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Pilot Data on Effects of Community Dance for Veterans with PTSD and their Family Members

Robin Gustafson, Cynthia Corbitt, Deborah Denenfeld, Tyla Johnson, Carlos Jimenez, & Marlon Tristao

Abstract

Prior research has shown that there are several symptoms of Post-Traumatic Stress Disorder (PTSD) that are persistently hard to treat and critically important for full recovery. Community reintegration can be an especially challenging aspect of returning home from combat duty. The purpose of this study was to test the effects of a community dance program on some of these psychological symptoms. Community dance has been shown to strengthen cognitive plasticity which is often a problem for veterans with PTSD. This program also includes predictable gentle touch and family involvement, two elements that can predict stress reduction and successful community reintegration in those with PTSD. Before and after each ten-week community dance program, seventeen veterans and accompanying family members were measured on connectedness using the Interpersonal Needs Questionnaire, Revised (INQ-R) (Van Orden, Witte, Gordon, Bender, & Joiner, 2008), experience avoidance using the Acceptance and Action Questionnaire, Version 2 (AAQ-II) (Bond, et al., 2011), and hope and optimism using a modified Life Orientation Test, Revised questionnaire (LOT-r) Scheier, Carver, & Bridges, 1994), combined into a wellness score. Each ten-week program consisted of weekly, 90-minute community dances with live music and a nationally recognized dance caller. We found improvements in wellness scores for all participants, regardless of PTSD status, partial η^2 =0.52. We think this program, and programs like it, show great promise in treating some of the most persistent symptoms of PTSD in veterans and in their families.

Keywords: PTSD, reintegration, community, psychology, dance, alternative treatment

Introduction

Post-traumatic Stress Disorder (PTSD), although sometimes called different names, has long been a problem for returning military personnel and continues to be a problem today, with approximately a quarter of returning veterans showing at least some of the symptoms of this disorder (National Center for PTSD, 2017). The disorder has a long history of being treated using medical techniques such as medicines that act as antagonists to the stress system, and later using psychological therapy techniques, such as classical and operant conditioning, information processing, and more recently, cognitive behavioral therapies (Brewin & Holmes, 2003; Watkins, Sprang, & Rothbaum, 2018). This historic dualism in treatment has coincided with a dualistic view of the human mind–the view that knowledge, memories, language, and rational decision-making are all abstract, coded, qualities of the human mind, while emotions, hormones, muscle memory, and psychiatric disorders are physical qualities of the human mind. This dualism is an incomplete and outdated view of the human mind (Moreno, Ruiz-Mirazo, & Barandiaran, 2011; Clark, 2016).

Cognitive science has repeatedly and convincingly shown us over the past 50 years that the human mind is a biological, dynamic network of ever-changing structure (Spivey, 2007) and knowledge depends on an endless stream (Reed, 1996) of meaningful interactions with the wider environment (Flanagan, 2010). The mind-body connection is real (involving the hypothalamus and the peripheral nervous system), the mind is made of biological material that extends throughout the entire human body and possibly beyond the body to the surrounding environment (Clark, 2016); situation and context matters (Gonzalez-Vallejo, 2002; Barsalou, 1982; Tulving & Thomson, 1973); emotions are integral to thinking and decision-making (Damasio, 1994) and the whole system is connected, network-style, with dynamic experience-based updates being made continuously (Butz &

Kutter, 2017). We should not be surprised, therefore, that when medical symptoms are well-controlled, and psychological memories have been reviewed and reappraised, that there remain additional problems that are not uniquely medical, not uniquely cognitive, and not uniquely emotional, but the result of an imbalance or maladjustment in the whole, dynamic, network within which the person with PTSD is now living. Lack of community reintegration, domestic disruption, and a feeling of disconnection with a once meaningful life are all normal and persistent aspects of the PTSD palette of problems to solve (Morissette, Woodward, Kimbrel, Meyer, & Kruse, 2011; Sayer, 2011). Reintegration and reconnection are critically important to the full recovery of those who have suffered from PTSD and these elements are often not addressed in the doctor's office or therapist's office.

Using a more holistic view of the human mind helped the authors develop a program to help veterans and ex-military with these last elements. By definition, reintegration and reconnection have to be part of a larger context than what is typical of the doctor's or therapist's office. We envisioned an experience that would allow for regular, routine, reintegration of body, mind, family, and community for those already under medical and psychotherapeutic treatment. The experience would have to be something that facilitated being part of a wider community, would involve physical activity and interactivity, could include family members and friends (Batten, et al., 2009; Fischer, Sherman, Han, & Owen, 2013; Hawkins, McQuire, Britt, & Linder, 2015; Porcari, et al., 2017), would be accessible to beginners but still engaging for the more advanced, would involve predictable patterns and movement, and would provide safety from intrusive memories, unpredictable behaviors and emotions, and the still-prevalent stigma associated with military and ex-military seeking mental health help (Khaylis, Polusny, Erbes, Gewirtz, & Rath, 2011; Hoge, et al., 2004).

We had noted, for example, that research by Shors (2014) has shown that while physical exercise increases the growth of new hippocampal cells, keeping those new hippocampal cells requires effortful learning within several days of the exercise. Some kind of recreational exercise seemed like a perfect fit in combination with the effortful, cognitive re-appraisal of old memories common to much of the current psychotherapeutic treatment of PTSD.

Additionally, even though prior research shows the very strong benefits of touch on stress disorders (Field, Seligman, Scafidi, & Schanberg, 1996), Lukoff and Strozzi-Heckler (2017) argue that helping veterans, in particular, to obtain the healing benefits of human touch is especially difficult because of problems of distrust from traumatic military experiences, and so it's especially important to find gentle introductions to touch. Touch may seem antithetical to military culture; however, 14% of active military report using massage therapy compared to 8.3% of civilians (Goertz, et al., 2013). Because touch is so important for healing, it has been recognized as a form of healing within the US Army Nursing Corps (Gordon 2012, as cited in (Lukoff & Strozzi-Heckler, 2017)).

We found a potentially promising solution in a weekly community dance program open only to military, ex-military, and their loved ones (i.e., friends and family). A community dance is a social event in which participants are led by a "caller" and by live music to participate in traditional American social dance, similar to contra dancing or square dancing. Most community dance programs meet weekly and become a routine activity for participants. Most community dance programs are accessible to beginners, with a little bit of teaching and a lot of dancing involved in every session, but still fun and engaging for those who have experience. Social dance, unlike many other recreational activities, puts the focus on the larger group (i.e., at least two people, sometimes three people, and often an entire room full of people), and makes social contact and interaction both fun and predictable. The dances grew organically and traditionally out of the living rooms, porches, and pubs of rural populations over the past few hundred years. Recently, one form of this type of

social dance, called "contra dancing" [possibly a variation on what was originally country dancing, possibly from the prevalence of two lines of dancers across (contra) from each other], has become incredibly popular, drawing participants from cities, suburbs, and small towns, of all ages, from teens through nonagenarians (Kelley, 2015; Partridge & Block, 2010; Weitz, 2015). However, as contra dancing has become more popular, it has also grown faster, louder, and somewhat more chaotic, with frequent changes in dance tempo, key changes, fast changes in directions called, one dance morphing into another without warning, and even "techno" versions. Community dance, however, has remained somewhat slower, somewhat quieter, with somewhat more predictable tempos and dance changes. We felt that a weekly community dance for veterans and their loved ones would meet the requirements of recovering military and ex-military with PTSD trying to complete reintegration into a meaningful, social, familial, and eventually work life. Community dance, is, after all, a low-risk routine opportunity to build human connection into one's life (Fredrickson, 2014).

Community dance is not only a recreational exercise that provides a gentle reintroduction to social and familial ties, but may also be a unique exercise in promoting neurological healing of parts of the brain (posterior cingulum white matter integrity) that is often compromised in PTSD subjects compared to comparably traumatized subjects without PTSD (Burzynska, et al., 2017; Fani, et al., 2012).

We began to measure the effect that a community dance program could have on veterans and ex-military with PTSD. Specifically, we examined feelings of connectedness, feelings of hope and optimism, and experience avoidance as these symptoms, especially when combined, point specifically to these last, hard, problems of full reintegration and recovery.

We hypothesized that the veterans and loved ones participating in our program would experience a significant rise in scores of connectedness (INQ-R), hope and optimism (LOT-r), as well as significantly lower scores of experience avoidance (AAQ-II), three of the most challenging aspects of community reintegration. We combined these scores and refer to them as a wellness score in reporting this study.

Method

Participants

Thirty-two participants began the program and 17 completed the program. This drop-out rate is fairly normal in programs for those recovering from PTSD. However, program morbidity effects are not an issue because the pre-program wellness scores of those who dropped out compared to those who remained were not different: $t(30)=0.18$, $p=0.86$. Participants included 10 veterans and seven loved ones. If participants had a diagnosis of PTSD (n=10) or PTSD and TBI (n=3), then they were under the care of a medical practitioner throughout the 10 weeks of the program. Seven participants had no diagnosis. Of the 10 participants with a PTSD diagnosis, nine were veterans and one was a loved one. Of the seven participants with no diagnosis, six were loved ones and one was a veteran.

Participants were recruited by word of mouth and by fliers posted at the local VA, as well as other locations around Louisville, KY likely to be frequented by veterans and their families. The location of the program and registration procedure were not advertised, and these pieces of information were not given to potential program participants until they had talked, by phone or by email, with the director of the program. This was to maintain confidentiality and privacy for veterans who may have felt self-conscious or stigmatized if others in the military were aware of their attendance. As noted earlier, this is a known deterrent to seeking help and engaging in therapeutic activity, especially among military and ex-military (Jain, et al., 2012; Porcari, et al., 2017)

Participants gave informed consent after registering for the dancing program and prior to answering any of the questions on the three pre-program assessments. Participants in the program were assured that they did not need to consent to having this data collected in order to participate in the dance program.

Procedures

The program, or intervention, consisted of three sessions of 10 weekly community dances, held privately in a veterans meeting hall in Louisville, KY. Participants registered for a 10-week session, and we collected data from three different 10-week sessions. The main differences between the three 10-week sessions from which we collected data, and the usual 10-week sessions that have been run for years, was the IRB review (approval #1617-95 and #1718-16 by the WCSU IRB), the informed consent for the collection of the data, and the elimination of all video and camera recording of the experience.

Community dancing consists of dances like the Virginia Reel and square dances done with others in informal pairs or triplets to live music, while dance prompts are given by the dance "caller." Dance prompts are directions such as "turn your neighbor around by right hands," or "all join hands and go into the middle of the circle." These are examples of predictable, gentle touch. The crowd at these dances was smaller and quieter than some dances to foster the safe, intimate, and comfortable feeling conducive to developing trust and for healing. Volunteers were consistent across the series and so were familiar to participants. All participants were assured that they could leave whenever they wanted. Participants also were provided a safe corner to which they could go if they felt overwhelmed. Interestingly, this safe corner was rarely used, which is a good indication of the safe atmosphere created. The dance caller was a national expert, calling dances all over the country on a regular basis.

Measures

Participants were assessed on three self-report measures prior to attending their first community dance (pre-intervention) and after attending the last community dance of the 10-week session (post-intervention). These three measures consisted of a modified Life Orientation Test , Revised (LOT-r) scale, using modifications recommended in the literature (Scheier, Carver, & Bridges, 1994) in which the higher the score the more hope and optimism the participant feels; the Acceptance and Action Questionnaire, Second Version (AAQ-II) (Bond, et al., 2011) in which the higher the score the more the participant tends to avoid experiences and the Interpersonal Needs Questionnaire, Revised (INQ-R) (Van Orden, Witte, Gordon, Bender, & Joiner, 2008), in which the higher the score the more connected the participant feels to family, community, work, and the world, and the fewer interpersonal needs they have. The assessments were given to all participants in this order, by graduate students and others trained in data collection; participants were reminded that they could skip any question for any reason and that they could stop answering at any time without penalty. None of the participants stopped before answering all three measures, and none of the participants left one or more questions unanswered. However, as mentioned earlier, 15 of the 32 participants did not complete the 10-session program, so these participants did not complete the post-intervention assessments.

Data analysis

The first 10-week session of participants used a slightly different version of the LOT-r measure. The measure was labeled "Optimism and Hope Scale," used a Likert-type scale with a hard-to-remember letter scale (A=definitely true, D=definitely false), and didn't include the recommended "filler" questions. These features made it possible that the scale was actually measuring social desirability rather than hope and optimism. After the first session we made the recommended

adjustments (Scheier, Carver, & Bridges, 1994), labeling the scale "The Future Scale," using a Likert-type scale (1=definitely not true, 4=definitely true), and including the recommended filler questions ("I feel tired most of the time" and "I worry about my health"). Because the participants were measured on slightly different versions we examined whether the scores were significantly higher (more socially desirable) for the first session than for the other sessions and did not find a significant difference: $F(2,14) = 1.94$, $p=.018$. We therefore included the LOT-r in our wellness calculations for all participants.

Wellness was defined as a combination of the scores on the LOT-r (scores can range from 14 to 56), the AAQ-II (scores can range from 7 to 49), and the INQ-R (scores can range from 15-105), using a formula that put the scores on equivalent scales. We used the inverse of the AAQ-II since high scores on this measure indicate more avoidance of experience and less flexibility, and thus indicate worse mental wellness. Specifically, we obtained both the pre-intervention wellness (Pre-wellness) and the post-intervention wellness (Post-wellness) scores by combining the three main measures (Wellness = INQ-R + LOT-r*1.88 – AAQ*2.14), which resulted in possible wellness scores ranging from -64 to 195.

Pre-wellness scores were not significantly different for those who remained in the program compared to those who dropped out: $t(30)=0.18$, $p= 0.86$. The missing post-wellness scores for these participants were the only missing data in the dataset. All but one subject with a PTSD diagnosis was also a veteran and only one of the non-military participants had a PTSD diagnosis. Because we did not have very many participants with TBI (n=3) and all of those with a diagnosis of TBI were also diagnosed with PTSD, we did not separate out TBI in our analysis. Because there was almost complete overlap between military status and PTSD diagnosis, we chose to focus on PTSD diagnosis, and not military status in our analysis. Pre- and post-wellness scores were analyzed by repeated measures Analysis of Variance (ANOVA) with PTSD diagnosis as a between-subjects factor. This analysis compares the pre- and post-wellness scores of each participant to determine whether the apparent improvements were significant and reliable and the results are reported as a computed F ratio (see results). We compared the individual survey results to assess improvements in those scores with the intervention. We also ran a paired t-test to determine if the intervention significantly raised post- versus pre-wellness scores specifically in veteran subjects with a PTSD diagnosis. Because we hypothesized *a priori* an improvement with intervention, we report the one-tailed p values.

Results

We examined pre- and post- wellness for all participants, using PTSD status as a between subjects factor (see Figure 1 next page). Overall, wellness improved significantly over the program: $F(1, 15) = 16.15$, $p = 0.001$, partial $\eta^2 = 0.52$; with no interaction with PTSD status: $F(1,15) = 1.28$, $p = 0.276$; and no main effect for PTSD status: $F(1, 15) = 1.45$, $p = 0.248$. For those with PTSD, wellness before the program (Pre: M=104.17, SEM=9.1) improved significantly ($p = 0.001$) over the course of the program (Post: M=132.95, SEM=12.9); for those without PTSD, wellness began fairly high (Pre: M=134.87, SEM=21.1) but also improved marginally significantly ($p = 0.06$) over the course of the program (Post: M=151.01, SEM=17.8).

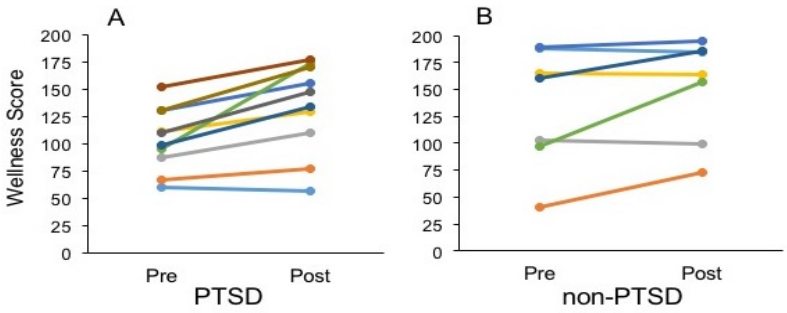

Fig. 1. Pre-intervention and post-intervention wellness scores for individuals (A) with (n=10), and (B) without (n=7) a PTSD diagnosis. Note that the PTSD group includes nine veterans with PTSD plus one non-veteran with PTSD; only one subject in the non-PTSD group is a veteran. All but one subject with PTSD exhibited an improvement in overall wellness score with dance intervention. Wellness = INQ-R + LOT-r*1.88 – AAQ*2.14.

To examine each wellness element separately we did three pairwise t-tests, using the Bonferroni adjusted alpha of .016, and found that there was significant improvement in the LOT-r scores: $t(16)=-4.76$, $p<0.001$, Cohen's $d = 4.76$; significant improvement in the INQ-R scores: $t(16)=-3.72$, $p=0.002$, Cohen's $d=3.72$; and marginally significant improvement in the AAQ-II: $t(16)=2.22$, $p=0.041$, Cohen's $d=2.22$. See Table 1 (below) for group averages ($\pm$ SEM).

	Connection		**Optimism**		**Avoidance**		**Wellness**	
Group	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
PTSD	80.2±4.2	91.2±4.1	42.8±1.6	46±1.9	26.4±1.8	20.9±3.1	104.2±9.1	132.9±12.9
Non-PTSD	90.9±5.9	95.6±5.0	44.7±3.0	50.1±2.3	18.7±4.7	18.1±4.3	134.9±21.1	151.0±17.8

Table 1. Average ($\pm$ SEM) **pre**-intervention and **post**-intervention scores of the three surveys (connection, INQ-R; optimism, LOT-r; avoidance, AAQ-II) and composite pre- and post- wellness scores in subjects with and without PTSD diagnosis. Note that the PTSD group includes 9 veterans with PTSD plus 1 non-veteran with PTSD; only one subject in the non-PTSD group is a veteran. Wellness = INQ-R + LOT-r*1.88 – AAQ*2.14

Finally, when selecting only veterans with PTSD status (*e.g.*, one fewer subject than the PTSD group), a paired t-test found statistically significant ($p = 0.003$) improvement in wellness score with intervention (Pre: M=101.2, SEM=9.6; Post: M=128.9, SEM=13.8).

Discussion

We found that feelings of connectedness, feelings of hope and optimism, and avoidance of new or uncomfortable experiences all improved over the course of this program. All but one of the subjects with a PTSD diagnosis exhibited an improved wellness score with dance intervention (see Figure 1 above).

This community dance program includes all of the important features associated with the broader, more recent, perspective on the human mind (Flanagan, 2010). Using medicine to address the sympathetic and parasympathetic nervous system problems, as well as cognitive behavioral and other rational, memory-based psychological treatments, are useful. However, in order to address the broader context in which the person with PTSD exists with his or her family and community, we need a broader context in which to help the person with PTSD to completely heal. The physical body and cognitive effect on memories are not completely separate systems, and we propose that both need to be activated within a broader context in order for complete healing to occur.

Like Shors (2014) and Burzynska and colleagues (2017), we found that improvements in psychological function were more likely to occur when the right exercise and the right type of learning were both involved (Gonzalez-Vallejo, 2002).

Like Fischer and her colleagues (2013), we found that the inclusion of family (or loved one, or trusted adult) was important because family members also saw benefits. We also believe that their inclusion was critically important for veteran participation and enthusiasm and hope that more programs will consider including family members.

We argue that the gentle touch argued for by Jain and colleagues (2012) and by Lukoff and Strozzi-Heckler (2017), is a critically important element contributing to the success of our program, and our data support the development of more research that isolates this particular factor. One possibility might be to compare community dance outcomes to Texas line-dancing outcomes because both involve traditional tunes, moves, structured social activity, and predictability, but only community dance includes any touch.

Self-selection into a program is always a concern. Because experience avoidance is a common feature of this population, being ready to register for a program like this puts our participants on the positive end of the healing spectrum already. One of our authors, a veteran with PTSD, pointed out that more recent, younger veterans might not see community dance as an enticing recreational choice because of (mistaken) prejudice about an activity called "community dance" and this may be affecting the self-selection into our program. However, as noted earlier, as contra dance becomes increasingly popular among young people, community dance may suffer from less prejudice. We think it is critically important, though, that the program be run as a community dance, and not as a contra dance, because of the noise and unpredictability of many contra dances, as noted earlier.

This was a field experiment, in which many involved had pre-existing relationships or developed new relationships with the participants and all involved had hope for good outcomes. We think these relationships are a positive element of our program. However, these relationships may result in some social desirability effects, or biases, in the self-report measures.

We find these results especially encouraging because they show quantitatively that a weekly recreational community activity can help improve the mental wellness of veterans and their loved ones, regardless of PTSD diagnosis. Although anecdotal, several veteran participants have declared in conversation that this program encouraged them not to isolate themselves (avoidance) and provided a community connection that they looked forward to every week, all of which relate to the measures we quantified.

Further implications

We found it very interesting that those with a diagnosis of PTSD ended the program with an average wellness almost indistinguishable from the average wellness of those with no PTSD diagnosis at all at the start of the program. In other words, those suffering from PTSD were about as "well" at the end of the program as those without PTSD at the beginning. We do not claim that the participants with PTSD are "catching up" to the wellness of their loved ones because the participants without PTSD also improved their wellness over the course of the program to a fairly equivalent degree on average, although three individuals exhibited a small decrease in wellness score; we also note that the non-PTSD scores were more variable overall than were the PTSD scores (Figure 1 page #). The program generally helped participants to feel more connected, less avoidant, and more hopeful.

These improvements in feelings of connection, optimism, and no longer avoiding social experience are critically important to the full recovery of the person. Because our program included a safe (military only) community of military, ex-military, family and friends, and because our program

used combinations of exercise and learning that had been found to be particularly effective in the past, we hope that this program will continue to show benefits to returning veterans, ex-military, their families, and their friends.

We think it is critically important to use a broader, more coherent model of the human being when addressing the whole portfolio of healing treatments and hope that other programs, currently in development, can benefit from the neural network, embodied, situated view of the human being alluded to earlier.

Because all participants in this program who had a diagnosis of PTSD were already under the care of medical and psychological practitioners, we feel that this broader context is not a replacement for, but a critically important addition to the recovery options of veterans with PTSD.

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Robin Gustafson
Associate Professor of Psychology
Western Connecticut State University
GustafsonR@wcsu.edu
Cynthia Corbitt
Associate Professor of Biology
University of Louisville
Deborah Denenfeld
Director
Dancing Well
Tyla Johnson

Carlos Jimenez, and
Marlon Tristao
Recent Graduates of
Western Connecticut State University