

Introduction

Mental health is characterised by an adaptive set of emotions, thoughts and behaviour. Good mental health enables individuals to cope well with daily events and obstacles while also enabling them to function constructively towards significant goals. Most Australians (80%) (Ree & Craigie, 2007) experience good mental health most of the time. However, about 45% will experience a mental health disorder at some point in their lives; and many will experience two or more disorders concurrently, such as depression, anxiety or sleep disturbance (ABS, 2012).

Anxiety is a mood state characterised by frequent and persistent unrealistic worries, accompanied by physiological symptoms of restlessness, tension or unpleasant physical arousal (Durand & Barlow, 2003). Depression is characterised by a persistent loss of pleasure (Clark, Steer, & Beck, 1994), sadness, feelings of worthlessness, excessive or inappropriate guilt, and thoughts of death (First & Tasman, 2005). Additionally, difficulty in concentrating and making decisions, and somatic symptoms such as fatigue and sleep disturbances may accompany both anxiety and depression (To, Zepf, & Woods, 2005). In fact, fatigue is considered to be a core symptom of major depression that often persists after depression treatment (Paykel et al., 1995).

Fatigue is generally transient and may be explained by current circumstances (e.g., a viral infection, medical illness or persistent sleep disturbance). However, when fatigue is persistent, debilitating, and cannot be explained by a medical condition, it may be diagnosed as chronic fatigue disorder (Afari & Buchwald, 2003). Aside from pain, the most commonly reported symptoms in primary care are depression, anxiety and fatigue (i.e., initial contact with the health care system) (Bates et al., 1993; Hickie, 1999). Sleep disturbance is also commonly seen by primary care physicians (Smith & Trinder, 2001), with about 10-20% of adults reporting chronic and severe insomnia (e.g., insufficient or inadequate sleep) (Aminoff,

Daroff, & Aminoff, 2003). Sleep disturbance is one of the diagnostic criteria for depression and anxiety (Benca & Juergens, 2004). Importantly, between 60% and 90% of individuals seeking treatment for depression, and 50% to 70% of patients with anxiety, report some degree of sleep disturbance (Anderson, Noyes, & Crowe, 1984; McCall, Reboussin, & Cohen, 2000).

The incidences of anxiety and depression in clinical practice are quite high, both separately and as comorbid disorders. A study conducted in Australia with 4,867 patients of 117 practitioners reported that in the previous 12-months 20.6% of patients visiting a general practitioner had been treated for either anxiety or depression, with most of the patients being prescribed medication (Ellen, Norman, & Burrows, 1998).

Pharmacological, cognitive and behavioural therapies are currently among the primary recommended treatments of these disorders. Several trials have reported significant improvement in patients taking antidepressant medication compared to placebo controls (Hollon, Stewart, & Strunk, 2006; Mundt, Clarke, Burroughs, Brennehan, & Griest, 2001). However, it has been claimed, that such results are based on trials that include only patients with more severe forms of depression at baseline, increasing their sensitivity to antidepressants relative to placebo groups, and that there is little evidence to suggest that medication provides benefits for those individuals with less severe depression (Kaplan, 2010; Zimmerman, Chelminski, & Posternak, 2005). Thus, recent meta-analysis investigating the benefits of specific serotonin reuptake inhibitors (SSRIs) relative to placebo has suggested a small effect size (Cohen's $d = 0.20$) for this first-line depression therapy. In particular, this study showed that in a heterogeneous sample in terms of depression severity, antidepressant therapy had a minimal or nonexistent effect in people with mild to moderate depression symptoms, although there was a linear increase in effect as depression severity increased (Fournier et al., 2010).

Poor adherence to medication is potentially another serious problem associated with antidepressant medication since at least one in three patients admit they have not completed their treatment (Pampallona, Bollini, Tibaldi, & Kupelnick, 2002). Furthermore, even if the medication is effective, it does not reduce the likelihood of the depression recurring (Hollon, et al., 2006). Another concern is that antidepressant medication is often less acceptable to depressed people, either because of the side-effects or the perceived low efficacy of the drug (Barney, Griffiths, Christensen, & Jorm, 2009). Thus, depressed individuals are generally more supportive of lifestyle interventions such as physical activities, relaxation training, and psychological therapies than antidepressant medication (Jorm et al., 2005).

Cognitive-behavioural therapy (CBT) is the main evidence-based psychological therapy used to treat depression. It aims to replace negative and maladaptive thoughts, perceptions, and habits by challenging the client's thinking (Zaretsky, Segal, & Fefergrad, 2007). Somewhat differently, interpersonal therapy (IPT) is a psychological therapy that aims to identify and improve patterns of interpersonal relationships. The purpose is to alleviate present stressful situations and associated psychological distress by enabling the person to focus on their immediate social context (de Mello, de Jesus Mari, Bacaltchuk, Verdeli, & Neugebauer, 2005), and build skills for dealing with others. Trials of CBT and IPT indicate that they have similar efficacy in reducing depression symptoms, with the depression outcomes also shown to be similar to antidepressant therapy (Cuijpers et al., 2011; Hollon, Thase, & Markowitz, 2002). However, CBT has been demonstrated to show enduring effects relative to antidepressants (Hollon, et al., 2006). Similarly, long-term behavioural treatments are more effective than medication in reducing insomnia-associated negative cognitions and arousal (Ebben & Spielman, 2009), including relaxation training, stimulus control, sleep hygiene training and CBT (Benca & Juergens, 2004). Non-pharmacological treatments such as CBT have also been shown to improve chronic fatigue by identifying and interrupting the

triggers that perpetuate its symptoms; and comparable improvements have been attained in evaluations of graded exercise therapy (Afari & Buchwald, 2003). Finally, meditation, relaxation and biofeedback training are self-regulatory behavioural strategies that are proposed to significantly reduce the physiological and psychological symptoms of anxiety (Kabat-Zinn et al., 1992).

Despite the availability of treatments, anxiety and depression continue to be worldwide health concerns with high rates of relapse after remission (i.e., low or absent symptom levels) (Paykel, 2008). Rate of relapse in the first ten-months is 76% for those with partial remission (i.e., residual depression symptoms), whereas 40% of patients with minimal or absent symptoms relapsed during this time (Paykel, 2008; Paykel, et al., 1995), indicating that residual depression symptoms are a strong predictor of relapse (Belaise & Fava, 2008). Even after two courses of antidepressants, only about one-half of the patients attained remission of their depression symptoms (Mathys & Mitchell, 2011). Thus, appreciating that depression is a persistent and recurring disorder is crucial in effectively managing the condition, including relapse prevention (Teasdale et al., 2002). A recent telephone survey designed to assess public awareness, knowledge, and attitudes to depression indicated that about two-thirds (65%) of Australians reported knowing at least one person close to them with depression, and nearly one-fifth (18.7%) of the respondents had experienced depression themselves (Hight, Luscombe, Davenport, Burns, & Hickie, 2006).

Importantly, about two-thirds of people who experience anxiety and/or depression will never access effective treatment (Ree & Craigie, 2007). There are many significant barriers to receiving effective care including a lack of trained providers, lack of personal resources, prior negative experiences with healthcare professionals, and the social stigma associated with a diagnosis of a mental disorder (McNair, Hight, Hickie, & Davenport, 2002). Of these barriers, stigmatising beliefs about depression (i.e., self-stigma, perceived stigma) are the

leading causes of concern for people with depression, and it may be one reason they tend to avoid seeking professional care (Barney, Griffiths, Jorm, & Christensen, 2006; McNair, et al., 2002). Self-stigma refers to the way in which people view their own depression (Yen et al., 2005), whereas perceived stigma refers to the belief that *others* hold about depression or depressed individuals. In this regard, more than half (53%) of Australians believe that the majority of people (a) regard depression as a sign of weakness, and (b) think that a person with depression is responsible for their own condition. This suggests that people think that they will be blamed for their depressive state (Griffiths et al., 2006). Such attitudes highlight the difficulties a person with depression may experience in daily life (Barney, et al., 2009).

Treatment strategies that can minimise barriers associated with a mental health condition may help to augment the effectiveness of mainstream treatments (Kessler et al., 2001a). Thus, it is imperative to generate a greater array of alternative and complementary therapies that are more acceptable to people seeking treatment for their mental health condition and/or who may not benefit from current mainstream treatment. Strategies that have not yet been established as conventional treatment are referred to as alternative approaches, whereas if the approach is used in conjunction with conventional treatment, it is referred to as a complementary therapy (Brolinson, Price, Ditmyer, & Reis, 2001). An example of this approach is to teach life skills that promote physical fitness, exercise behaviour, and healthy eating (Hayes, Beevers, Feldman, Laurenceau, & Perlman, 2005), so as to promote a positive lifestyle change.

In general, physical activities have been shown to be beneficial as they can produce positive changes in one's sense of well-being. For example, T'ai Chi Chuan is a form of exercise that involves slow rhythmic movements which provide an awareness of the body and movement (Ho et al., 2007). A recent systematic review and meta-analysis of 40 studies from 8 English and 3 Chinese databases has shown that T'ai Chi is an activity that can reduce

levels of stress, anxiety and depression, while also increasing one's sense of self-esteem (Wang et al., 2010).

Dance has also recently gained credibility as a therapeutic activity (Quiroga Murcia, Bongard, & Kreutz, 2009). Dance movement therapy is described as a process of using movement and music to enhance a person's physical and psychological health (Goodill, 2005). It is believed to release or reduce feelings of tension and other associated symptoms occasioned by stress (Hanna, 1995). Psychologically, it is reported to be an effective adjunct to standard depression therapy (Koch, Morlinghaus, & Fuchs, 2007). However, aside from this study, few studies have evaluated the effectiveness of dance in improving mental health outcomes, with most of the reports being anecdotal in nature (Hanna, 1995).

Kessler and colleagues claim that two-thirds of people with depression and/or anxiety will likely use one or more complementary and alternative therapies (Kessler, et al., 2001a). In particular, a recent large survey involving 28,947 households found that the respondents had a strong preference for lifestyle-based interventions (e.g., physical activity, relaxation training) over medical and psychological therapies (Jorm, et al., 2005), suggesting that complementary and alternative medicine/therapies are more acceptable to Australians than the current recommended treatments.

Several complementary and alternative medicine/therapies have already gained some mainstream acceptance, for example, the practice of mindfulness has a deep and strong tradition practised for almost 2,500 years (Kumar, Feldman, & Hayes, 2008), but only recently has it been introduced as a therapeutic psychological technique (Hayes & Shenk, 2004). Similarly, tango dance evolved in Argentina in the nineteenth century, but it has only recently been used and evaluated in a therapeutic context (Peidro & Comasco, 2007a).

Consequently, the current project investigates the efficacy of tango dance for people with self-referred anxiety and/or depression, and evaluates tango as an alternative or non-

traditional therapy. We anticipate that tango will be shown to be a mindfulness-based physical activity acceptable to non-clinical and clinical populations, and will be effective in improving a range of frequently comorbid symptoms. To evaluate this premise, four RCTs were conducted to evaluate the effectiveness of this activity. In the first of these, tango dance is compared with an already established mindfulness activity, *mindfulness-meditation*.

Mindfulness-based Approaches

Some activities such as meditation have been shown to increase levels of mindfulness, and recent research consistently shows that mindfulness training can produce positive psychological outcomes (Brown & Ryan, 2003). Mindfulness is defined in the literature as the awareness that emerges from focusing on the present moment; it involves paying attention on purpose and in a non-judgemental manner (Kabat-Zinn, 2003). Mindfulness training invites the individual to let go, develop an open and accepting attitude, and to focus on present-moment experiences by drawing awareness to one's moment-to-moment sensations (Lau & McMain, 2005).

Training in mindfulness is the basis of several treatments that have been designed to augment health and well-being (Christopher & Gilbert, 2010). Mindfulness-based stress reduction (Kabat-Zinn, 1990) is built on strategies aimed to increase the ability to relax and increase one's awareness of all aspects of self. It is intended to draw the individual's attention to sensations of the present moment and away from rumination, which is repetitive disproportionate engagement of thoughts and emotions that can easily be triggered, and quickly becomes overwhelming (Hayes, et al., 2005). Thus, the intent of this approach is not to avoid negative thoughts and emotions, but rather to normalise thinking patterns, so that, for example, mild sadness does not escalate to a more severe state such as major depression (Lau & McMain, 2005).

Mindfulness-based cognitive therapy was originally developed as a treatment for depression and the prevention of depressive relapse (Segal, Williams, & Teasdale, 2002; Teasdale, Segal, & Williams, 1995b). This therapy encourages the person to direct their attention to immediate experiences rather than focusing on trying to defeat persistent negative thoughts. Indeed, in a state of mindfulness, negative thoughts and feelings are observed as being transient experiences that do not need to be eliminated or reacted to, thereby allowing the person to shift their attention to a non-evaluative style (Segal, et al., 2002).

Some intrinsic characteristics of mindfulness such as observation, awareness, and acceptance are also used in therapies such as dialectical behaviour therapy (DBT) and acceptance commitment therapy (ACT), which are mindfulness techniques that do not rely on meditation *per se*, although they often use this or similar procedures (Hayes & Shenk, 2004; Kwee, 1995). However these latter therapies place more emphasis on personal validation, with the patients being encouraged to accept themselves, their current situation, and any events as they are, while working to change the attention that is given to distressing stimuli or situations (Baer, 2003).

Mindfulness-Based Research

Mindfulness is an abstract concept that is difficult to define (Hayes & Shenk, 2004), and the absence of a clear operational definition for the construct has contributed to a certain ambiguity in the field (Dimidjian & Linehan, 2003). For instance, some authors suggest that teaching people some mindfulness principles (e.g., focus on current experiences) may produce benefits across a wide range of disorders (Baer, 2003), while others propose that it might be more beneficial to adapt mindfulness training to specific disorders to accommodate the patients' needs (Teasdale, Segal, & Williams, 2003). In Australia, Ainslie Meares was one of the first to introduce mindfulness-based techniques such as meditation for its use as a tool in

pain control, anxiety reduction, and cancer management (Allen, Chambers, Knight, & Melbourne Academic Mindfulness Interest, 2006).

Meditation as used in mindfulness-based cognitive therapy has already been found effective in several studies, especially in preventing relapse in recurrent depression (Segal, et al., 2002). An evaluation of mindfulness-based cognitive therapy in psychiatric outpatients with mood or anxiety disorder has also shown significant improvements in their levels of stress, anxiety, depression and insomnia (Ree & Craigie, 2007). However, it is unknown whether patients with extremely severe depressive symptoms would engage in meditation due to a lack of motivation, capability or both, and several scholars have suggested that some depression patients may develop psychotic features such as mania or euphoria after intensive meditation practice (Sethi & Bhargava, 2003; Yorston, 2001). Thus, the potential for therapy-induced psychological distress needs to be taken into account. It is important then, that mindfulness-based activities including meditation are conducted with a trained practitioner who is alert to the potential for intensifying distress in some vulnerable individuals. Apart from meditation, few activities have ever been evaluated and proposed as mindfulness-based activities which might be used in a therapeutic context.

Origins of Tango

Historians argue about the exact origins of tango, but it is generally accepted that it is a mixture of dancing styles from European migrants to Argentina and tunes and rhythms of African slaves already in the country. The population of Argentina doubled from 2 million people in 1870 to 4 million in 1895. Half the population were concentrated in Buenos Aires, where the number of immigrants reached 50% (Peidro & Comasco, 2007a). Tango is believed to have emerged as an outlet to express the feelings of sadness, nostalgia for their native countries, and the difficulties of communicating verbally due to language and cultural

differences (Nau-Klapwijk, 2006). It was the *silent embrace* that gave people the opportunity to connect and to create a new cultural identity, a dance that belonged only to them, in the disadvantaged districts of the city (Leymaire, 1997). The process of migration may be experienced differently by each individual migrant since many factors are involved in the adjustment to a new country (Bhugra & Jones, 2001). However, anxiety and depression often accompany this adaptation process (Oei & Kwon, 2007). Migration will continue to increase in Australia and in other parts of the world, thus strategies that promote mental and physical health that may be more acceptable to multicultural populations need to be developed and researched ("Populations at Special Health Risk: Migrants," 2008). Therefore it was appropriate to explore the effects of tango, a dance that evolved in a context of acceptance and hardship. We anticipate that tango will be shown to be an effective activity in improving a range of frequently comorbid symptoms of depression.

Might Tango be also a Mindfulness Activity?

Certain popular activities such as martial arts, dance, and other recreational or sporting activities require that particular attention is given to aspects of the present, such as learning new physical skills, and mindfulness skills might be introduced and applied in the activity so as to facilitate learning, interest and adherence. Hence, the physical activities do not train participants in mindfulness *per se*, yet these skills are learned as a consequence of the activity itself, and greater complexity of the activity requires greater concentration. Tango dance may be an activity that increases mindfulness, since by its very nature it contains the most basic components of mindfulness practice, total awareness of the present moment, openness to new experiences, acceptance and trust. Tango is a highly improvised dance with no defined sequence of steps (Dinzel, 1999a), thus, it is not possible to use a fixed mental schema to help anticipate the steps that will be executed next. Rather, the dance involves the constant

adaptation of the partners and the available space on the dance floor. That is, tango demands the ‘communion’ of two people; and both dancers need to let go and accept the partner’s interpretation, while they explore the-moment-to-moment experience of the dance (Nau-Klapwijk, 2006).

Tango Dance Research

Tango dance has recently been shown to enhance physical health (e.g., mobility, balance, vitality) (McKinley, Jacobson, Leroux, et al., 2008), social integration and mood in a variety of clinical and non-clinical populations (Trossero, 2006). Quiroga Murcia, Bongard and Kreutz investigated emotional and hormonal responses to tango dance, and reported that it might be considered as an anti-stress activity (i.e., decreased levels of cortisol) that can promote short-term positive psychological changes, increase positive affect and reduce negative affect (Quiroga Murcia, et al., 2009).

In Canada, a tango dance program for the elderly was shown to be very successful in improving balance. Often seniors can fall when they have to dual-task, such as walking while talking on the phone. In this study a walking while talking task was used to measure dual-tasking in tango participants, relative to a control group. This task involved seniors having to recite every second letter of the alphabet as they walked a fixed distance, turned and walked back to the starting point. Both number of errors and time to completion were measured. Initially, both groups took a similar time to complete the task and made a similar number of errors. Most participants had to stop to think in order to perform the task, otherwise they would lose their balance. However, by the end of the study the tango participants took a significantly shorter time and made less errors, without losing their balance, relative to the control group (McKinley, Jacobson, Leroux, et al., 2008).

Tango dance has also been investigated in patients with a variety of medical conditions, including heart disease and Parkinson's disease. In the Fundación Favaloro (a cardiovascular rehabilitation centre in Argentina) tango dance is routinely used in rehabilitation and to promote healthy habits in patients. It is reported to be a safe activity for cardiac patients as it involves only low to moderate intensity exercise, using mostly dynamic or static movements. Compared to the lack of treatment adherence reported for other exercise programs, almost all cardiology patients using tango dance are reported to complete the treatment program (Peidro & Comasco, 2007a).

Importantly, when this form of rehabilitation has concluded, the activity can be continued at a social level, either by attending regular tango classes or milongas (i.e., social tango dances), which are often available in major cities around the world. Likewise, Hackney and Earhart have conducted several studies to evaluate tango dance for use by patients with Parkinson's disease, and they showed that the activity was effective in improving balance, gait function, and enhancing quality of life (Hackney, Kantorovitch, R, & Earhart, 2007; Hackney & Earhart, 2009a; Hackney & Earhart, 2009b; Hackney, Kantorovich, & Earhart, 2007; Hackney, Kantorovich, Levin, & Earhart, 2007).

Thus there is international interest in exploring tango dance as a physical activity, and it has been shown to produce benefits in a number of physical parameters. However, to date, no previous RCTs have evaluated tango dance as a possible therapy for people with psychological symptoms, including anxiety and depression. We anticipate that tango will be shown to be a *physical* activity acceptable to non-clinical and clinical populations, and will be effective in improving a range of frequently comorbid symptoms. To achieve this objective, in the second RCT tango dance is compared with an exercise program, *circuit training*.

Physical and Psychosocial Benefits of Exercise

Regular exercise is regarded as a positive health behaviour leading to a healthier lifestyle (Barriopedro, Eraña, & Mallol, 2001), and there has been considerable research into the physical benefits of exercise, including the influence of exercise in increasing longevity (Peidro & Comasco, 2007a; Peidro et al., 2002; Ristow et al., 2009). The direct effect of exercise on the immune system has also been reported, as it is very likely that regular moderate exercise exerts a protective effect by decreasing susceptibility to infection, whereas exhaustive exercise may result in immune dysfunction (Brolinson & Elliott, 2007). Nonetheless, recent studies argue that both moderate and intense exercise stimulate phagocytic cells which protect the body by ingesting harmful foreign bacteria and dead cells (Ortega, 2008). Sedentarism, on the other hand, is a risk factor for several chronic diseases (Warburton, Nicol, & Bredin, 2006), including cardiovascular disease and diabetes type 2 (Peidro & Comasco, 2007a; Zimmet, Alberti, & Shaw, 2001). A meta-analysis of 48 clinical trials with a total of 8940 coronary heart disease patients reported the clinical benefits of exercise rehabilitation, including a reduced incidence of premature death (Taylor et al., 2004). Hypertension is a major risk factor for developing cardiovascular disease, and exercise has also been shown to lower blood pressure (Chen, Das, Barlow, Grundy, & Lakoski, 2010; Chobanian et al., 2003). Overweight and obese individuals are at risk for several chronic diseases, including diabetes type 2; exercise and reduction of calorie consumption are reported to be factors that can reduce the health risk of obesity (Kokkinos, Sheriff, & Kheirbek, 2011). Furthermore, active obese individuals are less likely to develop obesity-related chronic disease, and have lower rates of mortality than overweight individuals and those having normal weight who live sedentary lives (Blair & Brodney, 1999).

Moreover, exercise has also been demonstrated to increase one's sense of self-worth and self-efficacy by mastering new skills, or by receiving positive feedback from others

(Lawlor & Hopker, 2001; Mynors-Wallis, Gath, Day, & Baker, 2000). Exercise can also act as a distraction from negative and ruminating thoughts (Lepore, 1997), and it may involve socialising and receiving social support, all of which may be mechanisms that mediate the positive effects of exercise (Wolff et al., 2011).

Some researchers report that mood states are highly dependent on beta-endorphin secretion (Dinas, Koutedakis, & Flouris, 2011). The pituitary gland and hypothalamus produce beta-endorphin as a natural response to excitement and pain, and the release of beta-endorphin is associated with changes in pain perception and mood state (i.e., it causes euphoria). Physical exercise of sufficient intensity and duration has been shown to increase the release of endorphins (Fichna, Janecka, Costentin, & Do Rego, 2007; Goldfarb AH & AZ, 1997). The general consensus is that beta-endorphins are released when exercise is performed at a greater intensity than 75% of maximum oxygen uptake (VO_{2max}) or 80% maximum heart rate (HR), or if the duration of steady-rate exercise exceeds more than 60 minutes (Angelopoulos, 2001; Schwarz & Kindermann, 1992).

It is difficult to estimate the most advantageous dose and intensity of physical activity (Blair & Connelly, 1996), but findings from several exercise studies suggest that it is not necessary to undergo vigorous physical activity in order to obtain health benefits (McAuley et al., 2000). Evaluation of dancers during tango and milonga dancing showed that 46% of maximum oxygen uptake (VO_{2max}) was achieved in the tango and 55% for the milonga, and a maximum heart rate of 69% for the tango and 77%, for the milonga. These results suggest that tango and milonga dances are only low to moderate in intensity (Peidro, et al., 2002), yet have still been shown to induce positive health benefits (Peidro & Comasco, 2007a). In addition, Phillips and colleagues report that the majority of recent RCTs support the claim that physical activity interventions as short as 4 weeks can produce significant benefits in people with

depression, whether the activities are aerobic or non-aerobic exercises (e.g., resistance training, yoga) (Phillips, Kiernan, & King, 2003).

Depression and Exercise

In general, research trials support the use and benefits of exercise in clinical and non-clinical populations (Phillips, et al., 2003). These include advantages of exercise and physical activity on emotional and cognitive functioning which are similar to pharmacological outcomes in terms of reducing symptoms of depression (Schulz, Meyer, & Langguth, 2012). Although some authors report similar outcomes for combined exercise and antidepressant treatment (Blumenthal JA et al., 1999). However, a recent 6-month follow-up study showed significantly lower relapse rates for a group of aerobic exercise participants relative to those taking only antidepressants and a combined exercise-medication treatment (Babyak et al., 2000). Thus, exercise-based treatments may be more effective in reducing symptoms of depression when administered alone. However, Lawlor and Hopker (2001) argue that many studies in the field are under-powered, use non-clinical populations, and provide brief or inadequate follow-up (Lawlor & Hopker, 2001). Nonetheless, despite the possibility of injury, physical exercise interventions have the advantage of not causing drug-induced side effects, and they are an economic alternative that can be performed at the person's convenience (Daley, 2008). Exercise can also be offered to individuals who cannot use antidepressants due to other illnesses or because they prefer not to use medication (Ormel et al., 1994). Thus, larger RCTs need to be conducted (Wolff, et al., 2011), and possible barriers preventing participation need to be identified and overcome, especially since people with depression tend to be less active (Kravitz, 2007) and have less motivation than their non-depressed peers (Salmon, 2001). Therefore, a prime challenge is to develop novel and interesting activities to

attract and maintain the participation of depressed people in treatment. However, few such activities have been evaluated in this regard, especially for disadvantaged populations.

Depression in People with Chronic Conditions

The association of mental disorders with chronic medical conditions (e.g., ARMD) has been documented in numerous studies (Chapman, Perry, & Strine, 2005; Gagnon & Patten, 2002; Nuyen et al., 2005). A national epidemiological study of primary care patients recruited by general practitioners reported that the prevalence of mental disorders (i.e., depression, anxiety) was higher in patients with a chronic disease than physically healthy individuals (Gili et al., 2010). Major depression is particularly prominent in people who report one or more chronic somatic conditions (Gagnon & Patten, 2002), and patients with four or more chronic diseases present with the highest rates of mental disorders (Gili, et al., 2010). Chronic illness can exert a profound impact on an individual's mental health, for example, increased risk of major depression and its duration (Gagnon & Patten, 2002). In turn, mental health status can influence the capacity of people to participate in medical treatment, and it is associated with poorer adherence to medication regimes and slower recuperation (Lando, Marshall Williams, Williams, & Sturgis, 2006). The early identification of such comorbidities may help to ameliorate depression symptoms and increase quality of life (Klesse, Baumeister, Bengel, & Härter, 2008), for example, by encouraging participation in health-promoting behaviours such as adequate physical activity (Lando, et al., 2006; Moussavi et al., 2007). In line with the above, the fourth RCT explores whether tango programs can be tailored to suit a population with a visual chronic disease, specific to a population diagnosed with age-related macular degeneration.

Age-Related Macular Degeneration

ARMD is a chronic retinal disease that causes progressive vision loss (Rovner, Pasternak, & Casten, 2006). This medical condition involves atrophy or haemorrhage of the macula of the retina causing the loss of central vision (Brody et al., 2001). It is the leading cause of irreversible vision impairment and blindness in people older than 50 years worldwide (Banerjee, Kumar, Kulhara, & Gupta, 2008). Medical treatments are limited to only a very small percentage of patients (Mitchell & Bradley, 2006), and therefore, rehabilitation becomes a crucial concern for the well-being of people with this condition.

ARMD is a profoundly disabling condition with serious adverse consequences to the quality of life of the patient, since it is difficult to perform everyday tasks such as reading, face and object recognition, and being active (Mangione, Gutierrez, Lowe, Orav, & Seddon, 1999). Restrictions in mobility such as the inability to drive or limited walking can cause social isolation, while the loss of central vision may lead to a decreased interest or inability to continue with hobbies and other fulfilling activities which were previously important to the person's quality of life (Casten & Rovner, 2008). Loss of independence and feelings of inadequacy and helplessness often lead to depression (Horowitz, Reinhardt, Boerner, & Travis, 2003) and one-third of patients with ARMD become depressed at some point during the course of their illness (Brody, et al., 2001; Burmedi, Becker, Heyl, Wahl, & Himmelsbach, 2002). Importantly, the initial decline in visual functioning caused by the vision loss can escalate drastically if the person becomes depressed (Rovner & Casten, 2001), and people with vision loss and comorbid depression are less likely to seek or be referred to vision rehabilitation programs (Horowitz & Reinhardt, 2006). The emotional consequences of this age-related vision loss are generally unmet in the ophthalmological field and related rehabilitation services (Birk et al., 2004; Hans-Werner, Annette, Frank, Daniel, & et al., 2006; Horowitz & Reinhardt, 2006). Hence there is a need to develop and test activities that can

promote confidence, well-being and improve mood, while also engaging patients in a social context.

Dance is becoming more acceptable as a therapeutic intervention (Konnyu, 2008). Dancing with a partner may be less threatening to many older adults than other forms of exercise, and may elicit positive memories of dancing from their youth. A recent study exploring activities that seniors were forced to relinquish due to visual impairment identified the *loss of dancing* as most important in terms of the adverse impact on their quality of life and wellbeing (Good, 2008). Tango dance has already been tested therapeutically in people with different medical conditions. It has been shown to reduce risk of falls while increasing mobility and strength in older adults (McKinley, Jacobson, Leroux, et al., 2008), enhance cardiovascular fitness in cardiac patients (Peidro & Comasco, 2007a), and improve locomotion, balance and motor control in patients with Parkinson's disease (Hackney & Earhart, 2009a). Thus, we sought to develop a protocol of tango dance for individuals with ARMD.

At first glance, tango dance may seem overly challenging for a population with visual impairment. Nevertheless, tango was particularly chosen for this population as it is easily adaptable and has specific advantages for people with low vision. For example, vision is not a requisite for learning the dance. In practice, the focus and awareness that is required to synchronise with the movements of the leading partner are best achieved when the tango-follower dances with their *eyes closed* (Dinzel, 1999a; Nau-Klapwijk, 2006). Moreover, the dance is carried out in an open embrace or 'frame' that offers support and confidence to the tango-follower. Tango also uses strong hand signals and emphasises walking in many directions, employing a series of basic steps that can be used in many combinations so as to make the dance more or less challenging according to the ability and confidence of the dancers. Therefore, an adequate level of challenge and comfort can be tailored to each

individual, or for a specific illness population to generate a sense of achievement and increase motivation levels and adherence to the activity (Tenenbaum, Fogarty, & Jackson, 1999).

Aims for the Current Project

Tango dance has already been successfully applied to two different clinical populations (i.e., cardiovascular conditions and Parkinson's disease). These activity programs have generally varied in length from 10 to 13 weeks. However, one recent study has shown that an intensive tango program of 10 classes of 1½ hours within two weeks is effective in improving balance, gait and mobility measures (Hackney & Earhart, 2009b).

Thus, in accordance with the above mentioned literature, this project will explore tango programs of different intensity and duration in people with self-declared affective symptoms (i.e., anxiety, depression) in four independent studies each utilising RCT design. In the first study, we fully analysed the data collected during my honours year. Five specific aims were identified in this series of studies:

- (1) To determine the effectiveness of tango dance in reducing depression and comorbid symptoms of stress, anxiety, sleep disturbance and fatigue and increase self-efficacy and satisfaction-with-life.
- (2) To determine whether or not tango dance has a similar effect to mindfulness activity by comparing it with meditation.
- (3) To determine whether tango dance activity provided benefits beyond those arising from its exercise component. Tango dance was compared to circuit training exercise.
- (4) To determine if a short intensive tango program of 4 sessions per week for 2 weeks can produce benefits similar to those of a longer but less intense program.
- (5) To determine whether tango programs can be tailored to suit a population with a specific chronic illness (i.e. ARMD) and comorbid depression.

Preface

Research Study 1: ‘Argentine tango dance compared to mindfulness meditation and a waiting-list control: A randomised trial for treating depression’.

The first study was a reanalysis of data collected during my honours year and partly used for my honours thesis. A *6-week* RCT of tango therapy was evaluated, in which participants were randomly allocated to tango dance, mindfulness meditation, or a waiting-list control group. These data were now either re-analysed or analysed for the first time for further exploration of the results. ANCOVAs were used to examine group differences and multiple regression analysis was used to examine whether being in the tango group could predict mindfulness levels. The results for this trial are reported in the first article, which is the starting point of the present project and have been presented at the Conference of the International Society for Posture & Gait Research, Bologna, Italy June 2009.

**Argentine Tango Dance Compared to Mindfulness Meditation and a Waiting-List
Control: A Randomised Trial for Treating Depression**

Pinniger, R., Brown, R.F., Thorsteinsson, E.B., & McKinley, P. (2012). Argentine tango dance compared to mindfulness meditation and a waiting-list control: A randomised trial for treating depression. *Complementary Therapies in Medicine*, 20, 377-384.

Research Progression

Research Progression to Study 2: ‘Tango dance can reduce distress and insomnia in people with self-referred affective symptoms’. Study 1 revealed that participants in both tango dance and mindfulness meditation groups showed reduced levels of depression compared to the waiting-list controls after 6-weeks of classes. Participants in the tango group also showed significantly decreased levels of stress compared to participants in the meditation or control groups. In addition, being in the tango group was a predictor of increased levels of mindfulness. These preliminary findings opened the opportunity to further explore its potential.

Study 2 clarifies and expands on Study 1. Firstly, it includes another physical activity, circuit training, to determine whether the dance activity accrued benefits above and beyond those advantages that arise from exercise, relative to a stationary activity such as meditation and compared to waiting-list control group. Regular participation in physical activities or exercise programs has previously been shown to be associated with reduced psychological distress as well as improvement in physical health. Thus, we expected that tango would be at least as effective as circuit training in alleviating participants’ symptoms of depression, and would contribute to their increased satisfaction-with-life and self-efficacy. Secondly, new concepts were assessed to investigate further possible benefits of tango (e.g., fatigue, sleep disturbance and self-efficacy). Thirdly the treatment programs were extended to 8 weeks and a 1-month follow-up period was added to assess the long term benefits of the different activities.

**Tango Dance can Reduce Distress and Insomnia in People with Self-Referred Affective
Symptoms**

Pinniger, R., Thorsteinsson, E.B., Brown, R.F., & McKinley, P. (2012). Tango dance can reduce distress and insomnia in people with self-referred affective symptoms. *American Journal of Dance Therapy*. doi:10.1007/s10465-012-9141-y

Research Progression

Research Progression to Study 3: 'Intensive tango dance program for people with self-referred affective symptoms'. Study 2 revealed that tango dance did present a larger and more persistent range of benefits relative to the other groups. It was the only activity that significantly reduced insomnia and increased mindfulness both at post-test and 1-month follow-up. Participants in the tango group also significantly reduced levels of depression, anxiety and stress. The attrition for this study was low, however, qualitative feedback from the participants in the study who had to decline participation due to other commitments, suggested that an 8-week program did not suit all potential participants as it was perceived as too long a commitment, indicating they could partake if the program had a shorter duration. Recent research conducted by Hackney & Earhart (2008) of a tango dance program involving patients with Parkinson's disease has indicated that an intensive program of two weeks was as effective as the long term program (1 hour twice a week for 10 weeks). Moreover, they found that the attrition rate for the shorter program was only 14%, whereas it was higher (>30%) in people who completed a traditional high intensity balance-training program, suggesting that a shorter program might be more acceptable to some potential participants. The results from study 2 have been presented at the 40th Annual Meeting Neuroscience in San Diego, USA (November 2010).

Study 3 evaluates the efficacy of a shorter but more intensive program of tango dance (4 times a week \times 2 weeks). Offering an intensive program that is effective has several valuable implications: (a) it can be accommodated more easily in medical settings, (b) it can be implemented alongside other treatment, (c) it may be more appealing for individuals who cannot commit to a longer trial, and (d) it may allow individuals who are out of work due to disability to return to work sooner.

Intensive Tango Dance Program for People with Self-Referred Affective Symptoms

Pinniger, R., Thorsteinsson, E.B., Brown, R.F., & McKinley, P. (in press). Intensive tango dance program for people with self-referred affective symptoms. *Music and Medicine*.

Research Progression

Research Progression to Study 4: ‘Tango program for individuals with age-related macular degeneration’. The outcomes of the previous studies have indicated that tango dance can reduce levels of depression across different settings (i.e., 2 (intensive), 6, and 8 weeks), providing sufficient grounds to adjust the tango program to reach other vulnerable populations. Internationally, tango dance has been applied to specific populations (e.g., individuals with cardiovascular conditions, individuals with Parkinson’s disease, and seniors with a history of falls). The present project would like to further contribute to the international body of research in this area by creating protocols for individuals with a specific chronic disease who are also depressed, anxious or stressed. Previous research has indicated the need to develop programs for patients with age-related macular degeneration (ARMD) that can focus on their psychological and social needs, as these aspects are often unmet for ophthalmologic patients. Most individuals with ARMD have had to withdraw from valued activities they used to enjoy, causing serious feelings of loss and sadness. Thus, depression is reported to be a common and profoundly disabling complication of ARMD. The intention of the program in Study 4 is to provide a novel activity that even at latest stages of the disease participants can do well. The aim of Study 4 is to explore the feasibility, acceptability and effectiveness of such a tango program in reducing depression and improving well-being. The program for this group followed the protocol from the pilot study in Montreal of two classes per week for 4 weeks.

The results from Study 4 have recently been presented at the IV Congreso Internacional de Tangoterapia (The 4th International Congress of Tango Therapy) in Rosario, Argentina (July, 2011).

Tango Program for Individuals with Age-Related Macular Degeneration

Pinniger, R., Brown, R.F., Thorsteinsson, E.B., & McKinley, P. (in press). Tango program for individuals with age-related macular degeneration. *British Journal of Visual Impairment*.

General Discussion

The psychological literature currently emphasises the benefits of regular physical activity in improving anxiety and depression outcomes in clinical and nonclinical populations (Grudnik, 2011; Phillips, et al., 2003). The positive effects of exercise have been amply demonstrated to improve cardiovascular fitness, lower blood pressure and boost immune system function, as well as increasing longevity and reducing symptoms of depression (Brolinson & Elliott, 2007; Comasco, 2008; Kujala, 2006; Peidro & Comasco, 2007a; Phillips, et al., 2003; Warburton, et al., 2006).

A range of recreational activities has also been shown to reduce symptoms of stress, anxiety and depression (Street, James, & Cutt, 2007). In addition, the potential for recreational physical activities to reduce both disability levels and psychological distress in people with chronic illness has been demonstrated (Hurwitz, et al., 2005b), most probably because these activities focus the client's attention on their physical and psychological wellbeing rather than on aspects of their illness.

The aim of the present project was to explore the potential psychological benefits of tango dance, an activity which combines physical activity and aspects of mindfulness training, as discussed later. We examined two different populations (i.e., people with self-referred depression, and those with age-related macular degeneration (ARMD), and also different permutations of a standard tango dance program, which was adapted to the needs of the individual client populations.

The main aims were to determine: (1) the effectiveness of tango dance in reducing the experience of depression and comorbid symptoms (e.g., anxiety, fatigue, sleep disturbance) and improving psychological wellbeing as evidenced by increases in self-efficacy and satisfaction-with-life; (2) the effectiveness of tango dance in increasing mindfulness levels in relation to mindfulness-meditation; (3) the effectiveness of tango dance relative to an

exercise-based activity (e.g., circuit training); (4) whether a shorter intensive tango program of 4 sessions per week for 2 weeks could produce benefits similar to the longer but less intense program; (5) whether tango dance could be a suitable activity for elderly people with vision impairment.

Symptom Improvement (First Aim)

As expected, individuals who participated in the tango dance sessions showed substantially reduced levels of *depression* in all four of the RCT; the first three conducted in people with self-referred depression, and the fourth in elderly people with ARMD. In Trial 1, 6-week program, tango and meditation participants reported significantly reduced levels of depression after the program compared to wait-list controls. In Trial 2, 8-week program, tango and exercise participants showed reduced levels of depression after the program relative to mindfulness-meditation and wait-list control, and the tango participants maintained this improvement at 1-month follow-up. In Trial 3, 2-week intensive program, tango participants showed reduced levels of depression after the program relative to wait-list controls and this improvement was maintained at 1-month follow up. In Trial 4, participants with ARMD who participated in the tango dance program twice a week for 4-weeks also showed reduced levels of depression after the program, relative to wait-list controls.

Together, these results suggest that tango dance was beneficial in improving depression in people with different personal needs (i.e., chronic illness patients, self-referred anxious/depressed) and when offered in a variety of formats (e.g., short vs. long programs). However, future studies should investigate a broader range of formats consistent with the preferences for this activity as indicated by the study participants.

Individuals who participated in the tango dance sessions also showed substantially reduced levels of *anxiety* after the program, but not the participants completing other study

activities. In Trial 2, the 2-week intensive RCT, participants in the tango group showed reduced anxiety levels at post-test and 1-month later, relative to wait-list controls; and in Trial 2, the 8-week program, tango participants showed reduced levels of anxiety at post-test and follow-up, relative to meditation, circuit-training, and wait-list controls. However, significant reductions in anxiety levels were not observed in Trial 1, the 6-week RCT, and it was not measured in Trial 4, the ARMD trial.

A similar pattern of results was obtained for perceived *stress* levels across the studies. In Trial 1, the 6-week RCT, participants in the tango group showed reduced levels of stress at post-test relative to meditation and wait-list control; and in Trial 3 the 2-week intensive RCT, tango participants showed reduced stress levels at post-test and at follow-up relative to wait-list controls. In Trial 2, the 8-week RCT, participants in the tango group did not show reduced stress levels after the program, but they did show reduced stress levels relative to wait-list controls at 1-month follow up.

Tango dance was also shown to improve the experience of comorbid symptoms of *sleep disturbance* across two RCTs which explored this symptom. In Trial 2, the 8-week trial, tango participants showed reduced insomnia levels at post-test and at follow-up relative to meditation, circuit-training and wait-list controls. In Trial 3, the 2-week intensive program, tango participants showed improvement in insomnia at post-test relative to wait-list controls, but this benefit was not maintained at follow-up, suggesting that a longer program may be necessary to produce persistent sleep benefits. In contrast, *fatigue* levels were not reduced in any of the activities compared with the control group. It is possible that manifestation of fatigue, such as the absence of motivation to perform mental or physical activity, or the inability to continue such activities, is more predominant in major depression disorder than for populations with mild to moderate depressive symptoms (Bakshi, 2003; Baldwin &

Papakostas, 2006), thus the present project may not have captured samples with high enough levels of depression to test the effects of tango on fatigue..

Improvement in Wellbeing (First aim)

Circuit-training was the only activity in which participants showed increased levels of self-efficacy after the program, relative to tango, meditation and wait-list controls.

Further more, this result persisted at follow-up. High self-efficacy has previously been shown to be associated with low levels of depression, for example in chronic pain patients it was shown to be a stronger predictor of depression than either pain intensity or disability levels (Arnstein, Caudill, Mandle, Norris, & Beasley, 1999). Thus, it is possible that the reduction in depression levels experienced by the exercise group was mediated by increasing self-efficacy levels (Blazer, 2002).

In Trial 3, the intensive 2-week program, tango participants also showed an increase in self-efficacy after the program relative to wait-list controls, although this increase was not maintained at follow-up. However, in Trial 2, the 8-week program, mindfulness-meditation and the tango dance program were not associated with improvements in self-efficacy. Taken together, these results suggest that increased self-efficacy was not a likely mechanism to explain the symptom improvement seen in tango participants. Nevertheless, the intensive 2-week program may be used to help participants attaining quickly a sense of achievement thus participants may be sufficiently motivated by their progress to continue with a longer-term regular sequence of classes, and thereby also gain the longer-term benefits available.

Similarly, in Trial 3, the intensive 2-week program, tango participants showed increased levels of satisfaction-with-life relative to wait-list controls. This was also observed in Trial 2, the 8-week program, relative to meditation, circuit-training and wait-list controls, although these improvements in satisfaction-with-life were not maintained at follow-up.

These results suggest that the improvement in life satisfaction was brief and persisted only while the activity was progressing. Thus, the improvement in symptoms experienced by the tango dance participants may not be explained by the transitory improvement in satisfaction-with-life.

Improvement in Mindfulness (Second aim)

There is increasing evidence that mindfulness training can improve physical and psychological functioning in a variety of clinical and non-clinical populations (Greeson, 2009), and is gaining in popularity (Bauer-Wu, 2010). However, few activities other than mindfulness-meditation have previously been evaluated as potential mindfulness-based activities. Thus, we evaluated whether mindfulness was increased in the tango participants as well as those completing mindfulness-meditation.

Meditation is the most frequently employed mindfulness activity in clinical settings (e.g., mindfulness-based cognitive therapy and mindfulness-based stress reduction). Thus, it was our intention to examine whether tango might be a mindfulness-based activity, as is implied in the dance literature where it is described as including some important aspects of mindfulness training such as acceptance and trust (Dinzel, 1999a). Importantly, a broader variety of mindfulness-based activities is required so as to cater to people's individual preferences for healthy physical activities. For example, some people may find it difficult to meditate, while other people with comorbid chronic medical and psychological conditions, may benefit more from a physical activity-based therapeutic approach.

In Trial 1 (6-week trial), we assessed mindfulness using the Australian Mindful Attention Awareness Scale (MAAS), which can assess levels of mindfulness in meditators and non-meditators (Brown & Ryan, 2003). In this study, tango group participation was associated with higher mindfulness levels after the program, relative to meditation and wait-

list controls. This result was somewhat unexpected insofar as there was no increase in mindfulness observed in the mindfulness-meditation group relative to wait-list controls, even though the meditation classes were conducted by a professional mindfulness-meditation instructor who used a clearly defined protocol for this activity.

Importantly, both tango and mindfulness-meditation were shown to significantly reduce levels of depression in the participants. Taken together with the above results, this suggests that there may have been different mechanisms of antidepressant action for each activity. Qualitative feedback derived from the study participants supports that this may have been the case. Participants in the meditation group described the activity as useful and relaxing, whereas tango participants perceived the activity as challenging and demanding a strong focus of attention in order to learn, suggesting that this increased focus of attention may have partly reduced depression in the tango group, whereas the meditation participants may have improved due to the increased time spent in a relaxed state.

Similarly, in the 8-week program evaluated in Trial 2, tango was the only activity that significantly increased levels of mindfulness between pre- and post-test, relative to the meditation, exercise, and wait-list controls, and this mindfulness state persisted 1 month later at follow-up. However, in the two-week intensive program (Trial 3), mindfulness was not shown to be higher in the tango dance participants, relative to the waiting-list controls. Taken together, these results suggest that it may take longer than 2 weeks to achieve aspects of mindfulness in relation to this activity, whereas increased mindfulness was experienced by participants who practised this activity for 6 to 8 weeks. Interestingly, feedback obtained from participants in the longer and shorter duration tango programs was similar, with all participants mentioning the need to totally focus on both the dance and their partner, and this is likely to have distracted them from their usual worries. It would be useful in future studies to use other mindfulness scales to reaffirm these results.

Exercise-based Therapies (Third Aim)

The mechanism(s) of action explaining the impact of exercise in reducing depression levels are not well understood (Daley, 2008). Nevertheless, there are several well accepted explanations. For example, at a physiological level, higher beta-endorphin levels which are released during exercise are known to be associated with mood improvement, and at a psychological level, exercise can increase self-efficacy, which in turn is associated with lower depression levels (Daley, 2008). However, it has also been suggested that psychosocial factors such as socialising or learning new skills, may exert a greater influence in reducing depression symptoms rather than the exercise per se (Lawlor & Hopker, 2001). Thus, we explored the potential impact of exercise-related improvements in explaining the antidepressant effects of tango dance, by comparing the participant responses with those who completed a circuit-training program of equal intensity and duration as the tango program.

In the 8-week trial (Trial 2), tango and exercise activities were equally effective in reducing depression levels, relative to meditation and wait-list controls, although these activities produced very different outcomes across the other measures. Only the circuit-training participants showed increased self-efficacy, and only the tango participants showed reduced insomnia and increased mindfulness, and these outcomes were shown to persist at follow-up. Taken together, the results suggest that different mechanisms may have reduced depression and associated symptoms in the two groups; that is, mindfulness and improved sleep in the tango participants and increasing self-efficacy in the exercise-group participants. Written feedback from the participants in the exercise group emphasised the social and physical benefits of the activity, whereas the tango participants focused on the challenge of the activity and their sense of personal enjoyment and achievement.

The results of the present studies are in general agreement with the exercise/ physical activity literature which demonstrates that exercise can produce initial positive results in reducing depression levels, but that there is little evidence of long-term improvement (Krogh, et al., 2011). Thus, future tango dance studies should conduct longer follow-up assessments of mental health outcomes so as to evaluate whether the effects of tango also decrease beyond 1 month.

Duration and Intensity of Activity Programs (Fourth Aim)

When the same number of tango sessions was offered in a short, intensive program of four times per week over a 2-week period instead of single weekly lessons for 8 weeks, post-test results were significant for all outcome measures (i.e., stress, anxiety, depression, insomnia, satisfaction-with-life and self-efficacy) apart from mindfulness, relative to the wait-list controls. In addition, both programs showed improvements in stress, anxiety and depression persisting at 1-month follow-up. This is an important issue since there is a need to cater for the preferences of individuals who wish to use this or similar services, and some participants expressed a desire to participate in a shorter intensive program rather than the longer version. However, mindfulness levels were not significantly increased after the intensive tango program, whereas they were increased significantly after the longer tango dance program. This suggests that it may take longer than two weeks to develop mindfulness state in relation to tango.

In terms of self-efficacy, the short program gave participants the opportunity to notice their rapid improvements and discover how quickly they were able to learn. In terms of insomnia the benefit was persistent at follow-up only for the 8-week program. The comparison between these two programs provides some practical insights. For example, a person with concurrent depression and sleep disturbance might benefit more with a longer

program, whereas a person with depression and low self-efficacy might do better attending an intensive program to begin with, then continue with weekly classes. Therefore it is important when screening for depression to identify concurrent symptoms, as well as identifying characteristics of the person and demographic variables that increase susceptibility to depression, such as age and ethnicity (Stickle & Onedera, 2006). Advertising the RCTs in local city newspapers and inner city locations provided this opportunity. In this regard, we had a large diversity of cultures represented in all of our studies. In the 8-week trial 52% of participants were born overseas, speaking a total of 18 languages other than English as their first language, and in the 2-week intensive trial 62% were born overseas and speaking 13 different languages. Such a multicultural profile suggests that tango is applicable across a multitude of cultures. The link between the acceptability of the tango dance program and the multicultural historic origins of tango, although intriguing, are beyond the scope of the present project.

The development of programs for populations at risk of depression due to physical illness and disability was also one of our aims. The initial study in this respect (Trial 4) was designed for individuals with ARMD.

Tango Program Tailored to a Specific Population (Fifth Aim)

Adapting protocols from the previous programs to suit the specific requirements of visually impaired participants was not difficult due to the flexibility of tango. For example it is performed within an embrace, a rigid frame that provides support and confidence, uses strong hand signals, and employs a series of basic steps that can be used in many combinations so as to make the dance more or less challenging according to the ability and confidence of the study participant. Consequently, the adequate level of challenge and

comfort can be adapted to each individual to promote a sense of achievement and increased motivation.

ARMD participants in the tango group showed reduced levels of depression and improved satisfaction-with-life and self-esteem compared with the control group. Although there were many similarities between this cohort and participants from the other programs with self-diagnosed depression (demonstrated by the results and the feedback), participants in the ARMD group indicated pride in what they learned, wanting to be video-taped, and showed more care about their appearance. Although we did not have provision for a follow-up, in this particular group the program was extended by the direct request of the participants, which indicates not only that tango dance was accepted by this population but that they perceived it as a helpful and positive adjunct in their lives.

The greatest difficulty in this RCT was to access the participants, as the recruitment for this population had to be an indirect approach. Alternative means of communication need to be utilised to access this population, particularly the individuals in more need for such a program (e.g., more depressed, less socially active) (Menéndez de Lucas & Morcillo Laiz, 2006).

General Limitations

The results should be interpreted with caution given several study limitations. First the sample size was small in some of the trials. However, the sample size generally exceeded the estimated sample size calculation needed to achieve power close to .80.. Nonetheless, the tango classes did need to be small so the instructors could attend to all participants.

Second, the participants in the first three RCTs had self-referred symptoms of mild to moderate depression, but they had not generally been diagnosed with a psychological disorder. Thus, it is likely that the study results will not be generalisable to patients with

severe depression. Thus, an RCT evaluating self- and clinically-diagnosed depressed people might be conducted, prior to recommending this activity in cases of severe depression, and may need to take place in a hospital setting to ensure that participants in the activity are supervised by health care professionals.

Third, in Trial 3 and Trial 4, the 2-week intensive and ARMD RCTs, we did not employ a recreational activity group; thus, participants in the tango group were compared only to wait-list controls. However, in the first two RCTs, activity-based control groups were included.

Finally, a longer follow-up interval might be employed in future studies so as to determine whether the benefits of tango dance persist beyond 1 month.

Practical Implications

The findings of this project suggest that tango dance may be an accessible and low-cost non-pharmacological treatment for depression and comorbid symptoms. However, it would be misleading to assume that *regular* tango classes might be associated with these benefits. For example, the tango programs used in the trials of the present project were specifically designed and carried out within a therapeutic framework, and therefore, sought to minimise stressors that can easily arise in regular tango classes, whereas the aim of regular tango classes is to learn and perfect new techniques, which can become quite competitive. Thus, some of the adaptations that need to be considered when designing tango programs for therapeutic interventions include the provision of partners who can dance capably with study participants, and the systematic changing of partners so as to remove potential feelings of rejection and uncertainty. It is also important to introduce the ‘close embrace’ only when participants are ready. Finally, only professional tango dance teachers should be instructors in these therapeutic programs as it is the intent of this research group that the participants should

learn enough so that they can join an intermediate level tango class at the end of the study program. It is important to encourage participants to continue with the activity, thus they need to be confident of their ability to dance.

In summary, the present project presents a robust argument in employing tango dance as a therapeutic activity capable of producing short-term and long-term positive psychological changes. However, there are still many questions unanswered, and this is just the beginning of consolidating an effective novel approach for mood and other psychological disorders.

Where Do We Go from Here?

Last year we set up a non-government organisation, the Institute of Tango Therapy (ITT), in response to the current unmet need of individuals wishing to receive depression therapy, but preferring not to engage with formal mental health services. One of the aims of ITT is to reduce the stigma associated with depression, and to provide an ongoing social context and aftercare to people who wish to participate in our studies or would like to try tango as an alternative or complementary therapy. Another objective of the ITT is to evaluate the efficacy of tango dance in patients with a broad range of chronic medical conditions with comorbid anxiety and/or depression. The intention is to access these individuals at the primary care stage if possible, so as to improve the likelihood of halting or reversing the development of depression, and provide an opportunity to meet others with the same conditions. The model for this organisation is similar to that of patient support groups where patients have the possibility to meet and express their concerns, as well as to share and discuss similar experiences (Elliott & Shewchuk, 2002). This approach has already shown to be successful for individuals with ARMD (Owsley, et al., 2006; Wahl, et al., 2006), and we wish to build upon this approach by developing tango protocols that best suit the requirements of people with specific chronic illnesses. Finally, the ITT intends to contribute to the increasing evaluation of tango dance programs in order to contribute to the international body

of evidence relating to the physical and mental health benefits of the therapeutic use of tango dance in people with chronic illness.

Conclusion Statement

Overall, this project has provided support for tango dance as an effective tool for treating depression. Modification in the design of each trial (e.g., length of program, type of target population) has provided useful information for future programs. The acceptability by the participants is shown by the low attrition rate, 14% or less for individuals with self-declared depression, compared to the approximately 62% levels of attrition from the control groups in other programs (Stein, 2005). Moreover, we had no attrition when the program was tailored specifically for individuals with ARMD, suggesting that it is perceived as a safe and well accepted activity. The results obtained are very encouraging and helpful, but tango dance as therapy is still in its infancy, and future research is needed in order to gather further evidence to expand on the current findings.

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