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RESEARCH PAPER

A mixed-methods study into ballet for people living with Parkinson's¹

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Background: Parkinson's is a neurological disease that is physically debilitating and can be socially isolating. Dance is growing in popularity for people with Parkinson's and claims have been made for its benefits. The paper details a mixed-methods study that examined a 12-week dance project for people with Parkinson's, led by English National Ballet. *Methods:* The effects on balance, stability and posture were measured through the Fullerton Advanced Balance Scale and a plumb-line analysis. The value of participation and movement quality were interpreted through ethnographic methods, grounded theory and Effort analysis. *Results:* Triangulation of results indicates that people were highly motivated, with 100% adherence, and valued the classes as an important part of their lives. Additionally, results indicated an improvement in balance and stability, although not in posture. *Conclusions:* Dancing may offer benefit to people with Parkinson's through its intellectual, artistic, social and physical aspects. The paper suggests that a range of research methods is fundamental to capture the importance of a multifaceted activity, such as dance, to those with Parkinson's.

Keywords: dance and movement; Parkinson's; interdisciplinary research

M enters the room slowly, bent at the shoulders, shuffling then pausing, lifting his head to look around, then eases himself into a seat with his wife helping. An hour later the iconic, stirring music of *Romeo & Juliet* is being played on the piano. M strides forward from the corner in time to the music, digging his heel into the ground as he marches, head up, arms swinging, with his cane no longer in sight. (Fieldnotes, February 2011)

In the UK there are a small but growing number of dance artists who deliver dance to people living with Parkinson's Disease. As in the UK, worldwide, classes are expanding. With increasing popularity of dancing, it is timely to assess the experience people gain and examine the effects, particularly as claims have been made to its benefit. The description above is an illustration of one of many instances observed in a series of pilot dance classes for people with Parkinson's, led by English National Ballet in London, UK. The article explores the results from the mixed-methods study of that dance project. It discusses the physical and social impact, as well as highlighting the value of the dance class for participants and plans for further research are considered. In particular, echoing Houston (2011), the paper argues that a methodologically diverse way of researching is

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fundamental to capture the important aspects of a multifaceted activity, such as dance. This is especially the case in a research field where quantitative results have dominated, but where, as this paper points out, qualitative analysis has much to offer.

Parkinson's is a neurodegenerative disease that affects one in 500 people, mainly, but not exclusively, those over the age of 50. Symptoms can include decreased stability and coordination, muscle rigidity and tremors (Pederson, Berg, Larsson, & Lindval, 1997). As a result of these and other symptoms, such as bradykinesia (slowness), a stooped posture and shuffling steps, people may experience high fall rates (Kim, Horak, Carson-Kuhta, & Park, 2009). Symptoms often lead to psychological and social concerns, such as lower self-esteem, less social interaction, decreased quality of life and depression (Cummings, 1992). Medications prescribed often lose their efficacy over time and can lead to dyskinesia (involuntary movements of the body), (Nieuwboer et al., 1998). People can live with increasing disability for over 30 years of their lives. With no cure for Parkinson's, quality of life for people is important.

Research examining dance for people with Parkinson's has indicated that it may improve quality of life (Batson, 2010; Hackney & Earhart, 2009a, 2009b, 2010a, 2010b; Hackney, Kantorovich, & Earhart 2007; Hackney, Kantorovich, Levin, & Earhart, 2007; Heiberger et al., 2011; Marchant, Sylvester, & Earhart, 2010; Westbrook & McKibben, 1989; Westheimer, 2008; Westheimer et al., 2011). Mostly, studies concentrate on physiological changes: people with Parkinson's who took part in Tango sessions demonstrated improvements in balance and their Unified Parkinson's Disease Rating Scale (UPDRS) Scores (Hackney & Earhart, 2009a, 2010a, 2010b). Similar results were seen in a study that examined the effects of contact improvisation workshops on 11 people with Parkinson's (Marchant et al., 2010). Contemporary dance, with elements of ballet and musical theatre, was instituted in studies by Westheimer (2008; Westheimer et al., 2011) and Heiberger et al. (2011), with significant improvements in well-being, as well as mobility, for those involved.

Through questionnaires, Westbrook et al. (1989), Westheimer (2008), Hackney and Earhart (2009b) and Heiberger et al. (2011) suggest that participatory dance offers a level of social interaction that enhances well-being. Dancing also provides a situation where individuals are constantly challenging their dynamic stability (Batson, 2010) and studies have concurred that dance has helped participants improve on balance and functional mobility tasks (Batson, 2010; Hackney, Kantorovich, Levin et al., 2007; Heiberger et al., 2011; Marchant et al., 2010). Moreover, recent research has observed that adherence to dance is very high in comparison to other exercise initiatives for this population group (Hackney & Earhart, 2009a; Westheimer, 2008).

In order to develop understanding of the impact of dance on people with Parkinson's, Earhart (2009) suggests that further research is needed to build on the evidence. Houston (2011) points out that a wider methodological scope of studies is needed. As participatory art, dance is a multifaceted phenomenon. It may be seen as addressing physical fitness, alongside developing imagination, cultural education, social contact, community cohesion, as well as offering itself as a hobby, as a skill, as a creative endeavour and as entertainment. In order to investigate dance, it is therefore important to take into account the way in which participants may engage with it. In order to examine participants' engagement with dance, it is important to take into account the aesthetic, cultural and social value of dancing, as well as the potential biomechanical and psychological changes.

The featured study aimed to explore reasons why dance, as a multifaceted activity, might add value to a person's life. Specifically, we examined ongoing motivation to attend, the value of community and the value of dancing for participants, as well as the

physiological impact of dancing, specifically in the areas of balance, stability and postural alignment.

The study was part of a pilot dance project, led by one of Britain's leading ballet companies, English National Ballet. The 12-week project introduced participants to ballet and to the workings of a ballet company. As such, it was an artistic project, rather than conceived of as therapy. Although ballet "steps" were not necessarily used (such as the arabesque and pirouette), the principles behind this way of moving were utilised. In ballet there is an emphasis on posture, body alignment and projection of eye focus and limb extension, as well as whole-body coordination. It is a form of dance that can challenge one's strength and stability and also encourages a wide range of movement qualities and dynamics.

The 12-week project consisted of 1.5-hour sessions once a week, with time reserved afterwards for tea and biscuits. There were 6 sessions before a break of 4 weeks over Christmas, with 6 weeks following. There were also other events, such as watching rehearsals of the Company, visiting the theatre to see them perform and behind-the-scenes talks. The project was based on the ballet *Romeo & Juliet* that the Company was performing at the time and Prokofiev's music was played live on piano and flute during the sessions. Participants were asked to pay a voluntary contribution of £5 a session to English National Ballet and theatre visits were subsidised by the Company. No payment was demanded or given to take part in the research.

Sessions were led by three experienced dance facilitators, who modified movement from the ballet into sequences that were appropriate for the group. The participants were encouraged to explore different movement qualities; when they were thinking about Juliet's movements, they were encouraged to move with lightness and fluidity, whereas when asked to focus on the actions of Tybalt, strong, forceful movement was invoked. (The instance above of M marching was galvanised by thinking of Tybalt's pride and anger.) The facilitators made use of a wide variety of imagery – kinaesthetic, visual and musical – to help participants experience the different qualities in their actions.

In addition to the three facilitators there were approximately three able-bodied volunteers, as well as one or two Company dancers, to help with each session. A Parkinson's UK welfare support worker was also in attendance to help and advise.

Each class began seated in a circle, progressed to standing and then moving across the studio. The first part of the sessions focused on flexion, extension, and rotation, following rhythmic patterns. Improvisation was introduced with emphasis on upper body movements. Part two of the class consisted of standing and travelling exercises focusing on walking, swaying side to side, and marches. Part three involved small-group improvisation using simple hand movements and finished with the group in a circle.

Methods

As the participant experience was the primary focus, it was important to choose a research methodology that allowed us to understand this better. Using ethnographic methods of enquiry, we were able to observe and listen to those experiences, examining the quality of engagement. We also wanted to replicate tests to analyse measureable changes, which required statistical assessment. Results from each method of data collection were triangulated (Hammersley, 1996) to produce an analysis that cross-referenced participant comments and feelings with observed movement, interaction and measured movement tasks.

The research took place within an arts project delivered by English National Ballet, so it was not a project led by the research. Because of this, there could be no selection of any specific type of participant for the sessions, or any dictation by researchers as to how the arts project was delivered. As much qualitative research works through in-depth investigation of phenomena in the natural environment (“in the field”), observing the quality of engagement, rather than the quantity or purity of the sample, it was appropriate to emphasise this process of investigation.

Passed by the Ethics Committee of Roehampton University, we asked via letter for volunteers planning to attend the dance project to participate in any or all aspects of the research. All 24 participants consented to be filmed as part of the research, 14 chose to be interviewed, 4 kept diaries and 6 completed the balance and posture measurements. Out of the 6 completing the measurements, all chose to be interviewed and 2 of this group also kept a diary. There were 9 volunteers involved in the quantitative measurements initially, but 3 had to leave this component of the study because they were not able to complete all three testing sessions. The only requirement for taking part in the measurements was that volunteers be diagnosed with Parkinson’s; however, the nature of the assessments meant that they had to be relatively mobile and not reliant on a wheelchair. There were no exclusionary characteristics to take part in the other research components (interviews, writing diaries and filming).

The 24 participant-dancers were between 60 and 82 years old and had varying degrees of disease progression from mild to severe. There were two wheelchair users and six who normally used walking aids. Three people needed the support of carers to participate in class. Participant characteristics for those who completed the quantitative measurements are listed in Tables 1 and 2.

The majority of volunteers participating in the postural and balance assessments were aged between 65 and 72, with one aged 82. Half were male and half were female. Through interviews, participants disclosed their perceptions on the progression of their condition. For the purposes of clarity, their detailed descriptions have been translated retrospectively in Tables 1 and 2 into language used in the Hoehn and Yahr Scale (Hoehn & Yahr, 1967), although disease stage was not measured using this scale in the field. For example, participant 1’s description of tremor affecting her left leg only, with hardly any falls experienced, was translated as “evidence of Parkinson’s on one side of the body”. Participant 3 similarly claims he experiences symptoms on one side of his body, although as a result of Deep Brain Stimulation.² Unlike the categorisation of unilateral involvement indicating mild symptoms in the Hoehn and Yahr Scale, participant 3 has several functional impairments, which prevent him from doing several well-loved activities. He habitually falls daily and so “high degree of postural instability” has been added to his description. As with all perceptions of symptoms and disability, it relies partly on the person’s attitude to the disease and must be taken as an indication as to how the individual is feeling about the disease and how they experience it.

Tables 1 and 2 also include a list of other physical activities that the six volunteers participated in during the life of the research project. The information was gathered through the interview process. Participation in other activities could influence the conclusions drawn regarding the effects of the dancing and so it is an element to take into consideration. The list does not take into account the physical activities enjoyed before the onset of Parkinson’s, which still may influence how people respond to movement.

Pre-testing for the quantitative measurements was completed 4 days prior to the start of the dancing. Measurements were taken again at the midway point 3 days after the sixth

Table 1. Posture Results.

Participant	Age	Stage of Parkinson's progression	Participation in other physical activities during research period	Initial angle	Final angle	Change
1 (female)	65	Evidence of Parkinson's on one side of body	1 weekly dance class; 1 monthly Pilates class	39.06	38.87	-0.19
2 (male)	72	Mild to bilateral symptoms; some postural instability	Occasional gym sessions	15.87	18.61	+2.74
3 (male)	70	Evidence of Parkinson's on one side of body; high degree of postural instability; some functional restrictions	1 exercise class every 2 weeks	12.88	19.17	+6.29
4 (female)	68	Evidence of Parkinson's on one side of body	1 weekly dance class	11.00	13.00	+2.00
5 (male)	82	Severe disability; still able to walk or stand unassisted	1 weekly dance class	36.95	28.96	-7.99
6 (female)	63	Evidence of Parkinson's on one side of body; some postural instability	None declared, but uses Conductive Education knowledge	5.24	0.00	-5.24

Table 2. Fullerton Advanced Balance Scale Results.

Participant	Age	Stage of Parkinson's progression	Participation in other physical activities during research period	FAB score pre	FAB score post	Change in score
1 (female)	65	Evidence of Parkinson's on one side of body	1 weekly dance class; 1 monthly Pilates class	34	37	+3
2 (male)	72	Mild to bilateral symptoms; some postural instability	Occasional gym sessions	27	30	+3
3 (male)	70	Evidence of Parkinson's on one side of body; high degree of postural instability; some functional restrictions	1 exercise class every 2 weeks	19	23	+4
4 (female)	68	Evidence of Parkinson's on one side of body	1 weekly dance class	24	30	+6
5 (male)	82	Severe disability; still able to walk or stand unassisted	1 weekly dance class	4	4	0
6 (Female)	63	Evidence of Parkinson's on one side of body; some postural instability	None declared, but uses Conductive Education knowledge	16	16	0

dance session. The final testing session was held across 3 days and was carried out 1.5 weeks after the final dance session. The length of time between the final dance class and the final testing session was due to a lack of available space at the Company studios. The limitations surrounding this are discussed below.

To measure alignment in the upper body, a still photograph was taken of each volunteer from the side view. The idea of a plumb-line assessment was used for this study to measure the angle between the shoulder and the earlobe. The plumb-line assessment for posture is a widely used method that focuses on the line of gravity in the body and the balance of musculature on either side of that line (Fitt, 1996; Palmer & Epler, 1998). Ideally, the plumb line should fall through these five body landmarks to create a straight vertical line: the earlobe, centre of shoulder joint (acromion process), greater trochanter of the femur, anterior to the midline of the knee and the lateral malleolus of the ankle (Palmer & Epler, 1998). The stooped posture and resulting hypertension in the cervical spine causes the two uppermost landmarks to fall out of the vertical plumb line, so the back is not in alignment. We hypothesised that the emphasis on creating a sense of lift in the body and projecting focus outwards while dancing would have positive effects on posture, which is often compromised in people with Parkinson's.

The researchers used the concepts of the plumb-line assessment in their analysis to show that angles decreasing in value towards 0° were moving closer to ideal alignment. Verbal cues were given prior to the photograph being taken encouraging volunteers to stand naturally. Although verbal cues were given, it should be noted that error could have occurred if the participants were not standing in their natural stance. The still photographs were then analysed using a computer software system that allowed for goniometric measurement of the angle between the earlobe and shoulder joint. From this analysis it was possible to see if there were any changes in the participants' upper body alignment after dancing.

The Fullerton Advanced Balance (FAB) scale was used to assess balance and stability in both static and dynamic situations (Rose, Lucchese, & Wiersma, 2006). The FAB scale has been used previously to assess functional stability and balance in elderly individuals, as well as those suffering from Parkinson's (Batson, 2010; Hernandez & Rose, 2008; Rose et al., 2006). The test consists of 10 tasks that measure balance and stability in ways that challenge "visual, somatosensory and vestibular systems" as well as other limitations within the body (Batson, 2010). Each task is scored on a four point ordinal scale that gives an indication of the level of performance. The 10 tasks are as follows:

- (1) Standing with feet together and eyes closed for 30 s.
- (2) Reaching forward to retrieve an object with an outstretched arm, which is held by the tester at shoulder height.
- (3) Turning 360° around to the right and then left.
- (4) Stepping up and over a 6-inch bench using the right and left leg.
- (5) Tandem walk on a line heel to toe for 10 steps.
- (6) Standing on one leg eyes open for 20 s.
- (7) Standing on a foam cushion with eyes closed for 20 s.
- (8) Two-footed jump for distance.
- (9) Walk with head turns along a straight line for about 10 steps.
- (10) Reactive postural control – regaining balance after being put off-balance.

While these tests were being performed, the tester and helpers remained close by to supervise the safety of participants.

To examine the motivation to dance and ballet's value to participants, volunteers were interviewed individually for 20–60 min each before, during and after the project. The interviews were semi-structured in order to allow conversation to flow organically (Denzin & Lincoln, 2000). This allowed interviewees to say potentially relevant things that might not otherwise have been documented if interviews were based solely on standard questions. Open prepared questions included “Tell me about yourself”, “Why do you want to do this project?”, “How have you found the sessions?” The semi-structured nature of the interviews allowed us to develop a grounded theory, where ideas on what was important and relevant to the research were only developed after studying the interviews (Charmaz & Mitchell, 2001).

Participants were asked to keep diaries. Authors were encouraged to talk about as much of their daily life with which they felt comfortable, giving us a better understanding of social relationships, activities and priorities. The limitation of interviews and diaries is that there is a risk that participants try to please by saying what they think the researcher wants to hear. Enthusiastic statements can be clarified and explored further in a semi-structured interview and statements on the effects of classes were cross-checked with observations and measurements. The problem with using diaries was that not many people wanted to keep one, or to write at length. Those who did, however, provided an invaluable source of new and corroborated data.

Observations were made during the sessions, particularly on social interaction. Conversations were noted between participants, carers, project facilitators and visitors. A register of attendance was kept to look at adherence.

Film footage was taken of all sessions from two static “flip” cameras. Four individuals were tracked as case studies over the 12 weeks to look for changes in their quality of movement, alignment of bodies and coordination, in order to help us build a picture of physical learning and artistic contributions. We used Rudolf Laban's descriptions of Effort to describe and analyse qualities of movement (Thornton, 1971). Effort is a system used to describe movement qualities, specifically relating to travel through space, duration, weight and flow of movement. Laban's movement analysis is a well-established technique of describing and analysing movement in many contexts (Bartenieff, Hackney, Jones, van Zile, & Wolz, 1984; Foroud & Pellis, 2002; Tooru, Taketoshi & Tomomasa, 2001).

Observations are not necessarily as precise as measurements, but measuring the behaviour of a body in a natural, dynamic setting is difficult (Riddoch, Puig-Riber, & Cooper, 1998, p. 62). Moreover, as the project's focus was art, rather than research, we were conscious not to overload participants with many more interventions. Using film allowed us to pause and rewind to increase accuracy and the Effort descriptions gave the analysis structure and focus. Moreover, the Effort categories were helpful to examine quality and dynamic changes, given the participants' natural propensity to extremes of flow, travel, weight and duration of movement. In addition, the two investigators were experienced dance teachers well-versed in observing physical alignment and coordination professionally.

Reflecting on possible bias while within the field is imperative. Commissioned by English National Ballet, with the potential for the research report to advocate, we had to be mindful of our limitations and of any pressure in which to produce positive results. In producing an interim report for English National Ballet, we instigated a reflective dialogue with the facilitators. The research became part of a constructive tool for action learning. In this way, there was less pressure to produce positive results because the delivery of the project was constantly being revised and reflected upon.

Results

Motivation and Adherence

Fourteen people with Parkinson's began the English National Ballet sessions. Those 14 people (100%) continued to the end. Ten others joined during the 12 weeks. They all came back. Not everyone attended every session, because of illness, transport issues or prior engagements, but all attended regularly, as this participant pointed out:

It didn't matter how bad I felt I always wanted to go.

Participants reported that it was easier and more enjoyable to exercise as a group with a leader to structure the movement as many forgot, or did not want, to do their physiotherapy exercises at home:

I've a lazy mind. I wouldn't do exercise on my own.

It is hard to exercise alone. Movement is much easier with a leader to give verbal instructions and visual cues, so group lessons are good.

Postural Alignment

Table 1 shows the changes in posture from the beginning of the project to the end for all six participants taking part in the quantitative measurements.

Results show that two participants saw a large decrease in their angles. For these two, posture in the upper body likely improved towards a more upright stance. Participant 1 is showing a postural change in the same direction; however, the change is quite small. The other three participants seemed to go further into their thoracic curve as the project progressed. Results show no statistical improvement in posture. In order to conclude a permanent change in posture, however, multiple trials would have to have been completed across a set time period. This was not possible for this study and therefore is a limitation to these findings. Our hypothesis that ballet would help with posture has not been confirmed from this study.

The results also do not show any pattern that may indicate a difference in results among those with mild or with moderate symptoms, or between males or females, or among those who do more than one dance class a week and those who do less physical activity. A larger and longer study would be needed for any connections to emerge.

Balance and Stability

Results from the FAB scale were analysed using SPSS statistical software. Two participants could not carry out all of the balance tasks, due to not feeling or looking stable enough to carry out the tasks. Participants 5 and 6 have been removed from statistical analysis in order to create a more accurate set of data with means that are more representative of the group as a whole. However, the improvements seen from both of these participants will be discussed along with the others.

Table 2 displays the raw data results from the FAB scale. After *t*-tests there was a significant difference between the first and last set of balance scores, indicating an increase of stability and balance by the end of the project for the group as a whole. This comparison was significant at the 0.05 level for the group as a whole ($p = 0.011$) with an average change in score of +4.0 points. When the other two participants are added into the statistical comparison, the results are still significant at the 0.05 level ($p = 0.038$). Furthermore, if all six participants are included and the average results are used (total

score divided by the number of tasks the participant completed), rather than total scores, the results still show significance at the 0.05 level ($p = 0.042$).

Although statistical significance was seen after t -tests were completed, it is important to note that due to the small sample size, statistical power of these results is not sufficient to conclude statistical significance or to generalise these results to the wider population. The results, however, can be compared to those seen in other studies with slightly larger sample sizes (Batson, 2010; Hackney & Earhart, 2010b; Hackney, Kantorovich, Levin, et al., 2007) and through this comparison it is clear that the results in the present study are following a similar trend.

Participants 1, 2 and 4 have scores out of 40, participant 3 has a score out of 36, participant 5 has a score out of 8, and participant 6 has a score out of 28. Like the postural results, the FAB scale results do not reveal any patterns associated with age, gender, disease stage or participation in other physical activities. A larger sample over a longer period may reveal more.

Qualitative Changes

Qualitative analysis of the film footage showed a variety of changes in the participants' movement and this was corroborated by reports from participants and other people who attended the sessions and by a qualitative analysis of the balance tasks. Fluency of movement became more evident in many as the project progressed. Many participants were able to walk in time to the music, as strides lengthened and some coordinated arms and legs in contra-lateral movement. In association, several commented that humming tunes played within sessions aided walking in the street and in order to come out of "freezing".

The rigidity in movement and stance often seen in participants seemed to lessen as the project progressed. For example, an observed and reported loosening of the back was recorded in many participants. Isolation of the upper from lower body was achieved by the end of the project in exercises requiring the spine to rotate, as well as in post-project balance tasks, indicating a loosening of the spinal area for the four case studies. Many of the exercises carried out in class focused on actions that encouraged participants to rotate and twist from the back. Two participants noted how they were able to put on jackets – a movement which demands a rotation in the back – more easily for up to 2 days after dancing. Particularly in task 3 of the post-project FAB scale, it was noticeable that participants were turning around with head, upper torso, hips and feet following sequentially, rather than in one go, indicating less stiffness.

Participants were encouraged to explore a range of movement qualities and dynamics. People with Parkinson's often get stuck moving in one particular way, thereby contributing to stiffness and imbalance. They naturally moved with qualities that were either bound and sustained, or light, sustained and indirect. Energy projection through eye focus and extension of limbs and use of space were ideas that were practiced in class and gradually the participants became more able to transition between a light, soft, free quality and a strong, directed quality. With a growing ability to alternate between different dynamics, body awareness seemed to develop, which was highlighted in post-project balance tasks. Several participants unprompted talked through why they were going to move their head first rather than feet when attempting to turn around, for example, in order to complete the task more successfully.

An increase in confidence to try movement out was reported and larger movement with more outward projection was observed by the end of the project, suggesting an

augmentation in confidence. The re-stabilisation task in the FAB scale required much trust in order to give all body weight to the tester. This only happened successfully in post-project testing, suggesting an increase in confidence on the part of the volunteers.

Several people reported they felt lonely prior to the project; several had had to deal with bad physical and/or mental health. There was a reported development of well-being whilst being present in the sessions through words such as “elated”, “a feeling of well-being”, “relieving stress”, “feel good within myself”, “happy”, “joyous”, “uplifting”. Smiles and laughter were observed throughout, indicating an enjoyable or even cathartic process.

Together with catharsis, there was an observable and reported development of social interaction, to such an extent that several reports tallied in mentioning that the dance class was a better place for getting to know people than Parkinson’s Support Groups:

I know the [Parkinson’s UK Support Group] people by sight but not to speak to . . . this project we get to know people. S I say hello to, but now we’ve had a nice chat.

We talk more here than at [Parkinson’s UK Support Group].

There’s a community spirit about it. So and so isn’t here, let’s see what’s wrong with so and so.

Details on medication, therapists and how to cope with Parkinson’s were swapped; there were conversations about family, events and television programmes. Some were persuaded by others to join other arts activities they attended. Two people talked about the pleasure in holding hands with others during dance exercises.

Reports on determination to carry out the dance exercises and the feeling of achievement when this happened were common. Communal endeavour was a noticeable thread within interviews and diaries and observed in film footage, as encapsulated by these comments:

I appreciate the sense of working as a community, which can take up a challenge and collectively work towards solving this.

M, he’s come a long way. To see him walk across the floor with military precision. I feel like cheering when he does that.

It should be noted that the interview responses above deserve more description and analysis than can happen in the scope of reporting results tied to the triangulation of data. Please refer to the Discussion section for some amplification. A future research paper will elucidate the value and experience of dancing through interpreting the ethnographic data at length.

Limitations

Parkinson’s is an unpredictable condition, which does not progress in a linear fashion. Parkinson’s medication can become unreliable in time, with certain foods and if taken late. Stress, other high emotional states and lack of sleep can affect symptoms and noticeably affected dance participants on occasion. During each day, people with Parkinson’s may go through periods of feeling fairly normal (“on”) and periods when their symptoms of Parkinson’s take over (“off”). It is difficult to isolate the impact of dance against this backdrop. It was not possible to ask participants to take medications at certain times for the balance and posture measurements; however, they were asked to sign up at a time when they would probably be “on” after taking medication.

Working in the field with a busy ballet company brought its challenges. For example, when arranging testing sessions for the measurements, it was not always possible to test in the studio at the same time of day as the previous test because of Company rehearsal times and the volunteers’ own timetables. As a consequence, participants may have been in a

different “off” or “on” period than when they were tested previously, which could have slightly altered the results. In addition, as this was an arts project, we could not stipulate, like other research projects, whether participants were dance novices, or only in the first stage of disease progression, for example, in order to achieve a clean baseline. However, we entered into the arrangement willingly, as we could see the positive aspects of examining dance in a real, rather than experimental, setting. It allowed us to see the importance and complexity of the whole dance event; the social aspect, as well as the physiological benefits. Indeed, as the 1998 Health Education Authority review on the effectiveness of physical activity schemes points out, many studies of effectiveness “are likely to miss many real effects of a scheme, as they focus upon physical activity levels” (Riddoch et al., 1998, p. 55). The impact of physical activity schemes cannot be measured by physical activity alone. The impact is wider and “subtler” (Riddoch et al., 1998, p. 55) than this.

The small sample size for the statistical data means that we cannot make any generalisations from the results.

Discussion

In the light of the excellent adherence to the dance sessions, the project indicates that dancing would be an appropriate and enjoyable way of encouraging exercise and creative activity for people with Parkinson’s. It may be a useful way to exercise, particularly for this population, because in the short term it may address problems with mobility, stability and movement confidence, as well as potentially creating social networks and promoting well-being.

The project attracted people who were not maintaining regular exercise, who wanted to be led and motivated by being a member of a group. The perception that the dancing was “doing me good” contributed to this motivation. This belief was backed up by the evidence found in the balance tests and observation of movement development. In short, the dance project, a low-impact form of structured and improvised movement with music, seemed to be a successful way of retaining exercise levels and contributing to short-term gains in stability, coordination, mobility and well-being.

The study showed that the dancing helped participants find new pathways of movement allowing for a greater degree of freedom and expression. It is possible that this flexibility in movement quality may have helped to release areas of neuromuscular tension and stiffness in the body. Although posture did not significantly change across time, it may be that 12 inconsecutive dance sessions were not enough to see change. Research suggests that permanent adaptations in posture are only seen when neuromuscular adaptations occur and new pathways are strengthened (Krasnow, Monasterio, & Chatfield, 2001). Therefore, it must be questioned how long it takes for such changes in strength to occur and remember that this will be different for each individual.

This same idea needs to be discussed with respect to balance and stability as changes to these movement capabilities also require time, effort and training. Research suggests that improvements in muscular strength and endurance often require the individual to take part in at least two training sessions per week (O’Brien, Dodd, & Bilney, 2008). Our initial conclusions are that it seems unlikely that the participants in this project had enough consistent exposure to the dance sessions to gain significant levels of strength and proprioception that would improve their balance and stability scores. We suggested in our 2011 report for English National Ballet that,

changes seen in relation to this project specifically are more likely due to participants uncovering abilities that they already had or could have likely achieved at the beginning of the project but were possibly too unsure of their motor abilities to attempt the actions fully. (Houston & McGill, 2011, p. 15)

This observation only takes into consideration the activity carried out for this project. Several participants who took part in the interviews were taking other classes, such as dance, yoga and Pilates, and a few had experienced other exercise forms, such as Tai Chi and golf. (See Tables 1 and 2 for the list of physical activities undertaken by each person who completed the quantitative assessments, in addition to being interviewed.) It was interesting to note that there was no indication that either those who were very active, or those that were coming to dance for the first time, performed better or worse at the balance tests or through observations. One might speculate that the degenerative process of Parkinson's played a part in this result. Further investigation is needed to expand on this observation, suffice to say that whether the balance results were a consequence of increase in strength, proprioception and body awareness, or an increase in movement confidence, this specific project indicates positive development of people's *ability* to carry out tasks that challenge stability and balance irrespective of participation in other activities. This idea is supported by comments made by participants, such as:

I've been listening to Scottish reels. I was listening in pain and I was stiff, but then I did it [got up and danced]. Because of the sessions I had the confidence to do it... It's stopped me thinking I'm... stuck.

Having Parkinson's makes you insecure because you can't predict what will happen. Something like this is wonderful as it makes me feel better. The fact of getting up and doing something and finding you can.

Unusually in research in this area but in line with inclusive dance practices, the ballet project was open to people with any stage of disease progression. Three participants needed carer support for some or all of the dancing. The research indicates that dance can be used even for those with very minimal movement, as the arguably most disabled participant in the group pointed out:

Handicapped though I am, I value the freedom of expression and for this I am deeply grateful. I realise how difficult it must be to include me in the class and how small my contribution is. However, to me it is a breath of fresh air for which I am most appreciative.

The motivation to attend regularly was shown from those participants with a relatively large amount of mobility to those whose movement had been severely compromised. Yet in studying the quotation above and others like it, it is not the fact that it is an exercise class that has motivated this participant to attend, but the opportunity to express himself.

In examining the effectiveness of the project in retaining participants over the course of the 12 weeks and beyond, it was clear that there were a number of differences between it and a regular exercise class. Despite dance being a physical activity, noted for its merits as a form of exercise (Connolly & Redding, 2010), the project leaders were more concerned with promoting ballet as an artistic form. Ballet is a form of communication and artistic expression. Communication in daily life is often difficult for people with Parkinson's, with voices softening and slurring, facial muscles hardening and bodies erratically losing control. Interviews disclosed the embarrassment and frustration that often curtail efforts to communicate. By telling the story non-verbally of *Romeo & Juliet*, by being encouraged to dance together through positive and inclusive facilitation practices, participants appreciated this new way of communicating and for being valued for their contribution to the session.

Although the project was specifically for people with Parkinson's, it did not focus on the disease. Instead, it was an educational project on ballet. Theatre visits, rehearsal viewings and behind-the-scenes talks complemented the dance classes. Dance sequences were often mentally challenging. The intellectual stimulation the ballet encouraged was greatly valued, attracting not only people who were interested in culture, but who also did not like attending Parkinson support groups, or who felt bored by straightforward exercise.

The social interaction gave another reason to stay. It played a crucial role in allowing participants to foster relationships, to have fun together, to find out about how others were coping with their condition and to gain confidence in moving with others with similar challenges. Determination to keep dancing is encapsulated in this comment:

It's being with people who are the same as yourself and all making every effort. Because of what you're feeling yourself you know what effort they're making.

So although people were motivated to attend because ballet was the focus, not Parkinson's, in reality, it was Parkinson's that brought people closer. It brought an emotional significance and connection. One man wrote in his diary:

The closing circle was very moving on the 22nd – somehow we were drawn together by our disability, the only time in the class that I felt Parkinson's really having a defining influence on the class.

In choosing to be active physically, cognitively and socially people with Parkinson's can improve their outcome of quality of life whatever their disease severity (Shulman, 2011). Dancing offers physical exertion, which also can be challenging and stimulating intellectually and emotionally. It offers possibilities of social interaction.

Following Tinetti and Powell (1993), Shulman (2011) concluded that self-efficacy for self-management of the condition was the greatest determinant of disability and quality of life. In exploring the participant experience of dancing, it is clear that in lifting confidence, determination and motivation, participants were moving in ways in which they were probably already capable of doing, but did not have the courage, or the circumstances, to try. The communal motivation of the group developed confidence in being able to achieve. This observation links to our conclusion that the results of the balance tasks were also partly due to an augmented movement confidence.

Dancing can be seen as a successful motivator to encourage physical and social activity. We conclude that it could be useful in particular for those who do not like repetitive exercise regimes, who are socially isolated, who lack confidence, or who have limited movement capabilities, as well as those who enjoy cultural pursuits. This study points to a project that participants engaged with on several levels. Their experience was not just physical, but emotional, intellectual and social. The value of dancing for people lay in the multilayered experience that the dance sessions provided.

Further Research

We are following up this study with a three year investigation with English National Ballet tracking participants over the long term. We are modifying our measurements to take into account the conclusions drawn from this study. Looking at ideas in different ways might show us changes or continuity in a different light. A control group will allow us to investigate the unique nature of dance further and a larger collection of interviews will help form a richer picture of what is meaningful and important to participants. Methodological eclecticism (Hammersley, 1996) is important in a relatively uncharted area and because this study has demonstrated that dance in the field is multifaceted; that

potential physical benefits may be outweighed sometimes by the social, emotional, creative or intellectual effects that a dance project can nurture.

Notes

1. The term “Parkinson’s” will be used throughout the article, rather than “Parkinson’s Disease” or “PD”. The latter two terms are commonly used in scientific papers, particularly in North America. “Parkinson’s” is the preferred term used by the Parkinson’s community in the UK. It emphasises Parkinson’s as a condition that one lives with, rather than a disease. Additionally, “PD” is used by the medical community in the UK to mean “personality disorder” rather than Parkinson’s Disease. As this article deals with the experiences of individuals in the UK, we will use their preferred term “Parkinson’s” throughout.
2. Deep Brain Stimulation, or DBS, is a procedure whereby electrodes are implanted in the brain to sustain an electrical pulse from a small generator installed in the chest to lessen the effect of tremor and slowness. Participant 3 was the only person in the dance group to have had DBS.

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