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Mechanisms of Dance/Movement Therapy for Building Resilience in People Experiencing Chronic Pain

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Abstract
Growing evidence suggests that dance/movement therapy is a promising approach for the management of complex medical conditions such as chronic pain. However, there is a lack of understanding about the specific factors and pathways through which dance/movement therapy exerts its therapeutic effects on chronic pain outcomes. In this paper, we present the key mechanisms of dance/movement therapy for chronic pain management that were derived from a mixed methods grounded theory study. We discuss each mechanism in relation to both the existing relevant literature and supporting quotes from the research participants. We conclude by discussing implications for the design and implementation of clinical interventions with this population and offer suggestions for future research.

Keywords Dance/movement therapy model · Chronic pain management · Resilience intervention · Mixed methods grounded theory

Introduction

Empirical evidence for the efficacy of dance/movement therapy (DMT) on physical and mental health outcomes in people with complex health conditions is growing. However, there is inadequate literature on the mechanisms[1] by which DMT ameliorates, relieves, or helps to treat symptoms and health related conditions in these

[1] Mechanism refers to specific interaction between various biopsychosocial components/factors through which DMT produces its therapeutic effect.

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individuals. Examining the underlying treatment mechanisms of DMT is important because it can help clinicians develop treatment goals and strategies specific to the clinical needs of the target population and thus maximize the effectiveness of treatment. In addition, building a stronger evidence base for the underlying mechanisms of DMT (e.g., developing empirically derived and tested models) will strengthen the theoretical foundation of DMT. This, in turn, can promote the integration of DMT into mainstream integrative health care (Blatner, 1991; Haase, Kintner, Monahan, & Robb, 2014).

This article presents and describes the essential components of a theoretical model developed and tested in a multi-year research study. Namely, they include the key DMT mechanisms for building psychological resilience in people with chronic pain as well as therapy outcomes. In addition, we provide recommendations for the development and implementation of DMT interventions for this population.

Chronic Pain

Pain is a vital mechanism for human survival. However, when pain becomes chronic, it loses its functional usefulness. Chronic pain can become a disease in itself causing detrimental effects on the quality of life and well-being of afflicted individuals (Morley, 2008; Turk & Okifuji, 2002). It is a major public health problem worldwide. In the United States, for example, one in four people suffer from chronic pain, resulting in societal costs of $635 billion annually in treatment-related expenses and lost productivity. Moreover, chronic pain is the second leading cause of disability (Maxmen, 2012; Institute of Medicine [IOM] 2011).

Opioid analgesics are the class of medications most commonly prescribed for chronic pain. Unfortunately, opioids have limited effectiveness and adverse side effects including opioid abuse, overdose, and death (Rudd, Aleshre, Zibbell, & Gladden, 2016; Volkow & McLellan, 2016). Unrelenting pain contributes more to human suffering than any other disease and the quality of life of people with chronic pain is among the lowest of those with any medical condition (Lame, Peters, Vlaeyen, Kleef, & Patijn, 2005). Given its financial, societal and personal burdens, finding safe and effective methods for pain management is a recognized national priority (Centers for Disease Control and Prevention, 2018).

Chronic pain is constituted by a complex set of physical and psychosocial changes that are integral parts of the pain problem. They exacerbate the burdens of afflicted individuals in numerous ways (e.g., immobility, poor physical functioning, sleep disturbance, poor appetite and nutrition, inability to work, social isolation, relational strain, overuse/misuse of the healthcare system, anxiety, depression, suicide, etc.) (Gatchel, Peng, Peters, Fuchs, & Turk, 2007; Turk & Okifuji, 2002). Based on the biopsychosocial model of pain, significant attention has been given to the role of specific cognitive-evaluative and affective-motivational factors as prognostic drivers of chronic pain (Chung, Hur, & Lee, 2013; George, Fritz, Bialosky, & Donald, 2003). For example, fear-avoidance theory and research indicate that pain-catastrophizing promotes kinesiophobia (fear of movement). This leads to avoidance behaviors, inactivity, depression and disability resulting in a vicious pain cycle

(Buitenhuis & de Jong, 2011). Unfortunately, conventional pain management protocols (e.g., opioids, nonsteroidal anti-inflammatory drugs, spinal surgery, and nerve blocks) have tended to focus on control of the sensory processing of pain rather than treatment tailored to the multidimensional nature of chronic pain (Tunks, Crook, & Weir, 2008). Thus, it is not surprising that chronic pain is often undertreated and patient suffering is exacerbated due to over reliance on strong opioids causing negative side effects, addiction, and other complications (Gaskin & Richard, 2012; IOM, 2011). There is a need for non-pharmacological interventions that address the various psychosocial components of chronic pain and, ultimately, decrease individuals' pain experience and disability (Simons, Elman, & Borsook, 2014; Turk & Wilson, 2010).

Dance/Movement Therapy for Chronic Pain Management

Growing evidence suggests that DMT is a promising approach for management of the physical and psychosocial symptoms associated with complex medical conditions (Bradt, Shim, & Goodill, 2015; Koch, Kunz, Lykou, & Cruz, 2014; Strassel, Cherkin, Steuten, Sherman, & Vrijhoef, 2011). Within a therapeutic relationship, DMT therapists utilize creative processes, self-expression, relaxation techniques, and movement improvisation as key methods to promote physical functioning, emotional well-being, cognitive health, and social connectedness. Further, psychoeducation and cognitive processing are integral parts of DMT. These techniques enable individuals to integrate corrective feedback and insights gained from somatic experiences into their cognitive awareness, thereby promoting positive psychological and behavioral changes.

Dance/movement therapy can be particularly effective in addressing various biopsychosocial issues associated with chronic pain. Clinical reports and research, albeit limited, have shown the salutary effects of DMT on chronic pain and associated conditions (e.g., depression, anxiety, mobility, body image, quality of life, pain intensity) (Bojner-Horwitz, Theorell, & Maria Anderberg, 2003; Bojner Horwitz, Kowalski, Theorell, & Anderberg, 2006; Bradt et al., 2015; Bullington, Nordemar, Nordemar, & Sjöström-Flanagan, 2003; Gorham & Imus, 1999; S. Koch et al., 2014; Meekums, Karkou, & Nelson, 2015; Schewe & Heike Schwiertz, 2014; Sjöström-Flanagan, 2004). However, despite promising initial studies, existing DMT research suffers from a lack of systemic evaluation of its efficacy for chronic pain outcomes (e.g., randomized controlled trials). Further, the underlying mechanisms through which DMT exerts its therapeutic effect on chronic pain are largely unknown.

To answer this need, a research study was conducted to develop and test an empirically derived theoretical model explaining the therapeutic mechanisms of DMT for resilience building in people with chronic pain. Specifically, a preliminary model was developed based on the literature and qualitative interviews (N = 16, consisting of people with chronic pain, DMT therapists, and a pain management specialist). The model was then tested with a mixed methods clinical study utilizing 10 weekly 70-min group DMT interventions with 20 people having chronic musculoskeletal pain. 10-session intervention was designed and led by the first author, a

board-certified DMT therapist. Session themes and activities used in the DMT interventions were designed to address specific therapeutic factors identified in the preliminary model. Although the themes and activities for each session varied, all DMT sessions followed the following sequence—(1) verbal check-in and semi-guided movement warm-up; (2) main activities; (3) cool-down; (4) journaling; (5) group discussion; and (6) closing (see Table 1 for session contents). At the end of the study, exit interviews were conducted to learn about the participants' experiences of partaking in the study. Based on the findings, the preliminary model was revised and refined to construct a composite theoretical model. Details regarding methodological procedures and study outcomes are beyond the scope of this paper; these details can be found in Shim et al. (Shim et al., 2017; Shim, 2015; Shim, Johnson, Gasson, & Bradt, 2018).

The Theoretical Model

Overview

The model indicates that DMT mechanisms involve dynamic and intricate interactions between various therapeutic factors that foster resilience resources in people living with chronic pain. The central theme that encapsulates the participants' overall experience of the DMT process was *breaking free and regaining control*. That is, DMT helped them to break free from an imprisoned state of mind and body (i.e., feeling helpless and "stuck") created by the impact of chronic pain, and move towards restoring a sense of control over their pain and their lives in general. Dance/movement therapy provided them with a novel therapeutic milieu in which individuals could freely explore and express the thoughts and feelings associated with their pain experience, gain meaningful insights, and learn new coping skills. Here, we will describe the catalytic factors, five key mechanisms, and therapy outcomes identified from this model. Supporting quotes from participants' exit interviews are provided for each mechanism.

Catalysts for the Key Therapeutic Processes

Two critical phenomena were identified as catalysts for the key DMT processes, namely *loosening-up* and *broaden-and-build* effects.

Loosening-Up

As participants started engaging in the group DMT sessions, they experienced a release of tension/rigidity and an increased sense of flow and flexibility at all levels—physical, emotional, cognitive, and social. Physically, gentle stretching and dynamic body movements helped people to move with a greater ease and range of motion. As one participant (B1) described, "Dancing freed my body from the stiffness. It broke the ice to move more and better". Emotionally, participants recognized

Table 1 DMT session contents

Wk	Themes	Objectives	Session Activities
1	Tuning in	1. Orientation to the group structure and building rapport 2. Increasing body awareness and exploring self-image	Introduction to the group structure and rules Introducing self with movement Semi-guided movement warm-up focusing on articulating each body parts and the connection between them Exploring self-image though creating a visual self-portrait and embodying the image
2	Making Connections I: Intrapersonal integration	1. Increasing a sense of connection to self 2. Developing perception of body as a dynamically integrated holistic unit	Deep breathing and breath-guided movements Experiencing interbody connections—6 connectivities from Bartenieff's Fundamentals (Bartenieff, 1980) and the psychological concepts related to each connectivity Learning the "connection dance" sequence
3	Awakening Senses (Movement Narrative I)	1. Increasing sensory awareness and recognition of self as the active agent of perception 2. Reflection of self through movement narrativization	Various improvisational movement focused on the exploration of six senses– visual, auditory, olfactory, tactile, taste, and proprioception (e.g., I see, I hear, I feel) Choreographing and performing a movement narrative I—"My story of self in pain"
4	Attention and Focus	1. Articulating and broadening attention scope 2. Recognizing and expanding movement repertories 3. Developing ability to refocus	Recognizing the concept of personal space (kinesphere) and boundary in various contexts—physical, psychological, and interpersonal Exploring movement repertoire in relation to various space elements and broaden the scope of attention and movement Focus training (internal vs. external, refocusing to positive/neutral stimuli, mindful awareness)
5	The Shape of pain—Symbolic expression	1. Objectifying pain through symbolic expression and identifying personal meaning of pain	Creating visual symbols of pain and enacting them with movement metaphors Mirroring-based dyad exercise

Table 1 (continued)

Wk	Themes	Objectives	Session Activities
6	Becoming smarter with feelings	1. Using movement for emotional awareness 2. Learning to use movement as a mode of self-expression	Self-reflection through authentic movement Projecting and expressing feelings through movement metaphors
7	Making Connections II: Interpersonal connection	1. Increasing sensitivity to nonverbal communication 2. Building relationship through movement interactions 3. Fostering group cohesion and support	Shaping exercises and contact improvisation Role playing and mirroring-based dyad exercises Action-based group rapport-building exercises
8	Tools for better coping	1. Learning various movement qualities and their implications in coping skills 2. Recognizing personal movement preference and expanding movement repertoire	Learning and practicing Laban's 8 movement elements (i.e., Efforts) and its psychosocial implication for coping Imagery-based movement exercises
9	Creativity and Play (Movement narrative II)	1. Fostering spontaneity and ability to improvise 2. Creating and performing a movement narrative	Creative dance/movement improvisations Choreographing and performing an autobiographical poem "I am"
10	Reflection and Integration	1. Integrating the past themes and group experiences to establish a sense of accomplishment and conclusion 2. Reinforcing a sense of community and hope	Review the skills learned and share individualized goals and plans Learning and performing a group circle dance

that movement could be a way of discharging the emotional tension that had been held inside. A male participant said, "Movement gives vent to the bottled up anger, fear, and sadness inside of you and helps you to let go of those toxic feelings" (B5). Cognitively, creative dance/movement helped individuals to experience a more open, flexible, and insightful state of mind. As it was described, "It helps you to get out of that mold, a fixed way of looking at things and gives you an opportunity to see yourself in a different way" (C4). Socially, participants felt a sense of safety and trust in the group therapy environment that enabled them to express their thoughts and feelings without the fear of judgment. "There was a sense of intimacy and trust. We opened up about things that we wouldn't probably share with anybody else", noted participant B6.

The same phenomenon has been reported in the existing literature. Bullington et al. (2005a) found that 'the issue of rigidity' is one of the most problematic characteristics in individuals with chronic pain. They confirmed that non-verbal therapies like DMT can help these people to "loosen up to gain flexibility of body and psyche and acquire a sense of new possibilities" (p. 253). One potential explanation for this phenomenon is the classic fight-or-flight theory (Cannon, 1932). Evidence from neuroscience research suggests that failure to successfully produce a fight-or-flight response to a stressful condition (i.e., living with uncontrollable pain) can result in immobilization and inability to attend to one's inner state of perception. This may become a conditioned behavioral response (i.e., the freeze response) (Greenberg, 2012; Zamuner et al., 2015). Thus, successful therapy should include physical self-experience and self-awareness using embodiment-based techniques such as breathing or body movement, and help individuals to experience a physical sense of control over their stressful situation (Van der Kolk, 2006). Patients' experiences of feeling 'stuck' and 'imprisoned', or an overall sense of rigidity across the entire system, can be related to this 'freeze' response. Therefore, the sense of freedom and healing experienced by participants during the DMT process can be understood within this theoretical framework.

Broaden-and-Build Effect

A second catalytic factor identified from the model was the *broaden-and-build* effect. Participants reported that DMT elicited a range of positive emotions such as feelings of joy, excitement, relaxation, liberation, hope, gratitude, absorption in the moment/a state of flow, and social connectedness. One participant described this experience this way.

> In this class, you can relax and be silly….you find yourself laughing and being playful. People learn easier when they are in a relaxed, playful mode. We learned really important stuff and how to better take care of ourselves through our own innate creativity (C3).

Fredrickson (2001) described the effect of positive emotions on individuals' ability to build resources and coping strategies that are useful for survival and sustainability. Experiencing positive emotions during DMT appeared to have a broadening effect on individuals' awareness and action. This facilitated their exploration of new

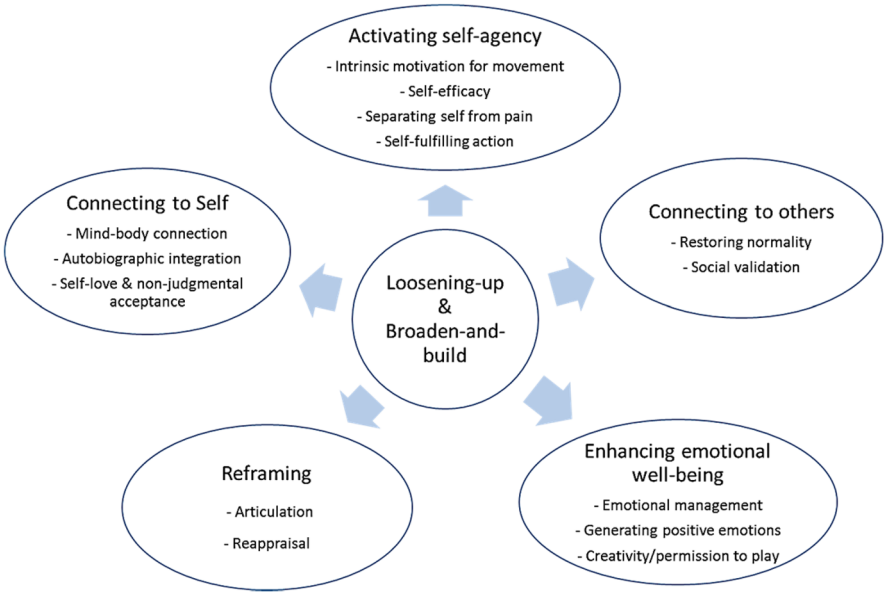

Fig. 1 Key therapy mechanisms of DMT for resilience building in people with chronic pain

ideas, actions, and social interactions both inside and outside of the therapy setting, which, in turn, helped them to build new skills and resources for pain management.

Key DMT Mechanisms

Five key mechanisms of DMT for resilience-building in the context of chronic pain rehabilitation were identified—(1) activating self-agency, (2) connecting to self, (3) connecting to others, (4) reframing, and (5) enhancing emotional wellbeing (Fig. 1).

Activating Self-Agency

This mechanism describes DMT's role in increasing an individual's sense of agency/internal locus of control, the perception that one is initiating, executing, and controlling one's own actions in the world (Jeannerod, 2003) in the context of chronic pain. There are four specific DMT components that support this process, namely (a) facilitating intrinsic motivation for movement; (b) increasing self-efficacy; (c) separating self from pain; and (d) the use of expressive movement as self-fulfilling action.

Facilitating Intrinsic Motivation for Movement Participants felt that in DMT, their personal limitations for movement were respected. They were allowed to participate in the activities of their own free-will at a pace and intensity matching their current physical capacity and pain level. Having this sense of autonomy reinforced them to (1) self-monitor their pain and energy level, (2) modify the quality and

intensity of movement according to their in-the-moment condition, and (3) challenge themselves to push their own limits and pain threshold by trying to move with a greater range/intensity or in a new way they had not tried before.

> I am motivated because there was no one telling me "do it a little longer or push it harder". In this class, there is no forcefulness, and that makes me self-motivated and feel like I'm in charge. I learned that I can set a limitation about what I am going to do and how long I can do it…. That actually made me want to do better and work a little harder (B5).

It appeared that intrinsic motivation for physical activity as opposed to external pressure was particularly important for this group of participants. This phenomenon is related to the underlying issues of social validation and stigmatization associated with living with chronic pain. Individuals with chronic pain often fear that other people may view them as being either hyper sensitive to pain and 'weak minded' or lazy when it comes to engaging in physical activity (Cohen, Quintner, Buchanan, Nielsen, & Guy, 2011; Jackson, 2005). Participants spoke about their experience of feeling judged or forced in other physical activity-based intervention settings (e.g., fitness classes, physical therapy), and how those experiences had made them passive or defensive about exercising. They worried that other people would push them to perform beyond their physical capacity and pain threshold, while not understanding or underestimating the seriousness of their condition, resulting in re-injury or aggravation of pain. This experience can lead to resistance or passivity toward physical activity, which may hinder successful management of chronic pain. Studies have shown the importance of innate motivation for physical activity, evidenced by the stress-induced hyperanalgesic effect that physical activity may have when it is forced or perceived as an unpleasant obligation (Abdelhamid, Kovacs, Pasley, Nunez, & Larson, 2013; Tajerian & Clark, 2017). The findings from this study demonstrate that DMT can be a viable intervention able to facilitate individuals' intrinsic motivation for physical activity.

Increasing Self-Efficacy Participants reported that DMT provided them with an opportunity to experience mastery, self-confidence, and a sense of accomplishment on the bodily level. This helped them not only to positively reevaluate their capacity for physical activity, but also to strengthen their personal beliefs about their ability to self-manage pain and related symptoms.

> I learned that if I put my mind to it, I could do anything. Learning those steps and being able to do it on my own. It's the feeling that "I accomplished something!" It also made me to think about how far I've come along in my recovery and what I have accomplished. That gave me hope and confidence. I feel very good about myself. (C3).

Self-efficacy has been reported as one of the most significant variables related to a number of chronic pain outcomes (e.g., pain intensity, disability, depressive symptoms, pain coping strategies (Arnstein, Caudillb, Mandlea, Norrisa, &

Beasleyc, 1999; Jensen, Turner, Romano, & Karoly, 1991; Lorig, Mazonson, & Holman, 1993). However, individuals with chronic pain typically demonstrate low levels of self-efficacy due to the perception that pain has taken over their bodies. Thus, they feel they have lost control over both their bodies and their lives in general (Afrell, Biguet, & Rudebeck, 2007). Dance/movement-based intervention can play a distinctive role in fostering individuals' self-efficacy as Sheets-Johnstone (2010) described:

> The repertoire of ''I cans'' is built up on the basis of developing synergies of meaningful movement, which are the foundation of our sense of agency… movement validates and gives expression to an "I"… in the sense of agency, of capability, hence in the sense of a kinesthetic/kinetic reality. Movement is indeed the basis of our experience of ourselves as capable and effective agents in the world. (p. 5)

The significance of having an embodied experience of self-efficacy lies in the fact that it can transfer to individuals' daily dealings with pain and attitudes towards managing their health since "patterns learned and insights gained from moving one's body in integrated, expressive ways, in the psychologically safe context of a therapeutic relationship can generalize to other domains of functioning and life" (Goodill, 2016).

Separating Self from Pain Participants reported that DMT gave an opportunity to externalize and objectify their pain in a creative and expressive way. They were able to separate/distance themselves from pain by the use of imagery and movement metaphors. By visualizing, labeling, or acting out their pain, participants were able to give a concrete form to their abstract sensory experiences and develop an objective perspective on their pain and their relationship to it. This shift allowed them to face and accept the pain as a reality and experience an increased sense of control.

> When you act or dance it [pain] out, you are putting it into a kind of concrete form. It legitimizes and validates that it is real. When you put something outside of you which has been always inside you, and you can see it more tangibly, it gives you a sense of acceptance. You feel like you can manage it better (D3).

This is relevant to the literature describing the effect of objectification in chronic pain rehabilitation—separating or distancing oneself from one's pain instead of feeling that the self is enmeshed with pain (e.g., perceiving self as a 'clump' of pain) (Bullington, 2009). Scarry (1985) states that once individuals can project pain into certain images, they can distance themselves from some of its adversity; This enables them to 'move towards their body again', allowing them to accept pain and reduce detachment from their body, as well as feeling more in control of their pain.

The Use of Expressive Movement as a Self-Fulfilling Action The typology, 'self-fulfilling action',[2] refers to the participants' acknowledgement of the impact/effectiveness of one's movement as an action-based positive affirmation in bringing the desired state or situation into reality.

> Acting is more than just thinking or talking about it. When I act it out and feel it in my body, it means so much more. I am already doing something about it and believing in it. So it could become reality. (C1)

Utilizing the reinforcing/actualizing effect of movement to empower individuals to recognize the self as the agent of positive transformation and their life trajectory is a basic principle of DMT practice. Koch and Fischman (2011) refer to this faculty of movement with the term, *enaction,* and attest that it "confronts us with our involvement, our responsibility as creators of our destinies….that our destiny is not already written; it is being co-constructed every second–changing with each of our movement decisions and, at the same time, being changed by them" (p. 66). The findings from this study demonstrate that DMT allowed participants to experience the empowerment of self as an agent in creating their own destinies and transforming the situations they were in rather than being dictated by the impact of pain.

Connecting to Self

This mechanism refers to the effect of DMT in promoting individuals' self-coherence and personal integration in the context of chronic pain. Two factors associated with this mechanism were (a) mind–body connection and (b) autobiographical integration.

Mind–Body Connection Participants expressed having an increased feeling of 'being in touch with' their bodies and emotions, as well as a sense of wholeness and integration as a result of their participation. They perceived DMT as an approach that works on both the mind (e.g., meaning making, developing an insight) and the body (e.g., connection between the body parts) and dynamically supports the integration of the two (e.g., decreasing dissociation).

> Moving free helped me to feel more integrated. Instead of having all my focus on my knees, it helped things to flow and get all parts connected – body, mind, soul, and energy all together. It's like I am putting my thinking into movement and then I realize something about myself or make feedback to myself by the way I move. There is that feeling of integration and interaction. My knees still hurt, but now I feel they are more integrated into my whole being. (C4)

Mind–body integration is one of the primary mechanisms and outcomes addressed in the DMT literature. Bullington et al. (2003) discussed how chronic pain

[2] This term was adapted from the concept of 'self-fulfilling prophesy', which originally referred to the phenomenon in which a strongly held belief that is actually false may have a sufficient effect on people that they act correspondingly so that they ultimately fulfill the once-false conception: Merton 1948).

can create a 'problem of linkage', a state of broken connections, disintegration, and chaos at all levels (body, emotion, cognition, and identity) in affected individuals. Dance/Movement therapy facilitated a sense of connection and integration among the once shattered pieces of individuals' perceptions of body and mind, while allowing them to accept pain and still 'be with the self' despite the pain (Bullington et al., 2005a, b; Christie, 2006; Gorham & Imus, 1999).

Autobiographical Integration Another way through which DMT supported individuals' sense of integration and self-coherence was in the experience of choreographing and performing movement-based narratives about their experiences of pain in the context of their overall life trajectories.

> Telling my story as a sequence of movement was helpful because I was able to look back and link the past, present, and the future. Recognizing how I got through the most vulnerable time of my life and got where I am now…the support I've had from my family and friends, and the fact that I've never given up. It gave me a new, positive perspective about the whole experience and the person I have become. That made me proud of myself and feel hopeful for the future. (C3)

Frank (1995) stated that people with illness feel the strong need to tell their stories, and telling stories about their illness is to give voice to the body. According to Hanna (2004), telling stories through the artistic form of dance can help people to make sense of the incomprehensible and transform the surreal into something real. Further, the act of narrativization[3] can help people to place pain in a meaningful order in time and context of their life worlds and reconstruct their *self-world* that has been un-made by pain (Mattingly, 1998). Our data demonstrated that an application of narrative techniques in DMT can facilitate the emergence of an embodied sense of meaning and enable individuals to actively create a new, positive meaning for their experience of pain. Through this experience, the pain-related aspect of self can be integrated into the overall sense of self and life trajectory.

Self-Love/Compassion and Non-judgmental Acceptance Participating in DMT reminded participants of the importance of self-care/self-love and helped them to develop self-compassion and non-judgmental acceptance in the context of chronic pain.

> It has helped me to be more accepting of my pain and the aging body. Yes, I know that the pain will always be there. But I learned that I can give a kind attention to my body and my pain instead of being upset about it. This class taught me that making time for myself to do these things for myself, to love

[3] According to Monika Fludernik's definition, *narrativization* is an action, putting the property of narratives as something outside of the text which is imposed on it, thus constructing, rather than reviling, it as a narrative (Fludernik 1996).

> myself, give myself a hug and take care of myself is so important. I learned that we need to value ourselves and our feelings. (C3)

Our findings are similar to the transformation of individuals' attitudes towards self that is noted in previous works (Bullington, Sjöström-Flanagan, Nordemar, & Nordemar, 2005b; Christie, 2006; Gorham & Imus, 1999). Pain research has shown the association between self-compassion/self-kindness and pain-related outcomes such as affect regulation, pain catastrophizing, and pain disability (Costa & Pinto-Gouveia, 2011; Purdie & Morley, 2015; Wren et al., 2012). Participant C3's description above well describes how DMT can promote self-love/compassion and facilitate a positive shift in one's attitude towards pain (i.e., from self-judgment to self-kindness).

Connecting to Others

This mechanism involves factors and processes related to DMT's role in building the social aspects of resilience. The strength of DMT as a strong relationship-based approach was acknowledged by all participants. *Restoring normality* and *social validation* are parts of this mechanism.

Restoring Normality Participants noted that the peer recognition and sense of camaraderie experienced amongst the group members (e.g., "I'm not the only one going through this", "there are other people who understand what I am going through") were critical parts of the therapy process. They were able to release their fear of judgment and emerge from a socially isolated and marginalized stance toward a restored sense of normality. In addition, participants were able to reset their normality as they became aware of their strengths and capacities and experienced mutual inspiration and a sense of community with the group members.

> Watching L [another participant] really trying to participate and enjoy what we were doing made me think, "If she can do it I can do it too". So that way, all of us inspired each other and we were fully engaged in this process, that sense that we are fully living! It made me realize that it's kind of 'normal'. That 'normal' would not mean going back to the time when you didn't have to worry about pain, but you just do things in a different way, the reality is just a little different now. There is a new normality. (C2)

The findings regarding the restoration of normality resonate with Yalom's (2005) group therapy principle of *universality,* as well as with Locock and colleagues' (2009) concept of *biographical repair* (i.e., how people restore a sense of normality in the context of serious medical conditions or learn to live with altered circumstances) and Schwartz et al's (2004) idea of *response shift* (i.e., redefining internal standards and changing definitions of health). The normalization process in DMT was unique compared to that of general group psychotherapy or chronic pain support groups because it took place at the bodily level based on the principles of kinesthetic intersubjectivity (Samaritter & Payne, 2013) and kinesthetic empathy (Hagendoorn, 2004). Participant C2's description demonstrates how both self-recognition

with reference to another person's moving body and body-informed intersubjectivity allowed her to develop acceptance and re-set a sense of normality in the context of her pain.

Social Validation Participants acknowledged that DMT can offer an embodied mode of giving and receiving social validation to people with chronic pain. This mechanism was related to participants' experiences of 'seeing and being seen' in meaningful ways while engaging in various DMT experiments (i.e., mirroring-based exercises, embodied narrativization). One particular exercise participants mentioned frequently was a mirroring-based movement exploration[4] during which (1) one person uses movement to demonstrate to a partner how his/her pain feels; (2) the partner mirrors the movement back to the mover; and (3) the original mover comes up with a new movement in response to his/her own movement as mirrored by the partner. One participant described this experience as:

> It makes you feel someone's heart inside of your body and makes your body to connect to their feelings. It's like telepathy or something like that. It's a way to let the other person know that "I know what you're going through". You are in both sides of listening and being heard at the same time, which felt very validating. (A1)

A1's description is a quintessential example of the healing power of kinesthetic empathy in DMT. As discussed in the literature, people living with chronic pain repeatedly experience skepticism and a lack of empathy and validation about their pain, which often drives them into deeper isolation and emotional distress (Jackson, 2005; Korula, 2008; Werner, Isaksen, & Malterud, 2004). As Brody (1977) discussed, finding a way to give testimony of one's suffering body to someone else in a more immediate, 'body-to-body fashion' can be deeply healing. It can help meet their desire for understanding and validation.

Reframing

This mechanism refers to the effects of DMT in changing the conceptual and/or emotional viewpoint individuals have had about various aspects of their pain experience, placing it in a more accurate/positive frame, and thereby changing its meaning towards a positive adaptation. *Articulation* and *reappraisal* are the two factors associated with this mechanism.

Articulation Engaging in various movement exercises that encourage self-reflection and self-awareness enabled people to better articulate and differentiate their perceptions of body, self, and pain. Participants reported enhanced ability to notice changes in their bodily sensations and pain-related symptoms, as well as a developing awareness of personal movement repertoires and unhelpful habitual patterns.

[4] This exercise was adapted from the "where does it hurt?" training exercise by Goodill (2005).

> I seem to notice things better. Movement made me to realize where I hold tension, where there is a lack of balance or blocked energy. It's like having a clearer image of my entire body in my head…. Because with pain, it tends to blur your thinking and other senses. I think movement helps breaking that blurriness. (D1)

In addition, temporal articulation (the perception of self and the pain experience in relation to time) was also noted. For example, participants reported increased ability to differentiate the time when their pain is severe versus mild/bearable (instead of perceiving that their everyday lives are entirely inundated by pain). This was also related to the participants' differential perception of 'pain and coping then' and 'pain and coping now', which took place during the movement-based narrativization.

> It helped me to think through what happened, how I've passed what happened, where I am now, and what I am looking forward to in terms of my goals for the future. I realized that even though I still have this pain, now I can do things much better. It's not as horrible as back then because I am not stuck, getting it going. So I am hopeful for the future. (B6)

Bullington (2009) also advocated body movement as a way for individuals with chronic pain to articulate the relationship between self and pain, or between body parts in pain vs. no pain, instead of perceiving oneself as a 'clump' of pain. When individuals can articulate, differentiate, or localize pain, it can be perceived as much more manageable. Further, being able to differentiate present-self vs. past-self and present-self vs. future-self seemed to help people develop a more holistic viewpoint about their pain experience in the context of time. In addition, this enabled them to have an appreciation for their sustainability and the progress they had made in their recovery, as well as developing optimistic predictions for their prognosis.

Reappraisal Dance/Movement therapy helped participants to recognize that some of their previously held beliefs or perceptions about pain intensity, the movement-pain relationship, or their personal capacity for physical activity were biased or inaccurate. The empirical self-awareness gained during the DMT process helped them to adjust/correct the maladaptive beliefs or behavioral patterns.

> You think you are in so much pain, but through the body movement, you get enlightened. Things become clearer and you realize that the pain is not as bad as you thought, and that movement is actually good for you… My attitude towards exercise and movement has changed a lot. I am more interested in exercises now. (B2)

This finding resonates with the chronic pain literature stressing the importance of cognitive restructuring of individuals' pain perception and their ability to cope with the impact of chronic pain (Lightsey, 2006; Linton & Ryberg, 2001). Through reframing the individual's field of experience, one can transform what used to be perceived as 'dangerous' into 'manageable' (Bullington, 2009). Further, neuroscience researchers suggest that to change one's negative cognitive structure or correct cognitive distortions related to pain and body perception, treatments that target

cortical areas (i.e., treatments that combine multi-sensory-motor experiences such as looking, hearing, touching, and motor imagery) should be applied (Cauda et al., 2012; Lewis, Kersten, McCabe, McPherson, & Blake, 2007; Longo, Betti, Aglioti, & Haggard, 2009). Dance/Movement therapy is an approach that dynamically and strategically utilizes multi-sensory-motor experience to facilitate individuals' processing of psychological concepts and meaning-making. Our findings demonstrate the mechanism through which DMT helps individuals with chronic pain to disconfirm and correct the maladaptive cognitive framework linked to their pain experience and establish new and healthy behavioral patterns (see Shim et al., 2017 for a visual model that describes this process).

Enhancing Emotional Wellness

Participants acknowledged that DMT helped improve their ability to manage pain-related distress and build personal resources/skills for emotional coping. Dance/Movement therapy factors associated with this mechanism were *emotional management*, *generating positive emotions,* and *creativity/permission to play*.

Emotional Management DMT may help individuals to better regulate and manage emotions by providing an opportunity to experience emotions, develop emotional awareness, and express feelings. DMT enabled participants to break the emotional numbness they had developed as a protective strategy, experience a range of emotions, and identify specific emotional resonance associated with their pain experience.

> Before, I couldn't feel or express myself because I didn't have the capacity to psychologically and emotionally handle anything because of my dealings with my pain. Yes, I am more emotional now. During exercise, I felt sadness, regretfulness, hope, joy… I felt my mind and body. (A3)

> When I was acting out my pain, the emotional reaction to my pain surprised me. I saw the anger and heaviness…when you think of pain, it's just pain, but with movement, you kind of unveil to what are the sources, what is it connected to, how it really feels like to you….acting out can be another way of becoming aware of your feelings. (D3)

Further, participants experienced that movement can be an effective way to express themselves and discharge bottled up emotions. Having this outlet resulted in improvement in managing emotional reactions and communicating feelings with others.

> You tend to hold emotions inside instead of expressing it outwardly. But through dance, you just release and let it go. I believe there's a healing there. I'd rather act it out and dance than crying all over the place. (C1)

> Emotionally I am able to deal with pain a lot better because I learned how to channel my feelings in a different way. When I start to get frustrated, I do my deep breathing and do my movement instead of putting it on other people. So

> it helps with my relationship with other people because I don't get attitudes anymore. (B5)

The effects of discharging emotional tension and channeling emotions through expressive movement identified in the current study were similar to the findings from previous research (Bojner Horwitz, 2004; Bullington et al., 2005b; Sjöström-Flanagan, 2004). As emotional management is one of the critical outcomes in pain resilience (Karoly & Ruehlman, 2006; Sturgeon & Zautra, 2010), the findings of this study support potential of DMT as a resilience-building intervention for this population.

Generating Positive Emotions All participants agreed that participating in the group DMT process was an enjoyable and 'uplifting' experience. Participants noted experiencing a range of positive emotions including joy, happiness, excitement, humor, calmness, relaxation, hope, love, inspiration, sense of belonging, and gratitude. These emotions, in turn, had a significant effect on coping with the adverse impact of pain.

> For one hour, you are floating on the clouds. I always left the class feeling relaxed, uplifted, worriless, and hopeful. It comforts me to be around you all and makes me to forget about pain and the stress of everyday going through it. Happiness is a natural pain killer! (C1)

This mechanism corresponds to the findings from previous clinical studies, which demonstrated that experiencing positive emotions has the potential to counteract the detrimental impact of chronic pain (i.e., helplessness, pain catastrophizing, pain intensity) and thereby bolsters individuals' cognitive resilience to subsequent pain (Ong, Reid, & Zautra, 2010; Zautra, Johnson, & Davis, 2005).

Creativity/Permission to Play DMT provided a safe and enriching environment in which participants felt comfortable engaging in child-like play. They also noted that the session activities were cognitively stimulating and enabled them to connect to their innate creativity.

> I've never been in a group where I could position myself on the floor and roll around like little kids! If your mind is at ease, your body can be at ease too. I learned that we can take care of ourselves through our own innate creativity. It was just rewarding to be able to participate where in your life you don't have those things on a regular basis. (B1)

Evidence supports the positive effects of playfulness on health-related outcomes (Hutchinson, Yarnal, Staffordson, & Kerstetter, 2008; Son, Kerstetter, Yarnal, & Baker, 2007; Yarnal, 2006). Magnuson and Barnett (2013) found that individuals who are high in playfulness tend to experience less perceived stress and engage more frequently in adaptive coping styles compared to low playfulness individuals. This indicates that playful individuals have sufficient inner resources necessary to overcome their stressors. Pain can cause demoralization which leads to decrease of activities and satisfaction, in other words, to depression and more pain (Wernik, 2010). DMT is a creativity-based approach that can promote child-like playfulness

across the lifespan thereby helping individuals to build inner resources and coping strategies to counter the impact of pain.

Therapy Outcomes

As a result of participating in the DMT intervention, participants experienced an array of positive changes and desired outcomes. First of all, participants reported (1) reduction in perceived pain (Shim et al, 2017). Many participants said that, in contrast to their previous beliefs regarding the movement-pain relationship (i.e., movement will cause or aggravate pain), they found that movement can actually ease their pain and other musculoskeletal symptoms. Participants experienced (2) an increased sense of control over pain and motivation to take charge of their own health and wellbeing. Participants not only practiced self-efficacy and self-agency during the DMT sessions, but were also able to utilize these skills at home to alleviate pain and related symptoms on a daily basis. This gave them confidence and empowerment in the self-management of their pain. Participants also experienced (3) an increased sense of acceptance and integration. They said that after the DMT intervention, they felt more 'whole' and 'at peace with' their own bodies. They were able to embrace pain as part of their life condition without being upset or overwhelmed by it. The acceptance took place at both intrapsychic level (i.e., mind–body connection, autobiographic integration) and interpersonal level (i.e., resetting normality through group validation and acceptance). (4) Emotional health was another important outcome. Participants experienced an improvement in overall mood as well as the ability to manage emotions. One example of this outcome was their ability to utilize expressive dance/movement as a way of channeling and discharging emotional tension instead of holding it inside or projecting it onto other people. In addition, participants reported (5) an increase in health-enhancing activity engagement. They reported being motivated to seek resources from the community and build a sustainable support system. It appears that DMT empowered people to take an active role in their own health care. Finally, participants (6) demonstrated the fundamental characteristics of resilience. The findings indicated that participants were able to cultivate the attitude/ability to withstand the adverse impact of chronic pain and go on with life with hope and confidence. People attributed this outcome to having an embodied experience of hope and connecting with their innate strengths.

Discussion and Conclusions

This article described part of the findings from a mixed methods grounded theory research study in which a theoretical model depicting the therapeutic mechanisms of DMT for resilience building in people living with chronic pain was developed. On one level, our findings may raise awareness of the roles of general mechanisms or ancillary factors in DMT and could provide an empirical basis for strengthening efforts to enhance these factors in current and future treatments. On another level,

our findings urge some cautions when therapists work with individuals with chronic pain and suggest some techniques that they can utilize.

The findings from this study indicate that several key concepts of DMT for chronic pain management previously identified by researchers (i.e., integration, loosening, meaning-making, self-awareness, creativity, structural transformation) are indeed central to the therapeutic process (Bojner-Horwitz et al., 2003; Bojner Horwitz et al., 2006; Bullington et al., 2003; Bullington et al., 2005b; Gorham & Imus, 1999; Sjöström-Flanagan, 2004). We, however, took implicit models from existing literature to the next level and provided a fuller and more specific understanding of the therapeutic mechanisms of DMT for resilience building in people with chronic pain. The core therapeutic process involves helping individuals to break-free from the physical and mental rigidity created by the impact of pain and cultivate resilience resources across multiple functional domains towards regaining a sense of control over their pain and their lives. Our findings indicate that a short-term (10-week) group DMT intervention may bring about a range of salutary effects in people with chronic pain (i.e., pain reduction, sense of control, acceptance, emotional health, health-enhancing activity engagement, and resilience).

Five key mechanisms covering multiple functional domains were identified, namely, *activating self-agency* (fundamental self-concept)*, connecting to self* (intrapsychic/mind–body integration), *connecting to others* (interpersonal/social coping and integration)*, reframing* (cognitive restructuring)*,* and *enhancing emotional wellness* (affective coping). Each mechanism is comprised of unique and universal factors in DMT and psychotherapy. It is important to mention that both of the catalysts (i.e., *loosening-up* and *broaden-and-build* effects) supporting these mechanisms are associated with theories of positive emotions. Positive emotions may loosen the hold that a negative emotion has gained on a person's mind and body by dismantling or undoing preparation for specific action. Further, positive emotions can also broaden individuals' thought-action repertoire and build resources and coping strategies that are useful for survival and sustainability (Fredrickson, 2001). Pain researchers also found that positive affect and psychological flexibility are important resilience mechanisms in promoting sustainability and recovery in people with chronic pain. They therefore suggest that a pain resilience approach should pursue positive outcomes (e.g., engagement in meaningful activities) beyond recovery from negative outcomes (Goubert & Trompetter, 2017). The mechanisms outlined in this article demonstrate the potential role of DMT in creating a wide range of positive emotions and a creative state of mind, which in turn, enable individuals to explore, learn, and practice invaluable coping skills and resilience resources for chronic pain management.

In addition, throughout the pain literature, the impact of chronic pain is portrayed as 'a problem of linkage', 'chaotic disintegration' (Bullington et al., 2003), 'detachment from self' (Jackson, 1994), 'disarticulation of fields' (Bullington, 2009), or 'unmaking of one's lifeworld' (Scarry, 1985). We have here identified some specific pathways through which DMT can counter the dismantling effects of chronic pain and help people to re-build their identities and lifeworlds. One particular method frequently noted by participants as being beneficial was movement-based narrativization. Participants reported that the experience of creating and performing

movement-based narratives gave them an opportunity to develop new insights about themselves and the experience of pain in the context of their overall life trajectory. Through this process, a corporeal sense of meaning emerged and they were able to actively create a new, positive meaning for their experience of pain and integrate the pain-related aspect of self into a coherent story of self. Our findings demonstrated that DMT can be a unique way to incorporate narrative techniques for this population and maximize its benefits as a discourse of healing and empowerment.

Our findings also provided some practical information applicable to clinical practice. We learned that there is a specific factor that DMT therapists should keep in mind when working with this population: the importance of respecting the individual's personal limitations for physical activity and promoting their innate motivation for restorative movement. When asked to name one aspect of DMT that they found most helpful/important, the majority of participants said the self-directed, non-prescribed structure in which they could participate in the movement exercises of their free will was critical. As discussed earlier, this can be a particularly sensitive issue for people with chronic pain due to problems related to the social stigma and lack of validation they often encounter in the health care system and general social settings. Therefore, when working with this population, DMT therapists should make an effort to (1) provide non-judgmental and non-forceful therapeutic support; (2) focus on improving individuals' self-awareness so that they can develop and practice an accurate appraisal of their own physical capacity and limitations; (3) offer an optimal level of challenges during the movement exercises so that the clients can experience a sense of accomplishment and mastery; and (4) provide an embodied mode of validation and acceptance through kinesthetic empathy and maximize the benefits of peer support within the group therapy structure.

Another issue a therapist should consider in relation to the problem of social validation is carefully addressing psychosomatic aspects of the individual's pain experience. Persons with chronic pain often experience resentment and frustration toward "It's all in your head"-type comments made by others (Morley, 2008); Thus, it is important to validate their pain and let them understand that the need for psychotherapeutic intervention is not because the therapist suspects a psychological origin of the pain, but because s/he is seeking to provide them with the tools to address multifaceted impacts of chronic pain and improve their quality of life. Further, it is always possible that underlying psychological issues linked to the clients' chronic pain experience can come up during the therapy process (e.g., physical or psychological trauma in the past). Therefore, a comprehensive treatment of individuals with chronic pain should include addressing any underlying psychological issues that might be associated with the person's experience of pain as a whole when this is appropriate for the context. The therapist should be aware of the possibility of the presence of associated trauma or psychological issues and be ready to provide safe and therapeutic support for the client to process these issues as they come up.

A couple of DMT techniques that appeared to work well in this population should be discussed. Besides movement-based narrativization, two other methods, imagery-based exercises and mirroring, were noted by the participants as most helpful. Imagery is one of the most widely used non-pharmacologic pain management strategies (Burhenn, Olausson, Villegas, & Kravits, 2014). In this study intervention,

imagery was used not only as a form of mental visualization, but also in combination with movement to create meaningful actions (i.e., kinesthetic imagining) (Serlin, 1996). In our data, imagery was associated with several therapeutic processes including, (1) separating one's self from pain by externalizing or objectifying the pain; (2) facilitating mind–body integration through embodying and enacting the images that have personal meaning to the individuals; (3) supporting the meaning-making process by interpreting the contents of the imagery; and (4) activating self-agency through performing a self-fulfilling action. Imagery can be a powerful tool for this population as it not only brings symptomatic relief, but also elicits positive physiological responses to treatment by working through individuals' beliefs and attitudes about an imagined reality. Thus, it is suggested that learning how to better mobilize and amplify the mechanisms of imagery in a purposeful, conscious way is a critical area of investigation for modern medicine (Bresler, 2010). The findings from this study provide qualitative support for DMT as a potentially powerful imagery-based chronic pain approach.

Although mirroring is a commonly used technique in all DMT settings, it appears to be particularly effective when used strategically with this population. Because of the nature of pain as an invisible and un-sharable experience, patients often experience an intensified desire to be understood and validated by others (Good, 1992; Jean Jackson, 1994). Therefore, having a sufficient experience of 'pain as a shared experience' can bring a powerful sense of healing to these individuals. Various mirroring-based activities offered during the DMT intervention provided participants with an opportunity to experience an authentic and embodied way of 'seeing and being seen' by others. This produced a strong sense of acceptance, validation, and healing. An important role of the therapist, therefore, is to activate his/her kinesthetic empathy in order to acknowledge, identify, and reflect the client's emotions and experience of pain in a sufficient way. In addition, when mirroring clients' experiences, the therapist should help them, if necessary, to change their current perception of pain by guiding them to differentiate and articulate the different aspects of pain (e.g., what does it look like when the pain is at its worst vs. pain at its best) and transform the meaning of pain so that it can be accepted and integrated into the person in a healthier way.

The final suggestion for clinical practice is based on the participants' reporting on the benefits of learning and practicing movement-based skills (e.g., breathing, stretching-based exercises, imagery-based relaxation techniques) they can use at home. For example, 'the connection dance' (a 7-min long movement sequence adapted from the Brain Dance by Ann Green Gilbert (Gilbert & Association, 1992)) was taught in the beginning of the study. A YouTube link to the recording of this sequence was shared with participants for use in home practice. The data indicated that having these self-help tools helped improve their confidence for the self-management of pain and related symptoms (e.g., fatigue, joint stiffness, anxiety). Since self-motivation and self-efficacy for pain management are critical attributes of successful chronic pain rehabilitation, incorporating an educational component in the DMT protocol might be useful.

Based on the mechanisms presented in this article, we conclude that DMT is a potentially powerful approach that can activate individual's innate strength for

healing and intricate mind–body pathways towards building resilience resources critical for the successful management of chronic pain. Further examination of various samples, data sources, and advanced quantitative analytic techniques such as mediation analysis is warranted, however, in order to confirm the mechanisms identified here. Finally, in order to demonstrate the value of DMT in the context of medical care and foster acceptance and dissemination of the DMT approach in the mainstream health care system, the field needs research that not only evaluates treatment efficacy for producing desirable outcomes, but also does so because of the unique factors and therapeutic mechanisms that DMT entails.

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Compliance with Ethical Standards

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