

**Dance/Dance Movement Therapy and General Wellbeing, Depression, and Anxiety:
A Meta-analysis**

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**A report submitted in partial requirement for the degree of Master of Psychology
(Clinical) at the University of Tasmania**

Statement

I declare that this thesis is my own work and that, to the best of my knowledge and belief, it does not contain material from published sources without proper acknowledgement, nor does it contain material which has been accepted for the award of any other higher degree or graduate diploma in any university.

Signed.....25/5/12.....

Date.....31/5/12.....

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Abstract

The overall aim of this study was to examine the effects of general/recreational dance and dance movement therapy (DMT) on general wellbeing, depression, and anxiety by conducting a meta-analysis on all randomised controlled trials evaluating these outcomes, that have been conducted since Ritter and Low's (1996) meta-analysis, which also investigated the effects of DMT. In addition, this study examined moderation of the effect of general/recreational dance and DMT by age, gender, type of dance (general/recreational vs. DMT), type of country (Eastern vs. Western), and type of therapist (specific vs. general). Results indicated that dance/DMT had small, but significant and positive effects on general wellbeing, depression, and anxiety. The effects for general wellbeing and depression were moderated by type of therapist, but were not moderated by age, gender, type of dance, or type of country. Results are discussed in relation to the quality of the trials included, Ritter and Low's findings, the findings of the moderation analyses, and the implications these findings have for psychologists who may be interested in using dance/DMT as an adjunctive intervention technique.

Dance/Dance Movement Therapy and General Wellbeing, Depression, and Anxiety:

A Meta-analysis

Depression and Anxiety in Australia

In 2007, the Australian Bureau of Statistics (ABS) found that anxiety disorders were the most common mental disorders, affecting 14% of Australians aged 16 – 85. Furthermore, the ABS (2007) found that that 6.2% of Australians aged 16 – 85 years suffer from a mood disorder (e.g. major depression, dysthymia, or bipolar disorder). In a review of the burden of disease in Australia in 2003, Begg, Vos, Barker, Stevenson, Stanley, and Lopez (2007) found that anxiety and depression are the leading causes of disease burden in men and women aged 15 – 45, accounting for 13% and 27.4% of the burden for men and women respectively. For both men and women, anxiety and depression (and Type 2 diabetes) were the leading causes of incident non-fatal disease burden (Begg et al., 2007). Furthermore, depression and anxiety were found to be leading causes of disease burden for boys and girls aged 0 – 14, accounting for 7.7% and 16% of the burden for boys and girls respectively (Begg et al., 2007). In sum, anxiety and depression account for 8.2% of the total disease burden for Australia. It is clear that anxiety and depression comprise as significant health issues on an individual and national level.

Current Recommended Treatments for Depression and Anxiety

Meta-analytic literature suggests that for mild-moderate depression, psychological and pharmacological treatments are equally effective (NICE, 2009). However, for severe depression, psychological therapies are most effective as an adjunctive treatment to pharmacotherapy, rather than primary treatment. Several psychological treatments for depression have been supported as effective by evidence-based systematic reviews and meta-analyses. Currently, the Australian Psychological Society (APS) acknowledges Cognitive Behavioural Therapy (CBT), Interpersonal Psychotherapy (IPT), brief psychodynamic

psychotherapy, and self-help (primarily CBT-based) to have Level 1 evidence supporting their use in the treatment of depression in adults (APS, 2010). For treatment of depression in adolescents and children, CBT and family therapy are supported by Level 1 evidence, while IPT has Level 1 evidence for adolescents only (APS, 2010). For mild-moderate generalised anxiety disorder, meta-analytic literature suggests that psychological treatment is more effective than pharmacological treatment (NICE, 2011). Currently the APS (2010) acknowledges CBT to have Level 1 evidence supporting its use with adults, adolescents and children for treatment of generalised anxiety.

Need for Further Research in Effective Interventions for Depression and Anxiety

Despite the presence of well-validated treatment options for depression and anxiety, the ABS (2009) found that in 2007, nearly two thirds (65%) of people with a mental disorder had not used professional services for their mental health problems in the 12 months prior to the survey. Of those with mood disorders, 50% had not sought services for their disorder, while 78% of people with an anxiety disorder also had not sought services (ABS, 2009).

One explanation for this may be that many Australians prefer self-help or complementary and alternative therapies (Wilson & White, 2007). For example, in a study examining Australians' attitudes to depression, Hight, Hickie, & Davenport (2002) found that participants reported a strong preference for self-help, alternative, and non-pharmacological treatments as a first choice of treatment for depression. In their study exploring the views of participants from an anxiety support group in Western Australia, on treatment processes, Page, Jones, and Wilson (2004) found that nearly all of the support group members had used some form of complementary or alternative therapy (88%), while fewer than half had tried cognitive behaviour therapies (44%). Similar results have been found in the United States. For example, Kessler, Soukup, Davis, Foster, Wilkey, Van Rompay et al (2001) found that of those who had sought traditional treatment for a mental

health problem, 65.9% of the sample with anxiety disorder and 66.7% of the sample with depression were also using alternative therapies.

This suggested preference for complementary and alternative therapies in Australia is consistent with the ABS's (2008) findings, which report that complementary and alternative therapies have experienced a general growth in popularity in Australia over the past decade. This suggested preference is also consistent with studies that indicate that increasingly, Australians who suffer from depression or anxiety are seeking treatment from complementary therapies as alternatives or adjuncts to traditional psychotherapy (Jorm, Christensen, Griffiths, & Rodgers, 2002; Jorm, Christensen, Griffiths, Parslow, Rodgers, & Blewitt, 2004; Thachil, Mohan, & Bhugra, 2007; Bassman & Uellendahl, 2003; Xue, Zhang, Lin, Da Costa, & Story, 2007; MacLennan, Myers, & Taylor, 2006).

In light of the prevalence and severity of depression and anxiety in Australia, the number of people who are not accessing professional help for mental illness, and the growing popularity of complementary therapies, further research in and evaluation of certain complementary and alternative therapies which may be useful in treating depression and anxiety, is warranted.

Complementary and Alternative Therapies

Complementary and alternative therapies can be defined as treatments that involve beliefs and practices that are not generally consistent with conventional and dominant healthcare practices in Western countries (e.g. creative arts therapies, acupuncture, naturopathy, yoga, meditation, St. John's Wort) (Jorm et al., 2002; Brannon & Feist, 2007). As the term suggests, complementary and alternative therapies can be used as alternatives to conventional healthcare, or as complementary or adjunctive treatments to conventional care. The rise in the use of complementary and alternative therapies impacts the provision of both medical and psychological services within Australia (Wilson & White, 2007). At present,

complementary and alternative therapies are not routinely funded through Medicare, with the exception of acupuncture.

Relevant concerns for psychologists and psychology, which is a discipline grounded in the scientific/medical model, include the need for complementary and alternative therapies to be subjected to more rigorous scientific testing and the need to determine which complementary therapies can be used for which psychological disorders (Wilson & White, 2007; Wilson & White, 2011). Creative arts therapies are a cluster of complementary and alternative therapies which may potentially be very useful in the treatment of depression and anxiety, but which require further empirical validation (Malchiodi, 2005; Pratt, 2004).

Creative Arts Therapies

Creative arts therapies work from the evidence-based foundation that emotional expression is an essential component of mental and physical health (Goodill, 2010). Creative arts therapies combine the use of art and science to improve communication and emotional expression, encourage the integration of physical, cognitive, and social functioning, and promote mental health (Goodill, 2010). Many difficulties associated with mental illness (e.g. withdrawal and problems with relationships, engagement with others, understanding meaning of behaviour, and managing feelings) are difficulties with communication, and it has been suggested that creative arts therapies can compensate for this by offering alternative means of communication and expression (Odell-Miller, Hughes, & Westacott, 2006; Malchiodi, 2005). When taking into account the potential usefulness of creative arts therapies in treating depression and anxiety, it is necessary to understand the importance of emotional expression, as it is one of the primary mechanisms of creative arts therapies.

Emotional Expression

The importance of emotional expression in facilitating physical and mental health has been advocated by many researchers and clinicians (Frisina, Borod, & Lepore, 2004; Goodill,

2010). Researchers such as Horowitz (1986), Kubler-Ross (1969, as cited in Stanton et al., 2000) and Pennebaker (1997) have long contended that engaging in active processing and expression of emotion has been found to be beneficial in increasing physical health and decreasing distress (Stanton et al. 2000; Berry & Pennebaker, 1993; Quartana, Laubmeier, & Zakowski, 2006). Conversely, literature also suggests that inhibiting the expression of emotion amplifies the likelihood of become ill and suffering from other stress-related physical and psychological problems (Pennebaker, 1997; Carver, 1993; Stanton & Snider, 1993).

Emotional expression can take many forms, but the primary focus, regarding forms of emotional expression as interventions, has been on expressive writing (emotional disclosure). Research on emotional disclosure, pioneered by James Pennebaker and his colleagues, has found that talking or writing about stressful experiences results in physical (improved disease-specific outcomes, regulated dopamine, and liver function) and psychological (decreased depression, anxiety, distress, anger, and increased subjective wellbeing) benefits (Frattaroli, 2006). Other forms of emotional expression, through dance, poetry, music, drama, and art have also been found to be effective as treatments of psychological illnesses, and these modalities consist as creative arts therapies (Pratt, 2004; Malchiodi, 2005).

There are five primary creative arts specialties: dance/movement therapy, art therapy, music therapy, poetry therapy, and drama therapy (Goodill; Karkou & Sanderson, 2006). Each of these specialties have become important facets of medical and psychological health care and are represented by their own national organisations that provide professional credentials, organise education, and foster research and development (Pratt, 2004). Despite this, creative arts therapies are still not considered mainstream therapeutic interventions, but rather, part of the larger field of complementary and alternative therapies. In relation to the need for alternative and complementary therapies to be evaluated in regard to their efficacy in

treating depression and anxiety, dance and dance movement therapy, in particular, have the potential to be effective treatments for depression and anxiety.

Dance Movement Therapy

Dance has been a part of human culture for centuries, being used primarily for spiritual, therapeutic, artistic, and recreational purposes (Aktas & Ogce, 2005). There have, however, been exceptions to these traditional uses of dance. Intriguingly, a curious phenomenon referred to as the “Dancing Plague” or “Dancing Mania” emerged in Europe during the thirteenth century. It entailed people congregating in large crowds to participate in frenzied dancing; persisting until the point of exhaustion, or sometimes death (Donaldson, Cavanagh, & Rankin, 1997). The Dancing Plague became a public health concern, and was later defined as a *“psycho-physical disease....with an irresistible impulse to motion, and an insane love of music, often sporadic, but with a tendency in certain circumstances to become epidemic”* (Davidson, 1876, as cited in Donaldson et al., p. 201). Speculated causes ranged from demonic possession, poisoning by tarantula bite, infection, and mental illness, however, no firm conclusions have been reached.

Accounts of the deleterious effects of dance, such as this, are rare, and today dance has become a key part of the internationally acknowledged, regulated and scientifically researched therapeutic intervention known as Dance Movement Therapy (DMT). DMT is the youngest of the creative arts therapies to be established as a distinct profession (Karkou & Sanderson, 2006). The American Dance Movement Association (ADMA, 2011) defines DMT as *“the psychotherapeutic use of movement to further the emotional, cognitive, physical, and social integration of the individual”*. DMT is based on the premise that the mind and body are interrelated and DMT therapists focus on movement and dance and the mind-body connection as a means of addressing feelings, cognitions, physiological

symptoms, and behaviours associated with mental illness (Odell-Miller, Hughes, & Westacott, 2006; Malchiodi, 2005; Koch, 2006).

Key components of DMT entail the mind-body connection, emotional expression, communication, social interaction, creativity, expressive and improvisational movement, dance with or without music, psychological therapeutic techniques, and the therapeutic relationship (Aktas & Ogce, 2005; Karkou & Sanderson, 2006; Boris, 2001; Pratt, 2004; Lumsden, 2006). It is both an art and a science that is currently driven by empirical research in psychiatry, psychology, medicine, nursing, physiotherapy, and the discipline of dance therapy itself (Dulicai & Hill, 2007). Dance therapists can provide treatment for people with both physical and psychological problems including somatic disorders, anxiety, depression, heart disease, and cancer (Serlin, 2010).

History of DMT

DMT as a profession originated in inpatient psychiatry in the United States during World War II (Pies, 2008). Many World War II veterans returned home, with what would now be diagnosed as Posttraumatic Stress Disorder, and received treatment at Saint Elizabeth's Hospital in Washington D.C. DMT pioneer, Marian Chace, was an experienced, professional dancer, influenced by psychiatrist Carl Jung, and an "artist in residence" at Saint Elizabeth's who provided dance therapy sessions for the returning veterans (Dulicai & Hill, 2007). Psychiatrists noticed that some of their patients improved after attending Chace's dance classes (Pies, 2008). Since then, DMT has maintained its focus on assisting people who suffer from mental illness, or who are interested in personal growth.

Like the other creative arts therapies, DMT has become globalised, being used in 37 countries (Dulicai & Berger, 2005). It is recognised internationally, and has its own national organisations which provide professional credentials, coordinate education, and cultivate research and development. Within the past twenty years, graduate programs have developed

in the United States and Europe, and research in dance/DMT has flourished. In the United States, The American Dance Therapy Association (ADTA) was founded in 1966, while the Association for Dance Movement Psychotherapy UK (ADMPTUK) was formed in 1982 in the United Kingdom.

Australia has its own association, the Dance-Movement Therapy Association of Australia (DMTAA), which was established in 1994, which has its own Code of Ethics for DMT therapists (DMTAA, 2011; Pratt, 2004; Karkou & Sanderson, 2006). DMT services within Australia now include a bi-annual journal, *Moving On*, professional development events, training, and conferences. Students can train to become DMT therapists through the International Dance Therapy Institute of Australia in Melbourne, Victoria (DMTAA, 2011).

General/Recreational Dance Distinguished from DMT

DMT is a treatment modality that is distinct from “general/recreational dance”. Dance can be defined as structured rhythmic movement, coordinated to music (Boris, 2001). When used recreationally, dance can include dancing at local studios, clubs, or at social gatherings, and includes specific dance types (e.g. tango, jazz, waltz, foxtrot, belly dancing, hip hop etc.). DMT differs from general/recreational dancing in that sessions are carried out by trained dance movement therapists, it does not necessarily always involve music, and it involves guided emotional expression and a specific therapeutic component (Haboush, Floyd, Caron, LaSota, & Alvarez, 2006). For the sake of clarity and succinctness, this study will use the term “dance/DMT” to encompass and refer to both recreation/general dance and DMT.

Treatment Mechanism and Therapeutic Qualities of Dance/DMT

It is suggested that a number of components make dance/DMT useful interventions in increasing general wellbeing and reducing anxiety and depressive symptoms (Jorm et al., 2002). One key component is physical exercise, which has been found to effective in reducing depression and anxiety, increasing psychological wellbeing, relieving physical and

mental tension, and regulating serotonin and dopamine levels, which play key roles in anxiety and depression (Mead, Morley, Campbell, Greig, McMurdo, & Lawlor, 2010; Brannon & Feist, 2007; Annesi, Merali, Poulter, & Hayley, 2005; Dunn, Trivedi, & O'Neal, 2001; Netz, Wu, Becker, and Tenenbaum, 2005; Sadock & Sadock, 2007).

The fun and pleasurable aspect of dancing is argued to be another therapeutic component of dance/DMT, as increasing the client's engagement in pleasurable activities is a behavioural strategy that is used to reduce anhedonia (loss of interest in pleasurable activities), a core symptom of depression (Sadock & Sadock, 2007; Gioino, 2005). The integration of physical with psychological treatment, discussed above, is a unique facet of dance/DMT, which allows it to be a wholistic intervention. Augmenting psychological treatment with dance or DMT may allow for a more effective, efficient, and comprehensive treatment approach that addresses both the physiological and psychological aspects of depression and anxiety (Dulicai & Hill, 2007). Social interaction (Westen, Burton, & Kowalski, 2006; Aktas & Ogce, 2005; Haboush et al., 2006), emotional expression (Rohricht, 2009; Odell-Miller et al., 2006; Malchiodi, 2005), and mental engagement (Sadock & Sadock, 2007; Gioino, 2005; Brannon & Feist, 2007) can also all be argued to be therapeutic components of dance which target symptoms specific to depression and anxiety.

Neuropsychological Theory Regarding the Mechanism of Dance/DMT

Research in neuroscience has explored the existence of "mirror neurons" which may play a significant role in empathy and mutual understanding (Gallese, Eagle, & Mignone, 2007). Researchers have discovered that when a person witnesses another individual exhibiting movement appropriate to the emotion that individual is feeling (e.g. displaying a negative facial reaction in response to eating a sour lemon slice), brain areas appropriate to the emotional expression of the other individual will demonstrate excitation (Gallese et al., 2007; Eagle, Gallese, & Mignone, 2009). In other words, like a mirror-image, the same sets

of neurons (mirror neurons) are excited in the individual observing, as in the individual expressing the emotion or behaviour (Berrol, 2006). Gallese (2009) argues that mirror neurons contribute to a mechanism referred to as “embodied simulation”, which facilitates our ability to share the meaning of actions, intentions, feelings, and emotions with others, providing a foundation for our identification and connectedness with others, empathy, and our sense of “we-ness”.

Connections have been made regarding the role mirror neurons play in empathy and the mechanism of dance/DMT (Rohricht, 2009). Empathy involves not only emotionally or intellectually understanding another’s emotional state, but also, to some degree, vicariously experiencing that state (Berrol, 2006). A key aspect of DMT is “movement mirroring” or “empathic reflection”, through which the therapist gains the trust of the client by feeling and communicating empathy (Dulicai & Hill, 2007). Mirroring does not necessarily involve actual imitation or replication of the client’s actions or words, but rather harmonising and complementary responses (Eagle et al., 2009; Berrol, 2006). The work of mirror neurons in sharing and interpreting the emotions of others therefore allows therapist and client to communicate via movement, permits the therapist to express empathy, and facilitates the client in feeling “heard” and understood.

Review of Research Examining Effectiveness of Dance/DMT on Depression: Does it Work?

In investigating the potential usefulness of dance/DMT as interventions for depression and anxiety, it is necessary to explore evidence which empirically supports it. A number of systematic reviews have examined the efficacy of dance/DMT as a complementary and alternative treatment for depression. Thachil et al (2006) reviewed the evidence base for complementary and alternative therapies in the treatment of depression, and found that dance/DMT was supported only by Grade 3 evidence. They determined that it was not possible for them to draw firm conclusions about the effectiveness of dance/DMT from their

results. Jorm et al (2002) also reviewed the effectiveness of complementary and self-help treatments for depression in Australia, and found that dance/DMT was supported only by Level III-3 evidence. They concluded that the effects of dance and DMT on depression have yet to be adequately evaluated.

Review of Research Examining Effectiveness of Dance/DMT on Anxiety: Does it Work?

Several systematic reviews have examined the potential usefulness of dance/DMT as an intervention for anxiety. Jorm et al (2004) reviewed the effectiveness of complementary and self-help treatments for anxiety disorders in Australia and found that dance/DMT was supported by Level II evidence in reducing anxiety. They concluded that further study is needed to validate the efficacy of dance/DMT in reducing anxiety. In their review of complementary and self-help treatments for anxiety disorders in adolescents and children, Parslow, Morgan, Allen, Jorm, O'Donnell, & Purcell (2008) found that dance/DMT was supported by Level 3b evidence and concluded that there are few studies of adequate quality which have investigated the use of complementary and self-help treatments for adolescents and children. In sum, these reviews indicate that dance/DMT are potentially useful interventions for depression and anxiety, however at present there is insufficient high-quality evidence to provide adequate validation for their use.

Previous Meta-analysis on DMT (Ritter and Low, 1996)

More convincing evidence for the potential effectiveness of dance/DMT as interventions for depression and anxiety can be found in Ritter and Low's (1996; Cruz & Sabers, 1998) meta-analysis which examined the effects of DMT on various populations and disorders. While Ritter and Low did not specifically examine depression, they found that DMT significantly improved psychological change, and in particular, reduced anxiety and anger. They also found that DMT was beneficial for children, adolescents, adults, and psychiatric patients. In their meta-analysis, Ritter and Low noted that the majority of studies

examining DMT involved methodological problems. They recommended that the quality of future research be improved, with the inclusion of random allocation and control groups.

The Need for Additional High-Quality Evidence for the Effectiveness of Dance/DMT

The amount and quality of dance/DMT research has developed considerably during the last thirty years. However, despite this growth, there is still a need for more high quality evidence in dance and DMT, particularly in its application in clinical settings (Meekums, 2010; Rohricht, 2009; Burton, 2009; Pies, 2008; Jorm et al., 2002; Thachil et al., 2006; Jorm et al., 2004; Parslow et al., 2008; Higgins, 2001; Cruz, 2006). Consistent with the reviews discussed above, Rohricht (2009) and Meekums (2010) argue that currently, a high-quality evidence-base for dance/DMT is yet to be established.

Dance/DMT are potentially valid options in the treatment of anxiety and depression, as indicated by the significant and positive effect DMT had on anxiety found in Ritter and Low's (1996) meta-analysis. However, while Ritter and Low's study has contributed significantly to the evidence-base for dance/DMT, only four of the studies they included which examined depression and/or anxiety were randomised controlled trials. It is argued that this is not sufficient to justify dance/DMT as a well-validated treatment option for depression and anxiety. Without high-quality research supporting the use of dance/DMT, they will fail to be considered by psychologists, policy makers, national health services, and commissioning bodies, as worthy alternatives or adjuncts to other well-validated therapies such as CBT in the treatment of mental disorders like depression and anxiety (Rohricht, 2009; Meekums, 2010).

Justification for Meta-analysis

Rohricht (2009) has argued that the current evidence base for the use of dance/DMT in clinical settings is unsatisfactory and recommends that future research investigate what kind of therapeutic intervention (e.g. dance or DMT) works best for particular individuals (e.g. impact of age, gender, or culture), whether any form of combined therapy is useful,

which therapist characteristics are most effective, and exactly what changes and benefits dance and DMT can produce (Higgins, 2001).

Meekums (2010) has recommended that in order to build a basis of high quality research, systematic reviews (or meta-analyses) need to be conducted once there is sufficient well-designed and high-quality randomised controlled trials involving dance and DMT. It is noted that since Ritter and Low (1996) published their meta-analysis, a number of high quality randomised controlled trials examining depression and anxiety have been conducted. Ways in which an additional meta-analysis could build on Ritter and Low's contribution would be to analyse these additional studies, review the effectiveness of dance/DMT for depression as well as anxiety, and to examine the potential roles of type of dance, participant characteristics, and therapist characteristics as suggested by Rohricht (2009) and Higgins (2001).

In summary, when considering the prevalence and severity of depression and anxiety in Australia, the number of people who are not accessing professional help for mental illness, and the growing popularity of complementary therapies, it is evident that further research is needed in evaluating the efficacy of complementary and alternative therapies in the treatment of depression and anxiety (Jorm et al., 2002; Thachil et al., 2006; Jorm et al., 2004; Parslow et al., 2008). It is also evident that dance/DMT consists as a potentially useful intervention for depression and anxiety, as indicated by Ritter and Low's (1996) meta-analysis, but for which a high quality evidence-base is currently lacking (Meekums, 2010; Rohricht, 2009). In particular, it is acknowledged that a number of randomised controlled trials have been conducted since Ritter and Low's meta-analysis, and there is a need for an updated systematic review (Meekums, 2010). Finally, it is evident that there is a need to determine under which circumstances dance/DMT is effective and for whom it is effective (Rohricht, 2010; Higgins, 2001).

The present study seeks to contribute to the meeting of these needs by conducting a meta-analysis with a focus on high-quality, randomised controlled trials that have examined the effect of dance/DMT on depression and anxiety. It aims to evaluate the quality of quantitative work undertaken since Ritter and Low's study, and to narrow its focus by evaluating the outcomes of general wellbeing, depression, and anxiety. Specifically, the present study seeks to build on Ritter and Low's work by analysing all randomised controlled trials conducted since their study which measure these outcomes, assessing the quality of these included studies, including depression as an outcome, and by examining the presence of potential moderators.

It is intended that this meta-analysis be conducted in a manner that is consistent with the PRISMA (Preferred Reporting of Items for Systematic reviews and Meta-Analyses) guidelines which entail updated revisions to the QUORUM Statement (Quality of Reporting of Meta-analyses) (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009; Liberati, Altman, Tetzlaff, Mulrow, Gotzsche, Ioannidis et al., 2009).

General Wellbeing

The overall effect which will be evaluated by this study will be general wellbeing. A measure of general wellbeing provides an indication of overall mental health. General wellbeing will be indicated by increased positive outcomes such as happiness, hope, vitality, vigor, and mental health and decreased negative outcomes such as depression, sadness, negative affect, anxiety, tension, anger, and psychological distress. Consistent with positive psychology, the rationale for examining wellbeing is that treatment and prevention of mental health problems involves not only the reduction of pathology, but also the increasing of positive emotions and wellbeing, which are associated with enhanced coping and mastery (Fredrickson, 2000; Folkman & Moskowitz, 2000; Tugade & Fredrickson, 2004; Goodill, 2006).

Proposed Moderators

Rohricht (2009) and Higgins (2001) have called for exploration of certain variables which would influence the effectiveness of dance/DMT, in particular; what kind of therapeutic intervention works best for particular individuals, whether any form of combined therapy is useful, and which therapist characteristics are most effective. Within a meta-analysis, there is the capacity to explore the influence of these variables on the effect of dance/DMT through moderation analyses. Therefore, in evaluating the effectiveness of dance/DMT as an intervention for depression and anxiety, this meta-analysis will explore which populations dance/DMT may work for best (e.g. age, gender, culture), and under what circumstances it is most effective (e.g. type of dance and type of therapist). The following sections discuss these potential moderators in more detail.

Participant Variables: Age, Gender, and Country

Age

Age and gender are two demographic variables that can often account for differences in the effectiveness of interventions in meaningful ways (Frattaroli, 2004). In their systematic review of the effects of DMT on improving psychological and physical outcomes for cancer patients, Bradt, Goodill, and Dileo (2011) recommended that future studies examine the influence of factors such as gender and age on the effectiveness of DMT. For studies investigating dance/DMT, there is a wide range of age groups included. Review of the literature suggests that dance/DMT is effective for children, adolescents, young adults, adults, and older adults (Ritter & Low, 1996; Dulicai & Hill, 2007; Pratt, 2004; Mavrovouniotis et al., 2010; Cohen & Walco, 1999). For example, Ritter and Low established that DMT had a positive effect for children, adolescents, and adults. However, their study did not examine the potential moderation effects of age on the effectiveness of DMT. Examining age as a

moderator would inform us as to whether dance/DMT is more effective with certain age groups.

Gender

In the majority of studies investigating the effects of dance/DMT, there are a greater proportion of female participants than male. This pattern is consistent with reports that there are smaller numbers of men than women in dance/DMT classes internationally (Capello, 2011). However, this does not necessarily mean that dance/DMT is more effective for women than for men, but perhaps may be a reflection of interest and preference. Frattaroli (2006) points out that Western culture traditionally discourages men from interpersonal expression, and suggests that providing men with a means by which they can express themselves in a way they would not usually (e.g. dance/DMT), may allow them to experience enhanced psychological adjustment benefits. By evaluating gender as a moderator, we can explore if there are differences in the effectiveness of dance/DMT for men and women.

Country

While dance has been an integral part of most cultures, it is not yet known if it is more effective as an intervention for some cultures than others; that is, if it has universal therapeutic qualities. Universals can be defined as core attributes that are shared or consistent across culture, and they are particularly important when dealing with interventions that are designed to alleviate social or psychological issues in more than one culture, as dance/DMT may have the capacity to do (Norenzayan & Heine, 2005; Matsumoto & Juang, 2004). When searching for studies to include in the current study, it was noted that the countries in which studies had been conducted were varied (Dulicai & Berger, 2005; Capello, 2010; Musmon et al., 2008). In their recent systematic review, Bradt et al (2011) also called for future studies to examine the influences of culture on the effectiveness of DMT. Given the multicultural

clinical environment in which psychologists increasingly work, it is important to explore if dance/DMT is an effective intervention for some cultures more than others (Chang, 2006).

Intervention Variables: Type of Dance and Type of Therapist

Type of Dance

There is speculation as to whether traditional cultural dances may be more appealing for older adults, in particular, and whether this enjoyment leads to more positive clinical outcomes (Eyigor, Karapolat, Durmaz, Ibisoglu, & Cakir, 2007; Kaltsatou, Mameletzi, & Douka, 2010). Furthermore, many studies have examined a number of different types of dance intervention including DMT (Bojner-Horwitz et al., 2003; Dibbell-Hope, 2000; Erwin-Grabner et al., 1999; Har-El, 2000; Jeong et al., 2005; Koch et al., 2007; Krantz, 1994; McComb & Clopton, 2003; Rohricht & Priebe, 2006; Sandel et al., 2005) and general/recreational dance such as belly dancing (Baptista & Natour, 2009), jazz (Kim et al., 2004; Kong, 2005;), ballroom (Haboush et al., 2006; Hackney & Earhart, 2009), traditional cultural dances (Eyigor et al., 2009; Kaltsatou et al., 2010; Robinson et al., 2010; Mavrovouniotis et al., 2010), TuRo Qi Dance (Lee et al., 2007), aerobic dance (Kim & Kim, 2007; Norregaard et al., 1997), and step dance (Hulya Asci, 2003; Hulya Asci, 2009).

To date, no reviews or meta-analyses have compared the effectiveness of general/recreational dance with that of DMT. There is therefore, a need to evaluate if there is a difference between the relative effectiveness of general/recreational dance and DMT. General/recreational dance has been included as part of this study because while it does not necessarily involve *guided* or facilitated emotional expression, as is encouraged in DMT, it does involve emotional expression and may still potentially possess therapeutic qualities. It cannot be assumed that “one size fits all” (Higgins, 2001).

Type of Therapist

The role of therapist and the therapeutic relationship has long been acknowledged as an integral part of an effective intervention (Egan, 2007). Within dance/DMT, the therapist involved and the nature of their interaction with the client is also considered to be an integral part of the intervention (Lumsden, 2006; Berrol, 2000). It has been suggested that DMT therapists and professionally trained dance instructors are uniquely able to facilitate changes through dance/DMT (Boris, 2001; Ginsburgs & Goodill, 2009). In any type of intervention, it is vital that therapists be qualified, however, it has not yet been examined, whether there is a difference between the efficacy of specially trained dance instructors/DMT therapists and general therapists using dance, for example, psychologists or physiotherapists.

Aims of the Meta-analysis

The overall aim of this study was to explore the relationship between dance/DMT and psychological adjustment. Its aim was to do so by specifically examining the overall effect of dance/DMT on:

- a. General Wellbeing
- b. Depression
- c. Anxiety

A secondary aim of this meta-analysis was to examine the impact of potential moderators by conducting moderator analyses. Based on a literature review, this study also aimed to examine if the effects of dance/DMT on general wellbeing, depression and anxiety were moderated by:

- a. Age
- b. Gender
- c. Type of Country (Eastern vs. Western)
- d. Type of Dance (General vs. Specific)
- e. Type of Therapist (General vs. Specific)

Method

Search Methods for Identification of Studies

Electronic Searches

To identify all relevant studies, a search of electronic databases was carried out. All articles or dissertations that had been published or written after December 1993 and prior to July, 2011 were considered for inclusion in the meta-analysis. This date range was chosen, as 1993 is when Ritter and Low (1996) concluded the search for their meta-analysis and any studies written earlier than 1993 would have already been included in their study. The keywords used in this search were the following: “dance” or “dance therapy” and “mood”, “depression”, “anxiety”, “stress”, “positive affect” and “negative affect”. Table 1 presents the databases searched.

Table 1: Electronic databases and trial registers searched for relevant studies

<ul style="list-style-type: none">• CINAHL• Cochrane Library (Cochrane Central Register of Controlled Trials)and Database of Abstracts of Reviews of Effectiveness• EMBASE• The Hong Kong University Scholar’s Hub• MEDLINE (PubMed)• Wiley InterScience• ERIC• Emerald• JStor	<ul style="list-style-type: none">• ProQuest• PsychINFO• PsychArticles• International Bibliography of Theatre and Dance Full Text• Clinical Controlled Trials (http://www.clinicaltrials.gov/)• Current Controlled Trials (http://www.controlled-trials.com/)• General search using Google Scholar• SCOPUS• Science – Direct• Project Muse
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Journals that were likely to contain relevant studies were hand searched from the first available date. Table 2 presents the journals searched.

Table 2: Journals hand searched for relevant studies

• E-motion, electronic journal for the Association for Dance/movement Therapy U.K. (2003 – 2011)	• Moving On, Journal of the Dance/movement Therapy Association of Australia (2002 – 2011)
• Journal of Bodywork and Movement Therapies (1996 – 2011)	• Journal of Physical Education, Recreation and Dance (2004 – 2011)
• Human Movement Science (1994 – 2011)	• Dance Research Journal (2008 – 2011)
• Arts in Psychotherapy (1994 – 2011)	• American Journal of Dance Therapy (1994 – 2011)
• Journal of Body, Movement and Dance in Psychotherapy (2006 – 2011)	• Journal of Dance Medicine and Science (1997 – 2011)
• International Journal in Sport Psychology (2004 – 2011)	

In an effort to identify further published, unpublished, and ongoing trials, dissertation data bases and the reference lists of all studies and reviews were searched. Table 3 presents the dissertation databases searched. Key researchers in the field and authors who wrote non-English studies were contacted to enquire about unpublished and English versions of their studies. Authors of studies which did not report appropriate statistics were contacted for additional data. Abstracts and posters from available dance therapy research colloquiums, conferences, and proceedings were searched and authors contacted to enquire if their studies had been completed and ascertain the possibility of accessing their data. Of authors with unpublished studies, 7 were contacted, 2 responded, and 1 study was acquired. Of authors with non-English studies, 6 were contacted, 1 responded, and no studies were acquired. Of authors whose studies did not report appropriate statistics, 7 were contacted, and 5 responded with the necessary statistics. Of researchers from colloquiums, conferences, and proceedings, 2 were contacted, 2 responded, and 1 study was acquired, which subsequently did not meet inclusion criteria.

Table 3: Dissertation databases searched for unpublished studies

• PROQUEST Dissertations and Theses	• INFORMIT
• Trove – National Library of Australia	• OAster – Libraries Worldwide
• COPAC - UK and Irish academic and national libraries	• EThOS – Beta: British Library
• Hong Kong University Theses Online	• DiVA Portal (Scandinavian Digital Scientific Archive)
• National ETD Portal – South African Theses and Dissertations	• NARCIS – Dutch ETDs
• Theses Canada – Library and Archives Canada	• DART – Europe E-Theses Portal
• Deutsche National Bibliothek	• Theses en Ligne - French Ph.D theses.
• VTLS Visualiser	• Networked Digital Library of Theses and Dissertations (NDLTD)
	• Scirus ETD Search

Inclusion Criteria for Studies

Each potentially relevant study was reviewed against the inclusion criteria. To be included, a study needed to: (1) be a randomised controlled trial, or trial with quasi-randomised methods of treatment allocation (e.g. alternate allocation of treatments), (2) include generalised/recreation dance or DMT as a component of the intervention, (3) measure psychological adjustment and wellbeing (e.g. mood and anxiety), and (4) report, or the authors provide (upon request), necessary statistical data. There were no exclusions with respect to age, gender, length of intervention, diagnosis, ethnicity or language.

Types of Interventions

As discussed above, studies involving either general/recreational dance or DMT were included. To determine studies that used DMT, the American Dance Therapy Association's (ADTA, 2011) definition of dance therapy – *“the psychotherapeutic use of movement as a process which furthers the emotional, social, cognitive, and physical integration of the individual”* - was used as a guide for inclusion. Provided dance was being used therapeutically, it did not need to be explicitly defined as “dance therapy” for the study to be

included. Studies using body-oriented therapy were included, provided the intervention focussed on creative movement.

Unlike Ritter and Low (1996), studies that used dance, dance therapy, or movement to music (both group and individual) as an adjunctive therapeutic intervention for psychological adjustment (e.g. mood, depression, anxiety, positive and negative affect, and stress) or as part of a multi-modal treatment, regardless of any other biological, psychological, or social intervention, were included.

Quality Assessment of Trials

A quality assessment of trials was undertaken using the CONSORT, TREND, and PRISMA Statements as Guidelines. Table 4 presents the quality assessment undertaken consistent with CONSORT and TREND guidelines (Schultz, Altman, & Moher, 2010; Des Jarlais, Lyles, & Crepaz, 2004; Caetano, 2004), while Table 5 presents a more specific assessment of quality for the six markers of validity consistent with the PRISMA guidelines (Moher et al., 2009; Liberati et al., 2009).

Studies Found

The entire search generated approximately 55,427 abstracts which were reviewed to determine whether they contained relevant information for the study. In total, 377 studies were obtained for a full-text review. Of these, 351 were excluded because they did not use a control group (37), were not randomised (42), were non-experimental studies (157), did not examine the outcomes under examination (30), did not include dance as an intervention (57), were past reviews (4), did not include appropriate statistics and authors were unable to be contacted (7), or contacted authors did not respond (12). Studies that used body-oriented therapy, and which focussed on massage and touch were excluded on the basis that they did not involve creative movement (3). Studies using repeated measures design were excluded because they did not include the correlations for pre and post outcome measures, which were

needed in order to compute accurate effect sizes for such designs (2). Twenty-six studies met all inclusion criteria and were retained for the meta-analysis, including 2 dissertations, 1 unpublished controlled trial, and 23 journal articles, representing 2540 participants. Details of these studies, including the study and participant characteristics coded, are presented in Table 6.

Table 4: Criteria for Rating Quality of Studies – Derived from the Consolidated Standards of Reporting Trials (CONSORT) and Transparent Reporting of Evaluations with Non-randomised Designs (TREND) checklists

STUDY	INTRODUCTION	SUBJECTS	INTERVENTION	OUTCOMES	RANDOMISATION	STATISTICS	RESULTS	DISCUSSION	TOTAL SCORE
	Theory driven	Eligibility criteria	Precise details and content of intervention for each group	Well-validated, reliable measures	Report method	Statistical method used to compare groups	Participant flow	Interpretation Balanced	
	Scientific background	Method of recruitment			Allocation concealment		Baseline data	Generalisability	
	Explanation of rationale	Settings, and locations of recruitment	Delivery method and timing	Clearly defined primary and secondary measures	Describe implementation	Statistical significance considered	Baseline Equivalence	Overall Evidence	
		Recruitment length		Methods used to enhance quality of measurements	Masking/blinding		Numbers analysed		
							Outcomes and estimation		
Maximum Score	3	4	2	3	4	2	5	3	26
Baptista & Natour (2009) (unpublished – from clinical control trial register)	1	3	1	2	1	2	4	0	14
Barnett et al. (2003)	3	3	2	3	4	2	5	3	25
Bojner-Horwitz et al. (2003)	3	4	2	2	1	2	4	3	21
Dibbell-Hope (2000)	3	3	2	2	1	2	3	2	18

Table 4: Criteria for Rating Quality of Studies – Derived from the Consolidated Standards of Reporting Trials (CONSORT) and Transparent Reporting of Evaluations with Non-randomised Designs (TREND) checklists (continued)

STUDY	INTRODUCTION	SUBJECTS	INTERVENTION	OUTCOMES	RANDOMISATION	STATISTICS	RESULTS	DISCUSSION	TOTAL SCORE
	Theory driven Scientific background Explanation of rationale	Eligibility criteria Method of recruitment Settings, and locations of recruitment Recruitment length	Precise details and content of intervention for each group Delivery method and timing	Well-validated, reliable measures Clearly defined primary and secondary measures Methods used to enhance quality of measurements	Report method Allocation concealment Describe implementation Masking/blinding	Statistical method used to compare groups Statistical significance considered	Participant flow Baseline data Baseline Equivalence Numbers analysed Outcomes and estimation	Interpretation Balanced Generalisability Overall Evidence	
Maximum Score	3	4	2	3	4	2	5	3	26
Erwin-Grabner et al. (1999)	3	3	2	2	1	2	3	2	18
Eyigor et al. (2009)	2	2	2	2	2	2	4	3	19
Haboush et al. (2006)	3	3	2	2	1	2	5	2	20
Hackney & Earhart (2009)	3	3	2	2	3	2	5	3	23
Har-El (2000)	3	3	2	2	4	2	4	3	23
Hulya Asci (2003)	3	3	2	2	1	2	4	3	20
Hulya Asci (2009)	3	2	2	2	1	2	4	3	19
Jeong et al. (2005)	3	3	2	2	1	2	4	2	19

Table 4: Criteria for Rating Quality of Studies – Derived from the Consolidated Standards of Reporting Trials (CONSORT) and Transparent Reporting of Evaluations with Non-randomised Designs (TREND) checklists (continued)

STUDY	INTRODUCTION	SUBJECTS	INTERVENTION	OUTCOMES	RANDOMISATION	STATISTICS	RESULTS	DISCUSSION	TOTAL SCORE
	Theory driven Scientific background Explanation of rationale	Eligibility criteria Method of recruitment Settings, and locations of recruitment Recruitment length	Precise details and content of intervention for each group Delivery method and timing	Well-validated, reliable measures Clearly defined primary and secondary measures Methods used to enhance quality of measurements	Report method Allocation concealment Describe implementation Masking/blinding	Statistical method used to compare groups Statistical significance considered	Participant flow Baseline data Baseline Equivalence Numbers analysed Outcomes and estimation	Interpretation Balanced Generalisability Overall Evidence	
Maximum Score	3	4	2	3	4	2	5	3	26
Jordans et al. (2010)	3	4	2	3	3	2	5	3	25
Kaltsatou et al. (2010)	3	3	2	2	1	2	2	3	17
Kim et al. (2004)	3	2	2	2	1	2	3	2	17
Kim & Kim (2007)	3	2	2	3	1	2	3	2	18
Koch et al. (2007)	3	3	2	2	1	2	3	2	18
Kong (2005)	3	4	2	2	3	2	5	3	24
Krantz (1994)	3	3	2	2	4	2	4	3	23
Lee et al. (2009)	3	3	2	2	2	2	3	3	20
McComb & Clopton (2003)	3	2	2	2	1	2	4	2	18

Table 4: Criteria for Rating Quality of Studies – Derived from the Consolidated Standards of Reporting Trials (CONSORT) and Transparent Reporting of Evaluations with Non-randomised Designs (TREND) checklists (continued)

STUDY	INTRODUCTION	SUBJECTS	INTERVENTION	OUTCOMES	RANDOMISATION	STATISTICS	RESULTS	DISCUSSION	TOTAL SCORE
	Theory driven	Eligibility criteria	Precise details and content of intervention for each group	Well-validated, reliable measures	Report method	Statistical method used to compare groups	Participant flow	Interpretation Balanced	
	Scientific background	Method of recruitment			Allocation concealment		Baseline data	Generalisability	
	Explanation of rationale	Settings, and locations of recruitment	Delivery method and timing	Clearly defined primary and secondary measures	Describe implementation	Statistical significance considered	Baseline Equivalence	Overall Evidence	
		Recruitment length		Methods used to enhance quality of measurements	Masking/blinding		Numbers analysed		
							Outcomes and estimation		
Maximum Score	3	4	2	3	4	2	5	3	26
Norregaard et al (1997)	3	3	2	2	2	2	4	2	20
Robinson et al. (2010)	3	4	2	2	4	2	4	3	24
Rohricht & Priebe (2006)	3	3	2	3	4	2	5	3	25
Sandel et al (2005)	3	3	2	2	3	2	5	2	22
Tol et al. (2008)	3	4	2	3	3	2	5	3	25

Table 5: Quality Measures for Six Markers of Validity Consistent with PRISMA Guidelines

Study	Method of Randomisation Reported	Concealment of Randomisation	RCT Stopped Early	Participants Blinded	Intervention Providers Blinded	Outcome Assessors Blinded
Baptista & Natour (2009)	No	Unknown	No	Unknown	Unknown	Yes
Barnett et al. (2003)	Yes	Yes	No	Unknown	Unknown	Yes
Bojner-Horwitz et al. (2003)	No	Unknown	No	Unknown	Unknown	Unknown
Dibbell-Hope (2000)	No	Unknown	No	Unknown	Unknown	Unknown
Erwin-Grabner et al. (1999)	No	Unknown	No	Unknown	No	Yes
Eyigor et al. (2009)	No	Unknown	No	Unknown	Unknown	Yes
Haboush et al. (2006)	No	Unknown	No	No	No	Yes
Hackney & Earhart (2009)	Yes	No	No	Unknown	Unknown	Unknown
Har-El (2000)	Yes	Unknown	No	Unknown	Unknown	No
Hulya Asci (2003)	No	Unknown	No	Unknown	Unknown	Unknown
Hulya Asci (2009)	No	Unknown	No	Unknown	Unknown	Unknown
Jeong et al. (2005)	No	Unknown	No	Unknown	Unknown	Unknown
Jordans et al. (2010)	Yes	Unknown	No	Unknown	Unknown	No
Kaltsatou et al. (2010)	No	Unknown	No	Unknown	Unknown	Unknown
Kim et al. (2004)	No	Unknown	No	Unknown	Unknown	Unknown

Table 5: Quality Measures for Six Markers of Validity Consistent with PRISMA Guidelines (continued)

Study	Method of Randomisation Reported	Concealment of Randomisation	RCT Stopped Early	Participants Blinded	Intervention Providers Blinded	Outcome Assessors Blinded
Kim & Kim (2007)	No	Unknown	No	Unknown	Unknown	Unknown
Koch et al. (2007)	No	Unknown	No	Unknown	No	Unknown
Kong (2005)	Yes	Unknown	No	Yes	Unknown	Unknown
Krantz (1994)	Yes	Unknown	No	Yes	No	Yes
Lee et al. (2009)	Yes	Unknown	No	Yes	Unknown	Unknown
McComb & Clopton (2003)	No	Unknown	No	Unknown	Unknown	Unknown
Norregaard et al (1997)	Yes	Unknown	No	Unknown	Unknown	Unknown
Robinson et al. (2010)	Yes	Unknown	No	Unknown	Unknown	Yes
Rohricht & Priebe (2006)	Yes	Yes	No	Unknown	Unknown	Yes
Sandel et al (2005)	Yes	Yes	No	Unknown	No	Unknown
Tol et al. (2008)	Yes	Unknown	No	Unknown	Unknown	No

Table 6: Characteristics of Studies Examining the Effect of Dance/DMT on General Wellbeing, Depression, and Anxiety Included in the Meta-Analysis

Study		Participants & Design			Study Characteristics				Outcome		
	<i>N</i>	Mean Age	% of Females	Country (Eastern vs. Western)	Sample (Clinical vs. Community)	Study Design	Type of Intervention (General vs. Specific)	Therapist (Specific: professional instructor/therapist vs. General: untrained instructor)	Outcomes	<i>d</i>	Quality Max Score 26
Baptista & Natour (2009)	80	49	100	Brazil (Western)	Fibromyalgia (Clinical)	BG	Belly Dancing (General)	Physiotherapist (General)	BDI SF-36	0.71	14
Barnett et al. (2003)	137	75	67	Australia (Western)	>65 & one or more physical impairments (Community)	BG	Structured Exercise: Dance steps, stretching, Tai Chi, and stepping practice (General)	Exercise Instructor (General)	SF-36	- 0.09	25
Bojner-Horwitz et al. (2003)	36	57	100	Sweden (Western)	Fibromyalgia (Clinical)	BG	DMT (Specific)	Not specified (General)	MADRS	- 0.25	21
Dibbell-Hope (2000)	33	55	100	United States (Western)	Breast Cancer (Clinical)	BG (Waitlist)	DMT (Specific)	Leader (General)	POMS SCL-90-R	0.00	18
Erwin-Grabner et al. (1999)	21	29	67	United States (Western)	University Students (Community)	BG	DMT (Specific)	DMT therapist (Specific)	TAI	0.84	18
Eyigor et al. (2009).	37	72	100	Turkey (Eastern)	Healthy females >65 (Community)	BG	Folkloric dance-based exercise routines (General)	Senior folklore dance expert (Specific)	SF-36	0.53	18
Haboush et al. (2006)	20	69	67	United States (Western)	Depression (Clinical)	BG (Waitlist)	Individual ballroom dance lessons: foxtrot, waltz, rumba, swing, cha-cha, and tango (General)	Ballroom dance instructor (Specific)	HRSD GDS BHS SCL-90-R	0.36	20

Table 6: Characteristics of Studies Examining the Effect of Dance/DMT on General Wellbeing, Depression, and Anxiety Included in the Meta-Analysis
(continued)

Study	Participants & Design			Study Characteristics				Outcome			
	<i>N</i>	Mean Age	% of Females	Country (Eastern vs. Western)	Sample (Clinical vs. Community)	Study Design	Type of Intervention (General vs. Specific)	Therapist (Specific: professional instructor/therapist vs. General: untrained instructor)	Outcomes	<i>d</i>	Quality Max Score 26
Hackney & Earhart (2009)	61	67	26	United States (Western)	Parkinson's Disease (Clinical)	BG	Tango, Waltz and Foxtrot lessons (General)	Ballroom Dancer (Specific)	PDQ – 39	0.27	23
Har-El (2000)	60	45	73	United States (Western)	Mechanical neck problems (Clinical)	BG	DMT and special neck exercises (Specific)	Not Specified (General)	POMS	- 0.37	23
Hulya Asci (2003)	40	21	100	Turkey (Eastern)	University students (Community)	BG	Aerobic and step dance sessions (General)	Not Specified (General)	STAI	0.31	20
Hulya Asci (2009)	138	22	53	Turkey (Eastern)	University students (Community)	BG	Step dance sessions (General)	Not specified (General)	STAI	0.13	19
Jeong et al. (2005)	40	16	100	Korea (Eastern)	Depression (Clinical)	BG	DMT (Specific)	Not specified (General)	SCL-90-R	0.04	19
Jordans et al. (2010)	325	13	49	Nepal (Eastern)	School children (Community)	BG	CBI: psycho-ed, socio-drama, DMT, group activities, relaxation, narrative drawing (General)	Research assistants (General)	CPSS DSRS SCARED – 5 CHS	0.45	25
Kaltsatou et al. (2010)	27	57	100	Greece (Western)	Breast Cancer (Clinical)	BG	Aerobic training with Greek traditional dances (General)	Professional dance instructor (Specific)	BDI	1.06	17
Kim et al. (2004)	398	20	48	Korea (Eastern)	University students (Community)	BG	Jazz, Hip-Hop & Aerobic Dance (General)	Not specified (General)	SEES	0.31	17

Table 6: Characteristics of Studies Examining the Effect of Dance/DMT on General Wellbeing, Depression, and Anxiety Included in the Meta-Analysis
(continued)

Study		Participants & Design				Study Characteristics			Outcome		
	<i>N</i>	Mean Age	% of Females	Country (Eastern vs. Western)	Sample (Clinical vs. Community)	Study Design	Type of Intervention (General vs. Specific)	Therapist (Specific: professional instructor/therapist vs. General: untrained instructor)	Outcomes	<i>d</i>	Quality Max Score 26
Kim & Kim (2007)	277	21	48	Korea (Eastern)	High school and university students (Community)	BG	Aerobic & Hip-Hop Dance (General)	Not specified (General)	SEES	0.43	18
Koch et al. (2007)	31	43	42	Germany (Western)	Depression (Clinical)	BG	DMT (Specific)	DMT therapists (Specific)	HBS	0.62	18
Kong (2005)	43	26	100	Korea (Eastern)	Eating disorder (Clinical)	BG	Jazz dance, meals, relationship group, assertiveness training, eating-attitudes education, body-image therapy, nutrition group, pharmacotherapy and related psycho-education (General)	Psychologist, psychiatrist, social worker & nutritionist (General)	BDI	0.84	24
Krantz (1994)	64	21	70	United States (Western)	College students (Community)	BG	DMT (Specific)	DMT therapist (Specific)	PEQ LDQ	0.07	23
Lee et al (2007)	48	13	100	Korea (Eastern)	School children (Community)	BG	TuRo Qi Dance System (Specific)	Certified TuRo Master (Specific)	SCL-90-R	0.87	20
McComb & Clopton (2003)	12	19	100	United States (Western)	Bulimia Nervosa (Clinical)	BG	Group discussion, DMT, & Relaxation (Specific)	Presenter (General)	STAI	- 0.27	18
Norregaard et al (1997)	23	50	Not stated	Denmark (Western)	Fibromyalgia (Clinical)	BG	Aerobic dance training (General)	Not specified (General)	BDI	0.00	20

Table 6: Characteristics of Studies Examining the Effect of Dance/DMT on General Wellbeing, Depression, and Anxiety Included in the Meta-Analysis
(continued)

Study		Participants & Design				Study Characteristics			Outcome		
	<i>N</i>	Mean Age	% of Females	Country (Eastern vs. Western)	Sample (Clinical vs. Community)	Study Design	Type of Intervention (General vs. Specific)	Therapist (Specific: professional instructor/therapist vs. General: untrained instructor)	Outcomes	<i>d</i>	Quality Max Score 26
Robinson et al. (2010)	225	9	100	United States (Western)	School children (Community)	BG	GEMS:Traditional African dance. Hip Hop, Step, GEMS talks, homework START: home-based screen time reduction intervention (General)	Female African American college students or recent graduates (General)	CDI	0.19	23
Rohricht & Priebe (2006)	45	38	47	England (Western)	Schizophrenia (Clinical)	BG	Body-oriented psychotherapy (DMT): (Specific)	DMT therapist (Specific)	PANSS	0.51	25
Sandel et al. (2005)	35	61	100	United States (Western)	Breast Cancer (Clinical)	BG (Waitlist)	DMT (Specific)	DMT therapist (Specific)	SF-36	0.67	22
Tol et al. (2008)	403	10	49	Indonesia (Eastern)	School children (Community)	BG (Waitlist)	CBT techniques, play, drama, dance, and music (General)	Interventionist (General)	CPSS DSRS SCARED5 CHS	0.16	25

Note. * If therapist qualifications were not stated, it was assumed they were a general instructor. BDI = Beck Depression Inventory, SF36 = Short Form 36 Health Status Questionnaire, DMT = Dance Movement Therapy, MADRS = Montgomery Asberg Depression Rating Scale, POMS = Profile of Mood States, SCL-90-R = Symptom Checklist 90-Revised, TAI = Test Attitude Inventory, HRSD = Hamilton Rating Scale for Depression, GDS = Geriatric Depression Scale, BHS = Hopelessness Scale, PDQ - 39 = Parkinsons Disease Questionnaire 39, STAI = State-Trait Anxiety Inventory, CBI = Classroom Based Intervention, CPSS = Child PTSD Symptom Scale, DSRS = Depression Self-Rating Scale, SCARED - 5 = Screen for Child Anxiety Related Emotional Disorders, CHS = Children's Hope Scale, SEES = Subjective Exercise Experiences Scale, HBS = Heidelberger Befindlichkeitsskala - Bipolar State Inventory, PEQ = Post-Experimental Questionnaire, LDQ = Last Day Questionnaire, CDI = Children's Depression Inventory, GEMS = Girls' Health Enrichment Multi-site Studies, PANSS = Positive and Negative Symptom Scale.

Data Extraction and Variables Coded from Each Study

For each study, data needed for the running of the meta-analysis and data consistent with the moderators under investigation, was extracted and coded. Table 7 presents the data extracted.

Table 7: Data extracted and coded for each study

Type of Data	Details
General Information	<ul style="list-style-type: none"> • Authors • Year of publication • Study Design (wait-list, between groups)
Trial Information (Consistent with CONSORT standards)	<ul style="list-style-type: none"> • Randomisation • Randomisation method • Allocation concealment • Allocation concealment method • Level of blinding
Intervention Information	<ul style="list-style-type: none"> • Type of intervention (Type of dance: General dance/dance as a therapeutic adjunct or Specific: DMT or dance designed as therapy) • Frequency, and duration of intervention (Session numbers) • Comparison intervention • Control group activity • Type of Therapist (Specific dance therapy instructor or General, nonspecific instructor, e.g. physiotherapist) • Treatment (Group or Individual)
Participant Information	<ul style="list-style-type: none"> • Total sample size • Number of experimental group • Number of control group • Gender (% of females) • Age • Country (Eastern or Western) • Sample (Clinical or Community)

Outcomes

- Setting
- Outcome measures used
- Sample size, mean and standard deviation scores both pre and post for the intervention and control groups

Coding of Moderators

In the present study, the following potential moderators were examined:

- a. Age
- b. Gender
- c. Type of Dance (General or Specific)
- d. Country (Eastern or Western)
- e. Therapist (General or Specific)

Dance Type. Differentiation was made between DMT and general/recreational dance.

Studies which labelled the intervention as DMT, or which designed dance to be used as therapy, consistent with the ADTA's definition of DMT were coded as specific. All other dance forms (e.g. traditional folk, ballroom, African) and dance used as an adjunct to other therapeutic techniques, but not designed to be a form of therapy itself, were coded as general.

Therapist/Instructor. Therapists or instructors which were qualified dance movement therapists or who were qualified dance instructors were coded as specific. All other types of instructors and those whose qualifications were not specified were coded as general.

Country. All countries which are geographically located in the Middle East and Asia were coded as Eastern, while all countries geographically located in Europe, the Americas, and Australia, were coded as Western.

Meta-analytic Procedures

Fixed and Random Effects Models

Meta-analyses are usually conducted using either the fixed effects or random effects model (Field, 2001; DeCoster, 2004). The primary difference between these models is that they attribute different reasons for the differences between study mean effect size and the population mean. The fixed effects model assumes that the difference is the result of subject-level sampling error. The fixed effects model therefore limits the researcher to generalising their results only to studies identical to those in their sample (Sathian et al., 2009).

Alternatively, the random effects model assumes that the difference is due to both subject-level sampling error and randomly distributed sources of variance (Sathian et al., 2009). The random effects model therefore allows the researcher to generalise their results to studies outside of those in their sample, to those using different participants and measures.

The freedom it permits the researcher to apply inferences to new situations makes the random effects model more desirable for a meta-analysis (Field, 2001). However, a limitation involved with using the random effects model is that when there are approximately 10 – 20 data sets in a meta-analysis, the random effects model may produce biased results (Hafdahl & Williams, 2009). The majority of the analyses in the present study involved less than 20 data sets, and so it was determined that the meta-analysis results would be interpreted using the fixed effects model. Therefore, the conclusions made, may not be generalisable to studies outside of those identical to the ones in this sample. However, the effect size results for the random effects model are also presented, and compared with the results for the fixed effects model. Consistent with the suggestion of Cohen (1992; Sathian et al., 2009), *d* effect sizes of .2 - .5 were considered small, .5 - .8 medium or moderate, and >.8 large.

Variability in Effect Sizes, Analysis of Heterogeneity, and Publication Bias

To assess the variability of the overall effect size, 95 % confidence intervals (CI) were used. If a 95 % confidence interval excludes zero, it indicates 95% confidence that the mean effect size is not zero. To evaluate the heterogeneity of mean effect sizes, Cochran's Q and I^2 indices were used (Higgins, Thompson, Deeks, & Altman, 2003). When Cochran's Q is significant, ($p < .05$), it can be interpreted that there is heterogeneity for the mean effect size. The I^2 value is the percentage of variation across studies that can be attributed to heterogeneity (Higgins et al., 2003). Consistent with Higgins et al's (2003) suggestions, I^2 values of approximately 25% were considered to indicate low heterogeneity, approximately 50% indicated moderate heterogeneity, and approximately 75% or greater indicated high heterogeneity. Rosenthal's Z or fail-safe number was calculated to examine publication bias. The fail-safe number is the number of non-significant, unpublished or missing studies that would need to be added to the meta-analysis in order to alter the results from significant to non-significance (Rosenthal, 1991).

Huedo-Medina, Sanchez-Meca, Marin-Martinez, & Botella (2006) recommend that if all of the following are present, heterogeneity can be assumed, and moderation analyses undertaken:

1. The effect size is significant
2. Cochran's Q and I^2 indices are significant and moderate-high, respectively
3. The 95% confidence interval for the effect size excludes zero

However, Huedo-Medino et al (2006) also argue that when a meta-analysis contains a small number of studies ($k < 30$) (Sathian et al., 2009), as is the case with all analyses in this study, Cochran's Q , the I^2 , and confidence intervals should be interpreted cautiously.

For the categorical moderators of type of dance, country, and therapist, the moderation analysis involved calculating between groups Q statistic or Q_b , which can be

likened to an analysis of variance (DeCoster, 2004). The difference between groups is dispersed as a chi-square test, with a df value of number of groups = 1. A significant moderation effect can be interpreted when Q_b is significant. For moderators, age and gender, a moderation analysis was implemented using meta-regression, which is akin to running multiple regressions (DeCoster, 2004). Meta-regression also provides a Q statistic, with $df=1$. A significant moderation effect can be interpreted when Q is significant.

Comprehensive Meta-Analysis (CMA) computer software was used to conduct the meta-analysis. The standardised mean difference (Cohen's d) was computed to represent the intervention effects reported in the included studies (DeCoster, 2004). This form of effect size was used to represent the difference between outcomes for the treatment and control group means (Richardson & Rothstein, 2008; Sathian et al., 2009). To rule out the presence of outliers which can distort the results, the distributions of the effect size estimates were screened. Individual standard differences of the mean that were four standard deviations above or below the mean of the standard error in the sample were defined as outliers (Huffcutt & Arthur, 1995). No extreme outliers were detected for any of the analyses and so all of the studies listed in Table 5 were used in the meta-analysis. Consistent with Lipsey & Wilson's (2001) recommendation that including multiple effect sizes from the same intervention violates the assumption of individual data points, the average of outcomes at the treatment-control level were used.

Results

General Wellbeing

Effect Size of Dance/DMT for General Wellbeing

Table 8 shows the mean effect size of dance/DMT for general wellbeing. The findings for the fixed effects model reveal that dance/DMT had a small, but significant and positive effect ($d = .29$) on general wellbeing. These results indicate that dance/DMT significantly increased general wellbeing for participants of studies included in the analysis. Figure 1 illustrates these findings.

Heterogeneity Analyses for General Wellbeing

Heterogeneity was indicated for general wellbeing, as demonstrated by the absence of 0 in the CIs (.210/.368), Cochran’s Q reaching significance (40.75, $p < 0.05$), and moderate I^2 value (38.65) (Please see Table 8). Consistent with Huedo-Medina et al’s (2006) recommendations, because the effect size for general wellbeing was significant, and heterogeneity was indicated, moderation analyses were undertaken.

Table 8: Meta-Analysis of the Effect of Dance/DMT on General Wellbeing

			Effect Size		Heterogeneity		Fail Safe
	k	N	d	95% CI	Q	df I^2 (%)	Number
General Wellbeing							
Dance	26	2540	.29***	.210/.368	40.75*	25 38.65	267
			(.30***)	(.182/.413)			

Note: k = number of effect sizes; N = combined sample size; d = Cohen’s d effect size; CI = confidence interval; Q = Cochran’s Q ; I^2 = Higgins & Thompson’s (2002) I^2 index. Values in parenthesis are for the random-effects model.

* $p < .05$; ** $p < .01$; *** $p < .001$

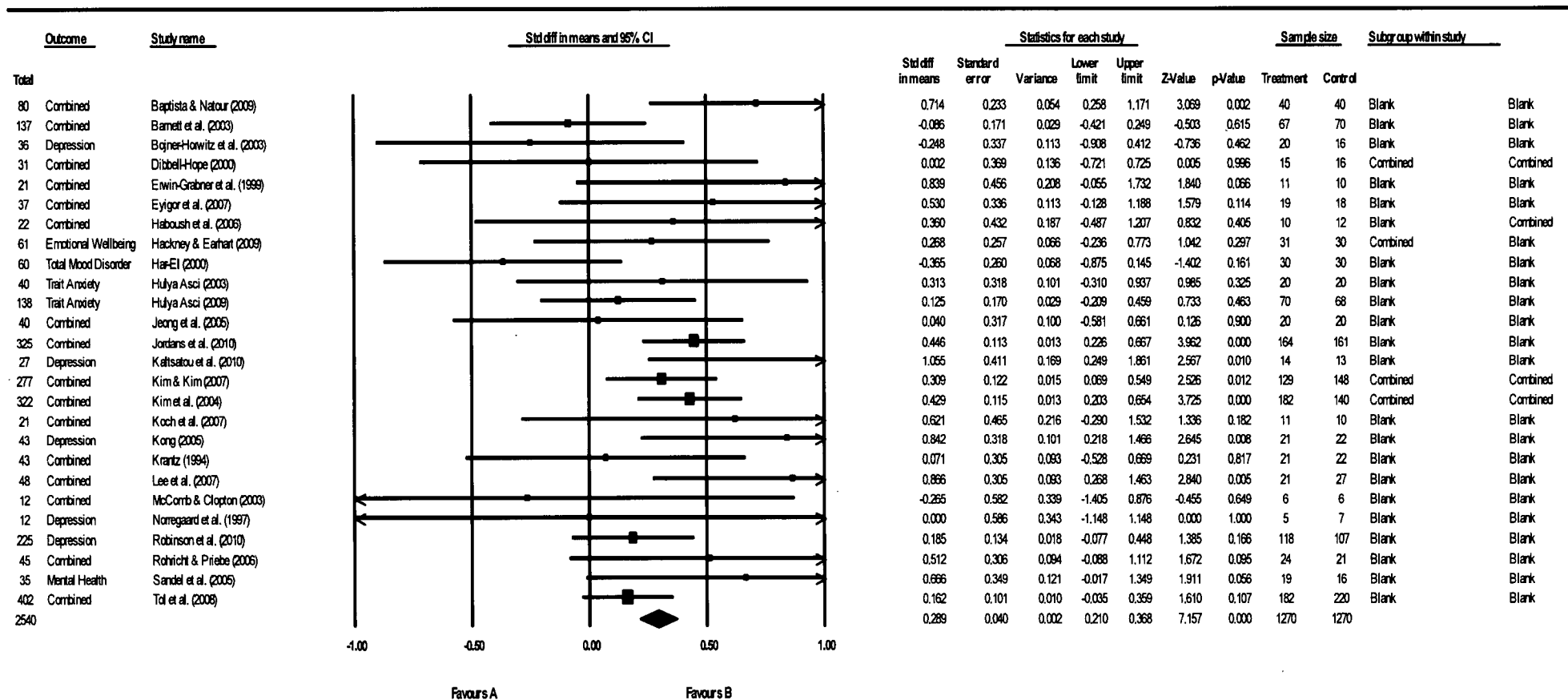


Figure 1: Forest plot illustrating spread of effect sizes for dance/DMT and general wellbeing

Moderation Analyses for General Wellbeing

Moderation of Effect Size for General Wellbeing. Tables 9 and 10 show part of the results for the moderation analyses. The effect of dance/DMT on general wellbeing was not moderated by age, gender, type of dance, or country. Despite, this, the effect sizes were significant and positive, albeit small, for both General and Specific type of dance ($d = .30$ & $.21$, respectively) and both Eastern and Western countries ($d = .33$ & $.21$, respectively). These results suggest that for the studies included within this analysis, both General (general/recreational dance) and Specific (DMT) types of dance were effective at increasing general wellbeing for males and females of varying ages from both Eastern and Western countries.

The effect of dance/DMT on general wellbeing was, however, moderated by type of therapist, as demonstrated by a small, but significant and positive effect size for General type of therapist, ($d = .23$), and a significant, positive, and moderate effect size for Specific type of therapist ($d = .56$). These results suggest that for the studies included in this analysis, the use of specially trained dance therapists and instructors was associated with a greater increase in general wellbeing than the use of instructors not specifically trained in dance or DMT.

Table 9: Moderation of the Effect of Dance/DMT on General Wellbeing by Age and Gender

B	X^2 (df)	p
Moderator = Age		
.00	.18 (1)	.67
Moderator = Gender		
.00	.28 (1)	.60

Note: B = beta (point analysis/estimate for meta-regression), X^2 (df) = chi square and degrees of freedom.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 10: Moderation of the Effect of Dance/DMT on General Wellbeing by Type of Dance, Country, and Therapist (Fixed Effect Analysis with Mixed Effect in Parentheses)

	<i>K(N)</i>	<i>d</i>	<i>Q(df)</i>	<i>Q_B(df=1)</i>
Moderator = Type of Dance				
General	15 (2148)	.302*** (.32***)	21.92 (14)	
Specific	11 (392)	.21* (.23)	18.25 (10)	
Total Between				.64 (.28)
Overall	26 (2540)	.29*** (.30***)	40.81 (25*)	
Moderator = Country				
Eastern	10 (1672)	.33*** (.35***)	12.95(9)	
Western	16 (868)	.21** (.24)*	25.53(15)*	
Total Between				2.27 (.80)
Overall	26 (2540)	.29*** (.31)***	40.75(25)*	
Moderator = Therapist				
General	15 (2100)	.23*** (.20**)	24.06(14)*	
Specific	11 (440)	.56*** (.56***)	7.48(10)	
Between Groups				9.21** (9.32**)
Overall	25(2540)	.29*** (.31***)	40.75 (25)*	

Note: k = number of correlations; *N* = combined sample size; *d* = Cohen's *d* effect size; *Q_B* = Cochran's *Q* between.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Depression

Effect Size of Dance/DMT on Depression

Table 11 shows the mean effect size of dance/DMT for depression. The findings for the fixed effects model reveal that dance/DMT had a small, but significant and positive effect ($d = .33$) on depression. These results indicate that dance/DMT significantly decreased depression for participants from studies included in the analysis. Figure 2 illustrates these findings.

Heterogeneity Analyses for Depression

Heterogeneity was indicated for depression, as demonstrated by the absence of 0 in the CIs (.247/.420), Cochran’s Q reaching significance, (32.78, $p < .05$) and moderate I^2 value (42.04) (Please see Table 11). Consistent with Huedo-Medina et al’s (2006) recommendations, because the effect size for depression was significant, and heterogeneity was indicated, moderation analyses were undertaken.

Table 11: Meta-Analysis of the Effect of Dance/DMT on Depression

		Effect Size		Heterogeneity		Fail Safe	
	<i>k</i>	<i>N</i>	<i>d</i>	95% CI	<i>Q</i>	<i>df</i> <i>I</i> ² (%)	Number
Depression							
Dance	20	2118	.33***	.247/.420	32.78*	19 42.04	247
			(.37***)	(.233/.500)			

Note: k = number of effect sizes; N = combined sample size; d = Cohen’s d effect size; CI = confidence interval; Q = Cochran’s Q ; I^2 = Higgins & Thompson’s (2002) I^2 index. Values in parenthesis are for the random-effects model.

* $p < .05$; ** $p < .01$; *** $p < .001$

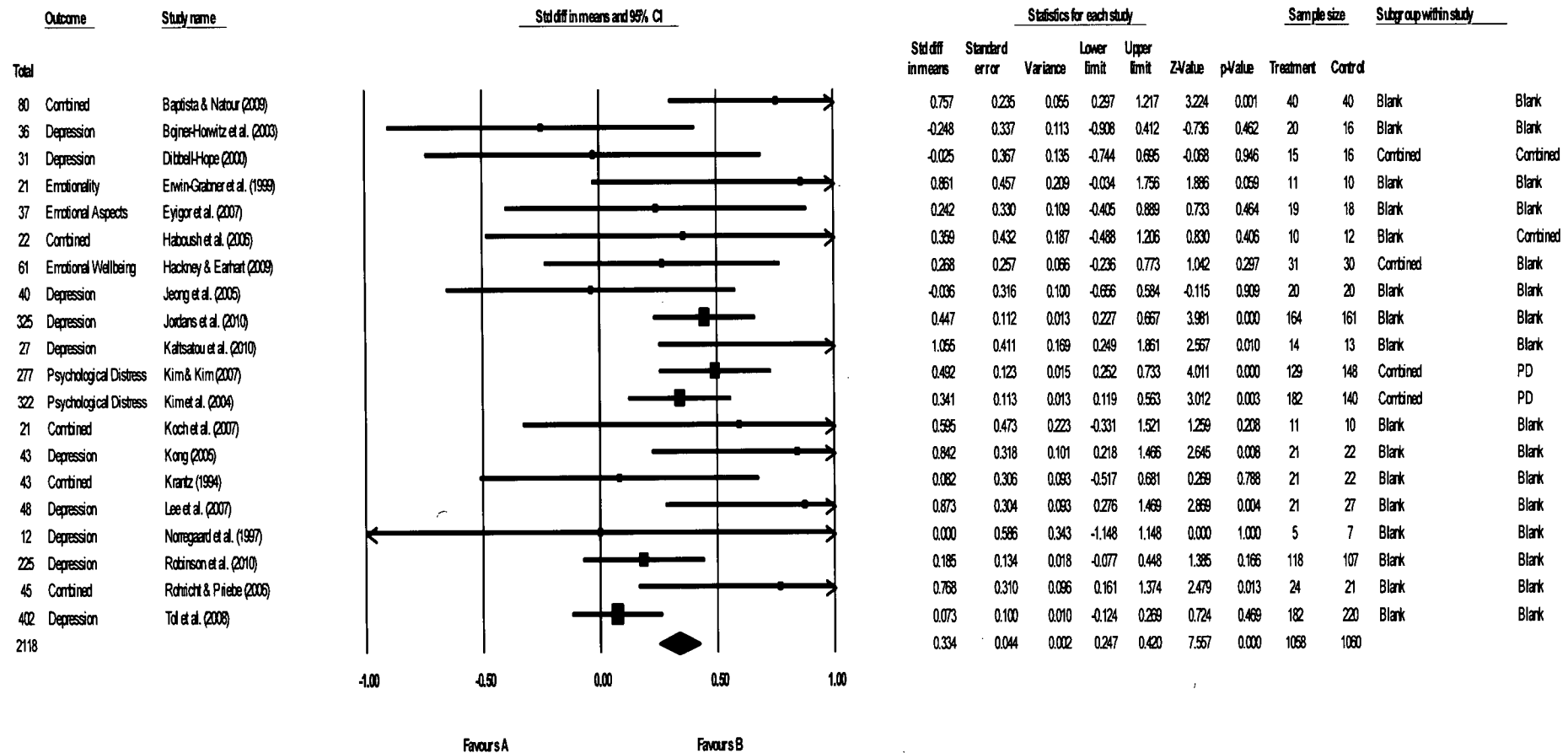


Figure 2: Forest plot illustrating spread of effect sizes for dance/DMT and depression

Moderation Analyses for Depression

Moderation of Effect Size for Depression. Tables 12 and 13 show part of the results of the moderation analyses for depression. The effect size for depression was not moderated by age, gender, type of dance, or country. Despite this, the effect sizes were significant and positive, albeit small, for both General and Specific type of dance ($d = .33$ & $.33$, respectively) and both Eastern and Western countries ($d = .34$ & $.33$, respectively). These results suggest that for the studies included within this analysis, both General (general/recreational dance) and Specific (DMT) types of dance were equally effective at decreasing depression in males and females of varying ages from Eastern and Western countries.

The effect of dance/DMT on depression was, however, moderated by type of therapist, with a small, but significant and positive effect size for General type of therapist, ($d = .28$), and a significant, positive, and moderate effect size for Specific type of therapist ($d = .56$). These results suggest that for the studies included in this analysis, the use of specially trained dance therapists and instructors was associated with a greater decrease in depression than the use of therapists and instructors not specifically trained in dance or DMT.

Table 12: Moderation of the Effect of Dance/DMT on Depression by Age and Gender

β	$X^2 (df)$	p
Moderator = Age		
.00	.15 (1)	.70
Moderator = Gender		
.00	.01 (1)	.91

Note: B = beta (point analysis/estimate for meta-regression), $X^2 (df)$ = chi square and degrees of freedom.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 13: Moderation of the Effect of Dance/DMT on Depression by Type of Dance, Country, and Therapist (Fixed Effect Analysis with Mixed Effect Analysis in Parentheses)

	<i>K(N)</i>	<i>d</i>	<i>Q(df)</i>	<i>Q_B(df=1)</i>
Moderator = Type of Dance				
General	12 (1833)	.33*** (.37***)	20.06 (11)*	
Specific	8 (285)	.33** (.34*)	12.82 (7)	
Total Between				.001 (.04)
Overall	20 (2118)	.33*** (.37***)	32.88 (19)*	
Moderator = Country				
Eastern	8 (1494)	.34*** (.37***)	16.62 (7)*	
Western	12 (624)	.33*** (.37**)	16.17 (11)	
Total Between				.00 (.00)
Overall	20 (2118)	.33*** (.37***)	32.78 (19)*	
Moderator = Therapist				
General	10 (1713)	.28*** (.27**)	17.78 (9)*	
Specific	10 (405)	.56*** (.56***)	8.97 (9)	
Between Groups				6.04* (5.00*)
Overall	20 (2118)	.33*** (.38***)	32.78 (19)*	

Note: *k* = number of effect sizes; *N* = combined sample size; *d* = Cohen's *d* effect size; *Q_B* =

Cohran's *Q* between.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Anxiety

Effect Size of Dance/DMT on Anxiety

Table 14 shows the mean effect size of dance/DMT for anxiety. The findings for the fixed effects model reveal that dance/DMT had a small, but significant and positive effect ($d = .31$) on anxiety, indicating that dance/DMT significantly decreased anxiety for participants of the studies included in the analysis. Figure 3 illustrates these findings.

Heterogeneity Analyses for Anxiety

Heterogeneity was not indicated for anxiety as demonstrated by Cochran’s Q failing to reach significance ($8.25, p > 0.05$), and an extremely low I^2 (2.97), despite the absence of 0 in the CIs (.190 - .434) (Please see Table 14). A lack of heterogeneity can be argued to indicate that moderators are not present for the outcome (Huedo-Medina et al., 2006). Although the effect size for anxiety was significant, due to the lack of heterogeneity indicated, moderation analyses for anxiety were not conducted.

Table 14: Meta-Analysis of the Effect of Dance/DMT on Anxiety

		Effect Size		Heterogeneity		Fail Safe	
	<i>k</i>	<i>N</i>	<i>d</i>	95% CI	<i>Q</i>	<i>df</i> <i>I</i> ² (%)	Number
Anxiety							
Dance	9	1057	.31***	.190/.434	8.25	8 2.97	39
			(.31)***	(.186/.440)			

Note: k = number of effect sizes; N = combined sample size; d = Cohen’s d effect size; CI = confidence interval; Q = Cochran’s Q ; I^2 = Higgins & Thompson’s (2002) I^2 index. Values in parenthesis are for the random-effects model.

* $p < .05$; ** $p < .01$; *** $p < .001$

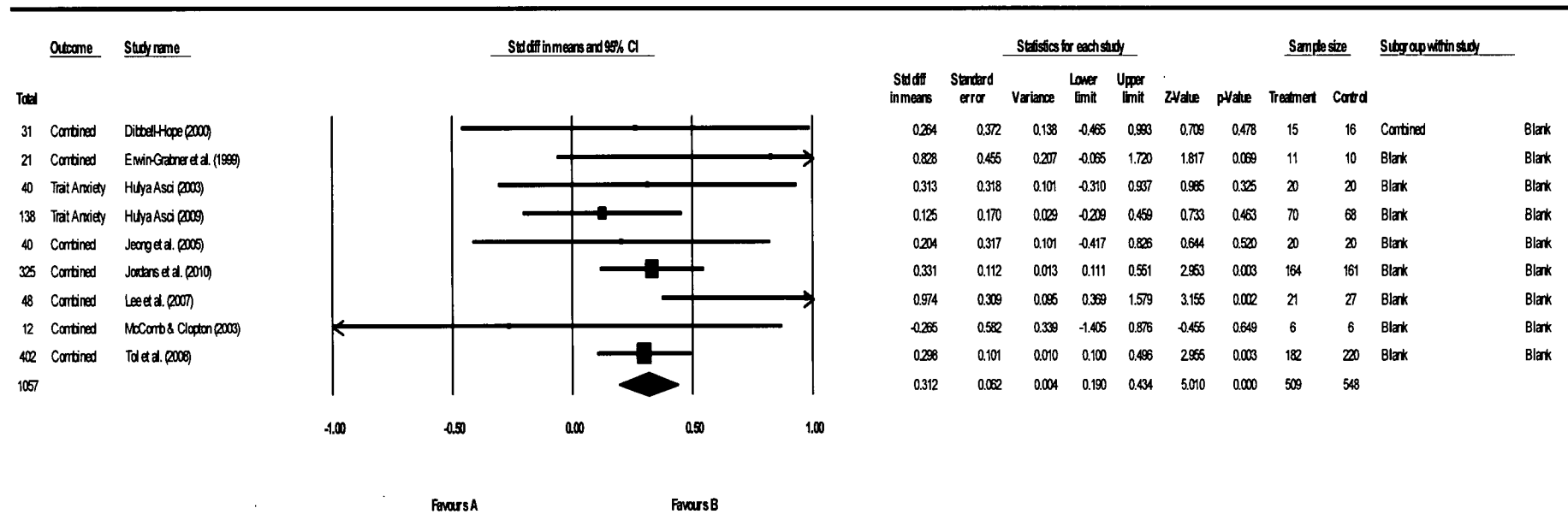


Figure 3: Forest plot illustrating spread of effect sizes for dance/DMT and anxiety

Discussion

Overall Effect Sizes

The results of this meta-analysis reveal that dance/DMT improved general wellbeing for participants of studies included in this analysis, as indicated by a small, but positive and significant overall effect size ($d = .29$). Results also reveal that dance/DMT reduced depression and anxiety for participants of studies included in this analysis, as indicated by small, but positive and significant effect sizes ($d = .33$, and $.31$ respectively). Moderation analyses were undertaken for general wellbeing and depression, and one moderator of dance/DMT was identified for both outcomes: type of therapist. Age, gender, type of dance, and country were not found to be moderators for either general wellbeing or depression.

Validity of Effect Sizes

Despite the fact that the effect sizes for general wellbeing, depression, and anxiety are small when considered in the context of Cohen's (1992) conventions for effect sizes, these effects should still be considered important and dance/DMT considered a potentially useful intervention. Cohen (1992, p. 156) acknowledges that small effect sizes are "*not so small as to be trivial*". Furthermore, Cohen (1988, p. 112; Frattaroli, 2006) has also commented on categorising effect sizes as small, medium, and large, stating that, "*there is a certain risk in offering conventional operational definitions...in as diverse a field as behavioural science*". Other researchers have argued that when considering the practical import of an effect size, the relative costs and benefits need to be considered (Frattaroli, 2006). For example, when the potential of dance/DMT operating as an effective adjunctive technique for psychologists and medical practitioners in the treatment of depression and anxiety is considered, it can be argued that a significant and positive effect, no matter how small, is worth taking note of.

Generalisability of Results

The results of the present study indicate that dance/DMT has a positive effect on general wellbeing, depression, and anxiety. It is noted that because the meta-analysis was

conducted with a fixed-effects approach, it could be argued that confidence in the true existence of this effect can be had only for studies that were included in the present analysis, and that conclusions may not be generalised to the broader population of studies (DeCoster, 2004). However, since the effect sizes from the fixed effects model were very similar to nearly all those found for the random effects model, it could also be argued that the results here may be generalised to studies beyond those included in this meta-analysis.

It is also important to note that though a significant and positive effect size was found for dance/DMT, we cannot say that the effect size is due to dance/DMT alone, when it could also be due to the other intervention components, which, in some studies included relaxation, group discussion, Tai Chi, aerobic exercise, or other creative arts therapy techniques. Ten studies included dance/DMT as an adjunct to other intervention components. These results, however, provide valuable information in that they suggest that dance/DMT can function as a complementary therapy or adjunct to other therapeutic modalities. This is relevant for many psychologists who may not be trained in dance instruction or dance therapy, as it implies that they can use dance/DMT as an adjunctive intervention.

Quality of Evidence

Before discussing practical implications of these results, it is important to consider the quality of the evidence found. It is firstly noted that many studies did not report information consistent with the six markers of validity (Liberati et al., 2009) (Table 5). In particular, many studies omitted to report whether participants were blinded (22), whether the interventionists were blinded (21), or whether the outcome assessors were blinded (15), which lowered the studies' quality rating. However, Bradt and Dileo (2011) argue that as blinding of both participants and the therapist is often not possible in most dance/DMT studies, it is extremely difficult for these types of clinical studies to achieve perfect quality ratings.

Randomisation was adequate for all trials, however, 14 studies did not report method of randomisation, while 22 studies did not report concealment of randomisation. It is not suggested that these markers of validity were not present in these studies, as they may well have been, however, authors did not report this information. It is recommended that researchers take care to report trial quality information, as doing so enhances the quality of the evidence-base for dance/DMT.

Overall, it is considered that the quality of evidence in this meta-analysis is moderate because of the small number of included studies (26) and the lack of reporting regarding trial validity, which may lead to risk of bias. However, the quality ratings achieved by the individual studies ranged from moderate-high, which increases the confidence which can be had in the conclusions made from this study (Table 4).

Moderators

Attention is now turned to the results of the moderation analyses and the implications of these results for use of dance/DMT as an intervention. Age, gender, type of dance, country, and type of therapist were examined as potential moderators of the effect of dance/DMT on general wellbeing and depression. However, only type of therapist moderated the effect of dance/DMT on general wellbeing and depression.

Type of Therapist

Results indicated that both general (e.g. psychologist, exercise instructor, physiotherapist, research assistant) and specific (specially trained dance instructors and DMT therapists) therapists contributed significantly to the effectiveness of dance/DMT in increasing general wellbeing, and reducing depression. However, as stated above, type of therapist was found to moderate the effect of dance/DMT. What these results suggest is that for the studies included in this analysis, the use of specially trained DMT therapists and professional dance instructors ($n = 11$) led to greater increases in general wellbeing and

decreases in depression than the use of general instructors (e.g. physiotherapist, exercise instructor, psychologist, research assistant) ($n = 15$).

A therapist or instructor who is qualified specifically in dance usually has experience in dance, is able to motivate and educate clients, and design choreography specific to the needs of the client (Storheim & Bo, 2000; Cruz, 2008). Professionally trained dance instructors and therapists are also able to continuously monitor and adjust the intensity level appropriately for clients, according to their physical ability, mobility, energy level, motivation, and cognitive ability (Eyigor et al., 2009; Haboush et al., 2006). These factors, specific to trained dance instructors and DMT therapists may increase treatment adherence, client skill growth, and client enjoyment, which may consequently influence the effectiveness of the intervention in improving general wellbeing, and reducing depression.

These results have implications for the use of dance/DMT as an intervention. They suggest that it is necessary for a dance instructor/DMT therapist to be professionally trained and qualified in order for a client to obtain the most therapeutic benefit. These results also imply that psychologists or other professionals who are interested in using dance/DMT as an adjunctive intervention should not implement dance/DMT themselves, unless they are appropriately qualified to do so. Rather, psychologists should seek out professionally trained instructors/DMT therapists to refer their client to, in order for their client to gain optimal therapeutic benefits.

Age

Results indicated that there was no moderation effect of age for general wellbeing or depression. These results suggest that for the sample included in this study, dance/DMT worked effectively across the entire age range. This is consistent with Ritter and Low (1996) who found that DMT was effective for children, adolescents, and adults, and will be discussed in greater detail below.

Gender

Results indicated that there was no moderation effect for gender for general wellbeing or depression. This suggests that for the sample included within the study, dance/DMT was equally as effective for men and women, despite the fact that there were a greater number of women (66%) than men. It may be that there are aspects of dance that appeal to both men and women, for example, the skill development and physical fitness enhancement components may appeal to both men and women (Asci, 2009). In particular, Asci (2009) suggests that the development of proficiency and mastery in female-appropriate activities, associated with the lower expectation of success in such activities, may be especially beneficial for men.

These results generalise the applicability of dance/DMT, and imply that clinicians should consider dance/DMT as a possible intervention or adjunctive intervention for both men and women. It is recommended that future studies continue to examine the interaction between gender and treatment, and that studies place a greater emphasis on examining the effects of dance/DMT on men (Capello, 2011). For example, no studies included within this meta-analysis examined the effects of dance/DMT on adolescent males, and it is suggested that this is an area that could be investigated further.

Type of Dance

Results indicated that there was no moderation effect for type of dance for either general wellbeing or depression, revealing that both general/recreational dance and DMT contributed significantly to the overall effect sizes. This suggests that for the sample included within the study, general/recreational dance was as effective as DMT in increasing general wellbeing and reducing depression. One of the reasons why there were no significant differences between the effect of general/recreation dance and DMT may be that they share important therapeutic similarities such as empathy, understanding, a treatment setting, and a

therapeutic procedure, all of which are considered to be important aspects of an effective therapeutic intervention (Haboush et al., 2006; Egan, 2007).

Implications for clinical practice are that when contemplating dance/DMT as a complementary or adjunctive intervention option, psychologists can consider using either general/recreational dance classes or DMT for a client. The advantage of recreational dance is that it is more easily used outside of the therapy room in everyday living, can be cost-effective, and has the potential to become a lifelong hobby for the client (Haboush et al., 2006). However, the advantage of DMT is that it provides a specific therapeutic component, and the therapist is able to provide a safe and supportive environment in which the client can explore their emotions comfortably (Haboush et al., 2006; Sandel et al., 2005). It is recommended that future studies examine the relative effects of general/recreational dance and DMT in more detail by comparing a form of general/recreational dance to DMT and a control group within the confines of a randomised controlled trial.

Country

Results indicated that there was no moderation effect for type of country for either general wellbeing or depression, revealing that both Eastern and Western countries contributed significantly to the overall effect sizes. This suggests that for the sample included within the study, dance/DMT was equally effective in increasing general wellbeing and decreasing depression in participants from both Eastern and Western countries. It may be tentatively suggested that these results indicate that dance/DMT may be a culturally universal intervention. This is strengthened by the fact that studies included in this meta-analysis came from a wide range of different countries that are culturally very diverse from each other, including Brazil, Australia, Turkey, Korea, Nepal, Greece, Germany, Denmark, England, Indonesia, and United States.

These results have implications for the use of dance/DMT for Australia, given Australia's multiculturalism. For example, tailoring interventions that are sensitive to a client's cultural background is a very important aspect of the therapeutic process. Dance/DMT may provide additional and complementary therapeutic options for the therapist that can be used to assist clients from various cultural backgrounds. These results also have implications for dance/DMT to be used as an intervention or adjunctive intervention in other countries. Culturally tailored (e.g. African American) or traditional dances (e.g. Turkish and Greek) were used in studies included in this analysis (Robinson et al., 2010; Eyigor et al., 2009 & Kaltsatou et al., 2010), however, DMT and other general/recreational forms of dance were also used in various countries. This suggests that dances specific to different countries and cultures may be able to be designed into programs that can be used therapeutically, as can other forms of general/recreational dance and DMT (Eyigor et al., 2009).

It is recommended that future research focus on cross-cultural components of dance/DMT, for example, investigating the relative effectiveness of dance/DMT for Koreans vs. Germans. Other cross-cultural research may include comparing the difference between culturally specific styles of dance with DMT, for example, comparing Greek traditional dance with DMT and a control group within the context of a randomised controlled trial.

In sum, the lack of moderation effects of age, gender, type of dance, and country suggests that both general/recreational dance and DMT may be widely applicable interventions or adjunctive interventions that are potentially effective in increasing general wellbeing and decreasing depression for men and women of all ages from varying cultural backgrounds.

Comparison of Results of Present Study with Ritter and Low's (1996) Meta-analysis

Psychological Adjustment

Overall, the findings from the present study are consistent with Ritter and Low's (1996) meta-analysis. For example, Ritter and Low (Cruz & Sabers, 1998) found that DMT had a positive effect on a range of psychological outcomes including self concept, ($r = .15$), body awareness ($r = .20$), anger ($r = .32$), and anxiety, ($r = .54$). Overall, they found a positive effect of DMT on psychological change ($r = .42$). Ritter and Low also found that DMT had a positive effect for psychiatric patients ($r = .37$). Consistent with Ritter and Low, the present study found that dance/DMT had a positive effect on psychological outcomes, significantly increasing general wellbeing ($d = .29$), and significantly decreasing depression ($d = .33$), and anxiety ($d = .31$). When interpreted together, the results of Ritter and Low and the present study suggest that dance/DMT may be an effective intervention or adjunctive intervention for overall psychological change and adjustment.

Anxiety

Together these results also suggest that dance/DMT may be a particularly effective intervention for some specific disorders, for example, anxiety disorders. A difference noted is that Ritter and Low's effect size for anxiety is large ($r = .54$), whereas the effect size for anxiety in this study is small ($d = .31$). Despite this, when Ritter and Low's and the present study's results are interpreted together, they suggest that dance/DMT may be an effective intervention or adjunctive intervention for reducing anxiety.

Age

As discussed above, Ritter and Low found that DMT was effective for children ($r = .29$), adolescents ($r = .47$) and adults ($r = .47$). The age range of studies included in this analysis was spread relatively evenly between ages 9 – 75. The results of this study did not find age to be a moderator for any of the outcomes, which indicates that for the studies

included in this analysis, dance/DMT was an effective intervention for increasing general wellbeing and decreasing depression across the entire age range.

When interpreted in conjunction with Ritter and Low's conclusions, our results suggest that dance/DMT may be an effective intervention or adjunctive intervention for all age groups. Furthermore, when this conclusion is considered in light of the above discussion regarding the effectiveness of dance/DMT on anxiety, it can be suggested that dance/DMT is an effective intervention or adjunctive intervention for reducing anxiety in all age groups. Such findings increase the generalisability of dance/DMT and are especially important when it is recognised that anxiety and depression are the leading causes of disease burden for boys, girls, men, and women, aged 0 – 45 in Australia (Begg et al., 2007). These findings imply that clinicians may consider dance/DMT to be a potentially useful and valid adjunctive intervention that can be used to help treat anxiety disorders in children, adolescents, adults, and older adults.

Quality of Evidence

Ritter and Low (1996) concluded that there was a need for more well-designed randomised controlled trials examining DMT to be conducted. Favourable comparison can be made between the number of moderate-high quality studies that were included in this study to the number of moderate-high quality studies that were included in Ritter and Low's meta-analysis. Five studies that measured anxiety and/or depression as an outcome were included in Ritter and Low's study. Only four were randomised controlled trials, as Leste & Ruste's (1990) study was non-randomised. In comparison, 26 randomised controlled trials that measured general wellbeing (26), depression (20), or anxiety (9) were included in the present study. In light of the number of moderate-high quality randomised controlled trials that were able to be included in the current meta-analysis, it is argued that there has been considerable

improvement in the quality of studies since Ritter and Low's meta-analysis. This is promising for the development of a high-quality evidence base for dance/DMT as in intervention.

Application to Clinical Psychology: Integration of Complementary Therapies

As discussed above, research suggests that the popularity and use of complementary and alternative therapies is rising within Australia (ABS, 2008; Xue et al., 2007; Page et al., 2004; MacLennan et al., 2006). While the integration of complementary therapies into psychological practice would involve a significant paradigm shift, it appears there is a need for clinical psychologists to consider how complementary and alternative therapies, such as dance/DMT might be able to be incorporated (Bassman & Uellendahl, 2003).

It is suggested that dance/DMT would be best integrated into clinical psychology as a complementary or adjunctive intervention. Examples of how this could be done might include encouraging clients to join local dance groups or classes, or finding a local dance therapist who is trained and registered with DTAA. For example, Wilson and White (2011) provide the example of a client with social anxiety disorder attending a yoga class once a week, in addition to attending therapy sessions. The yoga classes would not only present the client with social situations, but also teach the client relaxation. Dance classes/DMT may also serve the same purpose. It is important to remember that the effectiveness of dance/DMT will depend on the environmental context, the types of stressors involved, and characteristics and wishes of the client (Austenfeld & Stanton, 2004).

Consideration of Ethical Issues in Integrating Dance/DMT with Clinical Practice

Psychologists within Australia are required to adhere to a Code of Ethics and relevant guidelines for psychological practice developed by the Australian Psychological Society (APS). At present, these guidelines do not directly address complementary therapies, although psychologists are at all times expected to act in the best interests of their clients, even if they are not administering the dance/DMT themselves. What this may mean is that

ethically, if the psychologist wishes to use dance or DMT as an adjunctive intervention, they are responsible for helping the client find a dance class with an appropriately qualified dance instructor or referring the client to a qualified and registered DMT therapist (Bassman & Uellendahl, 2003).

Psychologists' Attitudes to Integrating Complementary and Alternative Therapies with Psychological Practice

In discussing the integration of dance/DMT with psychological practice, it is also important to consider psychologists' views on doing so, as this will affect the reality of such integration occurring. Wilson and White (2007) have developed a scale which measures psychologists' attitudes toward complementary and alternative therapies. They have also conducted a qualitative review of psychologists' beliefs regarding incorporating complementary therapies into psychological practice in Australia (Wilson & White, 2011). In sum, their research has found that psychologists' and psychology students' overall attitude toward using complementary therapies within psychological care was favourable, and that psychologists and psychology students were willing to see complementary therapies become integrated within psychological practice. However, relevant concerns included the need for a greater evidence base for the therapies, guidelines for their practice, and specific training in the therapies to ensure best practice. Concerns also involved the need to determine which complementary therapies can be used for which psychological disorders. These are valid concerns, and this study has sought to help meet these needs by contributing to the evidence base for dance/DMT through its meta-analysis.

Summary of Key Findings

In sum, the results of this study indicate that dance/DMT contributes to increasing general wellbeing and decreasing depression and anxiety. However, it is noted that in the present study, as studies that used dance/DMT as an adjunct to other intervention components

were included, it cannot be concluded that these effects are due to dance/DMT alone. It can, however, be concluded that these findings suggest that dance/DMT contributes as a beneficial adjunctive intervention for depression and anxiety.

These results are consistent with Ritter and Low's (1996) previous meta-analysis in that both studies found that dance/DMT significantly improved psychological adjustment, in particular, anxiety. The present study built on Ritter and Low's work by analysing all randomised controlled trials conducted since their study, which included general wellbeing, depression, and anxiety as outcomes; assessing the quality of these included studies; including depression as an outcome, which had not been included in Ritter and Low's study; and by examining the presence of potential moderators.

For the present study, one variable was found to have a moderating effect on general wellbeing and depression, which was type of therapist, suggesting that specially trained dance instructors/DMT therapists contribute more significantly to the increase in general wellbeing and the decrease in depression than general therapists using dance, such as psychologists, physiotherapists, or exercise instructors. The implications of this are that psychologists who are not trained dance instructors or DMT therapists, who are interested in using dance/DMT as an adjunctive technique, may need to refer their client to professionally trained dance instructors or DMT therapists in order for their client to receive the best therapeutic care. This would be consistent ethically with psychologists acting in their clients' best interests.

No differences in the effectiveness of general/recreational dance and DMT were found for any of the outcomes, which suggests that general/recreational dance may be as effective as DMT in making positive therapeutic contributions. Age, gender, and type of country were also found to have no moderating effect on the effectiveness of dance/DMT, suggesting that dance/DMT may be effective for men and women of all ages from varying cultural backgrounds.

Finally, the overall quality of studies included in this meta-analysis was found to be moderate. All 26 studies included were randomised controlled trials, which, when compared to the four randomised controlled trials that examined depression and/or anxiety and were included in Ritter and Low's (1996) meta-analysis, suggests that the quality of the evidence base for dance/DMT is growing. Furthermore, the moderate-high quality of the individual studies included in the present study increases the confidence that can be had in the conclusions made from our results.

Limitations of the Present Study

The findings from this study must be considered within the context of a number of limitations. Effort was made to ensure that a large number of databases, conference proceedings and abstracts, and dissertation databases were searched, that the reference lists of all relevant studies were checked, that relevant experts were contacted regarding unpublished trials, and that authors of studies not written in English were contacted for potential English versions of their work. Despite the comprehensiveness of the search, it is possible that some published and unpublished studies were missed.

Another limitation is the small number of studies that were included in this meta-analysis. However, it is argued that even with a small number of studies, meta-analysis is still the optimum means of integrating findings across studies, and that without it, researchers risk founding judgments on the findings of individual studies or narrative reviews, both of which are much more likely to lead to error (Delaney, Bagshaw, Ferland, Manns, Laupland, & Doig, 2005; Schmidt, Hunter, Pearlman and Hirsh, 1985). In light of this argument, a meta-analysis which has examined the results of randomised controlled trials only, was necessary.

Furthermore, as discussed above, as the mean effect sizes for the fixed effect model have been examined, the generalisability of our findings may be questioned. However, as argued previously, given the similarity between the effect sizes from the fixed effects analysis

and the random effects analysis, it could be argued that our conclusions may be generalised to studies beyond those included in this meta-analysis. An additional limitation, as is the case with any meta-analysis or systematic review, is that the participant population, the dance/DMT intervention, and the outcome measures used are not the same across studies.

Direction for Future Research

Direction for future research has been integrated with the discussion of the moderation results above, however, there are additional recommendations that can be made. Some studies included in this meta-analysis have compared dance/DMT to alternative interventions. For example, Koch et al. (2007) compared DMT to music alone, while Kim et al (2004) and Kim and Kim (2007) compared aerobic dance, jazz dance, and hip hop dance to body conditioning and ice skating. However, there is a need for randomised controlled trials to compare the efficacy of dance/DMT with that of other psychological interventions (Pies, 2008).

CBT is regarded as the gold standard treatment for depression and anxiety, but to date, no study has compared the efficacy of dance/DMT with that of CBT in the treatment of depression and anxiety (NICE, 2009; NICE, 2011). Future studies could compare the efficacy of dance/DMT with that of CBT or compare the efficacy of dance/DMT used as an adjunct to another therapeutic technique (e.g. CBT) to CBT or DMT used alone (Meekums, 2010). In addition, there is also a need for future studies to examine contraindications to the use of dance and DMT (Pies, 2008).

Conclusion

Depression and anxiety are highly prevalent mental disorders in Australia, and constitute as a significant proportion of the burden of disease for Australians (ABS, 2002; Begg et al., 2007). However, despite the presence of well-validated treatment options, the ABS (2009) has found that a significant proportion of Australians do not seek professional

help for depression and anxiety (50% and 78% respectively). It has been asserted that one reason for this may be the rising popularity of complementary and alternative therapies in Australia (ABS, 2008; Highet et al., 2002; Page et al., 2004; Jorm et al., 2002; Jorm et al., 2004; Thachil et al., 2007; MacLennan et al., 2006; Xue et al., 2007; Wilson & White 2007). One complementary and alternative therapy in particular, dance/DMT, has demonstrated potential as an effective intervention for depression and anxiety, as indicated by Ritter and Low's (1996) meta-analysis. However the lack of a high-quality evidence base for the use of dance/DMT precludes it from being acknowledged as a well-validated treatment (Meekums, 2010; Rohricht, 2009).

In response to the need for further validation of complementary and alternative therapies as beneficial treatments for depression and anxiety, the need for dance/DMT to develop a high-quality evidence base, and the presence of a number of high quality randomised controlled trials that had been conducted since Ritter and Low's (1996) study, a meta-analysis examining the effects of dance/DMT on general wellbeing, depression, and anxiety was conducted. Results indicated that dance/DMT was effective in contributing to the increase of general wellbeing and the decrease of depression and anxiety. It was also found that the quality of research examining the effects of dance/DMT on general wellbeing, depression, and anxiety has improved considerably since Ritter and Low's meta-analysis, which contributes to development of a high quality evidence base for dance/DMT.

Results further indicated that professionally trained dance instructors and DMT therapists contribute to greater therapeutic outcomes than instructors or therapists not specially trained in dance. Finally, results suggested that both general/recreational dance and DMT are equally as effective in contributing to improvements in general wellbeing and depression for both men and women from all age groups and from varying cultural backgrounds. This increases the versatility of dance/DMT as an adjunctive treatment option

for psychologists. It is concluded that the findings of this study contribute to the evidence base for dance/DMT and supports its use as an adjunctive treatment for depression and anxiety.

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