = 0.26$, $\eta^2 = 0.07$, power = 0.20. The η^2 value indicate that there was a large effect size between the BAI and STAI-t, along with a moderate effect size between the BAI and AMAS-E (Kinnear & Gray, 2004). For both of these comparisons there was low power available to detect these effects; running more participants might have resulted in statistically significant results.

There was very little difference between scores on the anxiety tests for the Young older group, ranging between only 50.93 and 51.29, a difference that did not reach significance, $F<1$.

In the Adult group the mean score on the BAI was 46.37 and was accompanied by a very low SD of 4.11, indicating that there was very little variance in the scores on the BAI for this age group. The mean score was lower than those on the STAI-t and AMAS-E by 5.08 and 4.34, respectively. However, a repeated measures ANOVA indicated that there was no significant difference between the BAI and AMAS-E, $F(1,19) = 3.27$, $p = 0.09$, $\eta^2 = 0.15$, power = 0.41, but there was a significant difference between the BAI and the STAI-t, $F(1,19) = 6.74$, $p = 0.02$, $\eta^2 = 0.26$, power = 0.69. The η^2 values indicate that there were strong effect sizes between both the BAI and the AMAS-E (Kinnear & Gray, 2004), although, again, there was low power to detect possible differences.

Hypothesis 3

The relationship between the anxiety tests, and between the depression tests will be similar across all age groups

To investigate some of the psychometric properties of the anxiety measures, Pearsons' product moment correlations were calculated to assess the convergent and divergent validity of the tests. Correlations for these tests can be seen in Table 5.

Relationship between anxiety measures

The AMAS-E had low correlations with the BAI in all age groups. The correlation for the adult group is lower than the two older groups with 2% shared variance (r^2) as opposed to 8% shared variance for the two older groups. The AMAS-E had moderate to strong correlations with the STAI-t in all three age groups. The Adult group had

lower correlations compared to the two older groups with 31% shared variance as opposed to 47% shared variance for the Old older group and 72% for the Young older group. The correlation between the BAI and STAI-t vary, with the Old older group having a weak to moderate correlation with 19% of the variance being shared. The Adult group provided only a weak correlation sharing 10% of variance. The correlation was very weak for the Young older group with 4% of variance shared between the two tests. In summary, the AMAS-E and STAI-t appear to have a strong relationship across all ages with reasonable correlations. The BAI does not appear to have a very strong relationship with either of the other anxiety tests.

Table 5.
Correlations Between the Tests in the Different Age Groups.

Older old group	BAI	STAI-t	AMAS-E	BDI	GDS
BAI	1				
STAI-t	0.43	1			
AMAS-E	0.28	0.68**	1		
BDI	-0.10	0.27	0.45	1	
GDS	0.31	0.50*	0.50*	-0.07	1
Younger old group					
BAI	1				
STAI-t	0.20	1			
AMAS-E	0.28	0.85**	1		
BDI	0.59**	0.55*	0.61**	1	
GDS	0.30	0.65**	0.69**	0.50*	1
Adult group					
BAI	1				
STAI-t	0.32	1			
AMAS-E	0.13	0.56*	1		
BDI	0.27	0.63**	0.40	1	
GDS	0.37	0.52*	0.56**	0.62**	1

* $p < 0.05$ level
** $p < 0.01$ level

Relationship between the depression tests

The BDI and GDS have a strong relationship in the Adult and Young older group with 39% and 25% shared variance, respectively. The relationship between these tests

was considerably lower in the Old older group with virtually no shared variance (0.5%). The BDI had a very poor relationship with the GDS in the Old older group while this relationship is moderate in both other groups.

Hypothesis 4

The relationship between anxiety and depression will be stronger in the older age groups.

The relationship between depression and anxiety was investigated through comparison of anxiety and depression correlations (see Table 5 p.49) and comparison of the standardized scores in Table 4 (p.48). Overall, the STAI-t had moderate correlations with all the depression measures except for the BDI in the Old older group. The BAI had weak correlations with all the depression measures except for with the BDI in the Young Older groups. The AMAS-E has moderate correlations with all the depression measures across all age groups.

In the Old older group the correlations between the BDI and the anxiety measures are weak to moderate, with the BAI having 1% shared variance, the STAI-t 7% shared variance, and the AMAS-E sharing 20% variance. The GDS had a more even spread of correlations in this group with the BAI and GDS sharing 10% variance while the other anxiety tests both share 25% variance. The Young older group had moderate correlations between all the anxiety and depression measures except the GDS and BAI. The shared variance between the GDS and BAI was 9%, while all the other tests had a shared variance between 30% and 47%. In the Adult group the GDS had moderate correlations with the STAI-t and the AMAS-E but only weak to moderate

correlations with the BAI, sharing 14% of variance. The BDI had moderate correlations with the STAI-t, sharing 40% variance, but only weak to moderate correlations with the BAI and AMAS-E sharing 7% and 16%, respectively.

In summary, contrary to predictions, the Old older group scores appear to yield a weaker relationship between anxiety and depression than the other two groups. The Young older group generally had similar relationships between anxiety and depression compared with the Adult group.

A repeated measures ANOVA was conducted on the standardized anxiety and depression scores within age groups. For the Old older and Young older groups there was no significant difference between any of the scores on the anxiety and depression measures, $F<1$. In the Adult group there were no significant differences found in the anxiety-depression comparison although some of the effect sizes (η^2) were moderately large. Tests of significance, effect sizes and power are given in Table 6. For all comparisons there was low power to detect any differences between the scores. If more participants had been run, then the power would have increased and these moderately large effect sizes could have yielded significant differences.

Internal consistency of the STAI.

Preliminary analysis of the STAI-t along with previous findings by Bouchard et al. (1998) showed some interesting item-total correlation changes with age, and, because of this was examined in further detail. The other anxiety measures did not produce any significant differences associated with age and there had not been any previous

research that had found the internal consistency of these tests to change with age. Based on this only the STAI-t was examined.

Table 6.
Test of differences between standardized scores of the BAI, STAI-t, BDI and GDS in the Adult group.

Comparison	*F*	*p*	η^2	Power
BAI-BDI	1.65	0.22	0.08	0.23
BAI-GDS	2.32	0.15	0.11	0.30
STAI-t-BDI	2.70	0.16	0.10	0.28
STAI-t-GDS	1.25	0.28	0.06	0.19

Note: All dfs = 1, 19

The internal consistency (Cronbach's Alpha) of the STAI-t can be seen in Table 7. The Cronbach alpha score for all three age groups are above 0.70 indicating that the STAI has reasonable internally consistency in all three groups (Pallant, 2001). The corrected item-total correlations are the correlation between single items, and the sum of all the other items in a test. There are some items in all the age groups that have corrected item-total correlations below 0.30, indicating that they are possibly measuring something different from the overall scale. There are four items (asterisked) in the Adult age group with corrected item-total correlations below 0.30. They are items 31, 32, 38, and 40, with item 32 having a very low correlation of –0.01. The Young older group has two items, with corrected item-total correlations below 0.30, items 25 and 35. The Old older group has the most number of items with corrected item-total correlations below 0.30. There are eight items, double the number of any other group, and they are items 21, 22, 24, 25, 28, 29, 38, and 40. The correlations are very low for item 25 with 0.07 and item 24 with a correlation of 0.05.

Table 7.

The item-total correlations and Cronbach's alpha correlations for the STAI-t

	Corrected item total correlations		
	Adult	Younger old	Older old
Item 21 "I feel pleasant"	0.46	0.78	0.23*
Item 22 "I feel nervous and restless"	0.51	0.62	0.13*
Item 23 "I feel satisfied with myself"	0.56	0.48	0.44
Item 24"I wish I could be as happy as others"	0.39	0.49	0.05*
Item 25 "I feel like a failure"	0.65	0.28*	0.07*
Item 26 "I feel rested"	0.60	0.54	0.61
Item 27 "I am calm, cool and collected"	0.81	0.72	0.63
Item 28 "I feel that difficulties are piling up and I can't overcome them"	0.32	0.42	0.17*
Item 29 "I worry too much over something that really doesn't matter"	0.52	0.66	0.27*
Item 30 "I am happy"	0.44	0.68	0.61
Item 31 "I have disturbing thoughts"	0.21*	0.54	0.36
Item 32 "I lack self-confidence"	-0.01*	0.58	0.50
Item 33 "I feel secure"	0.31	0.90	0.42
Item 34 "I make decisions easily"	0.65	0.80	0.43
Item 35 "I feel inadequate"	0.53	0.17*	0.45
Item 36 "I am content"	0.37	0.85	0.54
Item 37 "Some unimportant thought runs through my mind and bothers me"	0.40	0.67	0.42
Item 38 "I take disappointments so keenly that I can't put them out of my mind"	0.26*	0.30	0.26*
Item 39 "I am a steady person"	0.41	0.50	0.59
Item 40 "I get in a state of turmoil as I think over my recent concerns and interests"	0.18*	0.87	0.27*
Cronbach's Alpha	0.83	0.92	0.79

* Items with correlations below 0.30.

Discussion

Summary of Findings

The results from the present study indicate that anxiety does not change in any significant way (as measured by self-report tests) in mentally healthy people as a function of age. However, even though test scores failed to reach statistical significance, the effect sizes for some of the differences were moderately large. Most statistical tests had low power to detect change, and a larger sample probably would have produced significant effects.

The STAI-t and AMAS-E correlated well in all age groups, while the BAI had weak correlations with both the STAI-t and AMAS-E in all age groups. The depression tests also correlated well in the Adult and Young older group, while yielding a very poor correlation in the Old older group. There were moderate relationships between anxiety and depression, with the AMAS-E and STAI-t having moderate correlations with the depression measures. The BAI, however, did not correlate highly with depression measures in any age groups. In the Old older group the correlations between the STAI-t and the BDI, and AMAS-E and the BDI dropped significantly from the two younger groups. In an analysis of standardized scores, it was found that the two older groups produced no difference between scores on depression tests compared to anxiety tests. In the Adult group there was also no significant difference between scores, but moderately strong effect sizes, suggesting that there is a difference between anxiety and depression scores in this age group.

There was good internal consistency for the STAI-t, and as found by Bouchard et al. (1998) item 24 had very low item-total correlations in the Old older group. It was also

found that the Old older group had twice the number of items that did not correlate well with the rest of the scale compared to other groups.

Anxiety and depression scores as a function of age

Hypothesis 1 predicted that the scores on the anxiety and depression self-report measures would change with age. Statistical analysis of the test raw scores suggests that there were no differences between the anxiety tests across age. This outcome differs from previous research findings (e.g., Owens et al., 2000; Spielberger et al., 1983; Stanley et al., 1996). Thus, anxiety tests developed with younger adults appear to generate similar scores with older adults, and are appropriate to be used with an older population. However, the above conclusion is based strictly on statistical significance. Despite the lack of statistical significance, patterns in the scores did emerge, with some differences producing η^2 values that indicate moderate effect sizes. But the power available to detect the effect was low. Many studies rely on statistically significance without reporting effect sizes and the power available to detect these effects, yet with large enough samples even reasonably small effects can produce statistically significant differences. The effect of age on each of the five tests administered is discussed in greater detail below.

STAI-t

The scores on the STAI-t appear to decrease slightly with age, with the biggest decrease from the Young older group to the Old older group. However, these differences were not statistically significant, and did not support the prediction that the STAI-t scores would decrease with age. One possible explanation for the failure

of the current findings to support the predictions is that the sample used may have been too small to pick up any differences across age groups.

Previous studies have found the STAI-t scores decrease with age. Spielberger et al. (1983) found working adults aged 40-49 had a mean score of 35.05 while working adults aged 50-69 had a mean score of 32.83. There was no statistical analysis conducted to examine the differences between these scores with age; however, with the number of participants (over 600) the difference between these age groups would be statistically significant. Stanley et al. (1996) also found that STAI-t scores decreased with age in their comparison of college students (taken from Spielberger et al., 1970) to a normative sample of older adults between 55-82 years (M = 68) whose mean score was 26.8. The older groups in both these previous studies are similar in age to the Young older group in the present study. A comparison between the Adult (30.60) and Young older (30.20) group in the present study indicates that there is no difference between the scores, contrary to the findings of these previous studies.

Knight et al. (1983) used the older version of the STAI-t (form X), and compared score across all age groups in a New Zealand sample. They found that there was very little difference in scores across the adult and older adults aged between 30 and 79 with scores between 34 and 35. The 80-89 age group had a lower mean score of 28.1, although there were a small number of people in this group (N = 8). This mean score is very similar to that found in the present study (M = 28.4). However, it should be noted that Knight et al. used the older version of the test, and had only a small sample for the Old older group. Therefore, further research using the newer version of the

test, with a larger sample would be needed before any possible differences between STAI-t scores and age could be confirmed.

BAI

The scores on the BAI appear to increase with age, although mean differences failed to reach statistical significance. However, there was a large effect size for BAI scores across age groups, with the biggest difference occurring between the Adult and Young older group where the mean score increased by 2.66. If the number of participants had been larger, the power to detect any possible difference would have increased and probably lead to significant differences.

There has only been one other study (Owens et al., 2000) that has looked at the BAI across age with a mentally healthy sample. As with other research with older adults, the age ranges used for the older age groups were similar in age to the Young older group in the present study. They found that adults between 40-60 produced a higher mean score on the BAI (6.52) compared to an older adults groups aged over 60 (M = 73 years), with a mean score of 5.38. The scores in the older adult group were similar to the Young older group in the present study, while higher for the Adult group. It can be noted that when the age groups vary from study to study, comparison of results will be problematic.

The current finding is contrary to the findings of previous research. A possible reason for this is that the BAI may not be a pure measure of anxiety, but rather a combination of anxiety and physical health . Of the 21 items in the BAI, 15 of them are somatic in nature (e.g., Feeling hot, Dizzy or lightheaded, and indigestion or

discomfort in abdomen). Since there is an increase in physical health problems also associated with age, this could account for the increase in BAI scores. However, there appears to be an overlap between physical symptoms and anxiety in older adults (De Beurs et al., 1999). Therefore, the emphasis on somatic symptoms in the BAI does not necessarily mean that it is a poor test for older adults, although physical health should be noted when interpreting the BAI score.

AMAS-E

Analysis of the scores on the AMAS-E did not find any statistical significant differences between mean scores across age groups. This outcome differs from the prediction that there would be difference in the scores for the older age groups. However, there was a drop in the mean scores between the two older groups in the present study, although it was not statistically significant. The drop in scores occurred between the Young older group (M = 9.40) and the Old older group (M = 7.58). The AMAS-E was developed specifically for assessing anxiety in older adults (60 years and over), similar to the ages to the two older groups in the current study. There have been no previous studies looking at how scores on the AMAS-E change with age. The current findings indicate that scores might decrease within the older age group which the test was developed for. But further research is needed to confirm this.

BDI

As predicted, an analysis of the scores on the BDI did not find any statistical significant difference between scores on the test as a function of age. Previous research with non-clinical samples has found similar results to the current study (Bleecker et al., 1988; Bolla-Wilson & Bleecker, 1989). Bleecker et al. (1988) found

that a sample aged between 40-89 years old had scores on the BDI ranging between 4 and 6. This is similar to the findings in the present study where scores ranged between 4.90 and 5.85. Bolla-Wilson and Bleecker (1989) compared BDI scores across age in a non-clinical sample. They found no difference between an under 60 years of age sample (score = 4.41) and a sample over 60 (score = 5.36). The samples in the Bolla-Wilson and Bleecker study are similar in age to the Adult and Young older groups of the present study, and comparisons of the two studies show very similar results. Overall, the present results are consistent with previous findings, showing that scores on the BDI are invariant with respect to age.

GDS

Similar to the BDI, the GDS scores did not change with age. Previous research on non-clinical GDS scores across age found that scores increased slightly, with a sample aged 65-74 scoring 3.32 while the 75+ sample scored 5.06 (Knight et al. 2004). A comparison of these results with the current study shows that the Young older group had similar scores in the similar aged group in the Knight et al. (2004) study, while the 75+ group from the present study had a lower score compared with the equivalent age group. Thus, the present results differ somewhat from the Knight et al. findings.

The study by Bolla-Wilson and Bleecker (1989) investigated GDS scores in a non-clinical group aged under 60 and a group over 60. They found no difference between the groups with scores of 6.07 in the under 60 group and 6.79 in the over 60 group. A comparison with the equivalent aged groups in the current study (Adult and Young older groups) show that the current study has lower scores than these found by Bolla-

Wilson and Bleecker, but similar to their study, there was no difference between the age groups. In summary, it appears that scores on the GDS do not change between middle age and old age in a non-clinical sample.

Overall, the current study failed to find any support for the predictions made based on previous research, with the STAI-t, AMAS-E, and GDS not changing with age, while BAI scores appeared to increase with age. The small sample size in the current study means that the findings may not be representative of the population. It is also possible that the New Zealand population produces different scores on these tests to those normed with overseas samples, and that this is the reason for the difference. Further research, with much larger samples, would be needed before this could be confidently stated as a reason.

To further investigate the relationship among the anxiety tests, the standardised scores were compared within each age group. It was hypothesised that standardized scores on the anxiety tests would be the same within each of the age groups. The reason for this is that all the tests purport to measure the same thing, anxiety. A comparison of the anxiety measures in the Young older group did not reveal any significant differences between the anxiety measures which supports the hypothesis that the tests are measuring the same construct (anxiety). There was a significant difference found between the BAI and STAI-t, and a moderate effect size for the BAI and AMAS-E in the adult group. There were also moderate to strong effect sizes for the BAI and other anxiety measures in the Old older group, but low power to detect any possible effect. As mentioned earlier, had the number of participants been increased, the power to detect the change would also have increased, probably allowing significant

differences between the BAI and other Anxiety tests. Therefore, the present results are at least suggestive that tests purporting to assess general anxiety are generating different standardised scores, putting their validity to question. It is interesting to note that the difference between BAI scores and the other anxiety measures can only be seen in the Adult and Old older groups with the BAI producing a mean score higher than the other tests in the Old older group and lower mean score in the Adult group. This means that, while other anxiety test scores are staying reasonably constant across age, the BAI score (as noted earlier) is increasing with age, possibly indicating that it is not a good measure of anxiety. However, the STAI-t and AMAS-E are not benchmark tests of anxiety, so further evidence is needed before concluding that the BAI is not suitable in older age groups.

There has been no previous research that has looked at the comparison of standardised anxiety scores. Previous studies have looked at correlations between anxiety tests to examine the similarity they have to other anxiety tests (Creamer et al., 1995; Kabakoff et al., 1997; Osman et al., 1997). However, correlations examine the order of test scores for different measures within groups, and do not take in to account the magnitude of the scores. Therefore, comparisons of standardised anxiety scores are a useful analysis, allowing the level of anxiety measured by each test to be compared.

One possible explanation for the differences between the BAI and other anxiety tests can be found in a study by Creamer et al. (1995). They found that the BAI changed over situations of high and low stress, similar to what state anxiety would be expected to do. The STAI-t and AMAS-E are trait measures and are more stable over time and

situation. The BAI may, therefore, be a measure of an anxiety state rather than an anxiety personality trait. Overall the BAI does not appear to measure a similar construct to the STAI-t and the AMAS-E. A comparison of the State part of the STAI is recommended for future research to investigate the overlap with the BAI.

Correlations between anxiety tests

It was hypothesised that the anxiety tests would have good relationships with each other across all age groups. The STAI-t showed good convergent validity with the AMAS-E in all age groups, but only weakly correlated with the BAI in all three age groups. The AMAS-E also correlated poorly with the BAI, which shows that the BAI has poor convergent validity with both of the other anxiety measures. The strong correlations between the STAI-t and AMAS-E supports the hypothesis however. The poor correlation between the BAI and the other anxiety tests, taken together with the finding that the BAI had different standardised scores compared to the other anxiety measures, indicates that the BAI is possibly measuring a different construct to the other anxiety tests used in the present investigation.

A comparison of the correlations between the BAI and STAI-t with college students (Creamer et al., 1995; Osman et al., 1997b) and outpatients (Fydrich et al., 1992) has produced correlations between 0.57 – 0.68. These correlations are stronger than those of the Adult group in the present study. There have not been any non-clinical studies that have looked at the correlation between the BAI and STAI-t in older adults, but Kabakoff et al. (1997) found a 0.44 correlation in a group of outpatients aged 55 years and over (M=66 years). This age group is similar to the Young older group in the present study. The correlation between the BAI and STAI-t in the present study is

lower than that found by Kabakoff et al. (1997). In fact, the correlations obtained for the BAI and STAI-t in the current study are generally lower than those obtained in previous research. However, there have not been any studies that have investigated the correlations on a non-clinical working adults or an older adult sample. The present study is the first to examine the correlations of these tests in a normative sample of these age groups. The poor relationship between the BAI and other anxiety measures, along with the findings reported earlier, further question its use as an anxiety measure in both normative samples and also in older adults.

There has been no published research looking at the correlations between the AMAS-E and the BAI (Lowe, 2005, Personal communication). A study by Lowe and Reynolds (2006) with a non-clinical sample aged between 60 and 100 (M = 76.85) found a correlation of 0.65 between the STAI-t and AMAS-E. This age group has mean age that is closest to the Old older group in the present study. A comparison between the two studies show that they had very similar correlations, with the current Old older group having a correlation of 0.68. The results of the current study show further support for the convergent validity between the AMAS-E and STAI-t.

Correlations between depression tests

The correlations between the two depression measures were moderately strong in both the Adult and Young older groups, as predicted. However, in the 75+ group there was a very poor relationship between the two tests with less than 1% shared variance. This differs from the hypothesised relationship, and raises some interesting questions concerning tests developed to measure the same construct having such a poor relationship. Previous research has shown the two tests to have good correlations

in older adults over 55 years old (Olin et al., 1992; Wetherell & Arean, 1997). However, these studies had mean ages in the mid 60's similar to the Young older group in the present study. Apart from the present study, there has been no investigation using a 75+ group. Yet, based on the current findings, further research using commonly administered depression scales seems warranted in the 75+ age range.

The relationship between anxiety and depression across age

It was hypothesised that there would be a stronger relationship between anxiety and depression in the older age groups. The BAI showed a poor relationship with depression (low correlations) in all age groups with the exception of the BAI and BDI in the Young older group. The relationship was better for the STAI-t, with moderate to strong correlations found with both depression measures in all age groups, with the exception of the STAI-t and the BDI in the Old older group. The AMAS-E had moderate correlations with the depression measures across all age groups. The strengthening of relationships between the two constructs in older adults was not supported, with correlations remaining fairly constant across age groups, and weakening between the BDI and anxiety measures in the Old older group.

No previous studies have investigated the correlations between anxiety and depression measures across age. However, previous research on individual age groups has produced slightly higher correlations between the BAI and the BDI than the present study. In college students, previous research has found correlations between 0.54 and 0.63 for non-clinical samples (Clark et al., 1994; Creamer et al., 1995). Clinical populations of adults, similar in age to the Adult group in the present study,

generated correlations between 0.50 and 0.61 (Clark et al., 1994; Fydrich et al., 1992; Steer et al., 1995; Steer et al., 1993). Correlations from previous research between the STAT-t and the BDI for a normative sample of college students have been between 0.73 and 0.78 (Creamer et al., 1995; Tanaka-Matsumi & Kameoka, 1986). A clinical sample (Fydrich et al., 1992) produced a correlation (0.73) that fell into this range. All of these correlations are higher than those found in the Adult group of the current study.

Morin et al. (1999) found a correlation of 0.44 between the BAI and BDI in a normative sample of older adults over 55 years (M = 70 years). Clinical samples of adults over 55 years old had a correlation of 0.59 (Cook et al., 2004) and 0.57 (Shapiro et al., 1999). Hopko et al. (2000) found a correlation of 0.58 between the STAI-t and the BDI in a group of clinical older adults, while Stanley et al. (2001) found a correlation of 0.59 in similar group of adults aged between 60-80 years. Stanley et al. (2001) also found a correlation of 0.70 between the STAI-t and the GDS. The correlations of the Young older group in the present study were similar to those found in the previous research looking at older adults. However, there have not been any studies that have looked at the relationship between anxiety and depression specifically in the 75+ age group, with previous studies having age groups of 55+. From the current study, the relationship between the BDI and the BAI and STAI-t in this 75+ group is lower than correlations in the two younger groups. The relationships between the BDI and the anxiety measures were also weaker than those of the GDS and the anxiety measures in the Old older group. This, along with the poor relationship between the GDS and BDI in the Old older group raises some concerns around the use of the BDI in people aged 75 and over.

Lower correlations between anxiety and depression measures compared to between anxiety measures can suggest discriminant validity. However, as many studies have shown, anxiety and depression are related, and, therefore, it would be expected that there would be some overlap between anxiety and depression scores (Dobson, 1985). If we expect an overlap between anxiety and depression, then one cannot base a test of discriminant validity solely on weak correlations between the two as some relationship between the two tests would be expected. So, the poor correlations found with the BAI and depression measures by themselves should not be considered evidence of discriminant validity.

A comparison of the anxiety and depression standardized scores indicates that there is no difference between the tests in the two older groups. While there was no significant difference between the anxiety and depression measures in the Adult group, there were moderate to strong effect sizes between the BAI and STAI-t and the two depression measures, with low power to detect the effects. These results suggest that in the Adult group there was a tendency for people to produce different scores on anxiety and depression tests, as opposed to the older groups where scores on anxiety and depression measures appear to be similar. This in turn suggests that there is a bigger overlap between anxiety and depression in older adults, as people are getting similar scores on tests measuring the different constructs. However, the Adult group, with anxiety measures developed for adults, indicate a tendency to produce different scores to the depression measures, suggesting that there is less of an overlap between the two constructs.

Internal Consistency of the STAI-t

Preliminary investigation into the internal consistency of the STAI-t found that the Old older group had a large number of low item-total correlations compared to younger groups. This preliminary finding, along with previous research by Bouchard et al. (1998), who found item 24 to have poor item-total correlation in older adults, lead to further investigation of the STAI-t in the present study. Preliminary investigation did not reveal any similar differences for the other anxiety tests.

The STAI-t showed good internal consistency across all age groups, with the Old older group having the lowest Cronbach Alpha score. These alpha coefficients are slightly lower than those from previous studies with adults (Spielberger et al., 1983), and clinical samples of older adults (Kabacoff et al., 1997; Stanley et al., 1996) and slightly higher than a normative sample of older adults (Stanley et al., 1996).

The corrected item-total correlations in the different age groups in the present study reveal that there are items in all age groups that do not correlate well with the rest of the items. The Adult and Young older group have four and two items, respectively, that do not reach the correlation level of 0.30 (a value frequently used as the minimum desirable correlation). The Old older group has double the number of any other group, with 8 items falling below the 0.30 level. This indicates that the STAI-t possibly loses some reliability with Old older adults, with 40% of the items not correlating with the overall construct that the test is measuring (trait anxiety). Item 24 ("I wish I could be as happy as others") had a very low item-total correlation (0.05) in the Old older group, similar to that found by Bouchard et al. (1998). Although the age group for Bouchard et al. (1998) was slightly younger (65-92, M = 76) than the Old

older group, it is closer to this group than any other in the present study. This finding, along with Bouchard et al.'s result, suggests that clinicians should be very cautious in the use of this item 24 with older adults. Bouchard et al. suggested omitting this item and replacing it with the mean value of the remaining anxiety present items (items, 22, 25, 28, 29, 31, 32, 35, 37, 38, and 40). However, this would not work for the current study, with 6 of the remaining 10 anxiety present items for the STAI-t having poor item-total correlations. The high number of anxiety present items that do not correlate well with the overall scale could possibly indicate a reluctance of adults over 75 years of age to report negative symptoms. This explanation is supported by the results of Lawton et al. (1993), who found older adults reported fewer negative emotions (although their sample was slightly younger than the 75+ group in the current investigation). However, as mentioned earlier, the small sample in the current study is far too small to make any confident statements about the psychometric properties of the STAI-t. Nevertheless, the current finding, coupled with that of Bouchard et al., is interesting and further research investigating the reliability of the STAI-t with larger samples is warranted.

Comparison of test scores with overseas norms

The test means obtained in the present study are generally slightly lower than those obtained in previous overseas studies. All of the tests used in the current investigation were developed in America and, with the exception of Knight et al. (1983), the normative data provided above have come from overseas. The present data for the STAI-t are lower than Knight et al. found in a New Zealand sample, indicating that, possibly, the sample used in the present study had lower anxiety levels compared to the normal New Zealand population. However, Knight et al. used an older version of

the STAI (form X) as opposed to the newer version (form Y) used in this study, in which 30% of the items have changed (Spielberger et al., 1983). The New Zealand norms for the new version of the STAI, obtained in the current study, are lower than those from overseas (Spielberger et al., 1983). This raises issues over the use of these tests in New Zealand when they are developed and normed on overseas samples. These lower normative scores mean that there could be an increase in false negatives, with increased anxiety levels not being noticed when compared to norms from overseas. This seems to be especially true for the STAI-t and AMAS-E, with scores on the BAI being quite close to normative data from previous research. However, these differences could also be due to the participants completing five self-report measures together, the effects of which are unknown.

The scores on the anxiety and depression tests all fall into the "expected" or "minimal" range, as would be expected for a normative sample. The BAI scores for the older groups however, had reasonably high means. When taking the variance of the scores into account, the BAI mean score for the older groups include scores over 8 in its range, indicating mild anxiety (Beck & Steer, 1993). This is of concern, given that the data were obtained from a normative sample, presumably free from anxiety. Yet had this been in clinical practice it could have indicated to the clinician the presence of anxiety. In practice, other assessment techniques to assess anxiety would be used along side the BAI. However, the BAI has been a popular test for research (Piotrowski, 1999), and the current findings may have implications for its use in research with older adults. The current findings include normative mean scores near anxiety cut off scores, poor correlations between the BAI and other anxiety tests, and different standardised anxiety scores between the BAI and other anxiety measures.

One important implication is that the level of anxiety assessed in research could very well be dependant on which anxiety test one chooses to use. As such, conclusions would be influenced by the measures used rather than any difference in the person, condition, or treatment being researched. This would also have big implications in the testing if theories of anxiety, with the level of support for a theory being dependent on the test that is used.

Difference in test responses between ages

In the present study, it was observed that the older adults took longer to respond to the different tests, with Old older adults taking the longest. Time taken was not formally measured but based on the length of time spent with each participant while they competed the test battery. It was also observed that the older adults were more likely to fail to answer questions compared to the younger adults. This trend was evidenced by two tests in the Old older group not being used due to there being too many unanswered items, along with more missing answers in the Old older adults tests. These are similar findings to those of McDonald and Spielberger (1983), and indicate that the current tests may need modification, as specified by McDonald and Spielberger and Bouchard et al. (1998), before use with older adults. However, because the observations on time and missing answers were only informal, further investigation into the effects of age on the anxiety measures would be beneficial.

Limitations

One of the major limitations with the present research was the number of participants used. Due to time constraints and the difficulty in locating community dwelling participants over 75 volunteering to take part in the research, group sizes were limited

to 20 participants. As it turned out, only 20 participants in each age group, there was insufficient power to obtain statistically significant differences on many of the comparisons made. For example, to generate power of 0.80 when looking to detect an effect size of 0.7 ($\eta^2 = 0.11$), a minimum of 33 people would be needed per group (Cohen, 1988). So, in hindsight, probably double the number of participants in each group would have given results from which more substantial conclusions could be made. Increasing the number of participants would also have made the correlations between the tests more stable, with individual scores not having as much effect on the overall correlations.

Another limitation of the present research was the nature of the sample. The current sample were volunteers, mostly from community clubs or groups. The type of people that join these clubs and choose to volunteer for studies may not be representative of the general population. Also, a majority of the participants were New Zealand European/Pakeha, which means that the outcome of the present study cannot be generalized to other minority ethnic groups in New Zealand. Further demographic information could have been collected, such as the number of years of education and occupation, to examine the level to which the sample represents the general population. (It can be noted that a majority of the participants that volunteered were all reasonably well educated and seemed to be mainly from "white-collar" groups, and as such, not a true representation of the overall population.)

Future Directions

A replication of this study with larger participant numbers would be of interest, as the present study did not have sufficient statistical power to confidently say that there are

no differences between the anxiety tests across age groups. The current study suggests that there may be a difference between the two older age groups, and based on this finding, further investigation using larger samples, would be of interest.

Further, it may be useful to include a clinical population. A comparison of such a group with a group of normal controls would allow further investigation into the psychometric properties of the self-report measures. A comparison of test scores between a clinical and non-clinical group would also allow discriminant validity and diagnostic ability to be better assessed.

Further investigation into the AMAS-E in New Zealand would be of interest. The present study shows that this test appears to correlate well with the STAI-t in older adults in New Zealand, but not with the BAI. It also appears that the normative data from the present study produced lower scores than those supplied with the test (Reynolds et al., 2003). Further investigation into the psychometric properties and normative data for this test in New Zealand could give clinicians a useful tool for the assessment of anxiety in older adults.

Finally, the relationship between anxiety and depression failed to support the hypothesis that the two constructs would have a bigger overlap and stronger correlation in older adults (Krasucki et al., 1998). The small sample size in the current study could account for the failure of the present study to support the hypothesis. Therefore, further investigation into the relationship between these constructs as a function of age with bigger samples would be warranted. Including tests for positive

and negative affect would be useful in future research as these have shown to be good at differentiating between the two constructs in younger adults.

Conclusions

The present study suggests that the BAI may not be appropriate for use with older adults, as, contrary to prediction, scores on this test increased considerably with age. This means that a test that is commonly used in both practice and research may be producing inaccurate results for older adults. Also of concern is the fact that the BAI yielded different standardised scores from the other anxiety tests. This raises questions over the construct validity of the BAI. The difference in norms also raises the issue of whether many of these tests, normed on overseas samples, are suitable for use in New Zealand without further testing and norming.

Anxiety and depression tests produced mixed correlations, with the BAI failing to correlate with depression tests in any age group. The STAI-t and AMAS-E, however, appeared to be stable across age groups with moderate correlations between depression tests with the exception of the BDI and anxiety measures in the 75+ age group. The poor correlations between the BDI and anxiety measures in the 75+ group, along with the poor correlation between the BDI and GDS, raises concerns over the use of the BDI with people 75+, and warrants further investigation.

While the current study has not made any definitive findings into the change and measurement of anxiety in older adults, it has raised some interesting issues. Of particular note is that the use of some anxiety measures becomes problematic with people over 75 years old, and as such it is important for researchers to be more

specific with ages when they conduct a study with "older adults". A replication of this study with higher sample numbers in each group would produce more reliable results, from which conclusions about the measurement of anxiety and its relationship to depression in adults 75+ could be drawn.

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Appendix A. **E-mail Correspondence with Patricia Lowe**

"Lowe, Patricia A" <tlowe@ku.edu> wrote on 21st September 2005

> Hello Jethro,
>
> Here is a list of articles on the AMAS-E in addition to the manual.....
>
> Lowe, P.A., & Reynolds, C.R. (2000). Exploratory analyses of the latent structure of anxiety among older adults. Educational and Psychological Measurement, 60(1), 100-116.
>
> Lowe, P.A., & Reynolds, C.R. (in press). Examination of the psychometric properties of the Adult Manifest Anxiety Scale-Elderly Version (AMAS-E). Educational and Psychological Measurement.
>
> Lowe, P.A., & Reynolds, C.R. (in press). Do relationships exist between age, gender, education, and self-report of anxiety among older adults. Individual Differences Research.
>
> There is another article exploring the psychometric properties of the AMAS-E scores that I am working on with one of my graduate students and should be ready to submit for publication before too long.
>
> What spe! cific information are looking for that I can provide?
>
> Patricia (Trissy)

Hi Patricia,

The two articles that you have in press sound like they would be of interest to me. Do you have an electronic version of them that you would be willing to send to me?

I am looking for any research on the AMAS-E, such as comparisons with other anxiety self-report measures and its use in varying populations. In particular any research that has compared AMAS-E with the BAI and/or STAI as these are the tests I am using in my research.

Thank you for your response

Regards

Jethro

22nd of September 2005

Jethro,

When you send a manuscript to a journal for publication and it is accepted for publication, you transfer the rights of the manuscript to the journal. So, the journals have the copyrights for these two manuscripts, not me. Both of these articles should appear in the journals pretty soon. I have not done anything with the BAI with r.e. to the AMAS-E and I am not aware of anyone who has. We have done work with the STAI and this information is in the article that will be published by EPM. Correlations between the AMAS-E Total Anxiety scale scores and the STAI State and Trait scores were in the moderate range, with the correlation between the AMAS-E Total Anxiety scale scores and STAI Trait scale scores being higher. This goes along with the theory behind the AMAS-E as a measure of chronic, manifest anxiety, which evolved out of a trait theory of general anxiety.

I hope this helps!!

Trissy

Note. At the time of binding, the reference in the e-mail above, looking at the relationship between age and anxiety self-report was not available. The reference on the psychometric properties of the AMAS-E became available just before time of binding.

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Appendix B

Comparing Anxiety Across Ages

We are conducting a study investigating the measurement of anxiety, specifically in the elderly. We will compare some of the current self-report anxiety measures used with the general adult population with an older population of adults. The purpose of the study is to further Psychologists' knowledge of anxiety in the elderly and to work towards developing better assessment measures for this age group.

- We are looking for 120 participants between the ages of 35-55 years, 55-75 years and 75+years. To be able assess these measures; participants should currently be free from extreme anxiety, depression or any other mental illness.

- Participants who meet the inclusion criteria, will be given a number of self-report tests that assess anxiety and depression and asked a few general questions about anxiety and general worries.

- Data collection will take up to one and a quarter hours to complete and can be conducted at your house or at Massey University, depending on your preference.

- Any information gathered will be kept strictly confidential and only be used for the purpose of the study.

If you have any further questions and/or are interested in taking part in this study please feel free to contact us. You can do this through e-mail or phoning us through the School of Psychology at Massey University, between 9.00am and 4.30pm.

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Appendix C.

Measuring Anxiety in the Elderly

INFORMATION SHEET

Researcher(s) Introduction

This research is being conducted to determine whether current anxiety self-report measures are suitable for the use with an older adult population. It is hoped that the outcome of this study will indicate the usefulness of these measures with the older age group. Also it is hoped that the study will generate information that can be used to increase our understanding and generate better assessment for anxiety in that age group.

Jethro Pack is conducting this research under the supervision of Associate Professor John Podd, as part of his Masters in Science Degree. You can make contact with either of us through the School of Psychology at Massey University, Palmerston North. The telephone number and address are provided above.

Participant Recruitment

Participants are being recruited through advertisements in various community groups and volunteers who hear of the research through word of mouth. If you are currently suffering from a psychological disorder then you will not be suitable for the study. The study will involve about 120 participants of varying ages – from as young as 35 to as old as 85+. We will be taking short breaks between each section of the questionnaire to prevent tiredness. You are free to withdraw from the study at any time you wish and no explanation is required.

Project Procedures

The data from this research will be used to compare questionnaire scores across age groups. The data may also be used at a later date to help develop a test for anxiety in older adults if current tests prove to be less effective with this age group. Data will be recorded and coded on scoring sheets that will be kept in locked filing cabinet. The data will also be on computer for analysis. This computer will have a password, which only the researcher will know. The data from this research will be kept for five years following its collection and will then be destroyed. Following the completion of the research, a summary of the findings will be produced and sent out to you if you wish to receive a copy. A contact address or e-mail will be obtained when the testing is taking place.

Participant involvement
As part of this research you will be asked to complete five self-report measures, which are commonly used to assess for anxiety and depression. You will also be asked to provide some basic information about your health, age, gender and so forth. Each of the tests is reasonably brief; however, we will be taking a short break between each to avoid fatigue. Following the tests you will be asked a few questions about what anxiety means to you. In total it should take about one and a quarter hours to complete.

Participant's Rights
You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- decline to answer any particular question;
- withdraw from the study anytime before December 2005 (project completion);
- ask any questions about the study at any time during participation;
- provide information on the understanding that your name will not be used unless you give permission to the researcher;
- be given access to a summary of the project findings when it is concluded.

Support Processes
You will be given feedback on the scores you get for the different sections of the questionnaire. If you are concerned about any of your scores following this then we advise you to discuss this with your own health practitioner. If you do not wish to do so you can contact us and we can supply you with the name of a local clinical psychologist. You can contact us after the research if you have any concerns or issues following the research. We also will have the numbers for relevant support services available if needed. We can give you these numbers either at the time of the interview, or through contacting us later.

Project Contacts
If you have any questions about the research feel free to contact Jethro Pack through e-mail at jethro.pack.2@uni.massey.ac.nz, or A/Professor John Podd at j.v.podd@massey.ac.nz. A/Professor Podd can be contacted through the school of Psychology at Massey University at (06) 356 9099 Extn 2067.

Committee Approval Statement
This project has been reviewed and approved by the Massey University Human Ethics Committee, PN Application 05/40. If you have any concerns about the conduct of this research, please contact Dr John G O'Neill, Chair, Massey University Campus Human Ethics Committee: Palmerston North, telephone 06 350 5799 Extn: 8635, email humanethicspn@massey.ac.nz.

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Appendix D.

Measuring Anxiety in the Elderly

PARTICIPANT CONSENT FORM

This consent form will be held for a period of five (5) years

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

- I wish/do not wish to have a summary of the data sent to me.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: _____ **Date:** _____

Full Name - printed _____

Contact Address (For summary of data) _____

_____

Appendix E. Health Screening Questionnaire

- Have you been diagnosed with clinical anxiety?

Ever	☐
Within the last 5 years	☐
Within the last 2 years	☐
Within the last year	☐
Never	☐

Are you still diagnosed with anxiety? Yes / No

- Have you been diagnosed with depression?

Ever	☐
Within the last 5 years	☐
Within the last 2 years	☐
Within the last year	☐
Never	☐

Are you still diagnosed with depression? Yes / No

- Do you experience any other forms of mental illness? Yes / No

- Do you suffer from any chronic illnesses? Yes / No
(ongoing illness)
If Yes, can you please specify?

- Do you suffer from any neurodegenerative illnesses ? Yes / No
(such as Parkinson's or Alzheimer's)

- Are you currently taking any psychotropic medication? Yes / No
(medicine that affects your mind, emotions or behaviour)

- Do you have any hearing or visual impairments? Yes / No

Demographic Information

- How old are you? _____

- Are you Male or Female? _____

- What ethnicity are you? _____
(eg. Pakeha, Maori etc)

Appendix F. T-score equations for individual test scores

T-score equation

T-score= $10/\sigma$ x I - ($10/\sigma$ x μ - 50).

Where: σ = The standard deviation (SD) for a test over the whole sample

μ = The mean score for the test over the whole sample

I = Individual test score

Formulas used to obtain T-scores for the individual tests

STAI-t (μ = 29.85, σ = 6.9).

T-score=1.45 x I – (-6.72)

BDI (μ = 5.4, σ = 4.12).

T-score=2.43 x I – (-36.88)

BAI (μ = 4.98, σ = 5.7).

T-score=1.75 x I – (-41.29)

GDS (μ = 3.39, σ = 2.89).

T-score=3.46 x I – (-38.27)

AMAS-E (μ = 8.75, σ = 6.06).

T-score=1.65 x I – (-35.56)