

Music and Medicine

<http://mmd.sagepub.com/>

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

Rosa Pinniger, Einar B. Thorsteinsson, Rhonda F. Brown and Patricia McKinley

Music and Medicine 2013 5: 15 originally published online 16 January 2013

DOI: 10.1177/1943862112470143

The online version of this article can be found at:

<http://mmd.sagepub.com/content/5/1/15>

Published by:



<http://www.sagepublications.com>

On behalf of:



[International Association for Music and Medicine](http://www.iamm-online.com)

Additional services and information for *Music and Medicine* can be found at:

Email Alerts: <http://mmd.sagepub.com/cgi/alerts>

Subscriptions: <http://mmd.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>


>> [Version of Record](#) - Feb 15, 2013

[OnlineFirst Version of Record](#) - Jan 16, 2013

[What is This?](#)

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

Rosa Pinniger, BPsych¹, Einar B. Thorsteinsson, PhD¹, Rhonda F. Brown, PhD², and Patricia McKinley, PhD³

Music and Medicine
5(1) 15-22
© The Author(s) 2013
Reprints and permission:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/1943862112470143
mmd.sagepub.com


Abstract

Recent research shows that tango dance may be an effective strategy for influencing symptoms that contribute to mood disorders. In this study, we examined the efficacy of a short-duration intensive tango program (ie, 2 weeks). Forty-one participants were randomized to tango dance (1½ hours, 4 times/week for 2 weeks) or to a wait-list control condition. Self-rated symptoms of depression, anxiety, stress, insomnia, self-efficacy, satisfaction with life and mindfulness were assessed at pretest, posttest, and 1 month later. Tango group participants showed significant reductions in depression, anxiety, stress, and insomnia at posttest relative to the controls, whereas satisfaction with life and self-efficacy were significantly increased. At 1-month follow-up, depression, anxiety, and stress levels remained reduced relative to the wait-list controls. Thus, this brief but intensive program of tango dance was shown to be an effective strategy in alleviating mood disorders in people who self-report these symptoms.

Keywords

anxiety, dance, depression, insomnia, mindfulness

Dance movement therapy has been described as a process of using movement and music to enhance one's physical and emotional well-being.¹⁻³ Music alone also has the potential to increase self-awareness and pleasant feelings.⁴ Music therapy, for instance, has been shown to promote positive mood, increase motivation, and can stimulate movement activity.⁵ It may be particularly useful for individuals who do not benefit from verbal psychotherapy as it can offer a nonverbal means of expression and interaction.⁶

In a somewhat different perspective, dance can facilitate enjoyment and attentiveness to body sensations⁷ and is reported to be an effective adjunct to standard depression therapy.⁸⁻¹¹ Of particular interest are the results of Koch and colleagues,¹¹ who showed that participants allocated to a dance group showed significantly less depression than those who were allocated to a music-listening or exercise-movement group,¹¹ suggesting the expressive characteristics of dance may provide effects additional to those elicited by music and exercise.¹² However, dance as a therapeutic intervention remains an underutilized and insufficiently researched physical activity.^{13,14}

Depression affects about 121 million people worldwide, but less than 25% of these people will receive effective treatment,¹⁵ and over a third of these will fail to complete their treatment.¹⁶ Without appropriate treatment, depression can recur or become chronic.¹⁷ Importantly, people with self-reported anxiety and/or depression show a marked preference for complementary and alternative medicine (CAM) therapies relative to mainstream treatments¹⁸; 62% of US adult patients reported using at least 1 CAM therapy.^{19,20} Thus, there is a

need to expand the range of available treatments that are free of stigma and side effects and that may meet this apparent preference for an alternative approach in depression treatment.¹¹

Quiroga Murcia, Bongard, and Kreutz examined the effects of music and partners on dancing tango and found that dancing to tango music with a partner was associated with more positive effects on emotional state than movement without music or without a partner.²¹ Thus, tango dance and music enable participants to integrate a focused mental state with physical exercise. The dance and the music act as one in fostering this integration. The music is essential in setting the rhythm and tempo for the dance and likely for the degree of mental focus that is attained.²²

Tango dance has recently been investigated as a possible CAM therapy for people with self-reported feelings of anxiety and/or depression. The results of a recent randomized-controlled trial (RCT) showed that 6 weeks of this activity, 1 session per week, improved stress and mindfulness levels relative to meditation and wait-list control groups, and it

¹School of Behavioural, Cognitive and Social Sciences, University of New England, Armidale, New South Wales, Australia

²Australian National University, Canberra, Australia

³McGill University, Montreal, Canada

Corresponding Author:

Rosa Pinniger, School of Behavioural, Cognitive and Social Sciences, University of New England, Armidale, New South Wales 2351, Australia.
Email: rosapinniger@gmail.com

reduced depression symptoms, at posttest relative to wait-list controls.⁸ Furthermore, in an expanded 8-week program, tango dance and circuit training were shown to decrease depression levels relative to meditation and wait-list control groups, while tango also reduced insomnia levels and increased satisfaction with life and mindfulness levels after the program, relative to meditation, exercise, and wait-list controls. These improvements in stress, anxiety, depression, insomnia, and mindfulness were maintained at follow-up.²³ Additionally, tango dance has been shown to produce positive physical and psychological changes in people with a high risk of falling,²⁴ cardiovascular disease,²⁵ or Parkinson disease.²⁶

However, qualitative feedback from participants in our prior studies suggest that activity programs of 6 to 8 weeks do not suit all potential participants, with a significant proportion of working people indicating they preferred a shorter duration format of the activities.²³ A shorter program may also be more easily accommodated in the medical setting alongside other treatments and/or permit people who are highly distressed to return to work in a shorter time. Thus, in this study we evaluated the efficacy of a shorter but more intensive program of tango dance. This program involved 8 sessions of tango dance, with each session lasting 1½ hours and the classes presented over a 2-week period, with 4 classes/week. A similar approach has already been trialed by Hackney and Earhart who offered a 2-week intensive tango dance program for people with Parkinson disease. They found that this dance program was appropriate and produced similar benefits to the longer duration program (ie, 13 weeks), in terms of improvements in balance, gait, and mobility.²⁷

Tango is described as an engaging activity that promotes attention by demanding a strong connection with a partner.²⁸ Each dance lasts about 3 minutes, during which time the dancers attempt to move as one. This requires full awareness of one's own body and that of a partner, since one partner is stepping where the other has just stepped, in a synchronized movement.^{29,30} Furthermore, unlike other types of dance (eg, waltz), tango is highly improvised. That is, there is no defined sequence of steps and the leader can choose any speed or direction, or pause for an extra beat, according to the music and space available on the dance floor.³¹ In addition, tango music involves distinct styles (eg, tango salon, tango milongero) differentiated by a variety of tempos and rhythms (eg, milonga, vals, candombe-milonga).^{22,28} Thus, this creative and complex dance requires the full attention of participants to the task at hand.

Finally, prior RCTs comparing tango dance with mindfulness meditation suggest that tango is as absorbing an activity as meditation⁸ and has also been shown to increase the levels of mindfulness.²³ *Mindfulness* is described as a state of total awareness of the present moment,³² drawing the individual away from pondering about the past or worrying about the future, instead concentrating on what is occurring in the present.³³ This is suggested to decrease the risk of mild sadness developing into more severe depression,³⁴ which is an important consideration since people tend to better adhere to mindfulness-based programs more than other therapy

approaches,³⁵ especially if the experience is intrinsically rewarding,³⁶ inspiring, and physically challenging, such as tango dance is reported to be.^{37,38}

Thus, consistent with the above results, we anticipated that (1) tango participants would show greater reductions in perceived stress, anxiety, depression, and insomnia between pretest and posttest, relative to the wait-list controls; (2) tango participants would show greater increases in self-efficacy, satisfaction with life and mindfulness relative to the wait-list controls; and (3) the preceding differences would be maintained at follow-up.

Methods

Participants

This study was conducted with full institutional human research ethics committee approval from the University of New England, Australia. Recruitment was carried out via advertisements placed in local newspapers and technical colleges in the metropolitan area Sydney, Australia. Information about the study was also displayed at the University of New England website: www.une.edu.au. The inclusion criteria were that participants had to be 18 years or older and currently experiencing self-reported feelings of stress, anxiety, and/or depression. Exclusion criteria included pregnancy or walking or balance problems (eg, vertigo, leg weakness), as these conditions may affect the capacity to participate in the dance. Participants who were able to attend 4 classes per week over the 2-week period were invited to participate in the RCT. The study randomization procedure and its implications were explained to them prior to their participation. They were also informed of the voluntary nature of their involvement in the study and their right to withdraw at any time. Participants provided written informed consent prior to participating in the study.

Based on prior tango dance trials⁸ using a similar procedure, 36 participants were deemed to be sufficient to detect significant difference between the groups. A power analysis using G*Power³⁹ also indicated that 18 participants were required in each group, using an $\alpha = .05$, power $> .80$, and a large expected effect size, standardized mean difference, unbiased Hedges $g > .80$.⁴⁰

Sixty-seven individuals responded by telephone or e-mail to the advertisements, and 44 agreed to participate and were randomly assigned to the wait-list control ($n = 24$) or tango dance ($n = 20$) condition. The response rate of 65.7% (44 of 67) was lower than that of prior tango studies using a longer but less intense dance protocol (86%).²³ Thus, although longer programs may provide greater number of reasons for attrition, the current program required a major time commitment each week (4 nights/week over 2 weeks).

No information was collected on the nonresponders. Before the start of the study program, 3 participants dropped out of the control group; according to their pretest scores, all were severely stressed, anxious, and/or depressed. No participants dropped out of the study after the randomization procedure,

Table 1. Percentages of the Demographic Variables by Groups.^a

Variables	Sample (N = 41)	Tango (n = 20)	Control (n = 21)
Gender			
Male	19.5	25.0	14.3
Female	80.5	75.0	85.7
Marital status			
Never married	51.2	55.0	47.6
Married/de facto	29.3	20.0	38.1
Widowed	2.4	N/A	4.8
Divorced/separated	17.1	25.0	9.5
Education			
Year 10 or below	7.3	15.0	N/A
Year 12/HSC	4.9	5.0	4.8
TAFE certificate/diploma	14.6	15.0	14.3
University or college degree	43.9	45.0	42.9
Higher degree (postgraduate)	29.3	20.0	38.1
Employment status			
Employed full time	48.8	45.0	52.4
Employed part time/casual	19.5	20.0	19.0
Unemployed	2.4	5.0	N/A
Retired/volunteer work	7.3	5.0	9.5
Student (full or part time)	22.0	25.0	19.0

Abbreviations: N/A, not available; HSC, high school certificated; TAFE, technical and further education.

^aN = 41.

so that a total of 41 participants completed the program, of whom 20 completed a minimum of 6 of the 8 tango sessions, and 21 were wait-list controls. Two participants (1 in each group) did not send back the third questionnaire and therefore were not included in the follow-up analysis.

Participants' ages ranged from 18 to 73 years ($M = 38.68$, $SD = 14.10$), and most were female (80.5%). Just over one-half (51.2%) were never married, 29.3% had a partner, 17.1% were divorced or separated, and 2.4% were widowed. Most were well educated: 73.2% had a university degree (graduate or postgraduate), 14.6% had completed a trade certificate, 4.9% had completed their higher school certificate, and 7.3% had left school by year 10. More than two-thirds were currently employed, either full or part time (68.3%), 2.4% did regular volunteer work, 22% were students, and 2.4% were currently unemployed, while 4.9% had retired. The breakdown of the groups into gender and other demographics is provided in Table 1.

Procedure

Each potential participant received an introductory letter by mail as well as a consent form, demographic questionnaire, pretest survey, and a reply-paid envelope. The baseline survey included questions asking about their recent experiences of perceived stress, anxiety, depression, insomnia, fatigue, self-efficacy, satisfaction with life and mindfulness. After returning the questionnaire, the participants were randomly assigned to 1 of the 2 groups (drawn from a hat): tango dance or wait-list control. At *posttest* (ie, after the last session), participants in the

tango group completed the same survey as at baseline; and the same survey was sent by mail to the participants in the wait-list control group. At 1-month *follow-up*, participants in both groups received the same survey by mail and an invitation to attend 4 free tango classes. All surveys were allocated a unique study number to link individual participant responses across the 3 periods.

At the start of each tango session, participants were welcomed and encouraged to relax, while the instructor explained the structure of the class and demonstrated the steps they were going to learn. This was followed by a brief review that served as a warm-up, then the following components were discussed and practiced: consciousness of walking (*la caminata*), resistance and transference of weight, awareness of one's own and the other's body (ie, posture in tango embrace, connection and alignment in the upper body, distance of lower body). Thus, in each session, a new challenge was introduced, similar to the 6- and 8-week tango programs, for example, learning a new step, changing the tempo, and then reviewing previously learned steps.

A vital aspect of this dance approach is the teaching skills of the tango instructor and the tango experience of the assistants. In this study, the tango instructor demonstrated effective interpersonal skills, managing to engage with and relate to the participants with respect and empathy to build a sense of security and confidence via the provision of practical and constructive feedback. The instructor was also required to match the challenges of the dance to the skill level of individual participants, so that the challenges of the task did not overwhelm the capacity of participants to reach their set goals. Thus, a thorough knowledge of the dance and understanding how best to transmit this information are required for a successful outcome. In addition, the provision of experienced partners allowed participants to relax and enjoy the new steps, without worrying about whether they were doing the steps correctly. It also ensured that they were able to meet the new challenges offered within each session. The volunteers employed to assist the participants in this study had at least 5 years of tango experience. They were adept at exchanging roles as "tango leaders" and "tango followers," according to the gender of the participant; that is, female participants were always followers dancing with an expert leader (either male or female volunteer), whereas male participants were always leaders dancing with an expert follower (male or female volunteer). Such an approach is quite different from the approach used in tango classes in several respects: (a) The current program was carefully designed to encourage rapid learning (ie, participants were partnered with trained dancers), and (b) attempts were made to minimize any anxieties related to the novelty of the activity or the choosing or changing of partners. In addition, at the end of each dance session, a short wrap-up provided participants with the opportunity to ask questions and share experiences, after which they signed an attendance sheet and rated how engaged they were during the class (ie, almost always, frequently, infrequently, almost never).

Measures

Participants were asked demographic information (eg, age, education, background, occupation). They were also asked about their exercise practice, whether they had recently participated in a regular aerobic exercise program such as jogging, or engaged in other physical activities (yes/no). If so, they were asked to name the activity and how frequently they performed it—0 (*not applicable*), 1 (*once a month*), 2 (*once a fortnight*), 3 (*once a week*), 4 (*twice a week*), and 5 (*three to four times a week*).

Self-Report Symptom Scales

Depression Anxiety and Stress Scale (DASS-21).⁴¹ This 21-item scale is a short version of the original 42-item scale DASS-42. It assesses the emotional states of stress, anxiety, and depression using 4-point Likert-type scales ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much/most of the time*), with high scores indicating greater stress, anxiety, or depression. Internal consistencies for the subscales are high with Cronbach α s of .95 for stress, .92 for anxiety, and .97 for depression. Factor analyses support the 3-factor structure of this scale and the subscales show moderate construct validity.⁴² In this study, the Cronbach α coefficient was .90 for stress, .84 for anxiety, and .86 for depression. This scale has previously been shown to be sensitive to changes induced by tango dance.⁸

Insomnia Severity Index.⁴³ This 7-item scale assesses insomnia on 2 subscales, the degree of difficulty and degree of dissatisfaction with current sleep, using 5-point Likert-type scales ranging from 0 (*none*) to 4 (*very severe*), and from 0 (*very satisfied*) to 4 (*very dissatisfied*), respectively, and according to the perceived degree of severity. The total score was obtained by summing the 7 items, with high scores indicating worse insomnia. The scale has adequate psychometric properties with a Cronbach α of .88,⁴⁴ and it has been shown to be sensitive to changes in clinical trials of insomnia.⁴⁵ In this study, the Cronbach α coefficient for the scale was .86.

Positive Psychology Scales

Satisfaction with Life Scale.⁴⁶ This 5-item scale is designed to measure an individual's judgment about their contentment with life. Each item was scored on a 7-point Likert-type scale, using ratings from 1 (*strongly disagree*) to 7 (*strongly agree*), with high scores indicating greater satisfaction. The scale has adequate internal consistency with a Cronbach α of .80 and excellent test-retest reliability.⁴⁷ In this study, the Cronbach α coefficient was .81. This scale has previously been shown to be sensitive to changes induced by tango dance.²³

General Self-Efficacy Scale.⁴⁸ This scale consists of 10 statements related to successful coping. Each item is answered using 4-point Likert-type scales ranging from 1 (*not at all true*) to 4 (*exactly true*), with high scores indicating greater

perceived self-efficacy. The scale has high internal consistency with a Cronbach α of .86.⁴⁹ In this study, internal consistency for the scale was high with a Cronbach α of .88.

Mindful Attention Awareness Scale.⁵⁰ This scale consists of 15 items related to the frequency of mindful states in everyday life situations. It can distinguish between individuals who practice mindfulness and those who do not. Items are rated on 6-point Likert-type scales ranging from 1 (*almost always*) to 6 (*almost never*), with high scores indicating greater mindfulness. The scale has high internal consistency, with a Cronbach's α of .87.⁵¹ In this study, the Cronbach's α coefficient of the scale was high at .85.

Qualitative Information

Participants provided qualitative feedback on the tango dance sessions at the end of the study program in response to several open-ended questions. A limited conventional content analysis was used to code the written narratives, and the main themes raised by the participants are provided in the Results section. This process was performed independently by two researchers who then sought agreement as to the main themes presented.

Clinical Effectiveness of the Tango

Following the DASS severity rating guidelines (Psychology Foundation of Australia, 2010), DASS-21 scores were doubled, to comply with the original DASS-42 scale, and 5 clinical categories were utilized: extremely severe, severe, moderate, mild, and normal. Using the above criteria, 3 categories (better, same, or worse) were used to describe the clinical changes; with *better* representing an improvement by at least 1 clinical category (eg, from severe to moderate); *same* means there was no change in category, whereas *worse* represented a change by at least 1 category (eg, from moderate to severe). Most meditation, exercise, and tango participants showed clinical improvement in one or more measures (stress, anxiety, and depression), whereas the wait-list controls were shown to be clinically stable or became worse over time (see Table 2).

Statistical Analysis

All statistical analyses were conducted using SPSS (version 18). Analyses of covariance (ANCOVAs) were used to compare the tango and control groups' posttest and follow-up scores using pretest scores as the covariates. Normed values on the DASS-42⁵² were used to determine whether there was any clinically relevant improvement in stress, anxiety, and depression scores over time. The change in clinical category (eg, from severe to moderate depression, or mild to absent depression symptoms) between pretest, posttest, and follow-up was assessed for each participant and averaged for each group (see Table 2).

Table 2. Percentage Change in DASS Severity Ratings for Depression, Anxiety, and Stress.^a

Group	Depression			Anxiety			Stress		
	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better
Tango									
Post (n = 20)	5%	20%	75%	10%	35%	55%	6%	22%	73%
FU (n = 19)	5%	37%	58%	5%	26%	69%	–	26%	73%
Control									
Post (n = 21)	34%	57%	10%	24%	52%	24%	26%	44%	30%
FU (n = 20)	35%	35%	30%	25%	65%	10%	25%	50%	25%

Abbreviations: DASS, Depression Anxiety and Stress Scale; FU, follow-up 1 month; Better, improved by at least 1 category; Same, no change in category; Worse, get worse by at least 1 category.

^aCategories: Extremely severe, severe, moderate, mild, and normal.

Table 3. Means (standard deviation) of Dependent Variables by Groups at Pretest, Posttest, and 1-Month Follow-up (FU) and Standardized Mean Difference Hedges *g* Effect Sizes (95% confidence interval).

Measure	Tango			Control			<i>g</i> (Pre-Post)	<i>g</i> (Pre-FU)
	Pre (n = 20)	Post (n = 20)	FU (n = 18)	Pre (n = 21)	Post (n = 21)	FU (n = 20)		
Stress	13.00 (4.67)	8.30 (4.51)	8.94 (4.86)	11.10 (6.12)	11.38 (5.54)	10.95 (4.90)	1.13 (0.46-1.79)	1.00 (0.33-1.68)
Anxiety	8.85 (5.25)	5.20 (4.76)	4.89 (3.25)	6.00 (5.16)	6.19 (5.15)	6.50 (5.09)	0.91 (0.26-1.56)	1.27 (0.58-1.97)
Depression	11.85 (5.25)	5.90 (4.25)	7.06 (5.37)	9.19 (5.09)	9.71 (5.07)	9.00 (6.04)	1.59 (0.88-2.30)	0.85 (0.19-1.51)
Insomnia	15.30 (5.57)	10.10 (7.31)	13.39 (6.15)	13.95 (6.98)	12.81 (6.19)	13.30 (7.00)	0.91 (0.26-1.56)	0.28 (–0.36-0.92)
Self-efficacy	26.53 (3.82)	29.05 (5.16)	27.94 (5.42)	26.38 (6.68)	25.62 (7.09)	26.30 (7.23)	0.94 (0.28-1.61)	0.57 (–0.07-1.22)
SWL	14.10 (4.70)	19.40 (6.13)	18.44 (6.80)	16.62 (6.76)	17.38 (7.31)	18.30 (7.28)	0.82 (0.17-1.46)	0.49 (–0.15-1.14)
Mindfulness	3.30 (0.59)	3.58 (0.67)	3.74 (0.85)	3.30 (0.88)	3.36 (0.78)	3.37 (0.85)	0.40 (–0.24-1.04)	0.52 (–0.13-1.16)

Abbreviations: FU, follow-up 1 month; SWL, satisfaction with life; *g*, unbiased Hedges *g* based on eta-square values.

Results

Effectiveness of Tango Dance Relative to Controls (ie, pretest to posttest)

Regarding *symptoms*, ANCOVAs showed that there was a statistically significant group effect for posttest scores. In comparison with the control group, tango dancers showed a greater reduction in *stress*, $F_{1,38} = 12.59$, $P = .001$, partial $\eta^2 = .25$; *anxiety*, $F_{1,38} = 8.31$, $P = .006$, partial $\eta^2 = .18$; *depression*, $F_{1,38} = 25.60$, $P = .001$, partial $\eta^2 = .40$; and *insomnia*, $F_{1,38} = 8.30$, $P = .006$, partial $\eta^2 = .18$ (see Table 3).

Regarding *positive psychology* measures, the ANCOVAs showed a statistically significant group effect for posttest scores on *self-efficacy*, $F_{1,37} = 8.60$, $P = .006$, partial $\eta^2 = .19$; and *satisfaction with life*, $F_{1,38} = 6.68$, $P = .014$, partial $\eta^2 = .15$. However, there was no statistically significant group effect for *mindfulness*, $F_{1,38} = 1.70$, $P = .201$, partial $\eta^2 = .04$ (see Table 3).

Effectiveness of Tango Dance Relative to Controls (ie, pretest to follow-up)

Regarding *symptoms*, the ANCOVAs showed a statistically significant group effect at 1-month follow-up for *stress*, $F_{1,36} = 9.69$, $P = .004$, partial $\eta^2 = .21$; *anxiety*, $F_{1,36} = 15.13$,

$P < .001$, partial $\eta^2 = .30$; and *depression*, $F_{1,36} = 6.92$, $P = .012$, partial $\eta^2 = .16$. *Insomnia* was not significant at follow-up, $F_{1,36} = .71$, $P = .404$, partial $\eta^2 = .02$ (see Table 3).

Regarding *positive psychology* measures, ANCOVAs indicated there were no statistically significant differences between pretest and follow-up for *self-efficacy*, $F_{1,35} = 3.07$, $P = .089$, partial $\eta^2 = .08$; *satisfaction with life*, $F_{1,36} = 2.30$, $P = .138$, partial $\eta^2 = .06$; or *mindfulness*, $F_{1,36} = 3.35$, $P = .066$, partial $\eta^2 = .09$ (see Table 3).

Qualitative Analysis

Participants' feedback revealed that the intensive tango dance program was well accepted. Key themes raised by the participants indicated that they all found the activity to be beneficial, fun, and easy to engage with. These responses are consistent with the participants' individual assessments of their own level of engagement at the end of each session (ie, *almost always* = 4; *frequently* = 3; *infrequently* = 2; and *almost never* = 1), with a mean of 3.7 indicating very high perceived levels of engagement. Two participants initially found the "close embrace" to be emotionally challenging as it involved chest-to-chest contact between the partners. However, most participants found that the degree of concentration required was the most challenging aspect of the activity.

Discussion

Recently conducted RCTs of tango dance have shown that 6 to 8 weeks of this activity can improve a range of physical and mental health outcomes, relative to circuit training, meditation, and wait-list controls.²³ The results of the current study are consistent with these findings. As expected, symptoms of stress, anxiety, depression, and insomnia were significantly reduced immediately after the 2-week tango program, relative to wait-list controls. Moreover, these symptom reductions were determined to be clinically significant, using the accepted DASS-42 category ratings.⁴¹ The second hypothesis was also partly supported, with participants in the tango group showing a significant increase in their self-efficacy and satisfaction with life between pretest and posttest, relative to wait-list controls, but they showed no significant improvement in mindfulness levels. These findings suggest that an intensive program of tango dance over 2 weeks was sufficient to boost the participants' sense of self-efficacy, albeit in the short term.

The structure of this dance program was found to be acceptable to the study participants, and there were no dropouts from the study once the RCT had begun. However, this activity was shown to be insufficient to increase the mindfulness levels, whereas longer and less intensive versions of this activity were shown to significantly increase the mindfulness levels relative to the control group activities.^{8,23} Taken together, the results of this study suggest that the improvements in stress and distress were not likely to have been mediated by mindfulness, a process that may take longer than 2 weeks to develop. Nonetheless, general participant feedback indicated that this activity helped the participants to focus on the present moment and mentally switch off from their feelings of stress and distress, similar to the feedback obtained in prior studies.^{23,53}

Finally, the third hypothesis was only partly supported, since stress, anxiety, and depression remained significantly reduced 1 month after the end of the program, but insomnia did not. Nonetheless, the results are consistent with prior studies evaluating longer duration tango programs. Thus, both the 2-week intensive and 6- to 8-week programs have been shown to significantly reduce symptoms of stress, anxiety, and depression over time.^{23,53} However, 8 weeks of tango dance significantly and persistently decreased insomnia levels whereas the 2-week intensive program did not, suggesting that longer programs may be more effective in this regard. However, none of the positive psychology measures were shown to be significantly increased at follow-up relative to the wait-list controls, suggesting the improvements in self-efficacy and satisfaction with life associated with tango dance were only transient. Such outcomes are similar to the shorter-term benefits reported for exercise interventions, in which the therapeutic effects were not shown to persist beyond the finish of the program.^{54,55}

Finally, there are some limitations in generalizing the present findings. Since there were no activity-based control groups in this study, it is possible the results may reflect the effects of any activity, rather than this particular one, however, the results do accord with studies in which there were activity-based

controls.⁵⁶ Other limitations included the age diversity and gender imbalance of the present sample and the relatively small sample size; nevertheless, the effects are strong and should therefore be robust.

In summary, the results of this RCT of tango dance (1½ hours 4 times per week for 2 weeks) indicate that this activity was associated with significant and clinically relevant improvements in depression, anxiety, and stress and that these improvements were maintained 1 month later. Insomnia, satisfaction with life, and self-efficacy were also shown to improve at the end of the program, but these changes were not maintained at follow-up. These results suggest that this short tango dance program was effective in improving a range of psychological outcomes in a sample of people with self-referred feelings of anxiety or depression, similar to the results of longer, but less intensive, trials of tango dance.

Acknowledgments

We are indebted to Jacqueline Simpson (tango instructor) and Anthony Miller (assistant instructor), for their time and dedication in preparing and carrying out the program. We also wish to thank the tango team including Annabella Chang, Nga Nguyen, David Owen, Elcira Ratero, Paula Schooge, and Jean Weiner, for their time and professionalism in assisting with the tango classes; 'The Kirk' (venue at Surry Hills, Sydney) for providing an ideal space to conduct the program; and to all the participants whose commitment made the study possible and established grounds for future research.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

1. Castro ED. A dance a o trabalho corporal e a apropriação de si mesmo. *Revista Terapia Ocupacional*. 1992;3:24-32.
2. Goodill S. *An Introduction to Medical Dance/Movement Therapy Health Care in Motion*. London, England: J Kingsley Publishers; 2005.
3. Parslow R, Morgan AJ, Allen NB, Jorm AF, O'Donnell CP, Purcell R. Effectiveness of complementary and self-help treatments for anxiety in children and adolescents. *Med J Aust*. 2008;188(6):355-359.
4. Boso M, Politi P, Barale F, Enzo E. Neurophysiology and neurobiology of the musical experience. *Funct Neurol*. 2006;21(4): 187-191.
5. Trappe HJ. The effects of music on the cardiovascular system and cardiovascular health. *Heart*. 2010;96(23):1868-1871.
6. Erkkilä J, Gold C, Fachner J, Ala-Ruona E, Punkanen M, Vanhala M. The effect of improvisational music therapy on the treatment of depression: protocol for a randomised controlled trial. *BMC Psychiatry*. 2008;8(1):50.
7. Seyler EM, ed. *Dancing Toward Integration: A Mixed-Methods Study of Argentine Tango, Adult Health/Well-being, Aging, and*

- Spirituality in Philadelphia*. Repenser pratique et théorie: Colloque international de recherche en danse Trentième colloque annuel; 2008 June 2007; Paris.
8. Pinniger R, Brown RF, Thorsteinsson EB, et al. Argentine tango dance compared to mindfulness meditation and a waiting-list control: A randomised trial for treating depression. *Complement Ther Med*. 2012;20(6):377-384. <http://dx.doi.org.ezproxy.une.edu.au/10.1016/j.ctim.2012.07.003>.
 9. Trossero F. *Tango Terapia*. Rosario: Coqueña Ediciones, 2006.
 10. Eyigor S, Karapolat H, Durmaz B, Ibisoglu U, Cakir S. A randomized controlled trial of Turkish folklore dance on the physical performance, balance, depression and quality of life in older women. *Arch Gerontol Geriatr*. 2009;48(1):84-88.
 11. Koch SC, Morlinghaus K, Fuchs T. The joy dance: specific effects of a single dance intervention on psychiatric patients with depression. *Arts Psychother*. 2007;34(4):340-349.
 12. Svoboda E. Dance helps you process feelings you may have trouble dealing with in conscious, verbal terms. *Psychol Today*. 2007; 40(2):61-63.
 13. Hanna JL. The power of dance: Health and healing. *J Altern Complement Med*. 1995;1(4):323-331.
 14. Mehling WE, DiBlasi Z, Hecht F. Bias control in trials of bodywork: a review of methodological issue. *J Altern Complement Med*. 2005;11(2):333-342.
 15. WHO. Depression. World Health Organization (WHO). In: Organization WH, editor. 2012. <http://www.who.int/topics/depression/en/>
 16. Pampallona S, Bollini P, Tibaldi G, Kupelnick B, Munizza C. Patient adherence in the treatment of depression. *Br J Psychiatry*. 2002;180(2):104-109.
 17. Phillips WT, Kiernan M, King AC. Physical activity as a nonpharmacological treatment for depression: A review. *complementary health practice review*. *JEBCAM*. 2003;8(2):139-152.
 18. Kessler RC, Soukup J, Davis RB et al. The use of complementary and alternative therapies to treat anxiety and depression in the United States. *Am J Psychiatry*. 2001;158(2):289-294.
 19. Pagan JA, Pauly MV. Access to conventional medical care and the use of complementary and alternative medicine. *Health Aff*. 2005;24(1):255-262.
 20. Johnson P, Priestley J, Porter KJ, Petrillo J. Complementary and alternative medicine: attitudes and use among health educators in the United States. *Am J Health Edu*. 2010;41(3):167-177.
 21. Quiroga Murcia C, Bongard S, Kreutz G. Emotional and neurohumoral responses to dancing tango argentino: the effects of music and partner. *Music Med*. 2009;1(1):14-21.
 22. Kreutz G. Does partnered dance promote health? The case of tango Argentino. *J R Soc Promot Health*. 2008;128(2): 79-84.
 23. Pinniger R, Thorsteinsson EB, Brown RF, et al. Tango dance can reduce distress and insomnia in people with self-referred affective symptoms. *Am J Dance Ther*. [serial on the Internet]. In press. doi: 10.1007/s10465-012-9141-y.
 24. McKinley PA, Jacobson A, Leroux A, Bednarczyk V, Rossignol M, Fung J. Effect of a community based Argentine tango dance program on functional balance and confidence in older adults. *J Aging Phys Act*. 2008;16(4):435-453.
 25. Peidro RM, Comasco R. Con el Corazon en el tango, Guia para prevenir enfermedades cardiacas bailando tango. In: Armayor O, ed. *Las enfermedades de las arterias y el Corazon El ejercicio y la prevencion*. Buenos Aires: Guadal; 2007:52-53.
 26. Hackney ME, Earhart GM. Effects of dance on movement control in Parkinson's disease: a comparison of Argentine tango and American ballroom. *J Rehabil Med*. 2009;41(6):475-481.
 27. Hackney ME, Earhart GM. Short duration, intensive tango dancing for Parkinson disease: an uncontrolled pilot study. *Complement Ther Med*. 2009;17(4):203-207.
 28. Nau-Klapwijk N. *Tango, un Baile Bien Porteño*. Buenos Aires, Argentina: Corregidor; 2006.
 29. Dinzel R. *El tango una danza; Esa Ansiosa busqueda de la libertad*. Buenos Aires, Argentina: Corregidor; 1999.
 30. Earhart GM. Dance as therapy for individuals with Parkinson disease. *Eur J Phys Rehabil Med*. 2009;45(2):231-238.
 31. Hackney ME, Kantorovich S, Earhart GM. A study on the effects of Argentine tango as a form of partnered dance for those with Parkinson disease and the healthy elderly. *Am J Dance Ther*. 2007;29(2):109-127.
 32. Kabat-Zinn J. *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness*. New York, NY: Dell; 1990.
 33. Miller J, Fletcher K, Kabat-Zinn J. Three-year follow-up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. *Gen Hosp Psychiatry*. 1995;17(3):192-200.
 34. Lau MA, McMain SF. Integrating mindfulness meditation with cognitive and behavioural therapies: the challenge of combining acceptance- and change-based strategies. *Can J Psychiatry*. 2005;50(13):863-869.
 35. Baer RA. Mindfulness training as a clinical intervention: a conceptual and empirical review. *Clin Psychol Sci Pract*. 2003; 10(2):125-142.
 36. Teasdale JD, Segal ZV, Williams JM, Ridgeway VA, Soulsby JM, Lau MA. Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *J Consult Clin Psychol*. 2000;68(4):615-623.
 37. Comasco R, ed. *Dance programs for the congenitally blind*. First International Congress for Tango dance Rosario Argentina; 2008.
 38. Lavallo Cobo I. *Tango una Danza interior. Evolucion Psicologica del Tango*. Buenos Aires, Argentina: Corregidor, 2007.
 39. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using GPower 3.1: tests for correlation and regression analyses. *Behav Res Methods*. 2009;41(4):1149-1160.
 40. Borenstein M, Hedges LV, Higgins JPT, Hannah RR. *Introduction to Meta-Analysis*. West Sussex, England: Wiley; 2009.
 41. Lovibond S, Lovibond P. *Manual for the Depression Anxiety Stress Scales*. 2nd ed. Sydney, Australia: Psychology Foundation; 1995.
 42. Antony MM, Bieling PJ, Cox BJ, Enns MW, Swinson RP. Psychometric properties of the 42-item and 21-item versions of the depression anxiety stress scales in clinical groups and a community sample. *Psychol Assess*. 1998;10(2):176-181.
 43. Bastien CH, Vallières A, Morin CM. Validation of the insomnia severity index as an outcome measure for insomnia research. *Sleep Med*. 2001;2(4):297-307.

44. Bluestein D, Rutledge CM, Healey AC. Psychosocial correlates of insomnia severity in primary care. *J Am Board Fam Med.* 2010; 23(2):204-211.
45. Savard M, Savard J, Simard S, Ivers H. Empirical validation of the insomnia severity index in cancer patients. *Psychooncology.* 2005;14(6):429-441.
46. Diener E, Emmons R, Larsen R, Griffin S. The satisfaction with life scale: a measure of life satisfaction. *J Pers Assess.* 1985; 49(1):71-75.
47. Schutte NS, Malouff JM. *Sourcebook of Adult Assessment Strategies.* New York, NY: Plenum; 1995.
48. Schwarzer R, Jerusalem M. Generalized Self-Efficacy scale. In: Weinman J, Wright S, Johnston M, eds. *Measures in Health Psychology: A User's Portfolio Causal and Control Beliefs.* Windsor, England: NFER-Nelson; 1995:35-37.
49. Scholz U, Benicio Gutierrez D, Sud S, Schwarzer R. Is general self-efficacy a universal construct? psychometric findings from 25 countries. *Eur J Psychol Assess.* 2002;18(3):242-251.
50. Brown KW, Ryan RM. The benefits of being in the present: mindfulness and its role in psychological well-being. *J Pers Soc Psychol.* 2003;84(4):822-848.
51. Carlson LE, Brown KW. Validation of the mindful attention awareness scale in a cancer population. *J Psychosom Res.* 2005; 58(1):29-33.
52. Psychology Foundation of Australia. *The Depression Anxiety Stress Scales (DASS).* Sydney, Australia: Psychology Foundation of Australia; 2011.
53. Pinniger R, Brown RF, Thorsteinsson EB, McKinley P. Argentine tango dance compared to mindfulness meditation and a waiting-list control: a randomised trial for treating depression. *Complement Ther Med.* 2012;20(6):377-384.
54. Krogh J, Nordentoft M, Sterne JA, Lawlor DA. The effect of exercise in clinically depressed adults: systematic review and meta-analysis of randomized controlled trials. *J Clin Psychiatry.* 2011;72(4):529-538.
55. Lawlor DA, Hopker SW. The effectiveness of exercise as an intervention in the management of depression: systematic review and meta-regression analysis of randomised controlled trials. *BMJ.* 2001;322(7289):763-767.
56. McKinley P, Jacobson A, Leroux A, Bednarczyk V, Rossignol M, Fung J. Effect of a community-based Argentine tango dance program on functional balance and confidence in older adults. *J Aging Phys Act.* 2008;16(4):435-453.

Author Biographies

Rosa Pinniger, BPsych, is currently completing her PhD at the University of New England, Australia.

Einar B. Thorsteinsson, PhD, is a senior lecturer at the University of New England, Australia.

Rhonda F. Brown, PhD, is an associate professor in health psychology at the Australian National University, Canberra, Australia.

Patricia McKinley, PhD, is an associate professor at the McGill University, Montreal, Canada.