



DANCE SCIENCE RESEARCH REPORT

The effects of an eight-week creative dance programme on the physiological and psychological status of 11-14 year old adolescents: An experimental study.

Edel Quin, Emma Redding and Lucy Frazer



LABAN



Jif
partnerships

Table of Contents		Page
1.0	Introduction	1
2.0	Research Outline	3
2.1	Research Questions	3
2.2	Areas of Physical Fitness Assessment	3
2.3	Areas of Psychological Assessment	4
2.4	Structure of Assessments	4
2.5	Participants	5
3.0	Research Results	6
3.1	Physical Fitness Results	6
3.2	Psychological Wellbeing Results	9
4.0	Summary of Research Findings	12
5.0	Research Considerations	13
6.0	Future Research	13

Appendix 1: Detailed Methodology

Appendix 2: References

Appendix 3: Contacts

List of Tables and Illustrations	Page
Table 1: Outline of Assessment Structure	4
Table 2: Participant Characteristics	5
Figure 1: Average lung capacity scores in litres for males and females before and after the dance programme	6
Figure 2: Average hamstring flexibility scores in centimetres for males and females before and after the dance programme	7
Figure 3: Average number of shuttle runs for males and females before and after the dance programme	7
Figure 4: Overall percentage (%) increase in physiological areas assessed for males and females after the programme	8
Figure 5: Average male and female scores for self-esteem before and after the dance programme	9
Figure 6. Average scores for male and female Intrinsic Motivation Inventory after the dance programme	10
Figure 7. Overall attitudes towards dance after the dance programme	11

1.0 Introduction

Dance and the Healthy-Living Agenda

The recent government White paper 'Choosing Health'¹ prioritises the importance of increasing levels of physical activity with young people and research indicates that physical activity patterns established in childhood continue into adolescence and on into adulthood. Thus interventions focussing on children and young people are essential.

As a physical activity and a creative art form, it is believed that dance can make a significant contribution to the healthy-living agenda. Anecdotally it is known that dance has the potential to motivate and excite young people. It provides an active, non-competitive form of exercise that has potential positive effects for physical health as well as mental and emotional wellbeing. Dance can be a way of engaging young people, especially girls, in physical activity.

NRG Youth Dance and Health Project

In September 2004, the Joint Investment Fund for the Arts in the SHIPS region (JIF) commissioned Hampshire Dance and Laban to develop a youth dance project which would scientifically investigate the impact of dance on young people's health and wellbeing.

The project was devised with the aim of assessing the effects of a creative dance programme on the physiological and psychological health and fitness characteristics of school children aged 11-14 years old in the SHIPS region (Southampton, Hampshire, Portsmouth and the Isle of Wight). It was undertaken between October 2005 and March 2006 and involved 348 young people in nine schools across seven local authority and unitary districts. To coincide with the school term timetable, the project was delivered as a ten-week programme.

The programme of dance sessions had a strong focus on creativity so as to educate and inspire young people and to provide an opportunity for them to experience and enjoy dance as both a creative art form and a physical activity.

Rationale for Research

Dance is known to provide a means of expression and communication; 'Creating dance provides people with the opportunity to make individual responses to their world' and '...because of its expressive and creative nature [dance] stands apart from other physical activities.'² As such dance is acknowledged as being instrumental in developing young people's creative and artistic, personal and social skills. Moreover, as a physical activity, dance may also impact positively on fitness, health and wellbeing.

Much research in sport suggests that physical activity can have a positive effect on physical fitness^{3,4} and general psychological well-being.⁵ For example, studies have shown that physical activity increases lung function,^{6,7} flexibility,⁸ and aerobic capacity.⁹ In addition, various psychological benefits, such as self-esteem, have also been enhanced.¹⁰ It is interesting to note that in general, adolescent females' involvement in physical activity is less than that of adolescent males. Furthermore female involvement decreases from adolescence onwards.^{11,12,13}

As a result of the recent UK government level health initiatives to encourage more children to participate in physical activities, dance is increasingly on the agenda as a way of enhancing physical and psychological wellbeing. While the benefits of sports activities are well documented, the potential benefits of dance in this regard are less well known. Although dance educators are aware of these possible benefits, much of this knowledge is anecdotal rather than evidence based. There is, therefore, an increasing demand from dance providers for evidence relating to the potential physiological and/or psychological benefits of dance. This study intended to provide some such evidence, in relation to creative dance*.

*The term creative dance is used in this report to refer to the creative emphasis of the dance classes. Aspects of the dance sessions incorporated recognisable 'contemporary' or 'street dance' styles, however the main focus of the sessions was on the creative process, i.e. composing movements and dance phrases based on themes that were presented by the dance artist.

2.0 Research Outline

2.1 Research Questions

- Does creative dance have an effect on elements of **physical fitness** in 11-14 year old school children?
- Does creative dance have an effect on elements of **psychological wellbeing** in 11-14 year old school children?

2.2 Areas of Physical Fitness Assessment

- **Lung Capacity**
- **Flexibility**
- **Aerobic Capacity**

Lung Capacity (or function and capacity of the lungs)

To assess lung capacity a digital measuring device, called a Lung Spirometer (LS) was used [Appendix 1]. Two readings were displayed, the first indicated power of the lungs (Forced Expiratory Volume per one second (FEV)), and the second indicated total lung capacity (Functional Vital Capacity (FVC)). Measured in litres, a higher score in each measure represents greater lung capacity.

Flexibility (or range of motion at a joint)

Flexibility was assessed using a Sit-and-Reach (SR) box, which measures lower back and leg range of motion [Appendix 1]. Measured in centimetres, a higher score represented greater flexibility.

Aerobic Capacity (or cardiovascular endurance)

The 20 metre Shuttle Run test, more commonly known as a 'bleep test', was used to assess aerobic capacity [Appendix 1]. This test was scored by recording the total number of shuttle runs completed. A higher score represented a greater aerobic capacity.

2.3 Areas of Psychological Assessment

- **Self-esteem**
- **Intrinsic Motivation**
- **Attitudes towards dance**

Self-esteem (or self-respect; pride in oneself)

A standardised Self Esteem Scale (SES) [Appendix 1] was used to assess general, rather than activity-specific, self-esteem. A higher overall score signifies greater self-esteem.

Intrinsic Motivation (or participation for pleasure rather than external reward)

To assess motivation a standardised Intrinsic Motivation Inventory (IMI) [Appendix 1] was used. A higher score signifies greater intrinsic motivation.

Attitudes towards dance

A newly devised qualitative questionnaire, that included open ended questions, was used to assess attitudes towards dance [Appendix 1]. This gave the participants the opportunity to put their experience into their own words. Responses were then analysed as 'positive', 'negative' or 'undecided' and a percentage of each category was calculated.

2.4 Structure of Assessments

Table 1: Outline of Assessment Structure

Weeks	Activity	Tests Administered
1	Testing only	Lung capacity, Flexibility, Aerobic capacity, Attitudes towards dance
2	Dance class and testing	Self Esteem Scale
3-8	Dance class only	None
9	Dance class and testing	Self Esteem Scale
10	Testing only	Lung capacity, Flexibility, Aerobic capacity, Attitudes towards dance, Intrinsic Motivation Inventory

2.5 Participants

A staff member from each school was required to sign an ethical consent form on behalf of their participant class group, unless they deemed it necessary to seek individual parental consent. As is common in experimental research with large participant numbers, not all those registered for the project were available for every testing session. Only complete data sets were used for analysis, leaving 226 research participants. Participants' gender, age and height were recorded and are outlined below (Table 2).

Table 2: Participant Characteristics

	Participants (N)	Age (yr)		Height (m)	
		Mean	SD	Mean	SD
Male	68	13	±0.87	1.58	±0.11
Female	158	13	±0.73	1.59	±0.07
ALL	226	13	±0.77	1.59	±0.08

SD = Standard deviation to the mean

3.0 Research Results

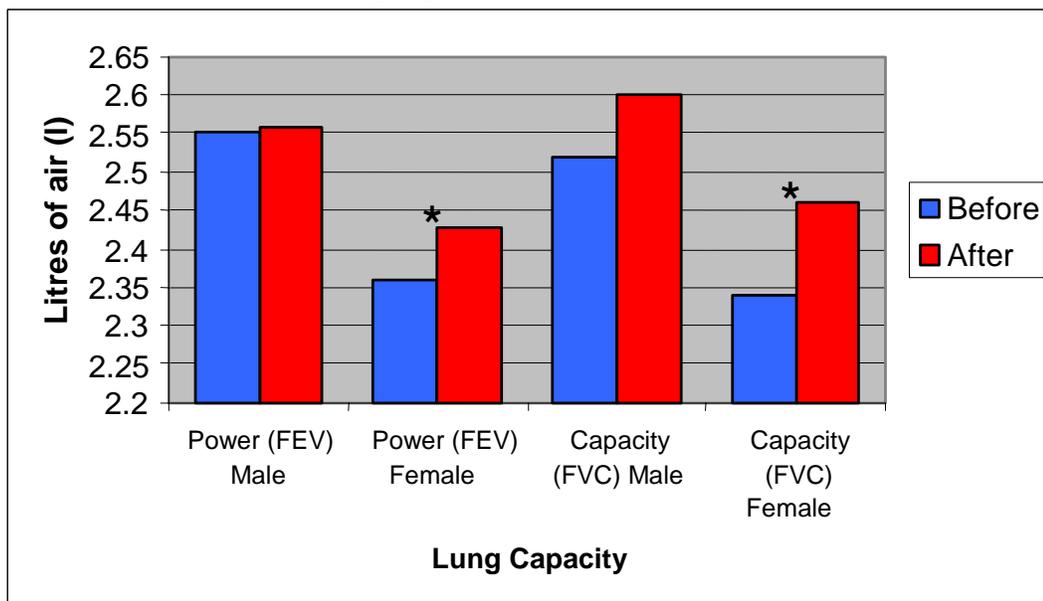
Statistical significance was set at $p < 0.05$

3.1 Physical Fitness Results

The degree of change in the three areas of physical fitness as a result of participation in the dance classes was statistically analysed.

**Results found that creative dance increased lung capacity, flexibility and aerobic capacity.
A statistically significant increase was found in the females.**

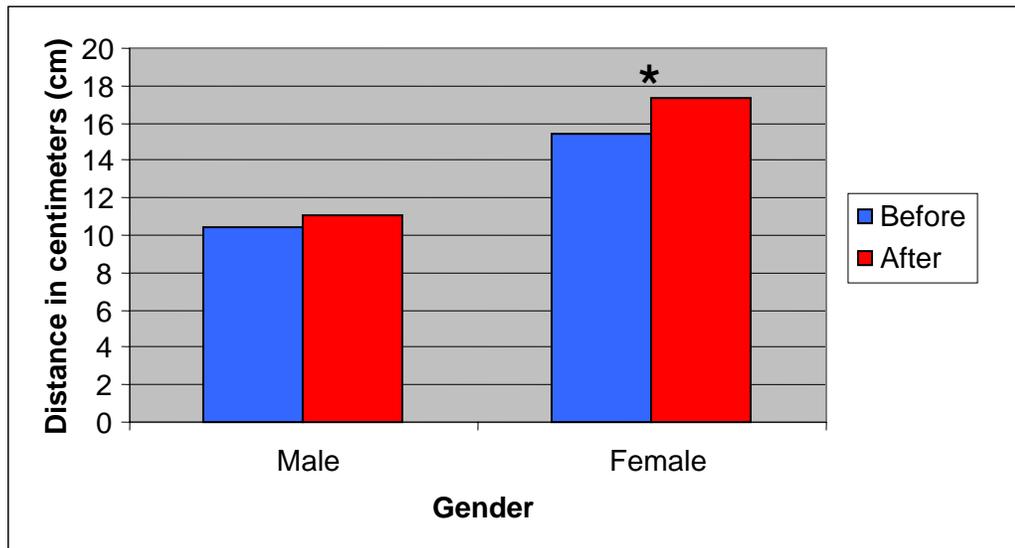
Figure 1. Average lung capacity scores in litres for males and females before and after the dance programme



* denotes statistical significant difference, $p < 0.05$

Males and females increased their lung capacity (FEV and FVC). Due to the physiological differences between males and females¹⁴ it is natural for males to have greater lung capacities than females, (Figure 1) however only the females showed statistically significant improvements. Interestingly, average lung capacity values for both male and female (before and after) were below the recommended values for the group's mean height, indicating potential for more improvement in both gender's lung capacity scores.

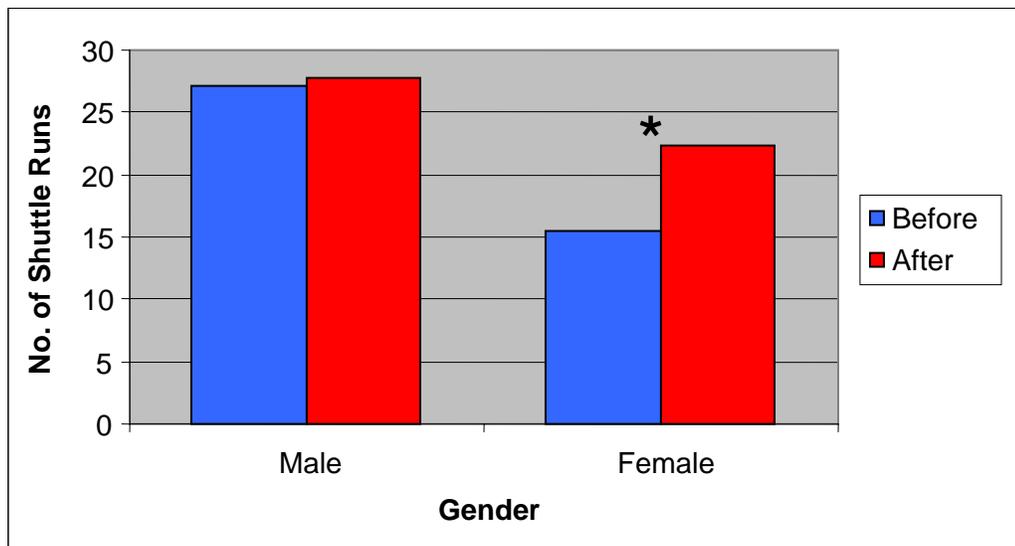
Figure 2. Average hamstring flexibility scores in centimetres for males and females before and after the dance programme



* denotes statistical significant difference, $p < 0.05$

Females statistically improved their flexibility more than the males. Female joint range of motion and their potential for improvement is generally higher than that of males¹⁵. This has been supported with the significant female improvement even though their initial flexibility was greater than the males.

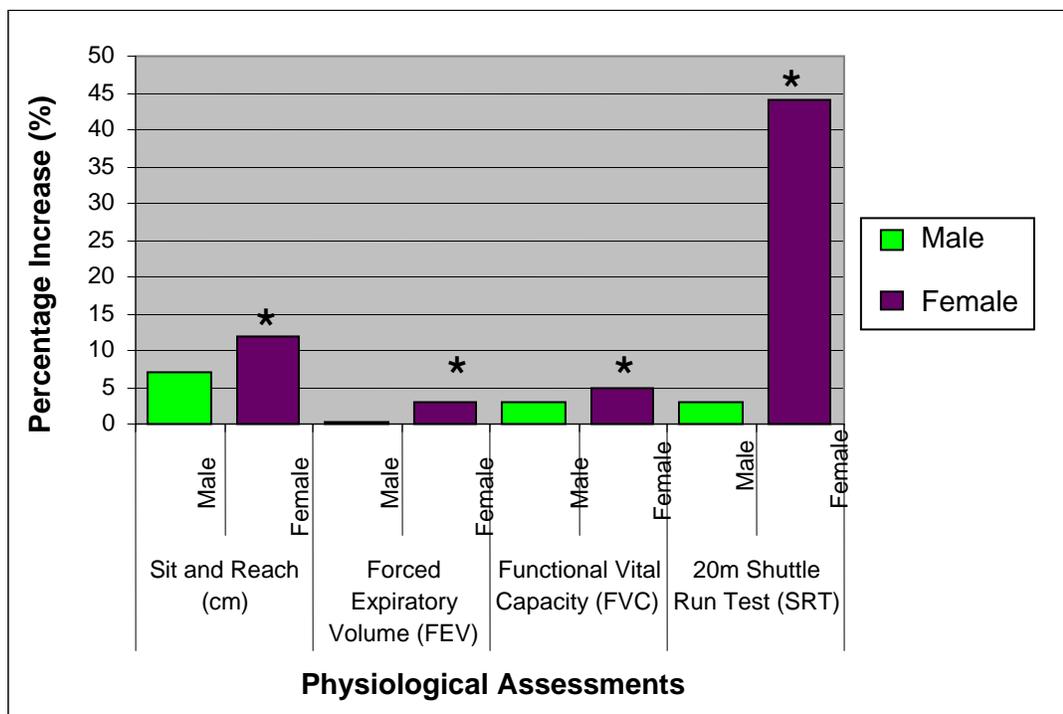
Figure 3. Average number of shuttle runs for males and females before and after the dance programme



* denotes statistical significant difference, $p < 0.05$

Males' initial aerobic capacity was higher than the females. This supports previous literature which has stated that male adolescents are generally more active than females, and partake in activities that are more vigorous.^{11,12,13} The relatively high initial aerobic capacity for the males meant that a statistically significant improvement would require a higher intensity. The statistically significant increase in females' aerobic capacity indicates the intensity levels of the dance classes were appropriate to elicit this change.

Figure 4. Overall percentage (%) increase in physiological areas assessed for males and females after the programme



*denotes statistical significant difference, $p < 0.05$

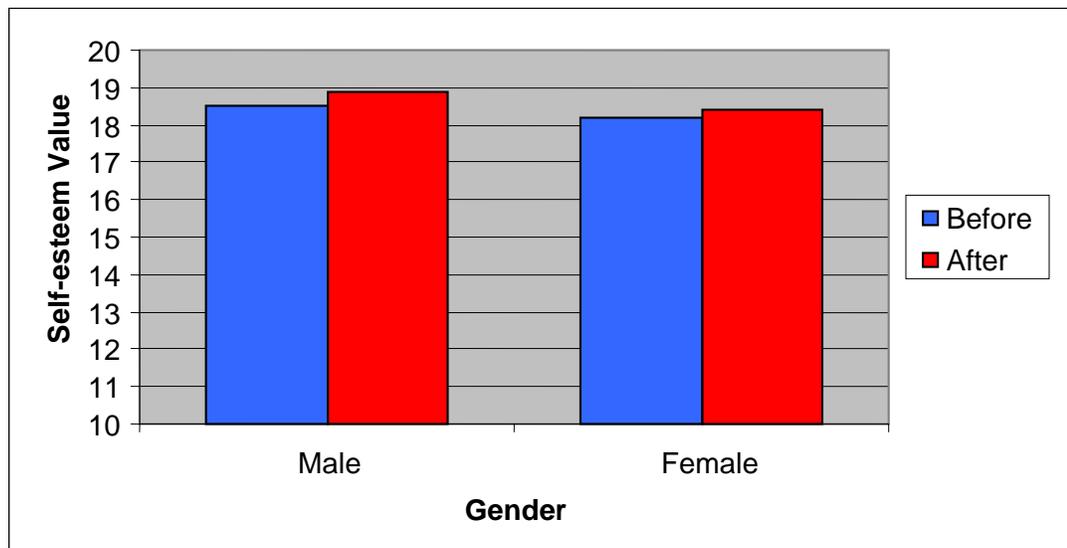
This graph summarises the percentage increase in each of the three areas of physical assessment. It shows that the females improved more than the males. It also shows the substantial increase in the female aerobic capacity as shown by the 20m SRT.

3.2 Psychological Wellbeing Results

The degree of change in the three areas of psychological wellbeing as a result of participation in the dance classes was analysed qualitatively and quantitatively.

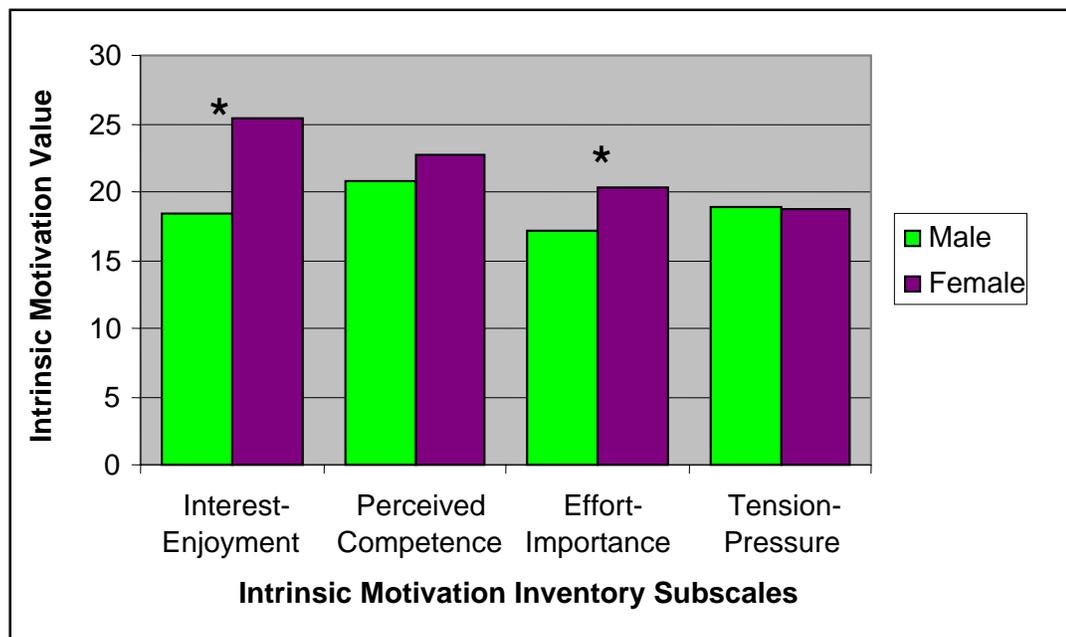
**Results found that creative dance enhanced psychological wellbeing in all three areas.
These changes were positive but statistically not significant.**

Figure 5. Average male and female scores for self-esteem before and after the dance programme.



Positive improvements were found in male and female self-esteem however statistically this improvement was not significant. It is worth noting that the SES is a global measurement of self-esteem, and not dance or activity specific.

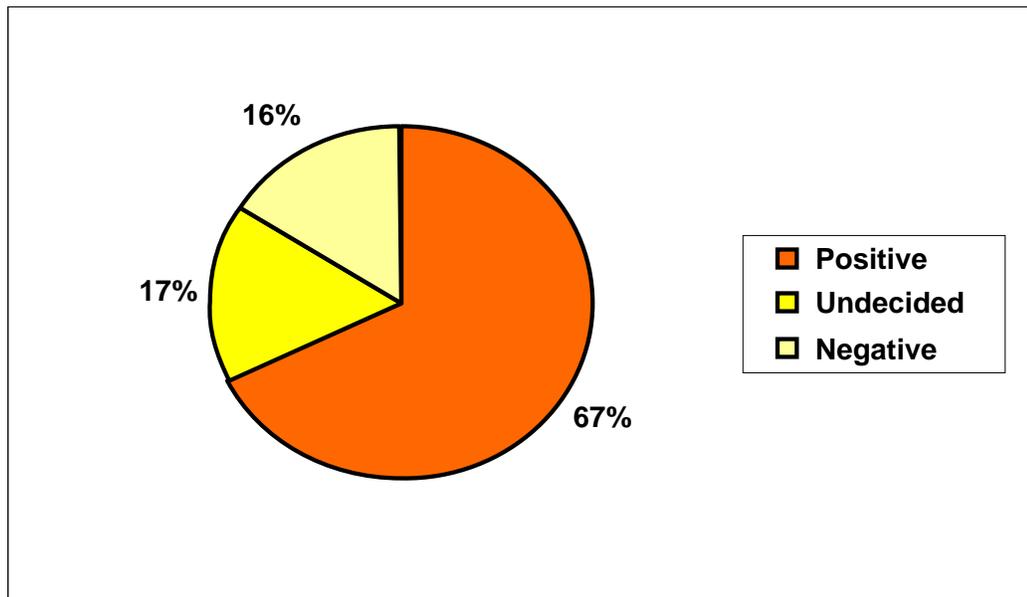
Figure 6. Average scores for male and female Intrinsic Motivation Inventory after the dance programme



* denotes statistical significant difference, $p < 0.05$

According to the IMI, completed at the end of the dance programme, males and females experienced different levels of intrinsic motivation. Females experienced significantly higher levels of interest-enjoyment and effort-importance than the males. Females also had a higher perceived competence level although this was not significant. Males and females experienced similar levels of tension-pressure. This would indicate that females had greater overall motivation to take part in the dance programme, which is consistent with previous literature assessing gender differences in motivation in relation to gender stereotyped activities.^{16,17} These motivational differences could also explain why the females showed a significant improvement in areas of physical assessment.

Figure 7. Overall attitudes towards dance after the dance programme



Based on responses to the qualitative questionnaire, over two-thirds of the group reported positively to the open-ended questions about attitudes towards the dance programme. Consistent with the majority of other areas assessed, the females responded more positively than the males. Despite this, the overall majority reported the dance programme as being fun, exciting and enjoyable. For example one participant commented:

"I'm now fitter and healthier. I thought it would be boring but it was a lot of fun. I would want to do it again."

4.0 Summary of Research Findings

Overall the dance programme had a positive effect on both physical fitness and psychological wellbeing. These findings support what is known anecdotally among dance practitioners and scientifically validate the potential health benefits of creative dance.

Creative dance is shown to be an activity that has potential to increase the health status of this age group by eliciting positive changes in certain aspects of physical fitness and psychological wellbeing. Therefore creative dance not only aids personal development but is also an activity that adolescents can be involved in for health and fitness purposes.

- **Creative dance can be considered a valid alternative to sport for eliciting certain health and fitness benefits.**

Statistical analysis shows that in this case, females benefited physiologically more than males from this form of physical activity. Females also had overall greater motivation in comparison to males. This suggests that creative dance is particularly beneficial for female adolescents.

- **Females who 'drop-out' of most other physical activities at this age could be more inclined to engage in dance and/or creative dance if available to them.**

Psychologically, although not significant, the positive responses in the wellbeing assessments suggest that a dance programme such as this has the potential to elicit positive effects on self-esteem, motivation and attitudes towards dance as a form of physical activity.

- **Creative dance can enhance psychological wellbeing.**

Previous studies have shown that those who are involved in physical activity in their youth will carry that involvement through to adulthood¹⁸, thus reducing risks of heart disease and other health related problems.

- **Involvement in dance during adolescence could increase involvement in physical activity in later life, thereby reducing health risks.**

5.0 Research Considerations

- This project did not have a control group. Although discussions were conducted about the additional validity a control group would give to the project, the feasibility of accessing a control group that was at least one-third of the participating group was not possible on this occasion.
- The impact of involvement in activities external to the programme was monitored within the open-ended questionnaire that enquired about attitudes towards dance however this information was not consistent enough to form part of the analysis.
- Unlike the other tests, the Self Esteem Scale (SES) was administered by the dance artists instead of the primary researcher. This was due to time constraints in weeks 1 and 10. In some cases tests were not re-administered in week 9 as scheduled. As a result these groups completed their second SES after the 20m Shuttle Run Test, in week 10, which may have affected responses.
- In an attempt to minimise group differences in class structure, content, and intensity, all dance artists administering the dance programme received specific guidelines and training. Nonetheless, six dance artists administered the classes, which no doubt introduced some unaccountable variables.
- Previous studies have recommended that activity sessions be administered up to three times a week,¹⁹ however, the dance class in this study only occurred once a week due to restrictions in school scheduling. Perhaps with a greater amount of classes even greater improvements might occur.

6.0 Future Research

A project of this kind has never before been undertaken in the UK. It is therefore pioneering and forward thinking in determining, through scientific methodology, the extent to which creative dance affects physiological and psychological wellbeing among young adolescents. There is still much to be done. For example, the study could be replicated in other regions of the UK and with other age groups, gender specific effects could be investigated further, and the percent of participants that continue involvement in dance could be tracked. Support for future research would further this field of investigation.

Appendix 1: Detailed Methodology

Schools were advised to ensure participants were in appropriate attire, such as gym/dance clothes and trainers.

Pre-test structure

A named class register for each participating group was provided before testing. The researcher used these names to pre-prepare individual record sheets for each participant's data. Upon arrival in the testing hall the researchers and dance artists were introduced and the procedure for the day was explained.

- o The class was immediately divided into 2 even groups. Where possible these groups were same gender
- o Group A went to Station 1 to have height and lung capacity measured while group B completed the Sit and Reach test (SR) at Station 2. Each participant was measured individually. Once all group A and B were measured, the groups swapped Stations.
- o While the individual participants were waiting in their groups to be tested, they were given an information sheet that outlined the project and explained each test. They also completed the newly devised open ended questionnaire
- o Upon completion of this section of testing the rules and protocol for the 20m Shuttle Run Test (SRT) were explained to both groups.
- o Upon completion of the 20 MST the dance artist spent 10-20mins on a movement and cool-down section with the entire group
- o The Self Esteem Scale (SES), administered in week 2, was completed at the end of the dance class under the guidance of the dance artist who had clear instructions provided by the researcher.

Upon returning to the research lab all data from the individual record sheets were inputted to Microsoft Excel and SPSS (Statistical Package for Social Science) files for later analysis.

Post-test structure

This followed the same structure as the pre-testing. The additional Intrinsic Motivation Inventory (IMI) was completed along with the post-version of the newly devised open ended questionnaire while awaiting measurement for Stations 1 and 2. The SES was administered in week 9.

Test Procedures

Lung Capacity

To assess lung capacity each participant took a big inhalation to maximally fill their lungs with air. Sealing their lips around a disposable mouthpiece the air was expelled out and down a tube into the Lung Spirometer (LS). Two attempts were made and the best score was recorded for analysis.



Figure A1. Lung Spirometer (Cranlea, UK)

Flexibility

Each participant sat on the floor with their legs extended and were directed to keep their knees straight and toes pointing towards the ceiling. With one hand on top of the other they exhaled and reached their hands as far along the top of the box as possible. This position was held for 2-3 seconds, released and then repeated twice more. A scale (in centimetres) on the top of the box was used to record the distance reached. An average score from the three attempts was used for analysis.

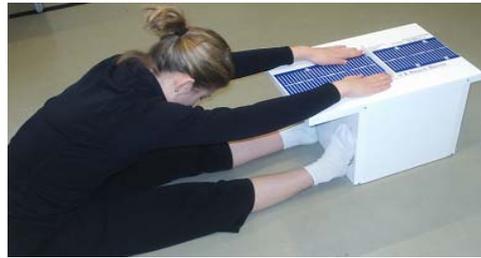


Figure A2. Sit and Reach Test (Micro Medical, UK)

20m Shuttle Run test for measuring aerobic capacity.

Many of the children were already familiar with this test as it had been used within their Physical Education programme. The protocol followed that of the accompanying test CD (Sports Coach UK and University of Loughborough, 2002) The participants ran from point A to point B (1 shuttle) within a timeframe dictated by pre-recorded beeps on the accompanying test CD. As the test continued, the timeframe in which to complete the shuttle run decreased.

Table A1. Table outlining no. of shuttles, accumulated shuttles, total distance and speed during the first six stages of the test according to the protocol used

Level	No. of 20m shuttles	Accumulated no. of shuttles	Total distance (m)	Speed (kph)
1	7	7	140	8.0
2	8	15	300	9.0
3	8	23	460	9.5
4	9	32	640	10.0
5	9	41	820	10.5
6	10	51	2000	11.0

Due to varied space limitations across the schools the 20m shuttle length was divided into 2x10m, meaning participants started and ended each run at the same line (from line A to line B = 10m. One run = A to B to A = 20m). It is understood therefore that comparisons with published results in previous literature would not be appropriate in this case. For accurate data collection a research assistant recorded the final level and run of each participant while two others observed the line A and B to ensure the protocol for reaching the lines was met. Additionally a testing assistant or dance artist ran the 20m SRT with each test group.

- o Participants lined up at line A
- o The test CD played a 5 second countdown followed by 3 beeps in close succession. This signified the start of the test.
- o The participants travelled from line A to line B and back to line A before the next 'beep' was heard. This was paced a light jog for all of level 1.
- o Three beeps in close succession signified the start of subsequent levels, each of which required an increase in speed.

Participants were withdrawn from the test if:

- o On 3 successive occasions they did reach within 1m of line A before hearing the 'beep'
- o They were consistently turning before reaching line B
- o It was deemed unhealthy for them to continue
- o Self-withdrawal

Self Esteem Scale²⁰

The scale (shown below) consisted of 10 statements, each of which required the participant to circle one of the following responses; 'Strongly agree', 'Agree', 'Disagree', 'Strongly disagree'. The responses to each statement were calculated, in accordance with the instructions accompanying the scale (responses carried numerical values of 1 – 4). The results of each item were then summed to give a single overall figure that was representative of global self-esteem.

Please read each statement in the table below. If you strongly agree with the statement circle '*strongly agree*'. If you agree circle '*agree*'. If you disagree circle '*disagree*'. If you strongly disagree circle '*strongly disagree*'. Please circle whichever answer **you** feel best describes **your** reaction to each statement.

1. On the whole I am satisfied with myself	Strongly agree	Agree	Disagree	Strongly disagree
2. At times I think I am no good at all	Strongly agree	Agree	Disagree	Strongly disagree
3. I feel that I have a number of good qualities	Strongly agree	Agree	Disagree	Strongly disagree
4. I am able to do things as well as most other people	Strongly agree	Agree	Disagree	Strongly disagree
5. I feel that I do not have much to be proud of	Strongly agree	Agree	Disagree	Strongly disagree
6. I certainly feel useless at times	Strongly agree	Agree	Disagree	Strongly disagree
7. I feel that I am a person of worth, at least on equal plane with others	Strongly agree	Agree	Disagree	Strongly disagree
8. I wish I could have more respect for myself	Strongly agree	Agree	Disagree	Strongly disagree
9. All in all, I am inclined to feel that I am a failure	Strongly agree	Agree	Disagree	Strongly disagree
10. I take a positive attitude towards myself	Strongly agree	Agree	Disagree	Strongly disagree

Intrinsic Motivation Inventory²¹

This inventory (shown below) consisted of 18 statements relating to the dance classes. Each statement required a response by circling one of the following; 'Strongly agree', 'Agree', 'Agree a little', 'Neither agree nor disagree', 'Disagree a little', 'Disagree',

'Strongly disagree'. The responses to each statement were calculated in accordance with the instructions accompanying the inventory (responses carried numerical values of 1 – 7). For this inventory, the 18 statements divide into 4 sub-categories that represent levels of *interest/enjoyment*, *perceived competence*, *effort/importance* and *tension/pressure*.

Please read each sentence in the table below. Then circle your response to that sentence. Please circle whichever answer you feel best describes your reaction to each sentence. For example if you strongly agree then circle 'strongly agree'. If you strongly disagree circle 'strongly disagree' and so on. Only circle only **one** answer for each sentence.

1	I enjoyed this dance programme very much	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
2	I think I am pretty good at dance	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
3	I put a lot of effort into this dance programme	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
4	It was important to me to do well in this dance programme	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
5	I felt tense while doing the dance classes	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
6	I tried very hard while doing the dance classes	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
7	Dancing was fun	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
8	I would describe this programme as very interesting	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
9	I am satisfied with my performance in this dance programme	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
10	I felt pressured while doing the dance classes	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
11	I was anxious while doing the dance classes	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
12	I didn't try very hard for this dance programme	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
13	While doing the dance classes I was thinking about how much I enjoyed it	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
14	After doing the dance classes for a while I felt pretty competent	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
15	I was very relaxed while doing the dance classes	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
16	I am pretty skilled at dance	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
17	This programme did not hold my attention	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree
18	I couldn't do the dance classes very well	Strongly disagree	Disagree	Disagree a little	Neither Agree nor disagree	Agree a little	Agree	Strongly Agree

Researcher devised open-ended qualitative questionnaire

Questions for pre-test period

1. What do you think of dancing?
2. Would you think of dancing for fun? (Please circle your answer)
Yes No Don't know
Reasons for your answer _____
3. Would you think of dancing to stay fit and healthy? (Please circle your answer)
Yes No Don't know
Reasons for your answer _____
4. What activities do you currently do that you think keep you fit and healthy?
5. How often do you do these activities?
Hours _____ Days _____
6. What do you expect to gain from this programme?

Additional questions for post testing period

6. a. What have you gained from this programme?
6. b. Is this what you expected? (Please explain your answer given in 6.a.)
7. Can you tell us in a few words what you thought of the NRG programme?
8. Was there anything you found surprising about the NRG programme?

Statistical analysis

- o Statistical Package for Social Sciences (SPSS) and Microsoft Excel were used for data analysis
- o Statistical significance was set at $p < 0.05$
- o Z tests were used to analyse pre-and post changes in whole group and gender specific data.
- o Cronbach alpha was used to assess reliability of the IMI. The Cronbach alpha coefficient was .91
- o A MANOVA was used to analyse gender differences in IMI subscales
- o Independent t-tests were used to measure gender differences between pre and post data
- o Qualitative data was analysed in percentage

Appendix 2: References

1. Department of Health: Choosing Health: Making healthy choices easier, 2004
2. National Dance Teachers Association (NDTA): *Maximising Opportunity, Policy Paper* 2004
3. Blair SN, Cheng Y, Holder, S: Is physical activity or physical fitness more important in defining health related benefits? *Medicine and Science in Sport and Exercise* S379-398, 2001
4. Strong WB, Malina RM, Blimke CJR, Daniels SR, et. al: Evidence based physical activity for school-age youth. *Journal of Pediatrics* 146: 732-737, 2005
5. Calfas & Taylor: Effects of physical activity on psychological variables in adolescents. *Pediatric Exercise Science* 6: 406-423, 1994
6. Holmen TL, Barrett-Connor E, Clausen J, Holmen J, Bjermer L: Physical exercise, sports, and lung function in smoking verse non-smoking adolescents. *European Respiratory Journal* 19: 8-15, 2002
7. Twisk JWR, Staal BJ, Brinkman MN, Kemper HCG, van Mechelen W: Tracking of lung function parameters and the longitudinal relationship with lifestyle. *European Respiratory Journal* 12: 627-634, 1998
8. Marshall SJ, Sarkin JA, Sallis JF, McKenzie TL: Tracking of health-related fitness components in youths ages 9 to 12. *Medicine and Science in Sport and Exercise* 30(6): 910-916, 1998
9. Baquet G, Berthoin S, Gerbeaux M, Van Praagh E: High-intensity aerobic training during a 10 week one hour physical education cycle: Effects on physical fitness on adolescents aged 11 to 16. *International Journal of Sports Medicine* 22: 295-300, 2001
10. Daley AJ, Buchanan J: Aerobic dance and physical self-perceptions in female adolescents: Some implications for physical education. *Research Quarterly Exercise Sport* 70(2):196-200, 1999
11. Clippenger K: Fitness, dance, and health. *Journal of Dance Medicine & Science* 1(1): 27-29, 1997
12. Livingstone MBE: Energy expenditure and physical activity in relation to fitness in children. *Proceedings of the Nutrition Society* 53: 207-221, 1994
13. Myers L, Strickmiller P, Webber L, Brenson G: Physical and sedentary activity in school children grades 5-8: The Bogalusa heart study. *Medicine and Science in Sport Exercise* 28(7): 852-859, 1996

14. Wilmore JH, Costill DL: Growth development and the young athlete. In: Wilmore JH, Costill DL (eds): *Physiology of Sport and Exercise* (2nd ed). Champaign, IL: Human Kinetics, pp 517-543, 1999
15. Alter MJ: Modern overview of flexibility and stretching. In: Alter MJ (ed): *Science of Flexibility* (3rd ed). Champaign, IL: Human Kinetics, pp 44 & 120, 2004
16. Fairclough, S: Physical activity, perceived competence and enjoyment during high school physical education. *European Journal of Physical Education*, 8, 5-18, 2003
17. Koka A & Hein V: The impact of sports participation after school on intrinsic motivation and perceived learning environment in secondary school physical education. *Kinesiology*, 35(1), 86-93, 2003
18. Pangrazi R, Corbin C, Welk G: Physical Activity for Children and Youth. *Journal of Physical Education, Recreation and Dance*, 67(4), 38-43, 1996
19. Sallis JF, Patrick K, Long BJ: Overview of the International consensus conference on physical activity guidelines for adolescents. *Pediatric Exercise Science* 6:299-301, 1994
20. Rosenberg M: *Society and the Adolescent Self-image*. Princeton: Princeton University Press, 1965
21. McAuley E, Duncan T, Tammen, WV: Psychometric properties of the Intrinsic Motivation Inventory in a competitive sport setting: A confirmatory factor analysis. *Research Quarterly in Exercise and Sport* 60(1): 45-58, 1989

Appendix 3: Contacts

Hampshire Dance

Lucy Frazer
lucy.frazer@hampshiredance.org.uk

Dance Director

Sally Beattie
sally.beattie@hampshiredance.org.uk

Professional Development Coordinator

T: 023 8065 2712
www.hampshiredance.org.uk

Laban

Emma Redding
e.redding@laban.org

Programme Leader – Dance Science

Edel Quin
e.quin@laban.org

Dance Science Researcher

T: 0208 469 9483
www.laban.org

Joint Investment Fund for the Arts in the SHIPS region (JIF)

Cheryl Butler
cheryl.butler@eastleigh.gov.uk

Head of Arts – Eastleigh Borough Council
Leader of the JIF Dance Development Programme
(2004-06)

T: 023 8068 8187
www.eastleigh.gov.uk
www.thepoint-online.co.uk

Photos courtesy of Laban.

© Hampshire Dance and Laban, 2007