The Development of Dance Talent in Young People: An Interdisciplinary Longitudinal Research Project

Interim findings

2008-2009

Sanna Nordin
Imogen Walker
Emma Redding
Introduction

This document reports on the main findings from the first year of the dance talent development project. It contains overall CAT averages (nationwide), showing changes over the six month period between data collections one (winter 2008) and two (summer 2009).

It is important to note that while many positive, and some negative, changes have been observed, these will not necessarily continue over the three years. Therefore, caution should be employed when interpreting or sharing the results to date as further changes might take place between now and the end of the project.

At the end of the report, we have included abstracts (summaries) from conferences at which we have presented during 2009. These abstracts show some of the relationships between variables and are an example of the sorts of research that can be conducted using this data. If you would like any more information about these presentations, please contact us.

**Important note**: the figures presented here represent average values for the groups seen in winter 2008 and summer 2009. However, some dancers who attended one screening session did not attend another (e.g. students new in summer 2009; students leaving after winter 09; absence due to illness, etc.), which means that the groups are not exactly the same. For obvious reasons, our analyses of change across time are performed only for those who attended both screenings. It is also the case that although groups sometimes appear different at the two time points, the difference is not statistically significant because the range of scores is very wide. For all these reasons, there are sometimes visual differences between groups in a figure that are not statistically significant – and vice versa.

In the graphs, we have illustrated the full range of scores on the y-axis (vertically) so as to indicate how large or small any changes were in relation to the overall distribution. In other words, values are set to the minimum and maximum scores recorded by students, so as to give a better “feel” for the scores.

We hope that you find this document informative and useful, and would like to thank you once again for your continued support and contribution to the project.

Sanna, Jen and Emma
The students

Before delving into the main findings, it is important to know something about the nature of the participants studied. Below we highlight the number of students from each CAT at the two different time points: winter 08 and summer 09. Note: not all students did all tests, so the number of participants are reported in relation to each test, below.

There was a small change in the proportion of males and females from winter 08 to summer 09:
1: Physical variables

1.1 Dance Aerobic Fitness Test (DAFT)

The DAFT is a dance-specific fitness test with five stages that increase in intensity. Students wore heart rate monitors while performing the DAFT so that heart rates at each stage could be recorded. The heart rates from stages 3 and 5 are reported here because stage 3 is designed to represent the intensity of technique class, and stage 5 represents stage performance intensity. The DAFT assesses aerobic fitness, which is a measure of stamina (endurance).

Nationally, 306-316 dancers performed the DAFT in winter 08 and 235-243 dancers in summer 09 (numbers vary depending on the stage of the test).

Results show that heart rates for the CATs nationally appear to have decreased between winter 2008 and summer 2009 for both stages. Among the dancers who provided data at both time points (184-194 dancers), the decrease was statistically significant\(^1\). This means that the heart became more efficient, indicating that students are aerobically fitter – a positive finding. It is important to note that these results may not necessarily be solely attributed to the CAT training but also to other factors such as physical activity in school.

\[^1\] t(193) = 6.95, \(p < .01\) for Stage 3, \(t(183) = 6.14, p < 0.01\) for Stage 5
1.2 Vertical jump height

The vertical jump measures one component of anaerobic fitness: muscular power. Jump height can indicate leg power by measuring the time in the air during a jump and converting this into centimetres. We measured jump height in one of two ways: either using a jump mat, where students stood on the mat and jumped as high as possible while the researcher noted down the measurement calculated by the mat; or using a jump belt (pictured). Here, a belt was secured around the students’ waist which was attached to a piece of taut string on a mat. Students jumped maximally, keeping on the mat, and the belt calculated the number of centimetres jumped by how far the string had been stretched. Both methods are reliable indicators of jump height. We used the jump mat at time 1 and the jump belt at time 2.

Nationally, 296 dancers were tested in Winter 08 and 259 dancers in summer 09.

As shown, there seems to have been a decrease in jump height between winter 2008 and summer 2009. Among the dancers who provided data at both time points, the decrease was statistically significant nationally (199 dancers)\(^2\). Because this does not make sense in light of our other findings, we are running additional tests comparing our two methods\(^3\). As such, we suggest caution in interpreting the jump height results for now.

\(^2\) \(t(198) = 14.65, p < .01\)
\(^3\) We may return to using the initial method and/or calculate an average difference value between the two that may then be used as a multiplier for future results.
1.3 Hand grip strength

Hand grip strength is an indicator of global upper body strength measured using a portable dynamometer. The test is dynamic to make it more dance-specific.

Nationally, 291 dancers were tested in winter 08 and 258 dancers in summer 09.

As shown, there seems to have been an increase in hand grip strength between winter 2008 and summer 2009. This is positive, given the importance of muscular strength in skilled dance performance, and may have been due to dance training; however, it may have also been affected by other physical activities and maturation.

Among the dancers who provided data at both time points, the increase was statistically significant nationally (197 dancers)\(^4\).

\(^4\) \(t(196) = -8.32, p < .01\)
1.4: Active and passive hamstring flexibility

Active and passive hamstring flexibility was measured using a straight leg raise assessment (SLR). Students lay on their backs on a mat and were asked to raise one leg as far as possible, while keeping the knee straight and the hips on the floor. The angle between the students’ raised leg and the floor was measured using a large custom-made protractor. Active SLR (pictured) was measured by asking students to raise the leg themselves; for passive SLR the researcher guided the leg to reach the end range of motion (to the point of resistance).

Nationally, 299-300 dancers were tested in winter 08 and 258 dancers in summer 09.

Nationally there appears to have been an increase in both active and passive hamstring flexibility between winter 2008 and summer 2009, and among the dancers who provided data at both time points, these increase were statistically significant nationally (200-201 dancers)\(^5\).

\(^5\) Active: \(t(200) = -7.48, p < .01\); Passive: \(t(199) = -5.92, p < .01\)
1.5 Turnout

We measured turnout using Functional Footprints™, rotator discs that allow for maximum hip external rotation with minimal friction. Students stood on the discs and were encouraged toward correct alignment before being instructed to turn out maximally (externally rotate the hips) three times. An average was taken from the three trials, and between right and left sides.

Nationally, 293 dancers were tested in winter 08 and 260 dancers in summer 09.

As shown, there appears to have been an increase in turnout at the national level between winter 2008 and summer 2009.

Among the dancers who provided data at both time points, the increase was statistically significant nationally (197 dancers)⁶. It is likely that any increases are due to increased strength and control, helping the dancers move closer to their end range of motion.

---

⁶ t(196) = -5.66, p < .01
1.6 Balance

Although essential in dance, balance is difficult to measure. Based on previous research and dance practice, we designed tests that we hoped would challenge the students. The balances were as follows:

1. Standing in parallel, plié, straighten knees, rise, hold for 5 seconds

2. As above but with eyes closed

3. Standing in parallel on the right leg, lift left foot by right ankle, close eyes and hold for 5 seconds (pictured)

4. As above but standing on the left leg

Students were scored on each balance on a number from 1 (falls over) to 5 (very stable). Unsurprisingly, students scored very highly for the first test, and fairly highly for the second. However, most found the third and fourth balances more difficult. This is because the base of support was much smaller and the eyes were closed, meaning students had to rely on their proprioception (our sense of where our bodies are in space). Only the results for balances 3 and 4 are shown here, as balances 1 and 2 were very easy for the students.

Nationally, 299 dancers were tested in winter 08 and 260 dancers in summer 09.

As shown, there appears to have been an increase in balance ability at the national level between winter 2008 and summer 2009.
Among the dancers who provided data at both time points, the increase was statistically significant nationally (201-202 dancers). The significant increase in balance scores over time indicates that both balance and proprioception had improved, because they were performed with eyes closed (thereby involving the proprioceptive system). Improvements are likely attributable to dance training, which uses different types of balance, many of which require proprioception to be performed correctly (e.g. turns, tilts).

Because tests 1 and 2 seem to offer too little challenge to students, we will be adding two more balances to our tests from winter 2009. These are a combination of all the existing tests: students will be asked to stand on one leg, plié, straighten and rise and hold for 5 seconds with their eyes open.

\[ \text{Right leg } t(201) = -5.40, p < .01; \text{ Left leg } t(200) = -6.71, p < .01 \]
1.7 Joint Hypermobility

A hypermobile dancer is one whose joints and tissues can extend beyond the normal range of motion. We screened for hypermobility using standardised protocols, including the Beighton score. This comprises a range of physical tests that assess joint angles (e.g. that of the knee; pictured left).

In physiotherapy, there are a total of 9 such tests. However, one of these movements asks individuals whether they are able to put their hands flat on the floor with straight legs. Because this is a skill involving hamstring flexibility (and, as such, is trained in dance) it is sometimes considered too easy for dancers (i.e. it might indicate a training effect, rather than inherent joint laxity). Thus, for dancers able to perform that movement we add an extra level of difficulty: asking them to put their hands flat on the floor next to their heels (pictured right). For this reason, we have a maximum score of 10 and dancers scoring 5 or more are considered joint hypermobile.

Nationally, 273 dancers were tested in winter 08 and 261 dancers in summer 09.
As shown, a considerable percentage (around 50%) of CAT dancers may be considered joint hypermobile. There appears to be some decrease from winter 08 to summer 09. However, analyses of change across time shows that this is not the case for those who took part at both time points (203 dancers). The percentage who changed (from hypermobile to non- or vice versa) is small, as would be expected:

![Pie chart showing distribution of hypermobility]

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistently hypermobile</td>
<td>34%</td>
</tr>
<tr>
<td>Consistently non-hypermobile</td>
<td>42%</td>
</tr>
<tr>
<td>Changed from non- to hypermobile</td>
<td>13%</td>
</tr>
<tr>
<td>Changed from hypermobile to non-</td>
<td>11%</td>
</tr>
</tbody>
</table>

CAT dancers in their early teens may have grown between winter 08 and summer 09, and some may have become less hypermobile as a result (that is, joints may stabilise during this time). Other dancers may have become more flexible as a result of training, and thus become able to perform especially the forward flexion tests mentioned earlier. There is also a degree of human error in measurement that needs to be considered.
1.8 Injury

At the time of screening, current injury was recorded via self-report as part of a survey. Nationally, 296 dancers were surveyed in winter 08 and 263 dancers in summer 09.

We found that a larger proportion of dancers were injured in summer 09 than in winter 08. This may be unsurprising, given that injuries are often caused by repetition, overuse and fatigue, which can occur during busy rehearsal and performance periods. We are also aware that many dancers had conflicting demands at the time of summer screening, with both dance performances and school exams.

However, analyses of change across time shows that for those who reported their injury status at both time points (198 dancers), the percentage that changed is small. Importantly, the number of dancers who changed their status from injured to non-injured (11.1%) is very similar to the number who changed from non-injured to injured (13.1%), and the majority of dancers were consistently non-injured (63.1%):
As we now have on-going injury tracking in place for all CATs, we will soon be able to present more in-depth findings relating to the dancers’ injuries.
2: Psychological characteristics

2.1 Self-esteem

The Rosenberg Self-Esteem Scale (1965) measured students’ favourable and unfavourable attitudes towards themselves in a 10-item questionnaire.

Two example items are:

<table>
<thead>
<tr>
<th>Item</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) On the whole, I am satisfied with myself</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2) At times I think I am no good at all</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Nationally, 312 dancers completed this questionnaire in winter 08 and 251 dancers in summer 09.

Overall, self-esteem scores were high (equivalent to answers around 3 on the 1-4 scale shown above) - a positive finding. As shown, self-esteem also stayed largely stable over time, probably because it represents global feelings about oneself and as such is less likely to be affected by day-to-day events. There were no statistically significant changes to self-esteem (192 dancers)\(^8\).

---

\(^8\) \(t(191) = .47, p = \text{NS}\)
2.2 Anxiety

We measured feelings of anxiety during class with the Sport Anxiety Scale-2 (Smith, Smoll, Cumming & Grossbard, 2006) which assesses three aspects of anxiety: somatic (physical, such as tense muscles), worry, and concentration disruption. These are added to form a composite anxiety score. Although initially made for use with athletes, the scale was modified for use in dance.

Three example items (one from each of the three aspects of anxiety) are:

<table>
<thead>
<tr>
<th>Item</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) It is hard to concentrate on the dancing.</td>
<td>1</td>
</tr>
<tr>
<td>2) My body feels tense.</td>
<td>1</td>
</tr>
<tr>
<td>3) I worry that I will not dance well.</td>
<td>1</td>
</tr>
</tbody>
</table>

Nationally, 313 dancers completed this questionnaire in winter 08 and 253 dancers in summer 09. For Laban, the numbers were 48 and 39 dancers, respectively.

Overall, anxiety scores were low (equivalent to answers around 1.5 on the 1-4 scale shown above) - a positive finding. As shown, anxiety also appeared to stay relatively stable between winter 08 and summer 09. Among those who completed the questionnaire at both time points, there were no statistically significant changes (192 dancers). In other words, dancers did not seem any more anxious in their dance classes around summer performance time 2009 than in winter time 2008.

---

9 $t(191) = 1.17, p = NS$
2.3 Perfectionism

Perfectionism was captured using the Perfectionism Inventory (Hill, Huelsman, Furr, Kibler, Vicente & Kennedy, 2004). This questionnaire captures two overarching constructs: *self-evaluative* and *conscientious* perfectionism. These are further described in the table below.

<table>
<thead>
<tr>
<th>Conscientious Perfectionism</th>
<th>Self-evaluative Perfectionism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strives for perfection</td>
<td>Highly concerned over mistakes</td>
</tr>
<tr>
<td>Highly planful</td>
<td>High need for teacher approval</td>
</tr>
<tr>
<td>Holds high standards for others</td>
<td>Perceives pressure from teachers</td>
</tr>
</tbody>
</table>

Ruminates

Example items (one from each of the two perfectionism types) are:

*Please think about your life around dance when answering these questions, not your life in general*

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat</th>
<th>Neither nor Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My work needs to be perfect, in order for me to be satisfied.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2. If I make mistakes, people might think less of me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Nationally, 297 dancers completed this questionnaire in winter 08 and 240 dancers in summer 09.
Note that although self-evaluative perfectionism scores appear higher than those for conscientious perfectionism, this is only because there are more questions for the former than for the latter. Overall, perfectionism scores were moderate (equivalent to scores around 3 on the scale shown above).

As illustrated in the graph, perfectionism scores appeared to slightly decrease from winter 08 to summer 09. Among those who completed the questionnaire at both time points nationally (173-175 dancers), there was a statistically significant decrease in conscientious perfectionism, and a marginal decrease in self-evaluative perfectionism.\(^\text{10}\)

\(^{10}\) Conscientious perfectionism \(t(174) = 3.02, p < .01\); Self-evaluative perfectionism \(t(172) = 2.21, p < .05\)
2.4 Eating Attitudes

We captured the dancers’ thoughts and feelings about food and eating with the Eating Attitudes Test (EAT-26; Garner et al., 1982). The questionnaire enquires about three aspects of disordered eating: dieting, bulimia and food preoccupation, and oral control. These have been added to form a composite eating attitudes score. Three example items (one from each of the three aspects) are:

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Usually</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I am terrified about being overweight.</td>
<td>Always</td>
<td>Usually</td>
<td>Often</td>
<td>Sometimes</td>
<td>Rarely</td>
</tr>
<tr>
<td>2.</td>
<td>I avoid eating when I am hungry.</td>
<td>Always</td>
<td>Usually</td>
<td>Often</td>
<td>Sometimes</td>
<td>Rarely</td>
</tr>
<tr>
<td>3.</td>
<td>I have gone on eating binges where I feel I may not be able to stop.</td>
<td>Always</td>
<td>Usually</td>
<td>Often</td>
<td>Sometimes</td>
<td>Rarely</td>
</tr>
</tbody>
</table>

Nationally, 326 dancers completed this questionnaire in winter 08 and 246 dancers in summer 09. For Laban, the numbers were 49 and 33 dancers, respectively.

Overall, scores were low - a positive finding\(^{11}\). However, scores did increase from winter 08 to summer 09: among those who completed the questionnaire at both times, this increase was statistically significant nationally (194 dancers)\(^ {12}\). In other words, dancers exhibited slightly more disordered eating attitudes over time. It is possible that this is due to perceptions of increased pressure, whether from home, school, and/or dance during the end of the academic year.

\(^{11}\) EAT scores need to be transformed logarithmically to enable statistics to be run, because of skew. This means that the y-axis for this particular variable is less easy to interpret than those for other variables, given that it does not correspond to the scores within the questionnaire. However, higher numbers (closer to 1) correspond to more disordered eating attitudes, and lower scores (closer to 0) to healthier attitudes.

\(^{12}\) \(t(193) = -6.58, p < .01\)

2.5 Motivational Climate

The motivational climate is the teacher-created psychological atmosphere in the dance school. We measured the motivational climate in both CAT and non-CAT dance settings with the Perceptions of Motivational Climate in Sport Scale-2 (Newton, Duda & Yin, 2000), which has been modified for use in dance. These are further described in the table below.

<table>
<thead>
<tr>
<th>Task-involving Climate</th>
<th>Ego-involving Climate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus on mastery</td>
<td>Focus on outdoing others</td>
</tr>
<tr>
<td>Self-referenced:</td>
<td>Other-referenced:</td>
</tr>
<tr>
<td>students encouraged to compare themselves to themselves</td>
<td>students encouraged to compare themselves to others</td>
</tr>
<tr>
<td>Cooperative</td>
<td>Rivalry</td>
</tr>
<tr>
<td>Effort over success</td>
<td>Success over effort</td>
</tr>
</tbody>
</table>

Example items (one from each of the two climate types) are:

<table>
<thead>
<tr>
<th>In this CAT ...</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Each dancer contributes in some important way.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2 The teachers give most of their attention to the “stars”.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Nationally, 314 dancers completed this questionnaire in winter 08 and 249 dancers in summer 09.
As illustrated above, students overwhelmingly perceived their CAT climate to be more task-involving than ego-involving. However, perceptions of an ego-involving climate did appear to increase from winter 08 to summer 09. Among those who completed the questionnaire at both time points there was a statistically significant increase in perceptions of ego-involving climate features, and no change in task-involving climate features; this was the case nationally (186-192 dancers).\(^{13}\)

It may be that the increase in ego-involving climate features has occurred as the CATs were in performance periods during the summer, but not in winter. It is encouraging that the task-involving aspects of the climate stayed high and did not decrease as ego perceptions increased.

\(^{13}\) Ego-involvement \(t(191) = -14.21, p < .01\); task-involvement \(t(185) = .83, p = NS\)
2.6 Passion

At the CAT conference at Laban in September 2008, we detailed the variables that we were going to assess. Passion was not one of them! However, in discussion with CAT teachers at the conference, there seemed to be a real interest in passion, or “how much they want it”. Therefore, we added the Passion Scale (Vallerand et al., 2003) to our measures. This questionnaire measures the extent to which students are passionate about dance, and the extent to which this passion is harmonious or obsessive. These two forms of passion are described in the table below.

<table>
<thead>
<tr>
<th>Harmonious Passion</th>
<th>Obsessive Passion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible involvement</td>
<td>Rigorous adherence</td>
</tr>
<tr>
<td>Fits with other activities</td>
<td>May clash with other activities</td>
</tr>
<tr>
<td>Can stop if facing negative consequences (e.g. injury)</td>
<td>Struggles to stop even if facing negative consequences</td>
</tr>
<tr>
<td>Identity formation from several sources</td>
<td>Identity and feelings of self-worth derived only from passion activity</td>
</tr>
</tbody>
</table>

Students are first asked to “describe an activity that you like, that is important for you, and in which you spend a lot of time. My favorite activity is:______________________”

If they write dance (or an aspect of dance), they are considered for further analyses based on a set of 16 items. Example items (one from each of the two passion types) are:

<table>
<thead>
<tr>
<th>While thinking of your favorite activity, please say how much you agree with these statements:</th>
<th>Do not agree at all</th>
<th>Very slightly agree</th>
<th>Slightly agree</th>
<th>Moderately agree</th>
<th>Mostly agree</th>
<th>Strongly agree</th>
<th>Very strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) The new things that I discover with this activity allow me to appreciate it even more.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>2) I have almost an obsessive feeling for this activity.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Nationally, 312 dancers completed this questionnaire in winter 08 and 261 dancers in summer 09.
As shown above, the majority of CAT students are passionate about dance. *Note that those who did not classify as passionate in this way probably (or even presumably) still do like dance a great deal – however, they may like something else even more, or have several favourite activities.*

![Graph showing percentage of passionate and not passionate CAT students in Summer 09 and Winter 08](image)

It is also clear that among those who qualify as passionate, their passion is generally far more harmonious than obsessive - a positive finding. Over time, there appears to have been no change in harmonious passion, but a decrease in obsessive passion; among those who completed the questionnaire at both time points these patterns were shown to be statistically significant nationally (122-125 dancers)\(^{14}\).

\[^{14}\text{Harmonious } t(121) = .92, p = \text{NS}; \text{Obsessive } t(124) = 5.35, p < .01\]
Conference abstracts

Here, we present the abstracts (summaries) of scientific presentations we have delivered during 2009. They represent our individual research interests and go into a far smaller number of variables but in greater depth than that reported above.

Listed in order, these are:

1. **Motivational climate and perfectionism among young talented dancers: Findings from the UK Centres for Advanced Training**  
   *Presented at the International Society of Sport Psychology 12th World Congress of Sport Psychology, 17-21 June 2009, Marrakesh, Morocco.*

2. **Dance talent in young people: A unique approach to interdisciplinary research and pedagogy in dance training**  
   *Presented at: Global Perspectives on Dance Pedagogy Research and Practice: Congress on Research in Dance Special Conference, 25-27 June 2009, De Montfort University, Leicester.*

3. **Correlates of disordered eating attitudes in a mixed-sex sample of young talented dancers: Findings from the UK Centres for Advanced Training**  

4. **Passion and well-being in young dancers: Findings from the UK Centres for Advanced Training**  

5. **Can demographic variables and dance styles predict indicators of physical fitness and injury in dancers? Findings from the UK Centres for Advanced Training**  
Motivational climate and perfectionism among young talented dancers:
Findings from the UK Centres for Advanced Training

Sanna M. Nordin, PhD¹, Imogen J. Walker, MSc¹, Emma Redding, PhD¹, Eleanor Quested², and Joan Duda²
¹Laban, London, England  ²Birmingham University, Birmingham, England

Researchers have linked the motivational climate to perfectionism among university dance students (Carr & Wyon, 2003). For example, dancers who perceived that their teachers punished mistakes, an aspect of an ego-involving climate, were more likely to report concern over mistakes and doubts about actions; both components of maladaptive, or self-evaluative, perfectionism (Hill et al., 2004). Other research suggests that aspects of perfectionism are prevalent among pre-professional dance students (Nordin & Cumming, 2008), but this has not been studied among younger dancers – the dancers of the future. Data from a research project with the UK dance Centres for Advanced Training (CATs) is ideally placed in this regard. CATs provide high-quality training for 10-18 year olds identified as talented in dance. Data is being collected on a range of variables (psychological, physiological, injury-related) twice yearly for 2.5 years. The current presentation comprises findings on perfectionism and the motivational climate from the first data collection. A total of 347 dancers completed questionnaires capturing perceptions of the motivational climate (Newton, Duda, & Yin, 2000) and perfectionism (Hill et al., 2004). MANOVAs revealed no differences between male & female ratings of task or ego climates either within CATs or in other dance training, nor for perfectionism. Subsequent analyses were therefore run for both sexes together. Paired samples t-tests indicated that dancers perceived CAT training to be both significantly more task-involving, and significantly less ego-involving than their other dance training (both p <.01). Hierarchical regressions were then performed to examine whether climate variables could predict key perfectionism constructs. It was found that age and task-involving CAT climate features positively predicted striving for excellence, even when controlling for other perfectionism constructs, $F(8, 200) = 15.31 \ p < .01$. In all, the regression predicted 38% of the variance, with 5.6% coming from task-involving CAT climate perceptions. A second regression revealed that age and ego-involving CAT climate features positively predicted, and task-involving other climate perceptions negatively predicted self-evaluative perfectionism, even when controlling for other perfectionism constructs, $F(8, 200) = 19.75 \ p < .01$. In all, the regression predicted 44.1% of the variance, with 8% coming from climate perceptions.

In conclusion, CAT training appears to be of high quality in motivational terms, although the older the dancers are, the more they appear to be treated in ego-involving ways. It is also clear that task- and ego-involving climates co-exist to some degree. While it may sound positive that task-involving climates are associated with a striving for excellence, dancers who report doing so are also more susceptible to the more negative sides of perfectionism (i.e. the self-evaluative aspects). Dance educators should be encouraged to continue promoting task-involving climates, and downplay ego-involving aspects.

References:
Dance talent in young people: 
A unique approach to interdisciplinary research and pedagogy in dance training. 

Relationships between perfectionism, injury and anxiety

Imogen J. Walker MSc, Sanna M. Nordin PhD, Emma Redding PhD and Sarah Irvine MSc, 
Laban, London, England

Learning and teaching in dance have typically evolved from tradition and experience rather than scientific principles. More recently, it has become clear that the application of scientific principles can enhance the development of young people’s talent (e.g., Baker & Horton, 2004). In other words, taking a systematic approach to examining the variables associated with positive outcomes may improve the performance and well-being of dancers.

Recent research with young ballet dancers has indicated that dancers who strive for excellence in a positive way (e.g. set high goals) report greater levels of both psychological and physical well-being than dancers described as perfectionists (Cumming & Duda, 2005). It has also been suggested that perfectionist ballet dancers are at a heightened risk of injury (Hamilton, 1998). Associations have been made between injury and anxiety (Smith, Ptacek & Patterson, 2000) but relationships between perfectionism, anxiety and injury have not been studied in dance. This study examined these relationships in a large sample of talented young dancers.

Participants were 347 dance students from the Centres for Advanced Training (CATs), UK government-funded centres providing high quality part-time dance training in styles including contemporary, ballet and South Asian dance. Students ranged from 10-18 years old ($M = 14.4 \pm 2$) and trained for approximately 7.9 hours per week. Participants completed an injury survey and validated questionnaires for perfectionism and anxiety. Fifty-five percent of the dancers had been injured in the past twelve months. Results indicated that students injured in dance in the past twelve months scored significantly higher on self-evaluative aspects of perfectionism ($p < 0.05$). Currently injured students were significantly more anxious than non-injured students ($p < 0.05$). There was also a significant correlation between anxiety and self-evaluative perfectionism subscales ($p < 0.05$).

Overall, perfectionism and anxiety appear to be related to injury in young dancers. The findings will be discussed in relation to teaching strategies and pedagogy.

Bibliography
Perfectionism is a risk factor for disordered eating (DE), which is closely linked to menstrual dysfunction. In dance these variables have not been investigated together, and DE research often employs female-only samples. Therefore, correlates of DE attitudes were examined within a mixed-sex sample of young talented dancers. As part of a larger study, 347 dancers aged 10–18 yrs completed standardized questionnaires. Equal proportions of females (7.3%) and males (7.6%) were symptomatic for DE. Regressions indicated that self-evaluative perfectionism ($\beta = .27, p < .01$), waking up more than twice per night ($\beta = .18, p < .05$) and hours of non-dance physical activity ($\beta = .14, p < .05$) together predicted 21.4% of the variance in log-transformed DE attitude scores among females ($p < .01$). For males, only the combination of self-evaluative and conscientious perfectionism was significant ($p < .05$). Self-esteem and demographic variables (e.g., age, hours of training) were not predictive. A MANOVA identified differences between menstrual status groups ($p < .01$). For Dieting behaviours, Young dancers (pre-menarcheal/within first year of menarche; 29.3%) scored lower than Dysfunctional (past or present dysfunction; 24.0%) and Functional (eumenorrheic/regular menses; 46.7%) groups ($p < .01$ and $p < .05$, respectively). For Bulimia and Food Preoccupation, Young dancers scored lower than the Functional group ($p < .05$), and both scored lower than the Dysfunctional group ($p < .01$ and $p < .05$, respectively).

**References**
Passion and well-being in young dancers
Imogen J. Walker, MSc, Emma Redding, PhD and Sanna M. Nordin, PhD,
Laban, London, UK

Dancers often attest to the importance of passion. Recent research states that passion is present when an individual likes an activity, spends a lot of time doing the activity, and finds it important.\(^1\) Furthermore, it posits that two types of passion exist: harmonious passion (HP), which is associated with flexible involvement and autonomous internalisation, and obsessive passion (OP), which is associated with rigid persistence and controlled internalisation.\(^1\) This study investigated relationships between passion and indicators of physical (injury) and psychological (self-esteem, anxiety) well-being in young talented dancers, extending a previous study.\(^2\)

As part of a larger study, 347 participants, aged 10-18 yrs, completed standardized questionnaires regarding passion, self-esteem and anxiety, and an injury survey. Results revealed that 79.8% of the dancers considered themselves passionate about dancing, and within this group 97.2% met the passion criteria detailed above.

ANOVA revealed that those who had sustained an injury while dancing in the past year reported greater levels of OP than those who had not, \(F(1, 188) = 4.41, p < 0.05\). No differences were found for HP. Hierarchical regression analysis showed that age, anxiety and passion each predicted significant amounts of variance in self-esteem (all steps \(p < 0.05\)), with the model as a whole accounting for 30.8% of the variance. Dancers with greater self-esteem were younger \(\beta = -0.22\), scored lower for the worry subscale of the anxiety questionnaire \(\beta = -0.35\), reported greater levels of HP \(\beta = 0.25\), and lower levels of OP \(\beta = -0.15\). Thus, passion emerged as a significant independent predictor of self-esteem, over and above the effects of age and anxiety.

Overall, passion is associated with indicators of physical and psychological well-being. Implications for dancer health relating to these findings will be discussed.

References
Can demographic variables and dance styles predict indicators of physical fitness and injury in dancers?
Emma Redding, PhD, Sanna M. Nordin, PhD, and Imogen J. Walker, MSc

The role of dancers’ physiology has recently come under increased scrutiny. One reason is that by improving fitness, dancers may delay the onset of fatigue, a main cause of injury. Previous research has focused on ballet and contemporary styles among vocational and professional populations, leaving young dancers training in multiple dance styles under-examined. Therefore, this study investigated whether demographic variables and hours in different dance styles predicted indicators of fitness and injury. Data was collected from 347 dancers aged 10-18 yrs using standardised techniques and an injury survey. Regressions (all \( p < 0.01 \)) revealed that dancers who were older (\( \beta = 0.50 \)), male (\( \beta = 0.34 \)), had spent more months in the dance programme (\( \beta = 0.20 \)) and more hours per week in contemporary dance (\( \beta = 0.18 \)), registered greater upper-body strength. Those with greater turnout dedicated more hours to ballet (\( \beta = 0.21 \)) but fewer hours to creative dance (\( \beta = -0.22 \)). Female dancers (\( \beta = -0.42 \)) spending more hours in ballet (\( \beta = 0.21 \)) had greater passive hamstring flexibility; those with greater active hamstring flexibility were also more likely females (\( \beta = -0.38 \)) spending more hours in ballet (\( \beta = 0.24 \)) but also in contemporary dance (\( \beta = 0.27 \)). Male dancers (\( \beta = 0.41 \)) who were older (\( \beta = 0.26 \)) and spent more hours in hip hop (\( \beta = 0.15 \)) but fewer hours in other mixed dance styles (\( \beta = -0.18 \)) seemed to jump higher. A MANOVA indicated that compared to non-injured dancers, injured dancers spent more hours in contemporary dance (\( p < .01 \)). In summary, indicators of fitness and injury in dance were predicted by both fixed (e.g. gender) and changeable (e.g. hours in certain dance styles) factors. Implications will be discussed with reference to recommendations for fitness training.

References