

TRINITY LABAN CONSERVATOIRE
OF MUSIC AND DANCE

PASSION, PATHWAYS AND POTENTIAL IN DANCE

TRINITY LABAN RESEARCH REPORT
AN INTERDISCIPLINARY LONGITUDINAL
STUDY INTO DANCE TALENT DEVELOPMENT

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MUSIC & DANCE

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STUDY INTO DANCE TALENT DEVELOPMENT

PRINCIPAL INVESTIGATOR DR EMMA REDDING
RESEARCH FELLOW DR SANNA NORDIN-BATES
PHD CANDIDATE IMOGEN WALKER



The Leverhulme Trust

Department for
Education

TRINITY LABAN
MUSIC DANCE

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Rachel Bradbear MSc
Mary Kate Connolly MA
Shantel Ehrenberg MFA MSc
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Sarah Irvine MSc
Angela Kerkhoff
Isobel Knight MSc
Tina Krasevec MSc
Ashley McGill MSc
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CONTENTS

EXECUTIVE SUMMARY
PAGE 4

CHAPTER 01
INTRODUCTION
PAGE 6

CHAPTER 02
METHODS: WHAT WE DID,
AND HOW WE DID IT
PAGE 12

CHAPTER 03
THE TALENT DEVELOPMENT
ENVIRONMENT
PAGE 22

CHAPTER 04
KEEPING STUDENTS IN TRAINING
PAGE 28

CHAPTER 05
PHYSICAL CHARACTERISTICS
AND TRAINING
PAGE 34

CHAPTER 06
UNDERSTANDING INJURIES
PAGE 44

CHAPTER 07
MAXIMISING WELL-BEING
PAGE 50

CHAPTER 08
NURTURING CREATIVITY
PAGE 56

CHAPTER 09
PERCEPTIONS OF TALENT
PAGE 64

CHAPTER 10
IMPLICATIONS FOR
DANCE EDUCATION
PAGE 68

REFERENCES
PAGE 76

PASSION, PATHWAYS AND POTENTIAL IN DANCE

EXECUTIVE SUMMARY



Through a groundbreaking collaboration between Trinity Laban dance science researchers and the Centres for Advanced Training (CATs) across England, almost 800 young dancers took part in an interdisciplinary, longitudinal research project into dance talent development. Funded for a 3-year period by the Leverhulme Trust and the Department for Education, the research comprised investigations into the psychology, physiology, anthropometry, injury, adherence, and creativity of this talented cohort of young dancers.

Our combination of quantitative and qualitative findings demonstrate that CAT dancers exhibited steadily increasing levels of physical fitness, high and stable levels of psychological well-being, low to moderate levels of injury and dropout, and positive creativity experiences. The CATs thus appeared to be nurturing young talent in an effective and healthy way. Findings are summarised under seven main headings, the key messages of which are as follows:

- ▶ **The Talent Environment:** CATs created healthy talent development environments in several ways. In particular, CATs were highly *task-involving*: they judged success as improving in relation to oneself rather than outdoing others, promoted cooperation, and valued all dancers equally.
- ▶ **Keeping Students in Training:** CAT dancers typically reported a healthy passion for dance. In combination with enjoyment, positive social relationships, and the rich opportunities available on the scheme this translated into high levels of commitment.
- ▶ **Physical Characteristics and Training:** CAT dancers' fitness, including their strength, power, aerobic fitness, joint mobility, flexibility, turnout and balance all improved during the course of the project. This strongly supports our view that many aspects of talent are trainable.

- ▶ **Understanding Injuries:** CAT dancers reported fewer injuries than many other dance samples previously studied. Dancers were more likely to sustain an injury if they were older, female, had joint hypermobility syndrome, and did more training.

- ▶ **Maximising Well-Being:** CAT dancers' self-esteem and healthy passion remained high, perfectionism moderate, and anxiety and disordered eating attitudes low during the project. This supports our view that well-being does not need to be compromised during intense training, but rather that the CAT environment supported well-being, which in turn contributed to talent development.

- ▶ **Nurturing Creativity:** CATs valued creativity as part of their curricula and appeared to nurture it in several ways. In fact, similar factors which contributed to well-being and commitment also seemed to nurture creativity, including valuing and supporting every student.

- ▶ **Perceptions of Talent:** CAT students with particular physical and psychological characteristics and training habits were perceived as more talented by CAT staff. Such findings may be used to fuel debate around what talent is and how it is identified at audition – especially because many of the factors associated with talent are under students' control.

In summary, we have generated evidence in favour of the view that many components of talent are trainable, and that the environment is paramount to optimising talent development. Because of the scale of the project, its methodological rigour, and the extensive scientific analysis undertaken, we believe that the findings are reliable and can make a significant contribution to dance education as well as the growing science around dance.

01



INTRODUCTION

WHY A RESEARCH PROJECT WITH THE CENTRES FOR ADVANCED TRAINING?

The Centres for Advanced Training (CATs) are a nationwide network of organisations offering high-quality dance training for young people. The CATs were founded on a belief that young people with talent or exceptional potential deserve access to high-level dance training at regional hub centres while still living at home.

The development of the CAT scheme represented an unprecedented opportunity to study a large, nationwide, unique cohort of young people as they developed their talent. Following several consultations with the CATs as well as academic experts, a research grant was awarded by The Leverhulme Trust to Trinity Laban Conservatoire of Music and Dance, match-funded by the Department for Children, Schools, and Families (now the Department for Education), thus allowing for the appointment of academic researchers to undertake the project.

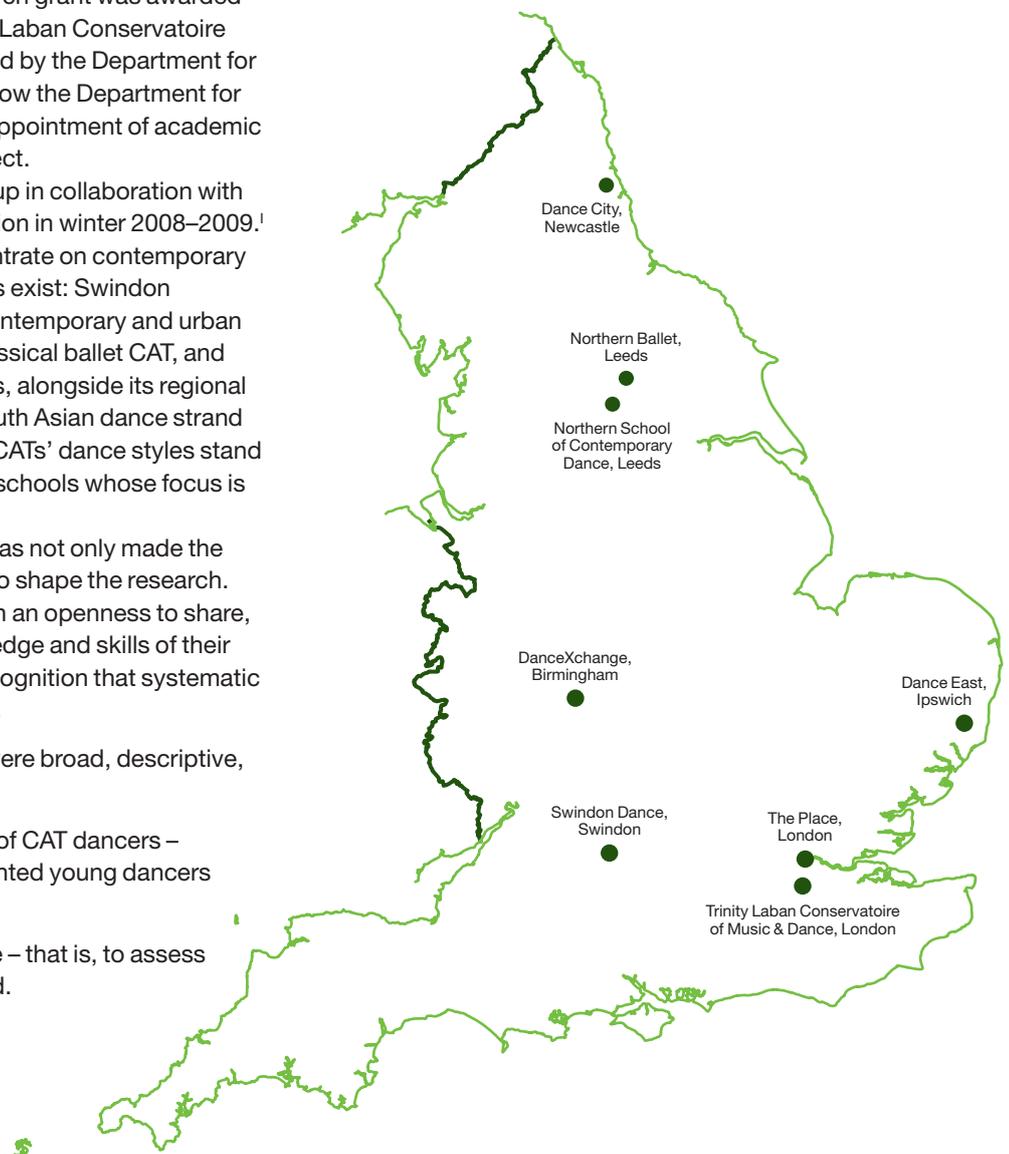
The research project was set up in collaboration with the eight CATs who were in operation in winter 2008–2009.¹ The majority of these CATs concentrate on contemporary dance, although notable variations exist: Swindon Dance operates dual strands in contemporary and urban dance, Northern Ballet hosts a classical ballet CAT, and DanceXchange in Birmingham has, alongside its regional contemporary dance strand, a South Asian dance strand with nationwide intake. Thus, the CATs' dance styles stand in contrast to the dance boarding schools whose focus is often on classical ballet.

The CATs' on-going support has not only made the project possible, but also helped to shape the research. Their participation was founded on an openness to share, an interest in furthering the knowledge and skills of their staff as well as students, and a recognition that systematic study can contribute to pedagogy.

The aims of the research project were broad, descriptive, and two-fold:

- 1 To profile the nationwide cohort of CAT dancers – to examine what this group of talented young dancers were like.
- 2 To examine changes across time – that is, to assess how the young dancers developed.

Our initial estimate of the number of dancers who would be involved in the project was 300. When the data collection phase was completed in winter 2010, this number had grown to just under 800 dancers – an indication of how much the CATs have expanded during this time. Notably, only around 10% of that number attended every one of the five data collections: many new students entered the scheme after the project started, others left (because they graduated from the scheme, or dropped out), and a small number were absent occasionally for reasons such as illness or school exams. Nevertheless, the project is the largest of its kind anywhere in the world, unprecedented both in terms of its entirely representative and large sample, its interdisciplinarity, its longitudinal nature, and the way in which it addressed unanswered research questions related to dance talent development.



¹ Since that time, an additional two CATs have opened: the Lowry in Salford, Manchester, and Dance4 in Nottingham. The Lowry focuses on contemporary dance and Dance4 on creative dance.



Tracking CAT dancers over two years, we examined which factors in their background, training, physicality, and psychology were related to physical fitness and psychological well-being, adherence and dropout, graduate destinations, and creativity. In doing so we hope to contribute to a better understanding of how young dancer talent can be developed.

STRUCTURE OF THE REPORT

Within this report, findings are presented in a series of seven chapters. These chapters summarise what our research has revealed about:

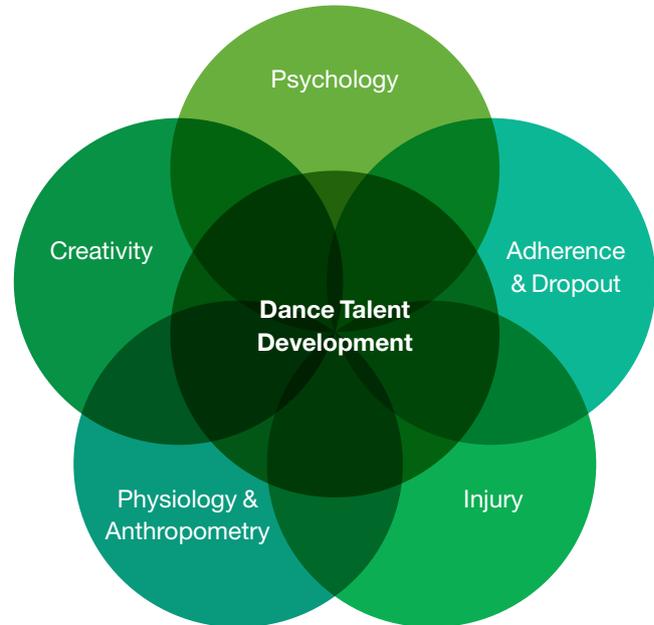
- ▶ **The Talent Environment:** motivational climates, teacher, peer and parent relationships, and the wider environmental context of talent development.
- ▶ **Keeping Students in Training:** commitment, adherence and dropout.
- ▶ **Physical Characteristics and Training:** aerobic fitness, strength, power, flexibility, turn-out, balance, growth, and joint mobility.
- ▶ **Understanding Injuries:** descriptive information about injury patterns, including prevalence, types, sites, and risk factors.
- ▶ **Maximising Well-Being:** self-esteem, anxiety, perfectionism, disordered eating attitudes, and students' passion for dance.
- ▶ **Nurturing Creativity:** conceptualisations of creativity and how it may be nurtured in dance classes as well as in the wider CAT context.
- ▶ **Perceptions of Talent:** staff members' views on student talent, relationships between different aspects of talent, and how perceptions of talent relate to student characteristics.

This report represents a summary of the research project and its findings. We provide references to more in-depth analyses throughout; this is to scientific journal articles and presentations we have made at national and international conferences.



RESEARCHING DANCE TALENT

Overall, research into dance talent is scarce. We therefore consulted previous studies in related domains, such as sport and music, and took a systematic approach. A literature review was conducted by Trinity Laban before the project started, acting as a scoping exercise.¹ After we had begun, a second more extensive and focused literature review was conducted and published.² A major consideration was that dance talent is multidimensional: to be successful, a dancer must be technically and artistically proficient while also being motivated, committed and able to cope with a demanding profession. Previous studies of talent in sport have examined a range of characteristics, including physiological (e.g. fitness), anthropometric (e.g. body composition), and psychological aspects (e.g. commitment).³⁻⁶ Research in music has addressed factors such as creativity and perceptual discrimination of sounds.⁷ But while the existing literatures in sport and music provided useful background information and theoretical models for our work, we were acutely aware of the fact that no other domain fully captured talent in a way wholly relevant to dance. For example, sport researchers do not typically consider creativity, and music researchers do not tend to consider the physical aspects of talent. It was therefore important to ensure that our work was *appropriately interdisciplinary*: that is, it had to take into account the wide-ranging nature of dance, and of talent development, while remaining firmly embedded in our area of expertise: dance science. The factors we did capture were based in the literatures around psychology, adherence and dropout, creativity, physiology, anthropometry and injury. We were particularly interested in the way these factors change over time, thereby revealing something about their relative importance in dance talent development. Furthermore, being an interdisciplinary project, we were interested in the way these factors overlap and interact.



The main part of the research was quantitative in nature, based on numerical information gathered from physical tests and psychological questionnaires which could be analysed statistically. This quantitative information was gathered during our five main biannual CAT visits (winter 2008 – winter 2010). Qualitative research, primarily in the form of interviews, added depth to the quantitative results. Importantly, we have not attempted to ‘measure talent’ per se; instead, we studied the nature of the CAT student cohort which was already identified as talented, or as having exceptional potential. Our investigation of CAT staff members’ perceptions of student talent is an exception, being more directly focused on the components of dance talent.

A major consideration was that dance talent is multidimensional

TALENT IDENTIFICATION VS. TALENT DEVELOPMENT

Literature indicates that there has been a shift in research focus over the years, from talent identification to talent development.^{8,9} There are many reasons for this shift, some of key relevance to our project:

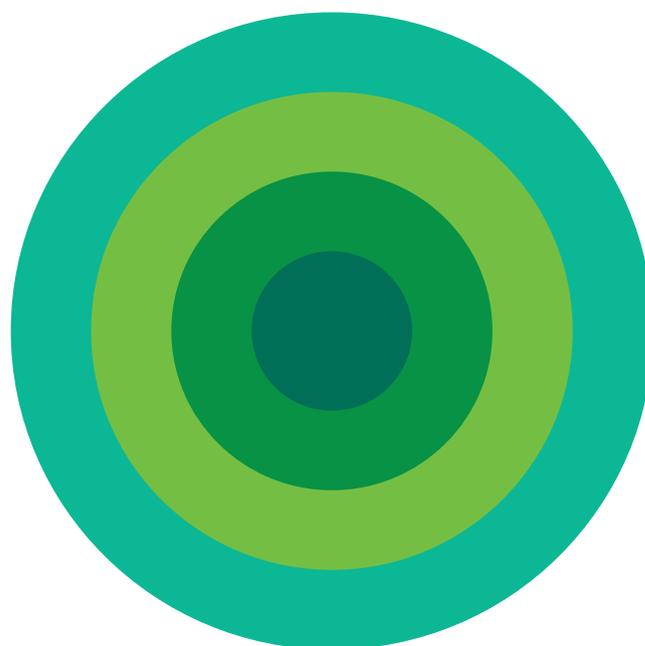
1 Dancers have tended to be identified as talented or not at a single audition, performance, or competition, often prior to puberty. Such one-off measurements imply that talent is static, while in reality it is dynamic and affected by a range of factors including physical and psychological maturation.²

2 Tests of physical characteristics and abilities with young people (e.g. anthropometry, strength) do not reliably predict future performance success.^{10, 11}

Additionally, dance educators have more sustained control over talent development than over talent identification. As such, it is a process which can be continually improved and adjusted in relation to the individual needs of performers and the progress of the art form. For these reasons, we focused predominantly on talent development rather than talent identification in the hope that we may also contribute toward the pedagogic practices of the future.

TALENTED INDIVIDUALS, CONDUCTIVE ENVIRONMENTS

Much research and conversation around talent tends to focus on the individual dancer and her or his attributes. For instance, we may say that 'she'll go far – she's so determined!' or 'to get to the next level, he'll have to work on his flexibility'. In recognition of the importance of individual characteristics, we focused much of our project at the student level. This focus on the individual, however, would be limited on its own; there is growing recognition that talent development is not only the result of particular individual characteristics, but is also dependent on interpersonal, environmental, cultural, and societal aspects.^{2, 4, 5, 8, 12-17} In view of this notion, we studied how students felt about their relationships with teachers, peers, and parents. In our research into creativity and talent perceptions, participants were not only students but also teachers, managers and visiting artists of the CATs. Using a simplified version of a talent environment model developed in sport research,¹⁴ this stance can be illustrated as follows:



● **Talented Dancer**

● **Immediate Environment**
Teachers, Dance Peers,
Managers, Other Staff,
Visiting Artists

● **Surrounding Environment**

Family, Non-Dance Peers,
Other Dance Schools,
Academic School

● **Wider Context**

Dance Culture, Education
System, Government Priorities

‘...rather than identify talent, it is of greater concern to give potential talent the environment into which it may emerge.’

(Critien & Ollis, 2006, p. 180)

In summary, the present project was undertaken to profile the talent development of young dancers in the Centres for Advanced Training across England over a two-year period. Our variables of interest related to psychology, physiology, anthropometry, adherence/dropout, creativity and injury, and were studied using a combination of quantitative and qualitative methods. It is our hope that the report will be a useful resource for teachers, educators, and others interested in dance talent development.



02

**METHODS: WHAT
WE DID, AND
HOW WE DID IT**

Our five data collections took place during the winter and summer periods of 2008 and 2009, and winter 2010. In addition to these scheduled data collections, interviews and other observations were conducted at different times of the year throughout the research project.

The project and its associated studies were approved by the Trinity Laban Research Ethics Committee. All participants completed informed consent forms; for those under the age of 16 years parental consent was also obtained. On the whole, CAT students seemed to enjoy being part of the project, saying things like:

‘I think it was really interesting
'cause it's something that
I'd never done before’

‘It kind of showed me
how everyone is different,
every dancer’

PARTICIPANTS

The following table shows the total number of students involved in each of the five data collections, together with information about participants' age and sex.

	Sample size	Mean age	Female (%)	Male (%)
Winter 2008	337	14.43	75.4	24.6
Summer 2009	332	15.07	63.0	37.0
Winter 2009	394	14.20	73.4	26.6
Summer 2010	345	14.13	63.3	36.7
Winter 2010	445	14.08	73.3	26.7

In terms of ethnicity, across the data collections students identified themselves as: white British or other white background (76.4%), black British or other black background (5.6%), Asian British or other Asian background (5.2%), mixed race (11.1%) or other (1.7%).

Approximately 10% of the total cohort of 795 dancers completed every data collection. For the various analyses used to obtain the results conveyed in this report, the sample size varies in accordance with the time points used, attendance at those data collections, and occasional, small amounts of missing data.

QUANTITATIVE METHODS PHYSIOLOGY

Dance Aerobic Fitness Test (DAFT)

The DAFT test¹⁸ was specifically designed to assess dancers' aerobic capacity and has been employed with vocational students and professionals.^{19,20} Using contemporary dance movements, the test consists of five 4-minute stages of increasing intensity. Stage 3 was designed to mimic the intensity of technique class and Stage 5 that of performance. Dancers wore heart rate monitors and recorded their heart rates at the end of each stage.

Vertical jump height

Vertical jump height was measured using a jump mat or belt (Probotics Inc., Huntsville, AL). The jump mat was used for the first data collection in winter 2008 and electronically measured seconds in the air during a vertical jump before converting this into centimetres. For the subsequent data collections, a jump belt was used due to its greater portability. Participants stood in the middle of a mat with the jump belt fastened securely around their waists, then performed two vertical jumps separated by a 30 second rest period. The highest jump recorded was used for analyses. This method of measuring jump height has been used in previous investigations with dancers.²¹





External hip rotation (turn-out)

Functional Footprint® rotator discs (Balanced Body, Sacramento, CA) were used to measure total active external rotation from the hip and lower leg. Participants stood on the discs, which rotate with minimal friction via ball bearings, and externally rotated their hips (turned out) maximally while keeping their knees extended. Measures were taken in degrees from the base of the discs. Students completed three trials of the test, the average of which was used for analysis. This measure of active external hip rotation is considered appropriate for dance research.²²

Height and sitting height

To measure standing height, participants stood against a measuring metre (Leicester Height Measure, SECA) in correct alignment. Height was measured in centimetres. Sitting height was measured in one of two ways: with participants either sat on a chair (with the chair height subsequently subtracted) or on the base of the height measure with the knees extended.

Balance

Balance is notoriously difficult to measure and no standardised tests are available to assess dancers' balance. Therefore, we created a series of tests based on previous research and experience. Balances 5 and 6 were added to our methods in winter 2009 to create an additional dance-specific challenge. Participants performed each of the following tasks for 5 seconds, timed using a stopwatch, and were given quality ratings for each task based on the criteria in the second table:

Balance task	
1	Standing in parallel, plié, straighten knees, rise, hold
2	As above but with eyes closed
3	Standing in parallel on the right leg, lift left foot by right ankle, close eyes, hold
4	As above but standing on the left leg (pictured)
5	Standing in parallel on the right leg, plié, straighten knees, rise, hold
6	As above but standing on the left leg

Balance rating	
1	Falls off balance/opens eyes
2	'Hopping' on feet/uses arms/comes down off rise
3	Feet rolling/upper body adjustment
4	Small lower body adjustments
5	Very stable balance with few lower body adjustments

Handgrip strength

A handgrip dynamometer (Takei Scientific Instruments, Tokyo, Japan) was used as an indicator of global upper body strength as previous research has demonstrated a relationship between handgrip strength and other measures of upper body muscular strength.^{23, 24} In a dance-specific version of the test, dancers gripped the dynamometer maximally and continually whilst moving the arm from a raised position down to the side of their bodies within a count of 3. The average from two attempts on each arm (with a rest period of 30 seconds between each trial) was calculated. The handgrip dynamometer has been used in other dance research projects with young people.^{25, 26}



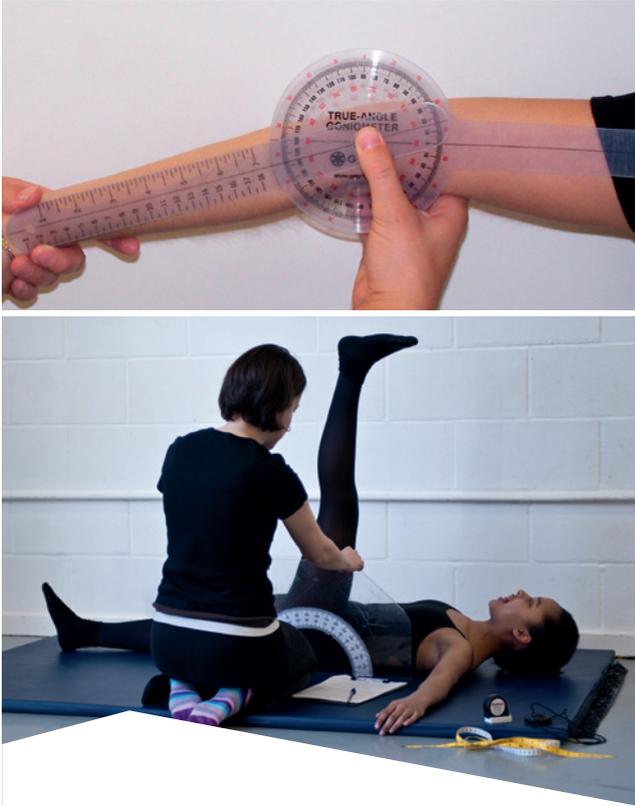
Anthropometry

In order to capture students' body dimensions and growth over time, six measures were taken using measuring tapes:

- ▶ Straight leg length (trochanterion to lateral malleolus)
- ▶ Thigh girth (mid-way between greater trochanter and lateral condyle of femur)
- ▶ Calf girth (widest point)
- ▶ Straight arm length (acromion process to end of middle finger)
- ▶ Upper arm girth (mid-way between acromion process and lateral epicondyle)
- ▶ Arm span (middle fingertip of left hand to middle fingertip of right hand with participants standing against a wall and arms extended horizontally)

With the exception of arm span, these measures were captured on right and left sides. Combinations of these measures have been used previously in assessments of talented young athletes²⁷ and professional dancers.²¹





Hamstring flexibility

Active and passive measures of students' flexibility were taken during a straight leg raise. Dancers lay supine on a mat and were instructed to lift one leg towards their chest as far as possible while keeping both knees extended and the hips on the floor. This constituted the active test. For the passive test, the same procedure was followed with the researcher moving the leg further until the point of resistance was felt. The angle between the leg and the floor was measured in degrees using a large custom-made protractor. The straight leg raise test has been used in a previous study of young dancers' hamstring flexibility.²⁸

Hypermobility

Hypermobility was assessed using the Beighton test²⁹ modified for use with dancers^{30,31} to comprise a total of ten assessments:

- ▶ forward flexion with extended knees to place hands flat on the floor (both in front of the toes and parallel to the heels)
- ▶ hyperextension of elbow and knee joints $> 10^\circ$
- ▶ passive apposition of thumbs to the flexor aspect of the forearm
- ▶ dorsiflexion of the fifth metacarpophalangeal joint $\geq 90^\circ$

A total score was calculated, and dancers were classified as joint hypermobile if they obtained a score ≥ 5 . The Brighton criteria³² were then used to assess the presence of Benign Joint Hypermobility Syndrome (BJHS). For the BJHS assessment, participants were asked a series of questions concerning aspects of their medical history (dislocations, subluxations, joint pain, soft tissue rheumatism, various skin issues, hernias, prolapses, and myopia). They were also asked to perform a series of simple physical tests relating to having stretchy skin and long extremities. Students' arm span/height ratio was captured via the anthropometric measures described previously. Eyes were examined visually for signs of drooping eyelids or antimongoloid slant. Following the criteria and procedures stipulated by experts in the field,³² dancers were classified as having BJHS or not. This modified version of hypermobility testing has been used previously with dancers.³¹

Individual feedback sheets

Students were given individual feedback sheets with the results of most physiological tests after each data collection, so that those who attended more than one session were able to monitor their progress over time. The majority of students found the feedback sheets valuable, saying:

'It's actually really quite a confidence boost, because then you can see how you've progressed... you see what aspects you're strongest in'

'It's showing you that all this dance training is working'

QUANTITATIVE METHODS INJURY

Health and injury survey

Participants completed a basic health and injury survey concerning aspects of health such as high blood pressure and migraines, and female health issues such as menstrual irregularity. Participants also indicated whether they were currently injured, and those new to the project provided information regarding any injuries they had sustained in the previous twelve months including information on injury site, perceived cause, treatment and action taken (if any), and the number of days off from dancing (if any). At the end of the project, continuing students were asked about injuries sustained during the past two years (the duration since the start of the project). This survey was based on a previously used large-scale survey of dancers' health and injuries.³³

Injury tracking

From spring 2009, the CATs undertook on-going injury tracking which was forwarded to the research team. Information gathered included date, time and place of injury, cause, type and site of injury, treatment sought and action taken (if any). The injury survey was again based on an instrument that has been previously used to survey dance injuries.³³

QUANTITATIVE METHODS PSYCHOLOGY

Self-esteem

Participants' favourable and unfavourable feelings towards themselves were captured with the 10-item Rosenberg Self-Esteem Scale.³⁴ Questions were scored on a scale from 1 to 4, with higher scores indicating greater self-esteem. This scale has been used in other dance research projects with young people.^{26, 35}

Anxiety

Anxiety was measured using a dance-specific version of the Sport Anxiety Scale-2,³⁶ a questionnaire specifically designed for use with young people. The questionnaire captures three dimensions of anxiety in the studio via 15 questions relating to somatic anxiety (physical symptoms associated with anxiety such as muscle tension), concentration disruption, and worry. Questions were scored on a scale from 1 to 4, with higher scores indicating greater anxiety.



Perfectionism

The Perfectionism Inventory,³⁷ modified for use in dance,³⁸ was used to capture students' perfectionistic tendencies. It comprises 51 questions in 7 subscales: striving for excellence, planfulness, high standards for others, concern over mistakes, need for approval, teacher pressure, and rumination. Questions were scored on a scale from 1 to 5, with higher scores indicating greater perfectionism. This questionnaire has been used to assess perfectionism in previous research with dancers.³⁸

Eating attitudes

Attitudes towards eating and food were measured using the Eating Attitudes Test,³⁹ which has been used previously with young dancer populations.^{40, 41} It consists of 26 items capturing three aspects of disordered eating attitudes: dieting; bulimia and food preoccupation; and oral control. Questions were scored on a scale ranging from Always to Never, with a cut-off point above which individuals may be at risk of an eating disorder. CATs were notified if any students scored above this cut-off point. An eating disorders policy was created for the CATs comprising guidelines for prevention, identification, and positive action following notification of a student having scored above the cut-off point.¹¹

Motivational climate

The motivational climate is the psychological atmosphere in the dance studio. Students' perceptions of the motivational climate were assessed with the Perceptions of Motivational Climate in Sport Scale-2,⁴² modified for use in dance.⁴³ The questionnaire comprises 24 questions scored on a scale from 1 to 5, capturing levels of task and ego-involving climates (for definitions, see *The Talent Environment* chapter). Students completed one questionnaire about their CAT teachers, and another about their dance teachers outside of CAT (e.g. private studio, school) if they took any dance classes elsewhere. The dance-specific version of this questionnaire has been used in other studies of dancers.^{43, 44}

Passion

The Passion Scale⁴⁵ measures whether an individual is passionate about their 'favourite activity', and the extent to which this passion is harmonious or obsessive (for definitions, see the *Maximising Well-Being* chapter). Participants indicated their favourite activity at the top of the questionnaire; those who wrote 'dance' and scored above cut-off on four passion criteria questions were classified as passionate about dance and included in further analyses. The remaining 10 questions pertained to *harmonious* and *obsessive* passion, scored on a scale from 1 to 7. The Passion Scale has been used in a previous study of dancers.⁴⁶

QUANTITATIVE MEASURES TALENT PERCEPTIONS SURVEY

In order to understand perceptions of talent, we developed a survey for CAT staff to complete in relation to their students. An online survey was created with questions relating to six talent areas: physical, technical, psychological, expressive and creative talent, and the perceived career potential of each student. These talent criteria were derived from the audition criteria used by CATs as well as related literature.

An online survey was created with questions relating to six talent areas: physical, technical, psychological, expressive and creative talent, and the perceived career potential of each student.

MIXED METHODS

In addition to the quantitative research forming the main focus of our research, a number of studies were undertaken using mixed methods: a combination of quantitative and qualitative data. Most qualitative studies were interview-based and used an interview guide to ensure that participants were asked the same questions. Interviews were recorded digitally, then transcribed and content analysed using qualitative analysis software. In all cases, participants were assured of their anonymity and ability to speak freely throughout the interviews.

COMMITMENT, ADHERENCE AND DROPOUT

To understand students' experiences in their own words, interviews were conducted with 19 committed and 10 dropout students. Students were recruited from four of the contemporary CATs across the country. Interview findings were triangulated using data from the CATs' graduate destinations spreadsheets for the years 2005–2009. Data was obtained relating to numbers of graduating and dropout students, graduate destinations, and reasons for withdrawing from the scheme.

A final approach to studying adherence and dropout comprised an examination of whether adhering and dropout students differed in any of the physiological or psychological measures outlined previously, and also whether these measures could statistically predict adherence to the CATs.

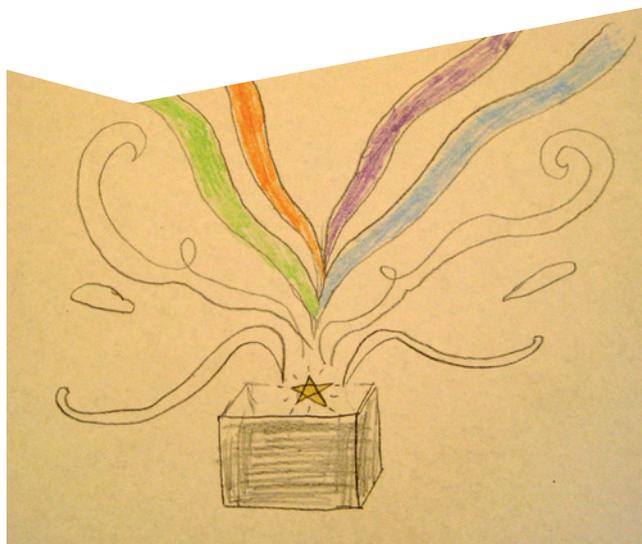
CREATIVITY

Data concerning conceptualisations of creativity and best practice in nurturing and developing this attribute was gathered in several ways. First, interviews were conducted with three students, three faculty teachers, three visiting choreographers and two managers from one contemporary CAT. Observations, field logs and conceptual drawings (pictured) were also employed.

The next phase of creativity research comprised the development of a questionnaire specifically geared toward gaining a better understanding of the dancers' own creativity perceptions. Entitled the Dancers' Perceptions of Creativity Questionnaire (DPCQ), this questionnaire is still under development but was used to gather preliminary data from all CAT students during the latter two of our five main data collections. In this first version, the DPCQ comprised 63 questions which asked dancers about such factors as the extent to which they felt inspired to create, engaged in behaviours such as improvisation and imagery, and how well they felt able to work creatively with others. Items were scored on a 1–5 scale where higher scores indicated a dancer seeing themselves as more creative.

SOCIO-CULTURAL ASPECTS OF TALENT DEVELOPMENT

In order to better understand how aspects of the socio-cultural environment impact upon talent development, an interview study was undertaken examining the influence of four cultural background variables (social support, socioeconomic status, race/ethnicity, values) on training. Seven urban dance students from one case study CAT were interviewed about their perceptions and experiences of each of the cultural background variables. Data on grant status was also obtained from the CAT relating to participants' socioeconomic status.



END OF PROJECT FEEDBACK

Once data collections were finalised, all CATs were invited to take part in feedback sessions with a researcher. Separate sessions were held with staff and students. In these sessions, participants were asked about their opinions of the final report and launch symposium as well as their perceptions of the project more generally. This feedback helped to shape the structure and content of this final report and the launch symposium on October 27th, 2011.

STATISTICAL ANALYSES

All quantitative data was inputted into and analysed using the Statistical Package for the Social Sciences (SPSS). This typically first comprised the generation of basic descriptive statistics such as means, standard deviations, ranges and frequencies. Thereafter, comparisons between groups were performed using t-tests, ANOVAs, MANOVAs, or MANCOVAs. Relationships between variables were performed using bivariate correlations, and predictions were computed using hierarchical or logistic regressions. The longitudinal analyses predicting changes in physical characteristics (see *Physical Characteristics and Training* chapter) and disordered eating attitudes (see *Maximising Well-Being* chapter) were performed via Multilevel Modelling using STATA. For further details regarding specific analyses, please refer to our scientific journal articles and/or conference presentations.





OS

**THE TALENT
DEVELOPMENT
ENVIRONMENT**

Talent development often refers to the individual, yet the talent development environment is pivotal to a student's experience for two main reasons:

- 1 The teacher-created environment (perceived motivational climate) can impact not only upon a young dancer's learning and development but also his or her well-being.
- 2 Dancers rarely 'make it' on their own: parental and peer relationships are of vital importance to a young person's talent development and are worthy of attention.

The motivational climate is the atmosphere that a teacher creates in the studio, and there are two types: task-involving and ego-involving:⁴⁷

Task-involving climates . . .	Ego-involving climates . . .
Focus on self-improvement	Focus on outdoing others
Support all students equally	Support 'star' students or favourites
Emphasise effort	Emphasise success
See mistakes as part of learning	Punish mistakes
Encourage collaboration with peers	Encourage comparison and competition with peers
Outcomes: ⁴³	Outcomes: ^{43, 48, 49}
Greater well-being	Lower well-being, or ill-being
Feeling competent	Emotional and physical exhaustion
Feelings of connection with others	Anxiety and perfectionistic tendencies



In terms of the wider environment, little is known about the role that families and peers play in the dance talent development process. Sport research suggests that both family support^{12, 50, 51} and peer relationships can play a crucial role in talent development.⁵² We aimed to better understand these factors in the CAT context.

OVERALL FINDINGS WHAT WE HAVE LEARNT ABOUT THE TALENT DEVELOPMENT ENVIRONMENT

- ▶ The CATs created a predominantly task-involving motivational climate.
- ▶ Perceptions of ego-involving climate features increased from winter to summer in the first year (2009), and were associated with increased anxiety in the studio.
- ▶ CAT students generally reported high levels of parental support and perceived this support as essential to their talent development.
- ▶ Peer relationships on the CAT were generally positive and helped to enhance enjoyment and motivation.

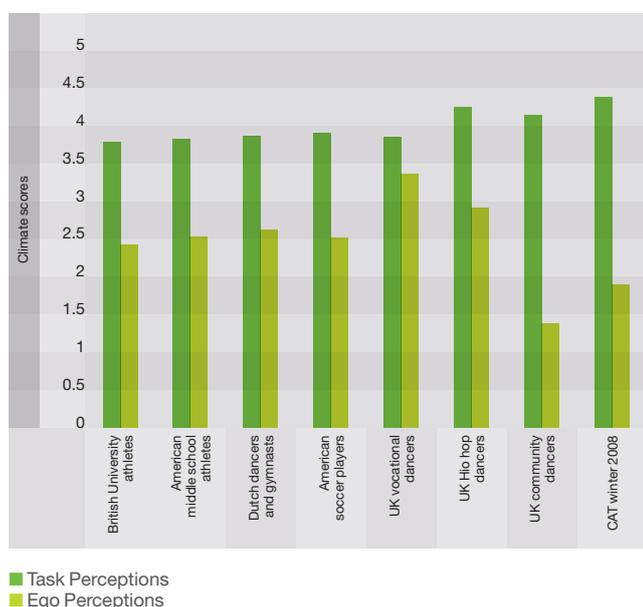
The CATs promoted a healthy task-involving motivational climate. Family support was of great importance, and the influence of peers should not be underestimated.

TAKING A CLOSER LOOK MOTIVATIONAL CLIMATE FINDINGS FROM QUESTIONNAIRES

The CAT climate in general

Positively, students perceived their environment to be significantly more task- than ego-involving. In fact, it appeared that CAT students' task climate perceptions were greater, and their ego perceptions typically lower, than those reported in a range of other studies.⁵³⁻⁵⁸

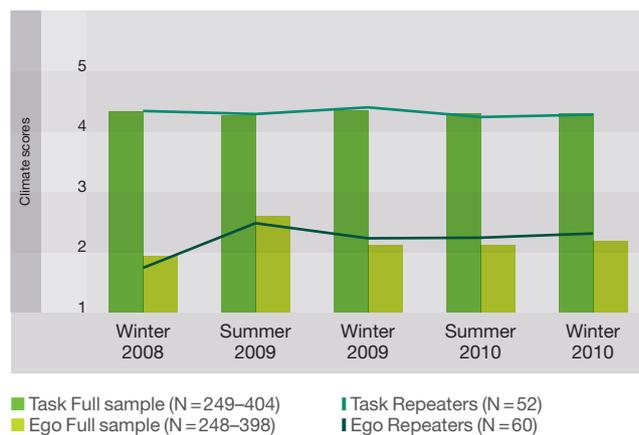
COMPARISONS OF CLIMATE PERCEPTIONS ACROSS STUDIES



Positively, students perceived their environment to be significantly more task- than ego-involving.

Task-involving climate perceptions remained high and relatively stable over time throughout the research project. However, ego-involving climate perceptions increased significantly between winter 2008 and summer 2009:^{III}

MOTIVATIONAL CLIMATE PERCEPTIONS



It could be that performances at the end of the academic year, which naturally place pressure on teachers, result in more attention being paid to the 'star students' and to promoting 'perfect' performance. We also found that:

- ▶ CAT climates were perceived to be significantly more task-involving and significantly less ego-involving than the dance classes students take outside of the CATs.
- ▶ Older students (aged 13–18 years) perceived the climate to be significantly more ego-involving than younger students (aged 10–12 years).⁵⁹

Relationships between the CAT climate and other variables

We also investigated relationships between the CAT motivational climate and other variables:

- ▶ Perceptions of task-involving climates were positively related to feeling **creative**.
- ▶ When the climate was perceived to become more task-involving over time, students' **harmonious passion** also increased.

^{III} Figures show data representing the average score for the full sample taking part at that time point (vertical bars) as well as for 'repeaters', i.e. dancers who participated at all 5 data collections (horizontal line).



- ▶ Ego-involving climates were associated with **negative aspects of perfectionism** including concern over mistakes, rumination and a need for approval.⁶⁰
- ▶ When the climate was perceived to become more ego-involving over time, students' **anxiety** also increased.⁶¹

These results suggest that the environment can impact upon both dance-related attributes (creativity and harmonious passion) and aspects of ill-being (perfectionism and anxiety). As such, the motivational climate can play an important role in talent development programmes.

TAKING A CLOSER LOOK FINDINGS ABOUT PARENTS, FRIENDS AND TEACHERS FROM STUDENT INTERVIEWS

What CAT students thought about their parents

With supportive parents,
'there's nothing that I can't do'

Family support was found to be extremely important to the CAT dancers for financial assistance, transportation to training, emotional support, and much more. Many other studies of young people have reported similar results.^{50, 51} However, there are two important points to note:

- 1 *A lack of support* did not seem to prevent very determined students from continuing with training, but it did make it harder.
 - ▶ For instance, not all cultures perceive dance to be a viable career, meaning that cultural values can undermine parental support.
- 2 *Over-involvement* can be difficult for students.
 - ▶ For example, one student had delayed her decision to withdraw from a CAT as she felt guilty about the high levels of investment (financial, emotional, moving locations) her parents had contributed towards her dancing, and their expectations for her.

What CAT students thought about their friends

'They're always there for you. We're like a family'

- ▶ CAT peers were important in terms of friendship, motivation and support. Students enjoyed spending time with like-minded peers, working together to learn exercises, choreographing, and performing pieces, and socialising outside of the CATs. Unsurprisingly, such close friendships were associated with commitment to the CATs and reflect previous findings regarding the importance of peer relationships in talent development.⁵²
- ▶ Not all peer relationships were positive: there were some mentions of rivalry, finding it difficult to make friends, not feeling heard, or lacking confidence to show work during creative tasks. For several students, poor peer relationships influenced their decision to leave their CAT, similar to previous sport research.⁵²

What CAT students thought about their teachers

'I really trust them in a way – not just with the steps they give us'

Aside from the motivational climate that they create, students valued teachers who:

- ▶ Were inspiring role models.
- ▶ Motivated students through constructive criticism, positive feedback and opportunities to be autonomous.
- ▶ Provided advice and support about future careers, and were approachable about issues outside of dance.
- ▶ Made the dance environment a 'safe space' – which was perceived to have a positive impact on creativity.

PRACTICAL RECOMMENDATIONS

HEALTHY DANCE TALENT DEVELOPMENT ENVIRONMENTS ARE ...

SOCIALLY SUPPORTIVE

- ▶ **Facilitating peer support**
- ▶ **Facilitating parental support**
- ▶ **Creating a safe environment**

COLLABORATIVE

- ▶ **Promoting cooperation**
- ▶ **Giving dancers chances to lead and cooperate in varied groups**

LEARNING-FOCUSED

- ▶ **Task-involving**
- ▶ **Instilling a sense of control over progress**

IDEAS TO TRY

Encourage peer collaboration rather than comparison.

Create a buddy scheme between students of different ages and/or ability levels.

Generate discussions about peer comparisons, effort, the role each dancer plays in the studio and on stage, and the importance of teamwork in all dance contexts.

Organise social activities (e.g. end-of-term parties).

Create a community around your school or centre through fundraising events, open days, informal and formal performances or workshops.

Involve parents in individual training plans and performance organisation.

Hold discussions with parents about dance as a viable career but one in which their children need support.

Be available to students to discuss dance and non-dance related concerns.

What activities and games can you introduce to enhance peer relationships?

Create cooperative goals so that students are working together towards the same end (e.g. a performance piece that involves and relies upon the whole class).

Help students interact in a variety of groups.

Develop leadership skills by having students teach each other and lead exercises.

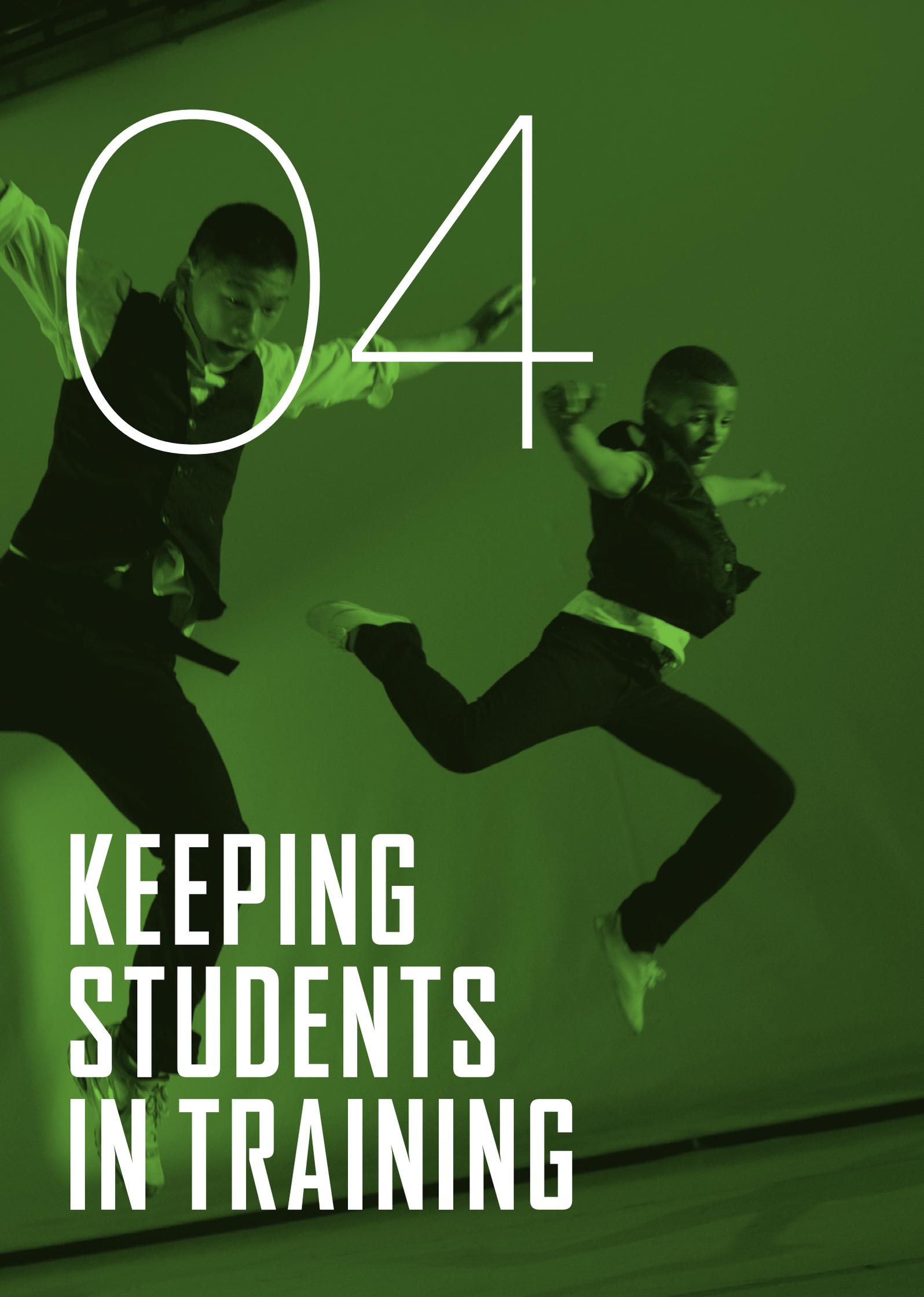
Avoid having groups based on ability (e.g. for performing an exercise in class).

How can I set up a constructive peer-feedback exercise system?

Keep the motivational climate task-involving regardless of student ages or season (e.g. stressful performance time):

- ▶ Emphasise effort and improvement over 'talent'.
- ▶ Give students equal, positive and constructive feedback.
- ▶ Help students use mistakes as an opportunity to learn.
- ▶ Encourage students to monitor their own progress rather than compare with each other, to help them feel in control of their progress.

These recommendations are based on results outlined in this chapter and related literature. Recommendations made in all other chapters contribute to healthy talent development environments.



04

**KEEPING
STUDENTS
IN TRAINING**

Sport researchers have long been interested in why some young people stay in physical activity programmes while others leave. However, little research of this nature exists in dance. We considered investigations into adherence, commitment and dropout in dance to be important for two main reasons:

1 Without adhering to training, a student will not optimally maximise his or her potential or develop talent.

2 The benefits of dance activity (e.g. increased physical fitness, enjoyment) will be lost if a student withdraws from training.

Commitment is defined as the psychological resolve to persist with training;⁶² adherence is the behavioural outcome of commitment. Sport studies have indicated that enjoyment, perceived competence and social relationships are strongly related to adherence, commitment and dropout.⁶³ Furthermore, some research suggests that technical/motor competence⁶⁴⁻⁶⁶ and body capacity or physical maturity^{65, 67} can influence adherence and dropout, particularly in talent contexts. We aimed to better understand all of these factors within the CAT talent development environment.

OVERALL FINDINGS WHAT WE HAVE LEARNT ABOUT COMMITMENT, ADHERENCE AND DROPOUT

► Dancers committed to CAT training because of enjoyment, social relationships, the varied opportunities available on the scheme, and parental support.

- Students with greater levels of harmonious passion were more likely to adhere to CAT training.
- Greater perceptions of an ego-involving motivational climate decreased the likelihood of adherence.
- Dropout reasons were complex and varied but the most common reasons were conflicting demands and a change in aspirations.

Commitment to CAT was characterised by a healthy passion for dance, enjoyment and positive social relationships. Teacher behaviour also had an impact upon whether students stayed in or left training, mainly through the motivational climate.

TAKING A CLOSER LOOK FINDINGS FROM INTERVIEWS WITH COMMITTED AND DROPOUT STUDENTS

Committed students

The key factors influencing student commitment were enjoyment, the social relationships and varied opportunities on the scheme, and parental support.⁶⁸

Enjoyment emerged as the factor most strongly related to dance commitment, which concurs with sport research.⁶³ Various sources of enjoyment were reported, many of which related to artistic aspects; self-expression was most frequently cited. The roles of peer relationships, opportunities and parental support reflect findings in sport and arts research.^{12, 52, 62} Teachers were also perceived as inspiring role models who emphasised autonomy and equality.

Commitment to the CATs is characterised by ...			
Enjoyment and passion	Social relationships	Opportunities	Parental support
Self-expression, performing, task mastery, movement sensations, creativity, emotional release	Like-minded and supportive friends to work with <i>'My friends at CAT are wonderful ... we bounce off each other'</i>	Performances, workshops, collaborations, etc.	Emotional support, advice and encouragement, financial and logistic support
<i>'there's nothing else I love as much ... and can see myself doing for the rest of my life'</i>	Inspiring, motivating and approachable teachers <i>'wow, I want to be like you, I want to get to where you've got to'</i>	<i>'I enjoy everything we do, especially performances and getting to work with different choreographers ... it's really, really good'</i>	<i>'[Mum's] always said to me, "follow your dreams, do what you want ... you put in your effort and you'll get out of it what you put in" ... she's been really helpful'</i>

Dropout students

Reasons for dropping out were more varied than reasons for committing to a CAT, although the most commonly cited reasons were experiencing conflicting demands and a change in aspirations for the future.⁶⁹

Several dropout reasons differed depending on the age of the student:

- ▶ Older students (over 15 years) cited other commitments, change in aspirations and lost passion as dropout reasons more often than younger students.
- ▶ Younger students (under 15 years) were more likely to report course-related factors, particularly repetition and the focus on technique.

Our findings support previous sport research in that having other commitments is a main reason for withdrawing from an activity.⁶³ Some participants had lost their passion for dance, suggesting that passion can play an important part in the decision to commit to training or to drop out. In terms of course-related factors, providing optimal challenge and a balance between technique and fun tasks may help to maintain motivation and enjoyment. Finally, half of the dropout participants had difficulties making friends within their CAT, which supports previous research.⁵²

Reasons for dropout from the CATs include . . .				
Conflicting demands	Change in aspirations	Loss of passion	Course content	Difficulty making friends
Dance training, homework, other hobbies, social activities, exam pressure	Finding another interest and no longer wanting a career in dance OR pursuing a less difficult and competitive career	Original passion for dance had faded over time	Too much focus on technique <i>'It made it feel like a chore kind of, you had to do the technique and you had to get it right'</i>	Competition, not being heard in creative tasks, difficulty of being the oldest or youngest
<i>'I kinda left CAT because on Saturdays and Sundays my friends were going cinema and stuff and I felt left out'</i>	<i>'I needed to decide what I wanted to do, and whether I was going to be able to succeed'</i>	<i>'... my own personal kind of drive and ambition and passion for dance had just burned out'</i>	Too little challenge; too much repetition <i>'We kept doing, like, stuff from the beginning'</i>	<i>'It's not the same sort of friendship when you're in that sort of intense environment'</i>
			Lack of individual feedback <i>'... I felt like I was doing worse in class which made me feel like an under-achiever'</i>	



TAKING A CLOSER LOOK FINDINGS FROM INTERDISCIPLINARY DATA

The physiological and psychological quantitative data was used to further investigate adherence and dropout.⁷⁰

Comparing adhering and dropout female students^{iv}

The diagram below shows differences between adhering and dropout students on a range of variables. Findings highlighted in bold were found to predict adherence to the CATs.

Adhering	Dropout
Greater levels of harmonious passion	Slightly more disordered eating attitudes
Lower ego-involving motivational climate perceptions	Lower task-involving motivational climate perceptions
Engaged in slightly more hours of CAT training over a one-year period	No change in hours of dance training over a one-year period

The greater the levels of students' harmonious passion (see the *Maximising Well-Being* chapter for a definition), the more likely they were to adhere, demonstrating that young dancers with a healthy, balanced engagement in dance were more likely to continue training. The greater the ego-involving motivational climate perceptions, the less likely students were to adhere. This supports previous research into sport dropout, highlighting the importance of the environment.⁷¹

Comparing students going into vocational training with dropout students

We were interested to assess whether differences might exist between students going into vocational training (post-18 years or post-16 years depending on the programme) and students who had dropped out of the course before graduating. This was not to suggest that those who were accepted into vocational training were necessarily more successful, but simply to give an indication of potential differences between the two groups.

Compared with dropout students, graduates to vocational training . . .
Had been attending their CAT for longer
Spent slightly more hours per week in non-CAT dance training
Jumped slightly higher
Were stronger (upper body)
Were slightly more flexible (hamstrings)
Balanced slightly better (flat foot, one-leg test)
Had slightly longer legs
Had slightly less disordered eating attitudes

Next, we assessed whether any of the above variables could predict whether students were accepted into vocational training. Analysis revealed that students going into vocational schools were more likely to have:

- ▶ Spent a greater number of months in CAT training.
- ▶ Spent a greater weekly number of hours in non-CAT dance training.

Thus, students who had engaged in more dance training – both at CAT and their local schools – were more likely to enter into vocational training. While students entering vocational training differed physiologically from dropout students in several ways, most of these differences could be due to the increased training in which they engaged.

^{iv} There were insufficient numbers of males for this analysis.

PRACTICAL RECOMMENDATIONS

TEACHERS AND ENVIRONMENTS WHICH OPTIMISE ADHERENCE ARE ...

SOCIALLY SUPPORTIVE

- ▶ Facilitating peer support
- ▶ Facilitating parental support

POSITIVE

- ▶ Stimulating enjoyment
- ▶ Giving constructive feedback

EDUCATIONAL

- ▶ Balancing different aspects of training

INSPIRING

- ▶ Employing & nurturing excellent educators
- ▶ Providing rich opportunities

ADAPTIVE

- ▶ Individualising tuition
- ▶ Age-appropriate

LEARNING-FOCUSED

- ▶ Task-involving

SUPPORTING AUTONOMY

- ▶ Nurturing individuality
- ▶ Promoting individual responsibility

IDEAS TO TRY

Group students strategically and change groups regularly.

Help the oldest and youngest students to bond, e.g. by using a buddy system.

Invite parents to events, performances and consultative meetings, and share achievements with them.

Maximise the enjoyable aspects of dance in class, such as self-expression, e.g. by placing emphasis on movement and performance qualities.

How can I build technical skill while maximising the enjoyable aspects of dance?

Change exercises often, even if only slightly, to give variety.

Hold careers days to facilitate discussion, e.g. about difficulties that may arise and how they can be overcome.

Share your stories and experiences to inspire students.

Provide inspiring opportunities such as a mix of different choreographic workshops and shows.

What helps me be an inspiring teacher?

Use individual goal setting to provide optimal challenge for each student.

Make teaching as age-appropriate as possible; for example, younger students may find repetition more difficult to handle than older students.

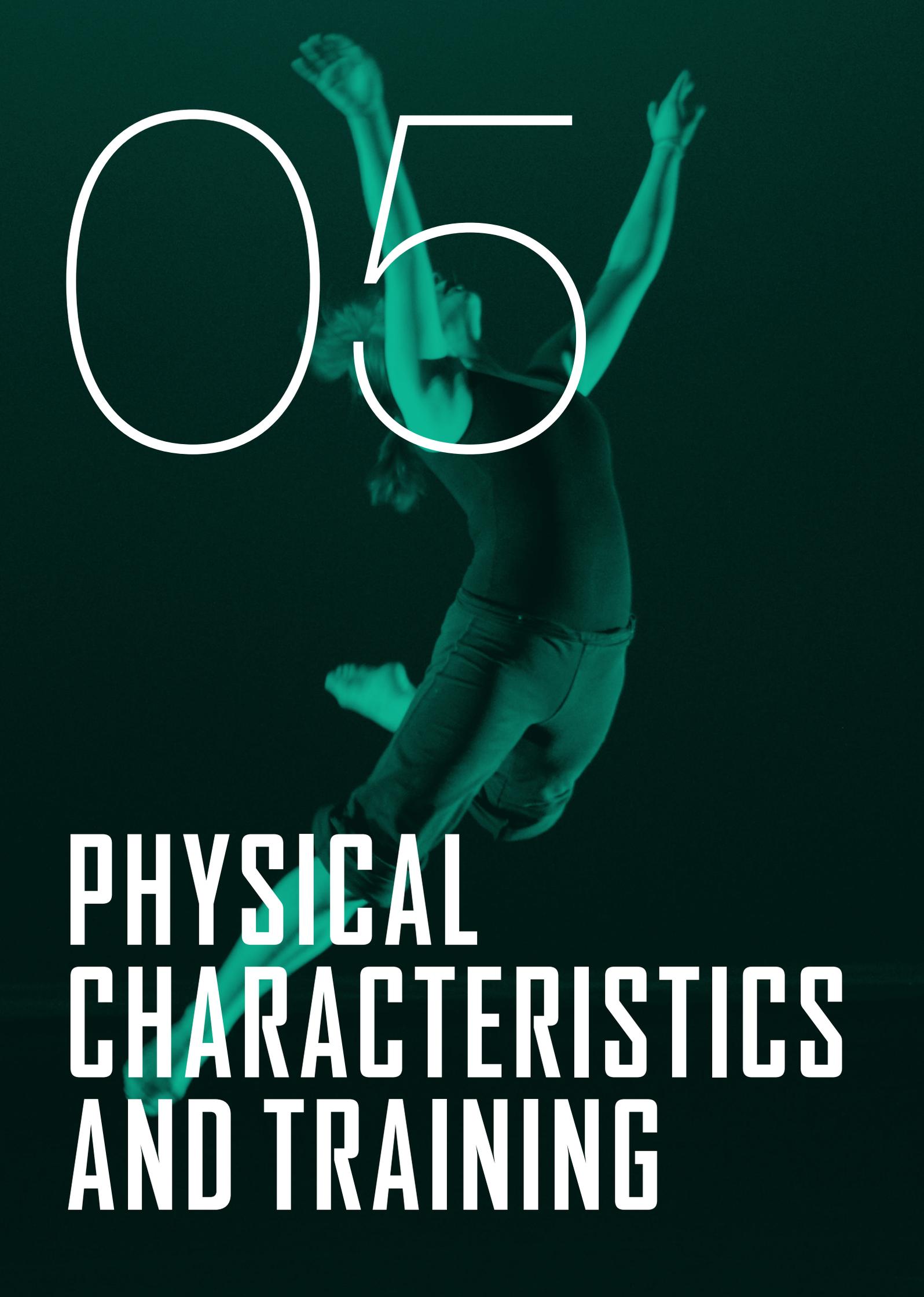
Avoid picking favourites or punishing mistakes.

How can I best give students individualised tuition while treating everyone as equals?

Support autonomy, e.g. by giving choices and offering reasons why certain exercises or tasks are taught.

Give students honest information about working in dance while emphasising that their career choice is an independent decision for which only they are responsible.

These recommendations are based on results outlined in this chapter and related literature. Recommendations made in other chapters likely also promote adherence (see e.g. *Maximising Well-Being*).

A person is performing a handstand with their arms raised in a V-shape. The image is overlaid with a large, white, hollow number '05'. The background is a dark, teal color.

05

**PHYSICAL
CHARACTERISTICS
AND TRAINING**

Dance is a highly skill based activity where tremendous physiological demands are placed on the performer in terms of joint range of motion, coordination and balance. Dancers are required to jump, perform fast explosive movements, balance and turn while at the same time giving due attention to flow, suspension and other qualities. In recent years the extent to which dance training itself can improve fitness has been at the forefront of debate.⁷²

Discussion continues regarding the extent to which certain physical attributes are trainable versus innate or stable and whether improvements in physical attributes and skills fluctuate or steadily improve over time. It is especially important to study these aspects with young dancers because both dance training and natural growth and development may impact on physical characteristics.

For all these reasons, we considered it important to study the physical development of CAT dancers.

OVERALL FINDINGS WHAT WE HAVE LEARNT ABOUT THE PHYSICAL CHARACTERISTICS OF YOUNG TALENTED DANCERS

Research findings clearly demonstrated that in terms of physiological development:

- ▶ All components of physical fitness changed across the 2-year research period.
 - This included cardiorespiratory fitness, muscular power, flexibility, upper body strength, balance, turn-out and joint mobility.
- ▶ Dancers who spent time in supplementary training (e.g. sport and exercise) became fitter than those who only engaged in dance.
- ▶ Certain physical attributes appeared to be variable, changing with the seasons (winter and summer time).

It appears that CAT dance training had a positive impact on many physical areas of development.

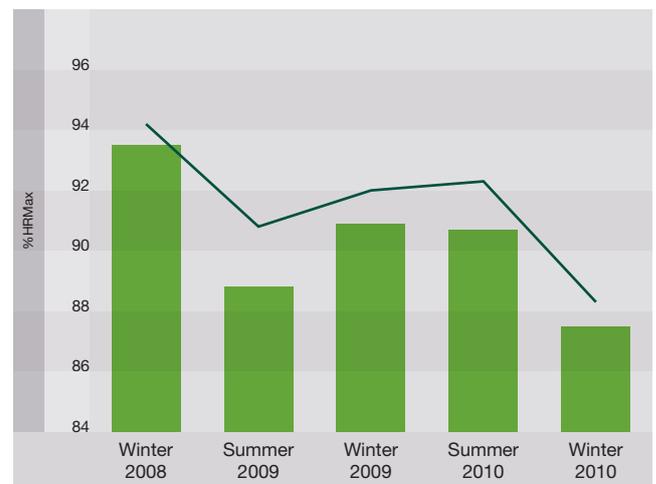
TAKING A CLOSER LOOK AEROBIC FITNESS

Aerobic fitness is important for general stamina while dancing as well as efficient recovery between bouts of movement.

CAT dancers' cardiorespiratory fitness improved across time (lower % of heart rate maximum indicates an increase in fitness). This holds true for the full group (full sample) as well as those who were tested at every time point (repeaters).^v

Interestingly, fitness was poorer in the winter time and better in the summer. Perhaps this is due to the increased number of rehearsals and performances in the summer placing different demands on the dancers' cardiorespiratory systems. Previous research shows that the intensity of dance performance tends to be higher than that of daily class, thereby eliciting a training effect.⁷³

DANCE AEROBIC FITNESS TEST (DAFT) STAGE 5



■ Full sample (N=233-375) ■ Repeaters (N=47)

The number of hours of non-dance physical activity (e.g. conditioning classes) within the CAT and outside activities (e.g. sport) appeared to be particularly related to the improvements in fitness. Thus, the role of supplementary training should be considered, as it has been for other dance populations.⁷⁴

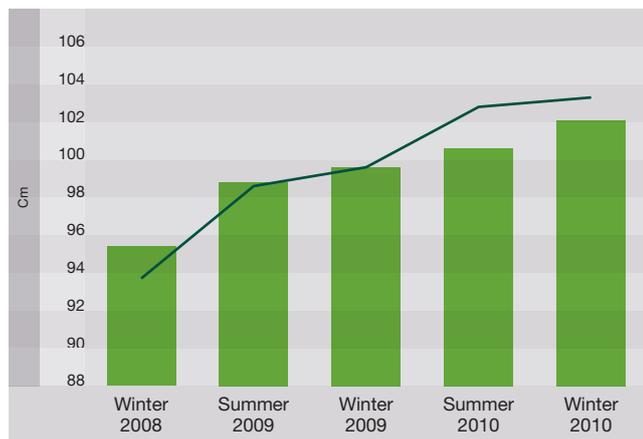
The older CAT dancers performed closer to their maximal heart rate during the fitness test, indicating that either they did the fitness test more fully (exerted themselves more maximally) or that they were less fit than the younger dancers.

^v Figures show data representing the average score for the full sample taking part at that time point (vertical bars) as well as for 'repeaters', i.e. dancers who participated at all 5 data collections (horizontal line).

TAKING A CLOSER LOOK FLEXIBILITY

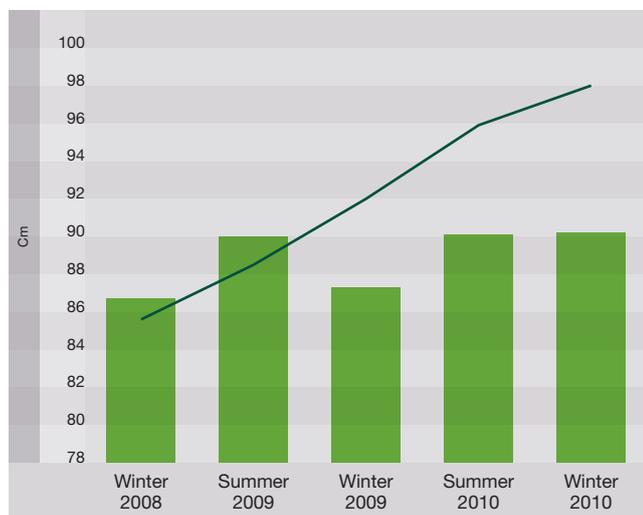
Flexibility is an important physical attribute since dancers are often required to reach great ranges of movement.

FEMALE FLEXIBILITY



■ Full sample (N = 182-302) ■ Repeaters (N = 46)

MALE FLEXIBILITY



■ Full sample (N = 68-113) ■ Repeaters (N = 11)

The CAT dancers' flexibility improved across time, indicating a training effect. The older dancers were more flexible than their younger peers and the more hours spent in ballet, the more flexible they were. We do not know whether this is due to selection (i.e. those who did more ballet were more flexible to start with) or training. The flexibility values recorded in this project were slightly lower than those reported in a recently published study with young ballet dancers.²⁸

TAKING A CLOSER LOOK MUSCULAR STRENGTH

Upper body strength is important for catching, throwing and lifting in dance as well as supporting one's body weight when using the floor.

FEMALE UPPER BODY STRENGTH



■ Full sample (N = 184-270) ■ Repeaters (N = 48)

MALE UPPER BODY STRENGTH



■ Full sample (N = 63-117) ■ Repeaters (N = 11)

The CAT dancers' upper body strength increased across time, with a notable peak in summer 2009. It was also noted that strength values tended to be higher in summer than in winter time. Again this could be due to the demands of particular choreographic work happening at that time; if so, this further supports the view that there may be certain areas of physical fitness which are honed in performance rather than in training.

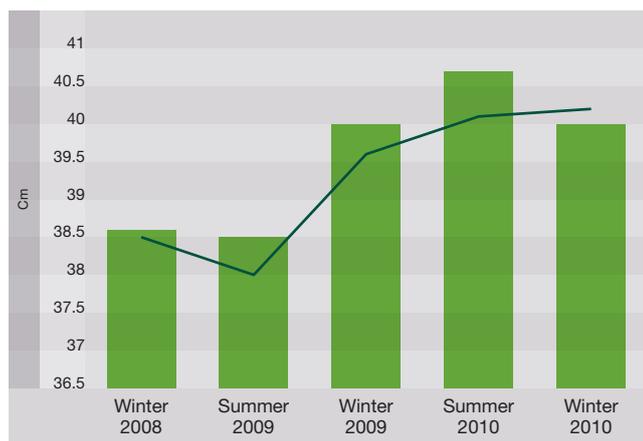
More hours spent in contemporary dance and/or hip hop were associated with greater strength (the more time in these styles, the greater the grip strength). Older dancers were stronger than their younger peers, which is not surprising given the physiological changes associated with growth. It was noted that girls improved in strength primarily during early (10–12.5 years) and mid-adolescence (13–15 years), while late adolescent girls (15.5–18 years) demonstrated a plateau. For boys, increases were particularly evident during mid-adolescence which likely concurs with their growth spurt.



TAKING A CLOSER LOOK MUSCULAR POWER

The vertical jump height test provides an indication of lower limb power which is important for fast explosive movements such as jumping, catching others, moving in and out of the floor, and elevation.

FEMALE JUMP HEIGHT



■ Full sample (N = 183–304) ■ Repeaters (N = 45)

MALE JUMP HEIGHT



■ Full sample (N = 67–112) ■ Repeaters (N = 11)

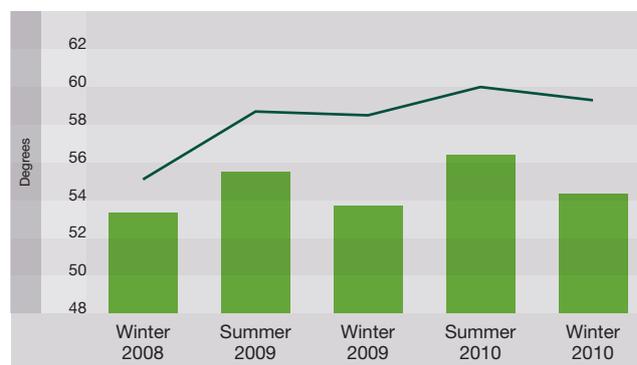
The CAT dancers' jump height improved across time. More hours spent in contemporary dance was associated with higher jumps (the more time in contemporary, the higher the jumps) while more hours spent in ballet was associated with lower jumps. Older dancers jumped higher than younger dancers; again, this is unsurprising given the physiological changes associated with growth.

The jump heights for females recorded in this project are greater than those reported in recently published studies with professional ballet dancers.^{21, 75}

TAKING A CLOSER LOOK TURN-OUT

Dance styles such as ballet, Bharatanatyam and contemporary comprise movement vocabulary which requires dancers to utilise their external hip rotation (turn-out).

TURN-OUT



■ Full sample (N = 259–424) ■ Repeaters (N = 59)

Although sometimes assumed to be fairly static, CAT dancers' turn-out improved across time, indicating a training effect. However, scores were higher in the summer than in the winter. This may be because the dancers' external hip rotators were stronger towards the end of the training season. Alternatively, if a dancers' internal body temperature is warmer, collagen within the hip joint is naturally more lax, allowing greater turn-out. Similar to the flexibility results, the more hours spent in ballet, the more turned-out the dancers were; again, we do not know whether this is due to selection or training.

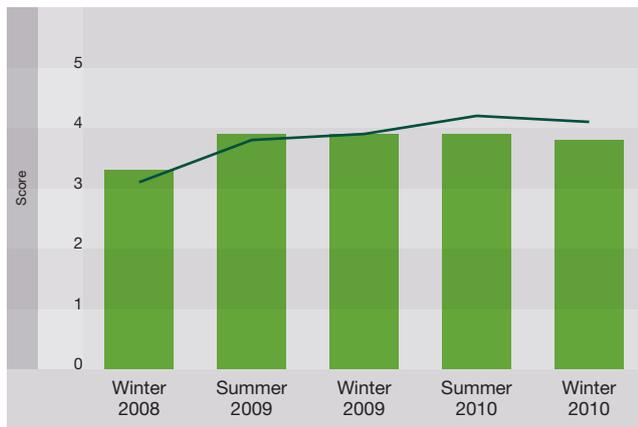
The CAT dancers' average turn-out was greater than values recorded in studies involving adolescent dancers,⁷⁶ university dance students⁷⁷ and pre-professionals⁷⁸.

TAKING A CLOSER LOOK BALANCE

Balance is important in dance because of the many poses, tilts and turns required for most styles. CAT dancers improved their balance over time, indicating a training effect.^{vi} Older dancers balanced better than younger dancers, possibly because balance is highly variable during periods of growth⁷⁹ or because they have spent more time training.

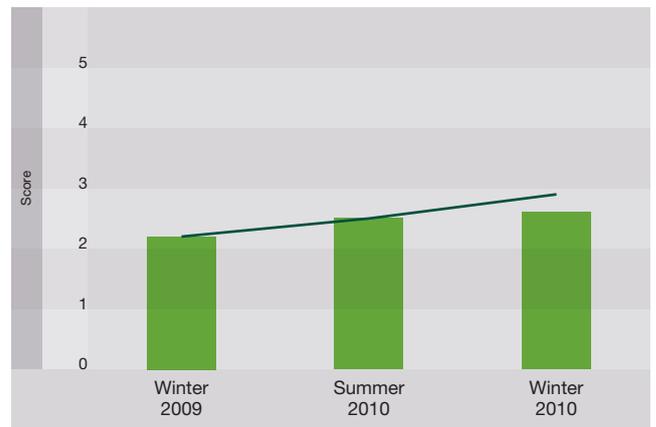
Spending more hours in ballet was marginally associated with better balance on one foot with the eyes closed and scores were higher in the summer than in the winter.

ONE-LEGGED FLAT FOOT BALANCE WITH EYES CLOSED



■ Full sample (N=259-422) ■ Repeaters (N=60)

ONE-LEGGED BALANCE, RISE WITH EYES OPEN



■ Full sample (N=318-421) ■ Repeaters (N=167)

^{vi} The second test shown was devised after the project started; hence, data exists for three time points only.







TAKING A CLOSER LOOK GROWTH

When young bodies grow during adolescence, many physiological changes occur including a sudden increase in height, increased arm and leg length and increased body mass. Growth does not happen symmetrically although usually the right and left sides even out at the end of the growth phase.⁶⁰

As a preliminary examination of CAT dancers' growth patterns, we examined changes in height and the dancers' thigh, calf, and upper arm girths. Students were divided into three groups according to their age at the start of the project:

- ▶ Early adolescence: 10 to 12.5 years old
- ▶ Mid-adolescence: 13 to 15 years old
- ▶ Late adolescence: 15.5 to 18 years old

As would be expected, student heights increased across the two year study period. However, when looking at this change in more detail, some patterns emerged:

- ▶ Girls' heights increased during early and mid-adolescence, but not in late adolescence.
- ▶ Boys' heights increased during mid-adolescence, but not in early adolescence.^{vii}

These results follow typical growth patterns in which girls start the adolescent growth spurt earlier than boys.⁶⁰

Limb girths did not increase notably for boys during the study period; for girls, only thigh girths increased, and only for the early adolescence group.

When young bodies grow during adolescence, many physiological changes occur including a sudden increase in height, increased arm and leg length and increased body mass.

TAKING A CLOSER LOOK HYPERMOBILITY

General Joint Hypermobility (GJH) is defined as mobility at a joint beyond the normal range. The prevalence of GJH across the five time points was around 53%, and was more common in females. It was further found that:

- ▶ Hypermobility appeared to increase over time.
- ▶ Students were more hypermobile if they:
 - ▶ were older
 - ▶ had spent more years in dance training
 - ▶ currently spent more time in ballet

This suggests that joint mobility typically increases as a result of dance training, and that for some this may result in what may be termed acquired hypermobility.

Benign joint hypermobility syndrome (BJHS) is thought to be an inherited connective tissue disorder and is often associated with joint pain and other complications. The prevalence of BJHS was less than that of GJH, averaging around 44%, and there was no difference in rates between males and females.



vii There was an insufficient number of males in the late adolescence group to be able to examine height changes.

PRACTICAL RECOMMENDATIONS

TEACHERS AND ENVIRONMENTS WHICH PROMOTE HEALTHY TRAINING FOR YOUNG PEOPLE ARE ...

EDUCATIONAL

- ▶ **Balancing different aspects of training**
- ▶ **Monitoring progress and needs**
- ▶ **Offering supplementary training**

ADAPTIVE

- ▶ **Individualising tuition**
- ▶ **Age-appropriate**
- ▶ **Periodising training**

INNOVATIVE

- ▶ **Always striving to improve provision**
- ▶ **Willing to try new approaches**

TALENT ASTUTE

- ▶ **Promoting a mindset that talent can change & improve**
- ▶ **Using multi-session auditions**

IDEAS TO TRY

Design classes to reflect the competing needs of technical, physical, and creative development.

Incorporate fitness classes to prepare dancers for performance, e.g. by considering the physiological demands of new choreographies.

Monitor hypermobility and support hypermobile dancers with tailored conditioning and safe technical training.

Can I allow time for individually appropriate exercises, e.g. stretching for some, strength for others?

Train dancers according to their developmental stage:

- ▶ avoid heavy resistance training with younger dancers
- ▶ consider intensity, frequency and duration of exercises according to the individual
- ▶ expect less aerobic improvement and strength gain from pre-pubertal than post-pubertal dancers

Explain to dancers what is happening during growth.

Adapt the training load to account for age as well as male-female differences.

Periodise schedules to avoid overtraining and provide continual challenge.

Consider how your curriculum might be improved and adjusted in line with emerging scientific knowledge.

Experiment with approaches already tested in sport and exercise science, adjusting to your specific needs.

Acknowledge that improvements do not necessarily happen in a gradual manner: performance can fluctuate as a result of training demands, maturation and season.

Let dancers know that the physical and technical aspects of talent will improve with effort.

Critically evaluate what you examine at audition: physical capacities change during adolescence, sometimes rapidly, and so may not be appropriate for assessment.

How can we assess dance talent in a way that accounts for differences in maturation and previous training?

These recommendations are based on results outlined in this chapter and related literature. Recommendations made in other chapters likely also promote healthy training (see e.g. *Understanding Injuries*). For more information on fitness training for dancers, dance training of adolescents during periods of growth, and teaching of hypermobile dancers see www.iadms.org/displaycommon.cfm?an=4

006



**UNDERSTANDING
INJURIES**

Monitoring dance injuries is important because dancers are at high risk of sustaining an injury.^{33,81} It stands to reason that sustaining an injury will cause frustration, potentially decrease well-being, and may hinder talent development. To date, however, most research has focused on adult professional dancers. More research is needed about young dancers' injuries, especially because their bodies are still developing and their training differs from that of professionals. Moreover, CAT dancers often undertake dance training in other schools, and take part in sports and other physical activities. As such, they may be at risk of sustaining an injury in several environments.

'every dancer worries about injuries' CAT dancer

The causes of dance injuries are not well established, but it is known that one risk factor is having had a previous injury.⁸² Therefore, more information is necessary about how to prevent injuries, whether acute, recurrent or chronic. For these reasons, we investigated a range of injury-related factors, such as incidence rates, injury sites, types, and risk factors.

OVERALL FINDINGS WHAT WE HAVE LEARNT ABOUT YOUNG TALENTED DANCERS' INJURIES

Research findings demonstrated that:

- ▶ The injury prevalence among CAT dancers was lower than that of many previous studies.
- ▶ The majority of injuries occurred to the knee, foot and ankle regions.
- ▶ Dancers who were older, female, started training at a younger age, trained more intensively, and had Benign Joint Hypermobility Syndrome (BJHS) were more likely to sustain an injury.
- ▶ Bi-lateral differences in turn-out and flexibility were not associated with injury.

The types, sites and risk factors of CAT dancers' injuries appeared similar to those recorded in previous research, but overall incidence rates appeared to be somewhat lower.

We recognise that there are several limitations to the research. For example, not all CATs were able to keep records of all injuries all of the time, and retrospective injury surveys rely on memory. The findings should therefore be viewed with some caution. Nevertheless, we consider it a strength to have collected data via two complementary methods.

TAKING A CLOSER LOOK INJURY PATTERNS

Around half of the dancers (52%) sustained an injury at least once during the two-year research period. Most dancers sustained one injury rather than several.

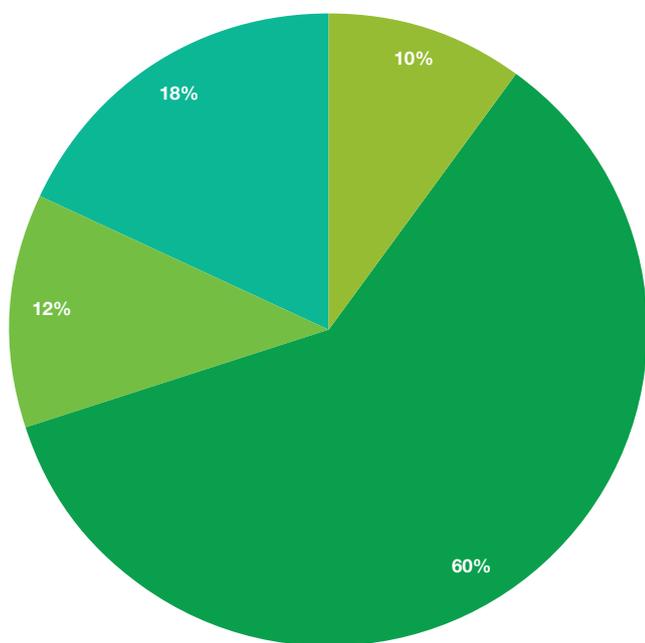
INJURIES PER DANCER ACROSS PROJECT



Average 1.49 injuries/dancer

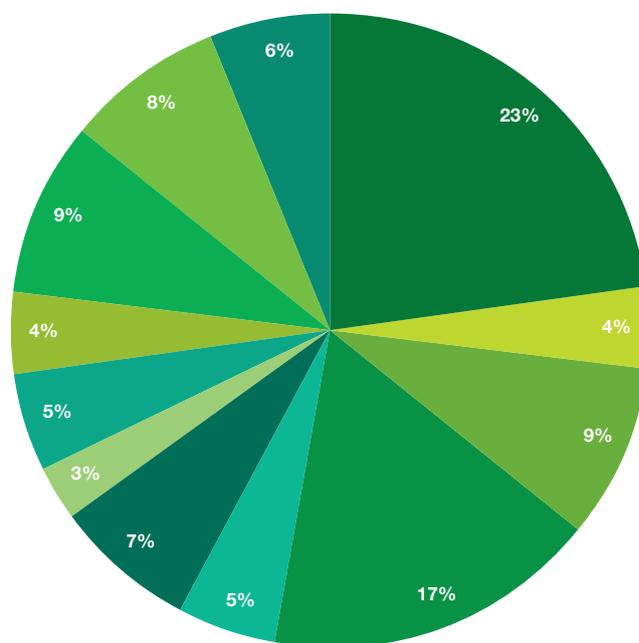
The injury incidence was similar for males and females. Overall, the injury rate is lower than rates reported in many other previous studies with dancers.^{33, 81, 83, 84}

INJURY CLASSIFICATION



- Acute 60%
- Chronic 12%
- Recurrent 18%
- Not specified 10%

INJURY SITES

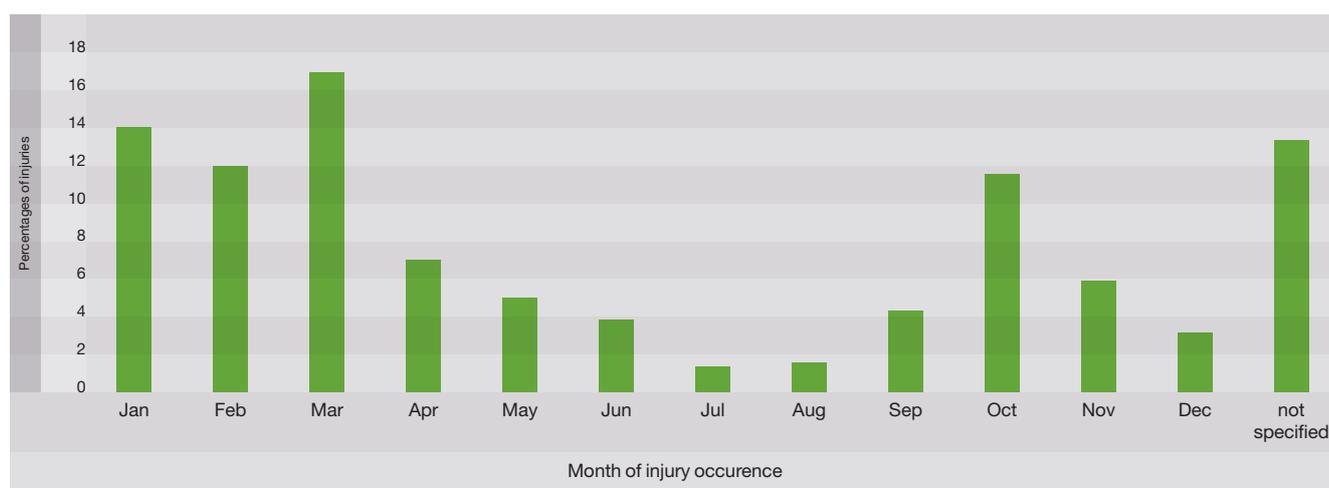


- Head or neck 3%
- Shoulder or chest 5%
- Arm, wrist or hand 4%
- Back 9%
- Groin, hip or buttock 8%
- Thigh 6%
- Knee 23%
- Lower leg 4%
- Foot 9%
- Ankle or heel 17%
- Multiple areas 5%
- Other 7%

The injury monitoring showed that most injuries were acute while recurrent and chronic injuries were less common. A chronic injury is a long-lasting and persistent injury whereas an acute injury happens more suddenly and is not long-lasting. A recurrent injury happens at the same site and is of the same type as a previous injury.

Our survey revealed that the majority of injuries occurred to the lower body (76%) at all five time points. In particular, injuries were prevalent in the knee, foot and ankle regions. Most of the injuries (40%) were muscular in nature. This is consistent with other dance injury research.^{33, 85, 86}

INJURY OCCURENCE IN RELATION TO TIME OF YEAR



Both self-report survey data and injury tracking data indicated that the majority of injuries occurred in the winter time.

Although our study design did not permit analyses of why injuries were more frequent during winter, we suggest that dancers and their educators may need to pay greater attention to the importance of adequate warm up before, and cool down after, dancing during the colder months.

In terms of treatment, dancers usually visited a physiotherapist. Nearly 40% of those injured were offered a modified training programme where classes and rehearsals were adapted to accommodate the dancer's injury while 27% were advised to temporarily stop dancing. Importantly, 39% of dancers who sustained an injury reported that they did not seek treatment.

TAKING A CLOSER LOOK INJURY RISK FACTORS

Dancers were more likely to sustain any injury if they:

- ▶ Were older
- ▶ Were female
- ▶ Started dance training at a younger age
- ▶ Trained more intensively (i.e. spent more hours in dance training and had been in CAT training for longer)

TAKING A CLOSER LOOK BI-LATERAL DIFFERENCE AND INJURY OCCURRENCE

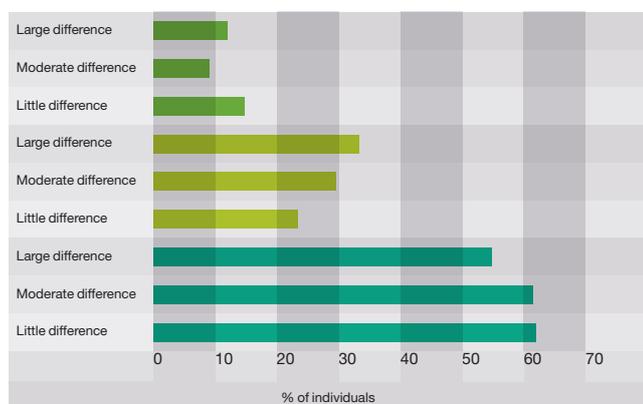
It has been suggested that dancers with large bi-lateral differences (i.e. differences between right and left sides in terms of turn-out and/or flexibility) may be more susceptible to injury.⁸⁷ In order to determine whether this was the case, we created three groups based on their degree of bi-lateral difference:

- ▶ little difference (< 5°)
- ▶ moderate difference (5–10°)
- ▶ large difference (> 10°)

This was done both for turn-out and for active hamstring flexibility. The three groups were then compared on the number of injuries sustained over the subsequent 12 month period.

Active hamstring flexibility and injury

BI-LATERAL DIFFERENCES IN ACTIVE FLEXIBILITY AND INJURY OCCURRENCE



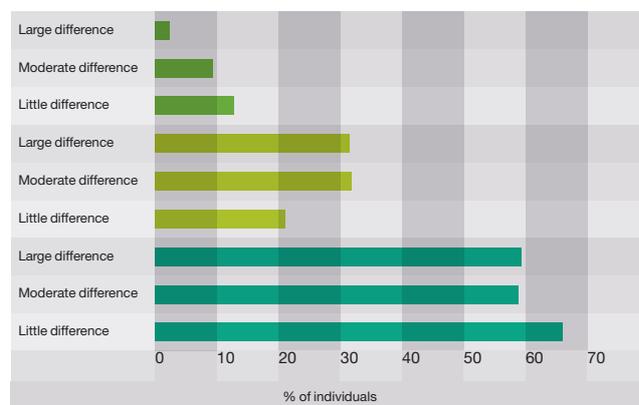
- No injuries
- One injury
- Two or more injuries

As shown, dancers with moderate or large differences in hamstring flexibility between their right and left sides were no more likely to sustain an injury than dancers with little such bi-lateral difference.

Turn-out and injury

Just like for hamstring flexibility, dancers with moderate or large differences in turn-out between their right and left sides were no more likely than dancers with little such difference to sustain an injury. In summary, bi-lateral differences in flexibility or turn-out were unrelated to injury occurrence.

BI-LATERAL DIFFERENCES IN TURN-OUT AND INJURY OCCURRENCE



- No injuries
- One injury
- Two or more injuries

TAKING A CLOSER LOOK HYPERMOBILITY AND INJURY

To examine whether hypermobility was associated with an increased risk of sustaining injury, two analyses were performed. Results revealed that:

- ▶ Dancers with General Joint Hypermobility (GJH) were no more likely to report an injury than dancers without GJH.
- ▶ Dancers with Benign Joint Hypermobility Syndrome (BJHS) were more likely to report an injury than dancers without BJHS. In other words, BJHS appeared to be an injury risk factor.

These findings suggest that it may not be merely having an unusually large joint range of motion which predisposes dancers to injury; rather, the far more complex syndrome, BJHS, appears to be the predisposing factor. This may be because BJHS affects a large number of tissues in the body: for instance, BJHS is associated with laxity in joints in general as well as the skin, whereas GJH can be more localised. Because little research has addressed BJHS among dancers in depth, and because it is partly genetic and due to non-dance related factors (e.g. skin stretchiness, eye myopia), it is difficult to forward recommendations about BJHS and dance training at this time.

PRACTICAL RECOMMENDATIONS

TEACHERS AND ENVIRONMENTS WITH A HEALTHY APPROACH TO INJURY ARE ...

EDUCATIONAL

- ▶ **Monitoring progress and needs**
- ▶ **Holding educational talks**
- ▶ **Encouraging help-seeking**

ADAPTIVE

- ▶ **Individualising tuition**
- ▶ **Periodising training**

LEARNING-FOCUSED

- ▶ **Promoting healthy goal striving**

SUPPORTING AUTONOMY

- ▶ **Promoting individual responsibility**

IDEAS TO TRY

Make profiling part of dance training to assess health, fitness, and injury susceptibility.

Hold talks on injury prevention to help increase awareness and encourage dancers to look after their bodies.

Encourage dancers to seek treatment and rehabilitation when injured - many dancers still ignore their injuries.

Track injuries as they occur and identify injury patterns and workload indicators throughout the year.

How can we involve our staff and students in effective, meaningful injury monitoring?

Adapt training for hypermobile dancers, for instance by involving appropriately qualified persons in the assessment and monitoring of hypermobility and giving hypermobile dancers individual training programmes.

Periodise training to avoid overtraining and prevent injury.

Injury rates can vary through the year, so ensure that dancers warm up before classes, particularly in winter.

Encourage dancers to strive and work hard, but within healthy boundaries. For instance, dancers should not:

- ▶ push to the point of injury
- ▶ dance through injuries
- ▶ work on complex technical skills when already fatigued

Provide regular feedback on profiling results, injury rehabilitation and similar. This helps dancers feel empowered and responsible for their development.

Encourage dancers to listen to their own bodies and to be confident to stand up for themselves if they cannot go any further – or if they could work harder!

Does my feedback style encourage dancers to be responsible for their own bodies?

These recommendations are based on results outlined in this chapter and related literature. Recommendations made in other chapters also contribute to injury prevention and healthy rehabilitation (see e.g. *Physical Characteristics and Training*). For more information on screening, first aid, and training hypermobile dancers see the Bulletin for Teachers and Resource Papers on <http://www.iadms.org/displaycommon.cfm?an=4>. For more information on warm up and cool down, see <http://www.danceuk.org/shop/information-sheets/>



MAXIMISING WELL-BEING

We consider well-being crucially important to dance talent development, and chose to make well-being an integral part of the research project for two main reasons:

- 1 Well-being is valuable in its own right – all dancers deserve to feel good about themselves and their dancing.
- 2 We believe that dancers who feel well will have a greater chance of performing well.

Previous research has indicated that dancers may be an at-risk group for psychological ill-being.^{33, 88–92} In contrast, other recent studies suggest that dancers report mostly high levels of well-being^{43, 44, 49}. Against this backdrop of conflicting evidence, we examined a range of well-being related variables including self-esteem, anxiety, perfectionism, disordered eating attitudes, and passion for dance. The overall aims were to explore the levels of well-being among CAT dancers as well as to document any changes in well-being over a two-year period.

OVERALL FINDINGS WHAT WE HAVE LEARNT ABOUT YOUNG TALENTED DANCERS' WELL-BEING

Research findings clearly demonstrate that in terms of psychological well-being, students generally reported positive results. CAT dancers generally reported:

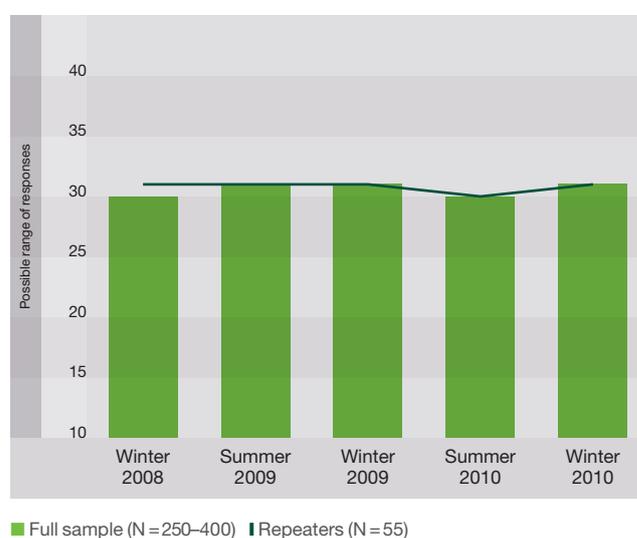
- ▶ High and stable self-esteem in their general lives
- ▶ Low and stable levels of anxiety when dancing in the CATs
- ▶ High levels of harmonious (healthy) passion toward dance
- ▶ Moderate levels of perfectionism
- ▶ Healthy eating attitudes

Well-being among CAT dancers was high and stable over the two-year period of the study. It is clear that CATs are developing young dancer talent while supporting well-being.

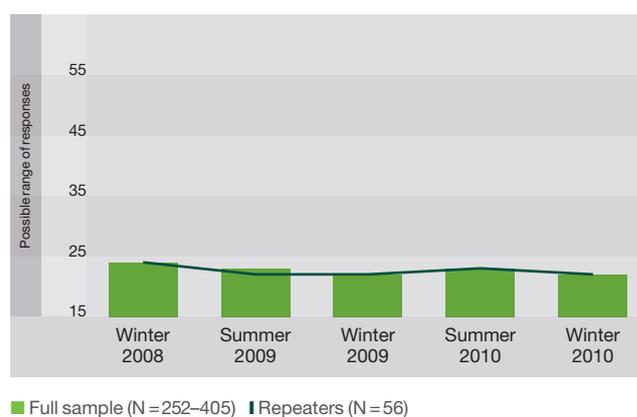
TAKING A CLOSER LOOK SELF-ESTEEM AND ANXIETY

CAT dancers' self-esteem scores were closer to the top (high self-esteem) than to the bottom of the scale, while anxiety scores were closer to the bottom (low anxiety) than to the top of the scale. Both were stable across the two-year period of study.^{viii}

SELF-ESTEEM



ANXIETY



^{viii} Figures show data representing the average score for the full sample taking part at that time point (vertical bars) as well as for 'repeaters', i.e. dancers who participated at all 5 data collections (horizontal line).

While unchanging levels of self-esteem and anxiety may not sound exciting, there is good reason to be encouraged by these findings: in particular, they stand as a positive contrast to much of the previous literature. For instance, other studies have indicated that:

- ▶ dancers have low levels of self-esteem^{88, 89};
- ▶ self-esteem typically decreases during adolescence⁹³; and that
- ▶ dancers are often anxious.^{88, 90, 94}

Additionally, CAT students' self-esteem scores were higher than a sample of professional dancers⁹⁵ while anxiety scores were lower than a sample of athletes of the same age range⁹⁶. In fact, anxiety scores were similar or lower than those recorded for a sample of athletes working with coaches who had been trained in how to create a healthy climate⁹⁶.

TAKING A CLOSER LOOK DISORDERED EATING ATTITUDES

While well-being was generally high among CAT dancers, there is inevitably variation between individuals. We were particularly interested in better understanding which factors might predict disordered eating attitudes (DEA). This was considered valuable because in other research, dancers have been found to report such problems more frequently than non-dancers.^{91, 92, 97}

A small percentage of CAT dancers (approximately 7%) reported DEA above the clinical cut-off score. These students were referred for support in line with the CAT policy.⁹⁸ As may be seen, average scores were far below the clinical cut-off; they were also stable across time.

To better understand what predisposed some CAT dancers to exhibit higher scores, we examined which other variables predicted DEA.^{99, 100} Results indicated that:

- ▶ **Personality variables** were strongly related to DEA: CAT dancers with low self-esteem and who exhibited perfectionist tendencies (such as a high need for approval from significant others) were at greatest risk.

- ▶ Variables related to the **dance environment** were also implicated: CAT dancers who perceived pressures from teachers reported more DEA. This may include feeling pressured to perform, having one's weaknesses emphasised, or an over-emphasis on having to constantly improve.

- ▶ To a smaller extent, **other variables** may help indicate that a CAT dancer is at risk: for instance, menstrual dysfunction (e.g. absence of 3 or more consecutive periods), poor sleep quality and excessive exercising outside of dance may be warning signs.

- ▶ In general, **females reported higher scores than males**. However, the prevalence of DEA above clinical cut-off appeared similar between the sexes.

- ▶ DEA scores were lower than those recorded in most studies with dancers,^{91, 101, 102} although scores for males were higher than those recorded in one study.¹⁰³

DISORDERED EATING ATTITUDES



■ Full sample (N=245-401) ■ Repeaters (N=56) ■ Clinical cut-off score

DEA scores were lower than those recorded in most studies with dancers, although scores for males were higher than those recorded in one study



TAKING A CLOSER LOOK PASSION

Being passionate about dance will logically help dancers initiate and continue developing their talents. In passion theory, however, a distinction is made between *harmonious* and *obsessive* passion: the former is a flexible love of dance where students are very interested in, and spend a lot of time on, their activity without it conflicting with other areas of their lives; the latter is a more rigid involvement where dance is all-consuming.⁴⁵ As shown, scores were notably higher for harmonious than for obsessive passion.^{ix}

‘...with passion you’re able to grow a lot stronger, especially as a dancer...the more you push yourself because you love it so much...you are going to notice a growth within yourself’
CAT dancer



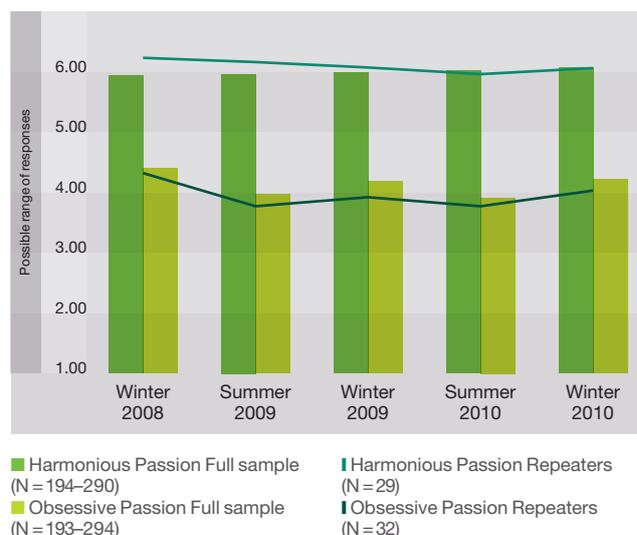
Harmonious passion remained high and largely stable over time while obsessive passion remained moderate and largely stable.

This indicates that CATs nurtured a strong commitment without suggesting that students have to give up their entire lives to dance. Like any other construct, however, there was variation between individuals; hence, it was useful to further examine how passion is related to other aspects of psychological and physical well-being. Results indicated that:¹⁰⁴

- ▶ Dancers who were injured in the year before our project started reported greater levels of obsessive passion than uninjured dancers. Harmonious passion was unrelated to injury.
- ▶ Dancers with higher harmonious passion reported higher self-esteem and lower anxiety.
- ▶ When dancers perceived their motivational climate to become more task-involving over time, their harmonious passion also increased.

Both HP and OP scores were similar to those reported in a study of university dancers.⁴⁶ In that same study, OP was similarly identified as an injury risk factor. HP was associated with better coping and suffering from acute injuries for shorter durations.

PASSION



ix The smaller sample size for this variable is due to its representing only students who both explicitly stated that dance was their favourite activity and scored above midpoint on the passion criterion questions which form part of the questionnaire.

PRACTICAL RECOMMENDATIONS

TEACHERS AND ENVIRONMENTS WHICH MAXIMISE WELL-BEING ARE ...

SOCIALLY SUPPORTIVE

- ▶ Giving equal attention & respect
- ▶ Creating a safe environment

POSITIVE

- ▶ Stimulating enjoyment
- ▶ Enthusiastic, can-do attitude
- ▶ Giving constructive feedback

EDUCATIONAL

- ▶ Monitoring progress and needs
- ▶ Holding educational talks
- ▶ Encouraging help-seeking

LEARNING-FOCUSED

- ▶ Task-involving
- ▶ Promoting healthy goal striving
- ▶ Instilling a sense of control over progress

IDEAS TO TRY

Help dancers feel valued, seen and heard, for instance by giving everyone equal attention in terms of:

- ▶ quantity – e.g. amount of feedback
- ▶ quality – e.g. degree of individualised advice

Tell dancers that mistakes are part of learning so that they feel safe to be brave.

How can I make everyone feel seen – in every class?

Avoid pointing out weaknesses – instead highlight:

- ▶ what students are doing well (to reinforce good habits)
- ▶ what they can do to improve further (to focus their minds on constructive action)

Be a positive, passionate role model by showing that you, too, love dance and have fun in class!

What words and images can I use to ensure feedback is always constructive?

Monitor disordered eating with an evidence-based policy created with those who will be affected by it.

Hold talks on well-being. For example:

- ▶ talks on disordered eating can increase knowledge and lessen taboos
- ▶ psychological skills training can boost well-being and performance

Talk openly about the importance of seeking help in times of trouble: for oneself or for friends.

Encourage dancers to feel successful when they improve in relation to their own level.

Tell dancers that perfectionism is more likely to hinder talent development than to help it.

Help dancers feel in control, for example by giving feedback based on what dancers *do* (e.g. work hard), not what they *are* (e.g. talented).

Let dancers know that passion for dance is important but should not become all-consuming.

When goals are set, are they challenging yet realistic?

These recommendations are based on results outlined in this chapter and related literature. Recommendations made in other chapters likely also promote well-being (see e.g. *The Talent Environment*). For more information on psychological skills training, anxiety management, disordered eating and nutrition see www.foundations-for-excellence.org/resources/. For an example of a disordered eating policy see www.trinitylaban.ac.uk/dance-science/department-research/the-cat-research-project/cat-project-resources.aspx



NURTURING CREATIVITY

Creativity is an important part of being a successful and fulfilled dance artist. Choreographers often seek dancers' input into new works, and dancers are expected to be able to interpret a role in their own way.¹⁰⁵ Creativity has also been seen as a form of well-being or an example of *optimal human functioning*.¹⁰⁶ Indeed, if a dancer felt that their creativity was optimised, this could lead to greater fulfilment and well-being – and good use of artistic potential. Additionally, dancers are often required to coordinate performing, teaching, short-term projects and other jobs within a portfolio career. Being creative is no doubt beneficial in finding, crafting, and balancing these competing demands.

Research into creativity has emerged within a range of domains such as professional arts practice, cognitive psychology and education; however, before this project it had not yet been researched within dance science.

For all these reasons, we chose to study creativity within our project.

OVERALL FINDINGS

WHAT WE HAVE LEARNT ABOUT YOUNG TALENTED DANCERS' CREATIVITY

Across our creativity studies, positive findings have been obtained. In particular, CAT dancers saw themselves as highly creative in their dancing. This was more likely if they:

- ▶ Were encouraged to explore and develop creatively from their own start point, whether those were tentative first steps or huge leaps towards the production of dance work.
- ▶ Exhibited high levels of well-being (greater self-esteem and lower levels of anxiety).
- ▶ Perceived their learning environment as a safe, supportive space (including being highly task-involving and less ego-involving^x).

The CAT environments studied appeared well set-up for nurturing creativity, and CAT students generally reported feeling creative in relation to their dancing.

TAKING A CLOSER LOOK

WHAT IS CREATIVITY?

To understand how creativity might be nurtured, it was important to first understand how it was conceptualised and considered in the CAT context studied. Numerous definitions of creativity exist and even dancers and staff

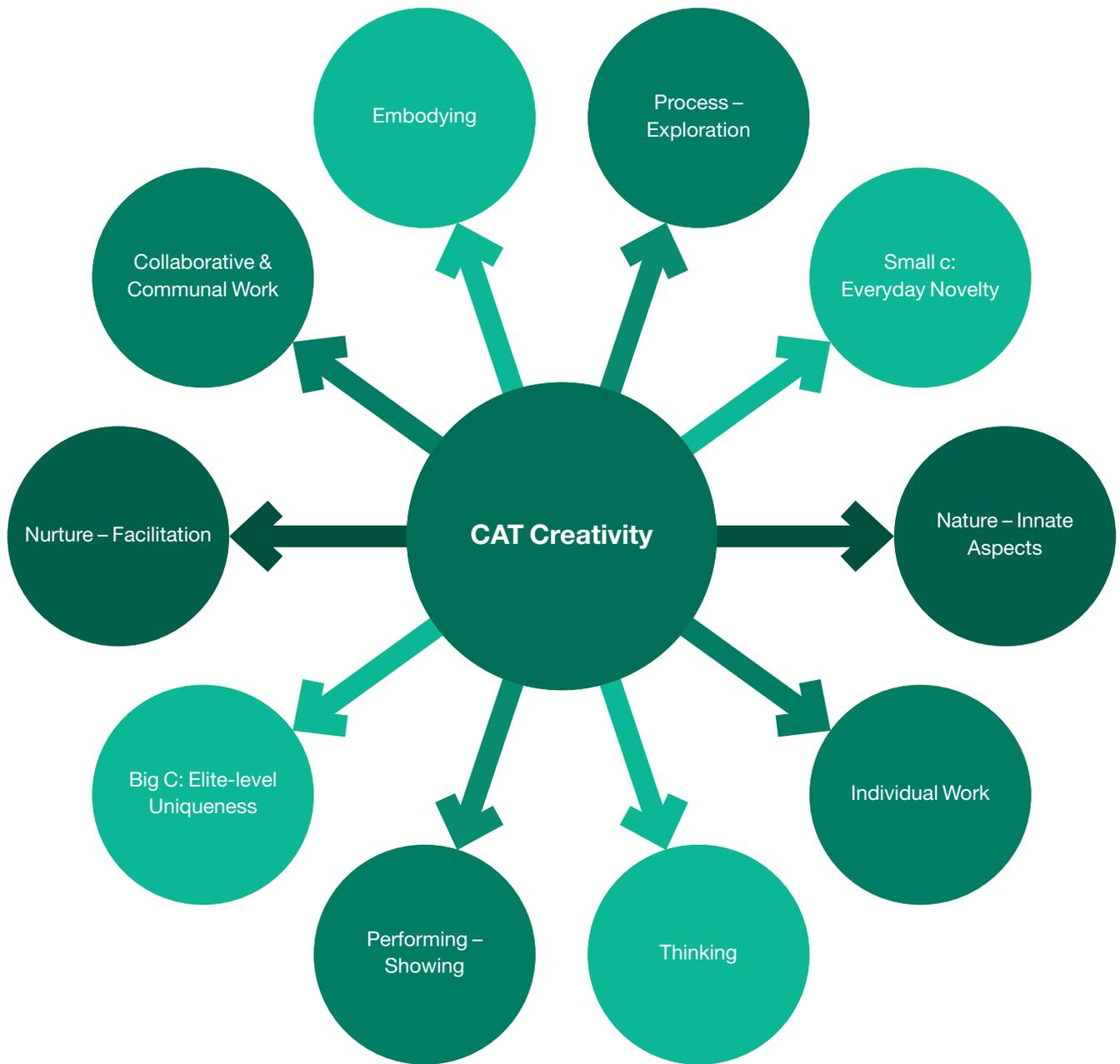
within the case study CAT conceptualised creativity slightly differently. This part of the qualitative research therefore helped ensure that descriptions of creativity used to move forward were anchored in the study context rather than imposed from the outside. The pendulum diagram overleaf highlights the main elements found to comprise creativity.

Emerging from these findings as well as the surrounding literature, the following description of CAT dancers' creativity was put forward:

Creativity in dance includes ideas or inspirations which begin as cognitions and/or physical impulses. The ideas, when allowed to flow, develop in many different directions to reveal something new and may lead to a distinctive dance movement or piece. The creative process involved in shaping a final product includes discovering, playing with, channelling, selecting and discarding ideas and movement material. Typically, dancers blend their own ideas, personal voice and life experience with learned art form knowledge, any tuition given, and other dancers' ideas and input.

Notably, these descriptions of creative activity are congruent with other research into dance education,^{107, 108} as well as reports and initiatives from the previous government.^{109, 110}

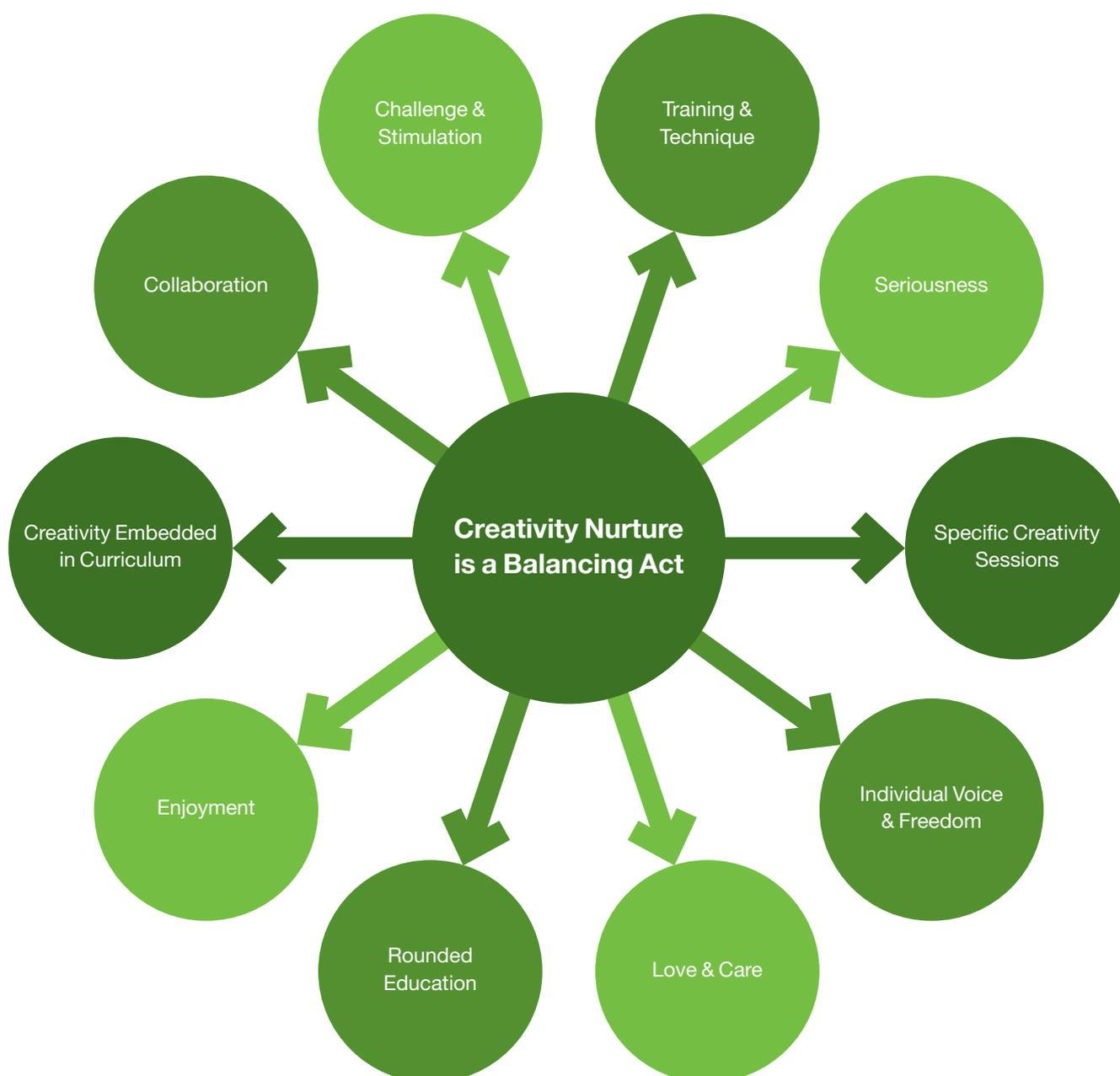
^x See *The Talent Environment* chapter for a definition of these terms.



TAKING A CLOSER LOOK HOW CREATIVITY CAN BE NURTURED

Although personal characteristics may make a dancer more or less likely to be creative, our findings strongly suggested that creativity could be, and often was, effectively nurtured within the case study CAT environment. This occurred in numerous different but interconnected ways which stemmed from a CAT ethos of valuing

individual uniqueness; in fact, the case study CAT seemed to balance a range of somewhat opposing qualities. These are further illustrated below. Perhaps it can be said that creativity is nurtured, and flourishes, in the balance and interaction of these factors – that is, when educators attend to each end of these spectra, none to the exclusion of another, creativity is nurtured:



Perhaps the best way to illustrate these factors is via the words of CAT dancers and staff members themselves. Many spoke of the CAT as a unique environment, partly because of its emphasis on balancing dance technique training with a **rounded education**:

‘...being here isn’t just about being a dancer, it’s about becoming a rounded person. It’s about taking ownership and responsibility of what you are doing.’ CAT manager

A staff member also explained how **creativity was embedded throughout the curriculum**:

‘It is about the teaching methodology, it’s about the teachers’ interaction and the expectations in the room and it’s all those things that are nurturing creativity, not necessarily those skills and structures that you are actually using as your framework for teaching and learning.’ CAT manager

Importantly, teachers were deliberately **challenging** and **stimulating** as well as **loving** and **caring**. Part of challenging students was helping them find their creative **voice**:

‘I think, particularly with students, there has to be a feeling of love in the room but otherwise it’s not going to go, it’s not going to happen because you need to feel safe.’ CAT teacher

‘You have to pass on certain knowledge and your skills but then give them the choice to use their skills and that knowledge... it is really important to give them a voice.’ CAT teacher

Although individual voice was valued highly, the nature of creativity in **collaboration** was equally important. In fact, creativity was often both collaborative and **communal** rather than the work of a single individual. One student explained:

‘I just love it . . . you put loads of input into the pot and then you mix it up and then you get a product which is brilliant because it has everyone’s view.’

CAT student

Finally, it was notable that **seriousness** and hard work was balanced with **enjoyment**:

‘. . . important to me that I take my students on a journey that really takes them somewhere and I demand a lot as a teacher so I have to demand that same amount from myself.’ CAT teacher

‘I have to have an environment where I feel safe to have a really, really great time myself with my students.’ CAT teacher



TAKING A CLOSER LOOK CREATIVITY AND WELL-BEING FROM A QUANTITATIVE PERSPECTIVE

Using the *Dancers' Perceptions of Creativity Questionnaire* (DPCQ) we extended our creativity research to the entire CAT sample, adding breadth to the findings reported above. We used the DPCQ to examine relationships between creativity perceptions and a selection of well-being related variables. First, we noted that on a 1 to 5 scale, CAT dancers' average perception of their own creativity was just under 4. This meant that dancers felt/saw themselves as creative and engaged in creative behaviours 'quite a bit':



1 = Not at all
2 = Not particularly
3 = Somewhat
4 = Quite a bit
5 = Definitely

In the table below, quantitative results relating to creativity and well-being are outlined.

CATs appeared to be nurturing creativity in a healthy, positive way. In the case study CAT, this had not come about accidentally but was the result of a carefully considered and ever-developing curriculum that saw creativity as inherently valuable. It appeared that as a result of such thoughtful, nurturing teaching and management not only creativity but also well-being was facilitated.

Variables studied	Results: <i>Dancers felt more creative if ...</i>	Support from interviews	Interpretation
Self-esteem	... their self-esteem was higher	<i>'... trusting yourself to be as good of a creator as the next guy. Just trusting in the ability to create.'</i> (Visiting artist)	If dancers feel valued and trust themselves, they likely also trust that their ideas and movements are adequate and feel safe to express themselves.
Anxiety	... their anxiety was lower	<i>'I've come against such fear that I've stopped myself from creating ... because of not wanting to risk being wrong.'</i> (Visiting artist)	When dancers are scared of doing something wrong or feel insecure, they seem to be less willing to take risks in creative activities.
Motivational climate perceptions	... they perceived the climate as more task-involving	<i>'I think as a teacher, stimulating openness, stimulating that a child's idea is respected and wanted and valid in the studio is a way of nurturing creativity.'</i> (CAT manager)	A task-involving climate values each individual, recognises effort and makes good use of cooperation, all of which appear to nurture creativity.
	... they perceived the climate as less ego-involving	<i>'When I became a dancer and it was all about getting the technique ... I was afraid of being creative ... because as soon as you do something it's like criticised: 'oh, that's rubbish' ...'</i> (CAT teacher)	An ego-involving climate values objective success most highly, gives unequal attention to students of different abilities, and punishes mistakes; such behaviours and attitudes seem to thwart creativity.

PRACTICAL RECOMMENDATIONS

TEACHERS AND ENVIRONMENTS WHICH NURTURE CREATIVITY ARE ...

SOCIALLY SUPPORTIVE

- ▶ Giving equal attention & respect
- ▶ Creating a safe environment

POSITIVE

- ▶ Stimulating enjoyment
- ▶ Giving constructive feedback

EDUCATIONAL

- ▶ Balancing different aspects of training

COLLABORATIVE

- ▶ Promoting cooperation
- ▶ Giving chances to work with other schools

INSPIRING

- ▶ Employing & nurturing excellent educators
- ▶ Providing rich opportunities

ADAPTIVE

- ▶ Individualising tuition

LEARNING-FOCUSED

- ▶ Task-involving

SUPPORTING AUTONOMY

- ▶ Nurturing individuality

IDEAS TO TRY

Emphasise that all students matter in creative processes.

Give dancers equal attention and respect so that they feel valued and safe to explore.

How can I best balance challenge with support?

Encourage dancers to have fun with movement and remind them that there are no rights and wrongs in creativity. Developing creatively is about exploration, and not every idea can be used.

Give new ideas to try rather than criticise – anxiety and self-consciousness undermine creativity.

How can I nurture technical skill and enjoyment?

Balance hard work and technique with creative tasks, development of personal and collective voice, and fun.

If possible, give space in the timetable for creative sessions. Also discuss with staff how creativity can be embedded into the entire curriculum.

Encourage collaboration. Creativity often emerges cooperatively, and although not always easy, collaboration can be a major source of inspiration and enjoyment.

How can I vary groupings to maximise collaboration?

Inspire dancers to be creative by exposing them to a variety of experiences, teachers, guest artists, and challenges.

Help staff to continue developing creatively themselves.

Get to know your dancers as much as possible. This way, you can help dancers extend their own boundaries.

Create a climate which focuses on discovery and self-improvement, not rivalry or outperforming others.

Give opportunities to contribute thoughts, opinions and ideas so that dancers develop their creative 'voice'. This has real educational value, as self-awareness will help students whether they pursue a dance career or not.

These recommendations are based on results outlined in this chapter and related literature. Recommendations in other chapters are also likely to nurture creativity (see e.g. *Maximising Well-Being*).



PERCEPTIONS OF TALENT

This chapter focuses on perceptions of student talent. This was considered a valuable addition to our research for two main reasons:

- 1 It provided a direct focus on talent and what it is associated with.
- 2 It extended the research with students into the realm of teachers and other staff.

To date, research into dance talent is scarce – which is surprising considering how often we use the word ‘talent’ in everyday conversation! Interviews with CAT students indicated that telling a student that s/he is talented can have a large impact:

‘my dance teacher at school used to tell me that I had potential, so I suppose that made me think psychologically, “oh let’s just go for it!”’ CAT dancer

‘How did it make you feel?’
Researcher

‘Good I guess. If anyone tells you you’re succeeding at something, you actually think “oh, I’m gonna really go for it, push myself, try and achieve something”’ CAT dancer

Our study addressed three related questions: first, the extent to which staff members agreed about student talent; second, the degree to which different talent criteria were related or distinct; and third, whether dancers exhibiting particular physiological and psychological characteristics, or training habits, were seen as more talented. Sport research suggests that instructors rely on a variety of personal, performance-related, and psychological cues to assess athlete ability or talent,¹¹¹ and this study was the first to extend this line of research into dance.

OVERALL FINDINGS WHAT WE HAVE LEARNT ABOUT DANCE TALENT PERCEPTIONS

- ▶ CAT staff members agreed to a moderate extent about the talent of their students. Stated differently, there was variation between raters but not a significant difference.
- ▶ Different aspects of talent were related. That is, a student rated highly in one way (e.g. for technical skill) was also rated more highly for other aspects (e.g. for expressivity).
- ▶ Talent ratings given to students by staff could, to a small extent, be predicted on the basis of students’ training habits, physiological and psychological characteristics.

TAKING A CLOSER LOOK DO STAFF AGREE?

CAT staff rated each of their students according to the different talent aspects listed below. CAT staff agreed about each students’ talent to a fair or moderate extent, depending on the talent aspect considered:

- ▶ The strongest agreement was about technical skill.
- ▶ The lowest agreement was about creativity.

Talent Aspect	Survey Question
Career Potential	Does the student have sufficient talent to pursue a career as a professional dance performer and/or choreographer?
Physical	To what extent does the student exhibit favourable physical facility?
Psychological	To what extent does the student exhibit favourable psychological characteristics (e.g. displays concentration, passion, commitment, etc)?
Technical	To what extent is the student technically skilled?
Creative	To what extent is the student creative (i.e. displays creative potential, responds creatively to tasks)?
Expressive	To what extent is the student expressive (i.e. has presence, musicality, is dynamic)?

TAKING A CLOSER LOOK ARE DIFFERENT ASPECTS OF TALENT RELATED?

All of the six aspects of talent were moderately or strongly related to each other:

- ▶ The strongest relationships were between creative and expressive talent aspects, and between physical and technical talent aspects.
- ▶ The aspect of talent most highly related to being seen as having good career potential was expressivity.

Still, it appeared that being seen as having greater physical facility, technical skill, psychological characteristics, creativity and expressivity were *all* associated with being seen as having the requisite talent for a successful career in dance performing and/or choreography.

TAKING A CLOSER LOOK ARE TALENT PERCEPTIONS RELATED TO STUDENT CHARACTERISTICS?

Students rated more highly for . . .	Also displayed the following characteristics to a higher degree than their peers:
Career Potential	Greater jump height Greater grip strength Longer legs More ego-involving climate perceptions
Physical Facility	More hypermobile Recorded higher heart rates during the fitness test (i.e. worked closer to their maximum)
Technical Skill	Longer time in CAT training Slightly greater hamstring flexibility
Psychological Characteristics	None
Creativity	Did less ballet Less disordered eating attitudes
Expressivity	Did less ballet

Several of these findings are worthy of note and debate:

- ▶ **Students with longer legs were seen as having greater career potential.** This raises questions about aesthetics versus function, because longer legs have been shown to be less dexterous.¹¹²
- ▶ **Are students who are seen as having greater career potential treated in a more ego-involving way?** For instance, perhaps teachers become more critical of their mistakes?
- ▶ **Students with lower cardiovascular fitness were seen as having greater physical facility.** Were these students simply seen as working harder, sweating more and so on?
- ▶ **Students with more pre-CAT experience and those doing more dancing in other schools were not rated more highly for technical skill** than their less experienced/less intensively involved peers. Does this have implications for auditions and training recommendations?
- ▶ **None of the students' self-rated psychological characteristics were associated with being seen as having favourable psychological characteristics.** Perhaps these characteristics cannot easily be observed by others?
- ▶ **The students' perceptions of their own creativity were not related to being rated as more creative.** It therefore seems important to distinguish the internal process of creativity from any external manifestations of creativity.
- ▶ **Spending more time in ballet was associated with being seen as less creative and expressive.** Does ballet truly have undesirable effects, or do other explanations exist?



PRACTICAL RECOMMENDATIONS

TEACHERS AND ENVIRONMENTS WITH HEALTHY PERCEPTIONS OF TALENT ARE ...

LEARNING-FOCUSED

- ▶ **Task-involving**
- ▶ **Instilling a sense of control over progress**

INNOVATIVE

- ▶ **Always striving to improve provision**
- ▶ **Willing to try new approaches**

TALENT ASTUTE

- ▶ **Judicious about talent**
- ▶ **Promoting a mindset that talent can change & improve**

IDEAS TO TRY

Avoid giving students feedback in relation to their talent as high or low; instead, focus on development. This promotes a sense of control over progress.

Consider whether you are more critical of some students than others, and give everyone feedback in relation to individual progress rather than objective success.

Do I treat students the same, regardless of how talented they may or may not seem?

Critically evaluate your own biases:

- ▶ What is important?
- ▶ How do I assess it?
- ▶ Is it based on how students perform, look, behave, or how they are in conversation?

The more sources you consult, the more likely you are to be accurate and fair.

Remember that psychological aspects may not be obvious to you as an observer.

Use individual tutorial time to get to know your students and their non-dance interests. Then work together to incorporate this knowledge about their strengths and passions into individualised goals and training plans.

Continually question what talent is.

Keep an open dialogue about what talent means. Not everyone shares the same perception of talent, but increased agreement may enhance clarity over what is valued as well as ensure fair treatment.

Be clear about what is seen as desirable at audition. Previous training may not mean being seen as more talented, while passion might be particularly important.

Inform students that talent is not fixed; rather, it can change over time as a result of effort and progress.

Advise students that talent is multi-faceted. Everyone has strengths and weaknesses, but particular strengths in one area (e.g. dedication) may well compensate for limitations in another area (e.g. jump height).

How can we make auditions maximally multi-faceted?

These recommendations are based on results outlined in this chapter and related literature. Recommendations made in other chapters are also likely to nurture healthy perceptions of talent (see e.g. *The Talent Environment* chapter).

1



**IMPLICATIONS FOR
DANCE EDUCATION**

Over its 3-year span, this project has resulted in an array of data, findings and insights relating to young dancers' psychology, physiology, anthropometry, injury, adherence, and creativity. We summarised these in the chapters within this report and accompanied the results with recommendations for practice based on our key findings and related literature. The aim of this final section is to 'bring it all together' to see what the project as a whole might be able to contribute to dance education. As part of this, we present a model of successful talent development environments and a synthesis of recommendations. The latter takes the form of an easily remembered acronym, SPECIALIST, which we hope will prove user-friendly. First, however, we turn our attention to two key issues in dance education: the notion of talent as something innate or trainable, and the ever-challenging settings of auditions and talent identification.

TALENT INNATE OR TRAINABLE?

A key debate in the literature as well as in everyday conversation is the degree to which talent is *innate* (genetic, immutable, static) or *trainable* (changing, dynamic and possible to develop). As a result of research in a wide range of talent domains as well as our own findings, we propose that talent is a result of the interplay between innate and trainable factors.^{4, 9, 13, 113} We agree with other researchers that focus should not lie on trying to uncover some hidden ability or prove whether talent exists or not; instead, we believe that the talent development environment is paramount and underpins success. While the individual is at the heart of this process, it is probably what she or he develops during training that ultimately matters. Dancers with many different backgrounds, training histories, and bodies can be equally successful, and the structure of the training process, the quality of instruction, and the nature of interpersonal relationships are crucial to talent development.

Dancers with many different backgrounds, training histories, and bodies can be equally successful, and the structure of the training process, the quality of instruction, and the nature of interpersonal relationships are crucial to talent development.

Admittedly, our project focused on a selection of variables and we did not engage in genetic testing or try to assess the innate presence of particular characteristics: innate or genetic aspects were only examined in terms of height, limb length and, to some extent, hypermobility. Most other aspects were seen as potentially changeable in response to training and/or maturation. Overleaf, a summary table provides an overview of the variables studied longitudinally. As shown, only one did not change during the project and is considered unlikely to do so even under other conditions; this is Benign Joint Hypermobility Syndrome (BJHS). Leg length is an example of a genetically determined characteristic which does alter, but as a result of biological maturation rather than training. Other variables, primarily psychological in nature, did not change during our project but may well do so under other conditions. For example, studies suggest that positive instructor behaviour can enhance the self-esteem of young people, especially when initial self-esteem is low.^{114, 115} The already high levels of self-esteem and task-involving climate perceptions evident at the start of our project may therefore represent a 'ceiling effect', explaining why these variables did not change (and, arguably, did not need to). Finally many variables, particularly those related to physical fitness, did change during the two years of study: some demonstrated a steady increase, and others showed seasonal variation or more erratic increases.

		Variable	Notable results
Unchanged during project	Unlikely to change	Benign Joint Hypermobility Syndrome (BJHS)	<p>BJHS prevalence was approximately 44%.</p> <p>BJHS prevalence did not differ between males and females.</p> <p>Dancers with BJHS were more likely to have sustained an injury than their non-BJHS peers.</p>
	May change under other conditions	Self-esteem	<p>Generally, high and stable self-esteem was reported.</p> <p>Low self-esteem was associated with an increased likelihood of reporting disordered eating attitudes.</p>
		Anxiety	<p>Generally, low and stable levels of anxiety were reported.</p>
		Perfectionism	<p>Generally, moderate and stable levels of perfectionism were reported.</p> <p>Perfectionism was associated with increased susceptibility to disordered eating attitudes.</p>
		Disordered eating attitudes (DEA)	<p>Generally, low and stable levels of DEA were reported.</p> <p>Around 7% of students were referred for further evaluation at each data collection after scoring above cut-off.</p> <p>Dancers with more DEA were perceived as less creative.</p> <p>Dropout students reported slightly more DEA than adhering students and those who graduated to vocational training.</p>
		Passion	<p>The majority of CAT students were passionate about dance.</p> <p>Generally, levels of harmonious passion (HP) were high and stable.</p> <p>Generally, levels of obsessive passion (OP) were moderate and stable.</p> <p>Adhering students reported greater levels of HP than dropout students.</p> <p>Dancers with greater levels of OP were more likely to have been injured.</p>
		Task-involving climate perceptions (TICP)	<p>Generally, high and stable levels of TICP were reported.</p> <p>TICP were linked to the development of harmonious passion over time.</p> <p>TICP were associated with dancers seeing themselves as more creative.</p>

		Variable	Notable results
Changing / increasing during project	Unrelated to training	Height, limb length	<p>Leg length was associated with being seen as more likely to have a successful dance career.</p> <p>Dancers who were accepted into vocational schools had slightly longer legs than dropout students.</p>
		Ego-involving climate perceptions (EICP)	<p>Generally, low levels of EICP were reported, but an increase was evident in the early stages of the project.</p> <p>Increased EICP were linked to increases in anxiety.</p> <p>Students rated as having greater career potential reported higher EICP.</p> <p>Dropout students reported greater EICP than adhering students.</p>
	Occasional or seasonal changes	Aerobic fitness	<p>Fitness improved over time, but dancers were fitter in summer than in winter periods.</p> <p>Engaging in more non-dance physical activity was associated with being fitter.</p> <p>Dancers performing nearer their maximal heart rate were perceived as having higher physical facility.</p>
		Turn-out	<p>Generally, good turn-out scores were recorded.</p> <p>Turn-out improved over time, but dancers had greater turn-out in summer than in winter periods.</p>
		Hamstring flexibility	<p>Flexibility improved over time.</p> <p>More flexible dancers were perceived as having slightly greater technical skill.</p> <p>Graduates to vocational training were slightly more flexible than dropout students.</p>
	Consistent / steady increase	Grip strength	<p>Grip strength improved over time.</p> <p>Dancers with greater grip strength were perceived as having greater career potential.</p> <p>Dancers going into vocational training recorded greater grip strength than dropout students.</p>
		Jump height	<p>Generally, good jump height scores were recorded.</p> <p>Jump height improved over time.</p> <p>Dancers with greater jump height were perceived as having greater career potential.</p> <p>Dancers going into vocational training jumped slightly higher than dropout students.</p>
		Balance	<p>Generally, varied balance scores were recorded on the different tests, indicating that good balance in one position is only weakly related to balance in another (i.e. balance ability is task-specific).</p> <p>Overall, balance improved over time.</p> <p>Dancers going into vocational training balanced slightly better than dropout students.</p>
		General Joint Hypermobility (GJH)	<p>GJH prevalence was around 52%.</p> <p>Generally scores increased over time, suggesting that GJH can be acquired.</p> <p>Dancers with GJH were no more likely to sustain an injury.</p> <p>Dancers with higher GJH scores were perceived as having greater technical skill.</p>

AUDITIONS AND TALENT IDENTIFICATION

As illustrated, a wide range of talent-related factors are subject to changes over time. This questions the efficacy of one-off auditions of talent or potential. For this reason, we believe that CATs and other dance schools might consider employing longitudinal talent identification procedures wherever possible. Although this may sound idealistic, the following examples highlight the advantages:

- ▶ Longer procedures help students calm their nerves, overcome initial shyness, and demonstrate learning potential.
- ▶ Staff may observe such factors as work ethic, attitude towards training and ability to work as a team, which may be more difficult to discern during short sessions.
- ▶ The outreach centres linked to the CATs seem to be well placed in this regard. For example, they can monitor development (physically and psychologically) over a period of time.
- ▶ If an audition takes the form of a course running over several days (e.g. over Easter holidays or half-term), all participants should get something out of the procedures whether they are eventually admitted or not.

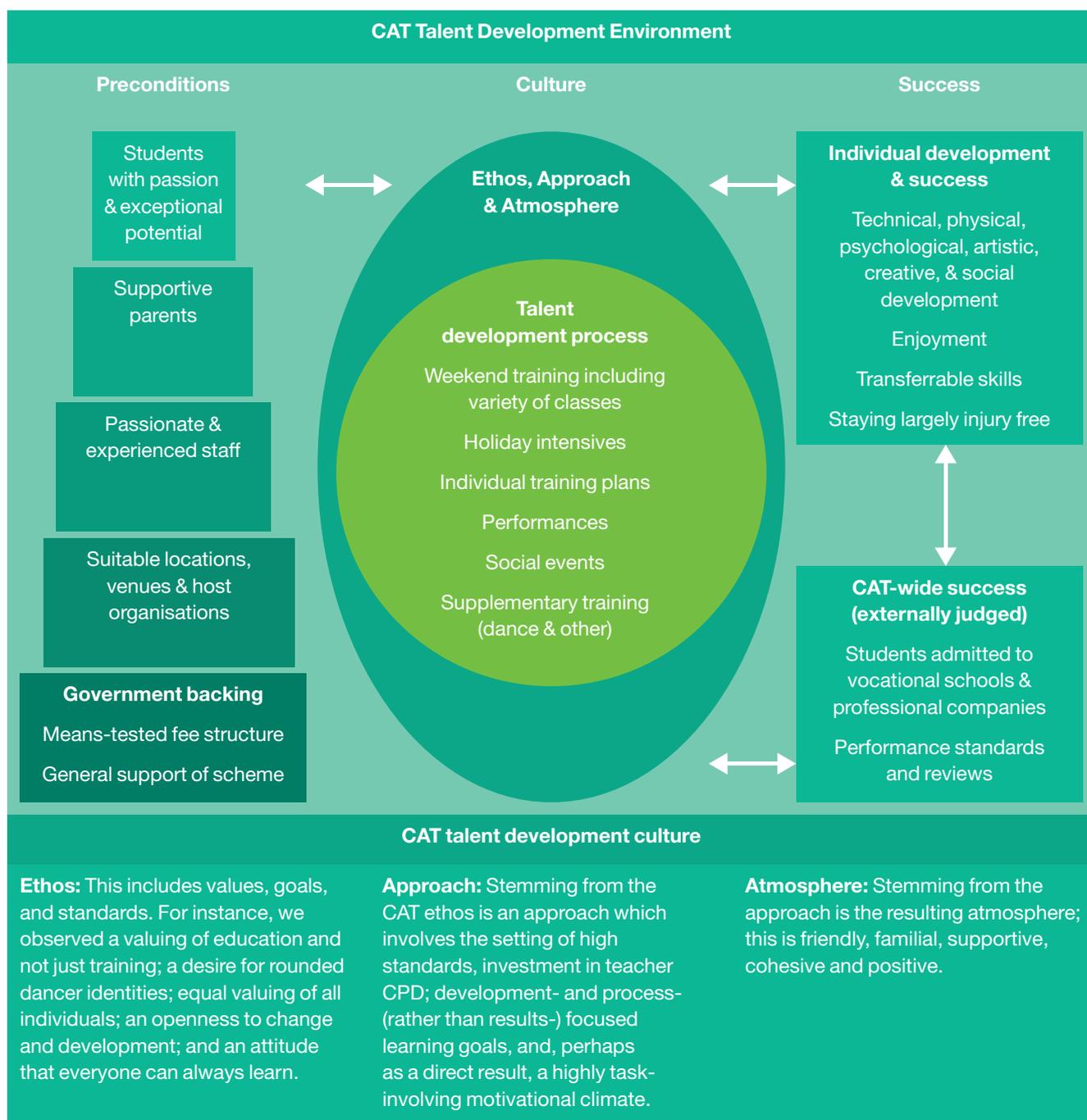
The latter two examples also have the additional advantages of letting students develop an understanding for themselves of whether (more) intense training is something they feel interested in, passionate about, and capable of committing to.

Northern Ballet is an example of a CAT in which a model not unlike this is already in use; we encourage further research and evaluation into its advantages and disadvantages. An alternative model has been developed in the USA, entitled the Talent Assessment Process (TAP).^{116, 117} In TAP, a multi-session audition comprising seven weekly classes is employed. Incorporating a variety of dance styles and involving students from urban schools and low socioeconomic backgrounds, TAP appears promising. Notably, the CATs' audition criteria are similar to those developed for TAP.

Given the changeable and subjective nature of many of the variables studied in the current project, we do not advocate using them as talent criteria. A notable exception is passion, which we feel may be used in talent identification. It is our belief that dancers should be encouraged to express their passion for dance (physically and verbally) and that audition panels view harmonious passion as a major predictor of positive outcomes and obsessive passion as more maladaptive. It also stands to reason that being passionate may help dancers with limited technical ability to progress and improve, whereas it may be more challenging to help a technically proficient dancer who lacks passion to achieve their potential.

CATS AS SUCCESSFUL TALENT DEVELOPMENT ENVIRONMENTS

In sport, authors have suggested that the main purpose of a talent development environment is to help performers with potential to transition successfully from junior-level to senior-level.¹⁴ Arguably, this is similar for CATs: as talent development environments, they are likely to be seen as successful if they help young dancers gain places at competitive vocational schools. Given the rate of entry of CAT students into vocational training, this does appear to be the case: for example, of the 2010 CAT graduates who chose to apply for further dance training, 94.8% were successful in their applications. Importantly, CATs are adamant that success is not measured by school entry records alone: instead, they emphasise that the training is just as much about personal development, enjoyment, and learning of transferrable skills. From our research and general observations this, too, seems to be in evidence. For instance, quantitative data clearly indicates that the motivational climate seems particularly favourable, and interviews further reveal a close-knit, family-like atmosphere where a balance is being struck between appropriate challenges and high perceptions of support. When considering these findings in light of current literature, it was striking just how similar the CATs appeared to family structures seen as particularly favourable for talent development in a range of domains,¹² and to talent environments in sport deliberately studied because of their success.¹⁴ To illustrate this similarity, and thus the process by which CATs may be said to be successful, we have modified a model created by researchers of successful sport talent development environments.¹⁴



‘I prefer [CAT] because it’s more, you learn more, the stuff here is more advanced, it goes to more understanding of your body and, like, the stuff that I have learnt here I probably never would have learned at my other dance school because here they teach you about your body and how to be creative, how to find out your own style and

here we try out so many different types of dance styles: like we did salsa and street jazz and things like that. And it’s just nice to try different things and learns lots more ... I take in lots more ‘cause the environment is more relaxed and it encourages you to. It’s mainly the environment.’
CAT dancer

Preconditions are necessary for the CATs to exist and succeed: for example, without financial grants many students could not access CAT training. Together, the preconditions lead to the essence of what the CATs are and do: **talent development processes** embedded within the wider **culture: ethos, approach, and atmosphere**. An example of ethos is evident in the following quote from a CAT manager: *'It is about developing skills – transferable skills, which I think is key in dance.'* These cultural aspects are, in turn, the **direct precursors of success**:

► **Individual success** is marked by learning and development in a variety of domains, and by staying largely injury-free. As explained by one student: *'I can see that there's been a real change and I'm really pleased because, yeah, it makes you feel really good.'*

► **CAT-wide success** is seen through the lens of external judgments, such as whether CAT students are successful in progressing to the next stage of talent development (typically vocational training in top conservatoires), although other criteria may also exist (e.g. external observers rating performances as being of high quality).

The process of talent development sits within the culture, because its structure and content is a direct product of aspects such as ethos and approach. For example, the belief that high-quality training can (and, according to some, should) occur at weekends, evenings, and in holidays (rather than full-time) has led to that being the primary mode of CAT training provision. Most important, perhaps, are findings indicating that CAT environments appear to directly impact on student commitment, adherence, physical fitness, enjoyment, creativity, and well-being.

The CATs' collaborative nature is reminiscent of what has been termed *communities of practice*:¹¹⁸ groups characterised by cooperation and an open exchange of information. It has been said that communities of practice are rare because people become unwilling to share knowledge which they themselves may have acquired at great cost, time and effort, and which they may feel underpins some of their success;¹¹⁸ at the same time, communities of practice may be the hallmark of successful talent development environments.¹⁴

INTEGRATED RECOMMENDATIONS

The seven chapters which report the results of the project all included practical recommendations. Opposite, we have synthesised these into a set of 10 inter-related areas. Together they spell the acronym SPECIALIST, highlighting the nature of healthy talent development environments. Put them on your wall and glance them over now and again!

FINAL WORDS

In summary, the findings obtained during this research project have been remarkably positive in nature. While variation always exists and there are inevitable examples of injury, disordered eating and dropout, the physical and psychological characteristics of CAT dancers were very positive overall. We have strong evidence for:

- the favourable nature of the CATs' motivational climates
- high levels of passion, self-esteem, commitment and perceptions of creativity
- improvements in all aspects of physical fitness, both general and dance-specific
- moderate levels of perfectionism, hypermobility and injury
- low levels of anxiety and disordered eating

Overall, we conclude that the CATs have construed highly successful talent development environments.

Although a wealth of findings have been obtained, much remains to be done before dance talent development will be truly understood. Perhaps a complete understanding is an impossibility, given the many and varied aspects that form part of talent development – and the very concept of talent and what it is may change over time. Within the scope of one project, we were furthermore unable to examine every variable which may impact on dance talent development. For example, we did not examine the role of psychological skills, which have been said to be crucial in making the transitions to higher levels of accomplishments in both sport and music.^{3, 119} We have also not tried to measure actual performance ability, or artistic aspects of dance talent and performance such as musicality and expressivity. Despite these shortcomings, we believe that the project, and this report, has broken new ground in dance science, and hope that it will have impacts on dance education both within and beyond the CATs. And while no single set of research findings are absolute, we hope that the results conveyed here can promote awareness and debate.

SUCCESSFUL DANCE TALENT DEVELOPMENT ENVIRONMENTS ARE ...

SOCIALLY SUPPORTIVE

- ▶ Giving equal attention & respect
- ▶ Creating a safe environment
- ▶ Facilitating peer support
- ▶ Facilitating parental support

POSITIVE

- ▶ Stimulating enjoyment
- ▶ Enthusiastic can-do attitude
- ▶ Giving constructive feedback

EDUCATIONAL

- ▶ Balancing different aspects of training
- ▶ Monitoring progress and needs
- ▶ Holding educational talks
- ▶ Offering supplementary training
- ▶ Encouraging help-seeking

COLLABORATIVE

- ▶ Promoting cooperation
- ▶ Giving chances to lead & cooperate in varied groups
- ▶ Giving chances to work with other schools

INSPIRING

- ▶ Employing & nurturing excellent educators
- ▶ Providing rich opportunities

ADAPTIVE

- ▶ Individualising tuition
- ▶ Age-appropriate
- ▶ Periodising training

LEARNING-FOCUSED

- ▶ Task-involving
- ▶ Promoting healthy goal striving
- ▶ Instilling a sense of control over progress

INNOVATIVE

- ▶ Always striving to improve provision
- ▶ Willing to try new approaches

SUPPORTING AUTONOMY

- ▶ Nurturing individuality
- ▶ Promoting individual responsibility

TALENT ASTUTE

- ▶ Judicious about talent
- ▶ Promoting a mindset that talent can change & improve

REFERENCES

*References are scientific journal articles or conference presentations by the research team specifically about this project.

- 1 Irvine, S., & Redding, E. (2006). *Dance science research report for the development of Laban's CAT*. Laban, London.*
- 2 Walker, I., Nordin-Bates, S., & Redding, E. (2010). Talent identification and development in dance: A review of the literature. *Research in Dance Education, 11*(3), 165–189.*
- 3 MacNamara, A., Button, A., & Collins, D. (2010). The role of psychological characteristics in facilitating the pathway to elite performance Part 1: Identifying mental skills and behaviours. *The Sport Psychologist, 24*, 52–73.
- 4 Baker, J., & Horton, S. (2004). A review of primary and secondary influences on sport expertise. *High Ability Studies, 15*(2), 211–228
- 5 Williams, A.M., & Reilly, T. (2000). Talent identification and development in soccer. *Journal of Sport Sciences, 18*, 657–667.
- 6 Fredricks, J.A., Alfeld-Lido, C.J., Huda, L.Z., Eccles, J.S., Patrick, H., & Ryan, A.M. (2002). A qualitative exploration of adolescents' commitment to athletics and the arts. *Journal of Adolescent Research, 17*(1), 68–97.
- 7 Haroutounian, J. (1995). Talent identification and development in the arts: An artistic/educational dialogue. *Roeper Review, 18*(2), 112–117.
- 8 Critien, N., & Ollis, S. (2006). Multiple engagement of self in the development of talent in professional dancers. *Research in Dance Education, 7*(2), 179–200.
- 9 Lidor, R., Côté, J., & Hackfort, D. (2009). ISSP Position Stand: To test or not to test? The use of physical skill tests in talent detection and in early phases of sport development. *International Journal of Sport and Exercise Psychology, 7*, 131–146.
- 10 Abbott, A., & Collins, D. (2004). Eliminating the dichotomy between theory and practice in talent identification and development: considering the role of psychology. *Journal of Sports Sciences, 22*(5), 395–408.
- 11 Wolstencroft, E. (2002). *Talent identification and development: an academic review*. Edinburgh, Scotland: Sport Scotland.
- 12 Csikszentmihalyi, M., Rathunde, K. & Whalen, S. (1993). *Talented teenagers: The roots of success and failure*. New York: Cambridge University Press.
- 13 Durand-Bush, N., & Salmela, J.H. (2001). The development of talent in sport. In R.N. Singer, H.A. Hausenblas, & C. Janelle (Eds.), *Handbook of sport psychology 2nd edition* (pp.269–287). New York: John Wiley.
- 14 Henriksen, K., Stambulova, N., & Roessler, K. K. (2010). Holistic approach to athletic talent development environments: A successful sailing milieu. *Psychology of Sport and Exercise, 11*, 212–222.
- 15 Howe, M.J.A., Davidson, J.W. & Sloboda, J.A. (1998). Innate talents: Reality or myth? *Behavioural and Brain Sciences, 21*, 399–442.
- 16 Warburton, E.C. (2002). From talent identification to multidimensional assessment: Toward new models of evaluation in dance education. *Research in Dance Education, 3*(2), 103–121.
- 17 Reilly, T., Williams, A. M., Nevill, A., & Franks, A. (2000). A multidisciplinary approach to talent identification in soccer. *Journal of Sports Sciences, 18*, 695–702.
- 18 Wyon, M., Redding, E., Abt, G., Head, A., Sharp, N., & Craig, C. (2003). Development, reliability and validity of a multistage dance specific aerobic fitness test (DAFT). *Journal of Dance Medicine and Science, 7*(3), 80–84.
- 19 Angioi, M., Metsios, G.S., Twitchett, E., Koutedakis, Y., & Wyon, M. (2010). Association between selected physical fitness parameters and aesthetic competence in contemporary dancers. *Journal of Dance Medicine and Science, 13*(4), 115–123.



- 20 Wyon, M., & Redding, E. (2005). Physiological monitoring of cardiorespiratory adaptations during rehearsal and performance of contemporary dance. *Journal of Strength and Conditioning Research*, 19(3), 72–75.
- 21 Wyon, M., Allen, N., Angioi, M., Nevill, A., & Twitchett, E. (2006). Anthropometric factors affecting vertical jump height in ballet dancers. *Journal of Dance Medicine and Science*, 10(3&4), 106–110.
- 22 Grossman, G. (2003). Measuring dancers' active and passive turnout. *Journal of Dance Medicine and Science*, 7(2), 49–55.
- 23 Milliken, L.A., Faigenbaum, A.D., Loud, R.L., & Westcott, W. (2008). Correlates of upper and lower body muscular strength in children. *Journal of Strength and Conditioning Research*, 22, 1339–1346.
- 24 Tong, R.J., & Wood, G.L. (1997). A comparison of upper body strength in collegiate rugby players. In T. Reilly, J. Bangsbo, & M. Hughes (Eds.), *Science and Football III: Proceedings of the Third World Congress of Science and Football, Cardiff, Wales* (pp.16-20). London: Spon Press.
- 25 Blazy, L., & Amstell, S. (2010). *NRG2 youth dance and health research report*. Trinity Laban Conservatoire of Music and Dance. Available at: [www.trinitylaban.ac.uk/media/177211/nrg_10%20\(2\).pdf](http://www.trinitylaban.ac.uk/media/177211/nrg_10%20(2).pdf)
- 26 Connolly, M., Quin, E., & Redding, E. (2011). Dance 4 Your Life: Exploring the health and well-being implications of a contemporary dance intervention for female adolescents. *Research in Dance Education*, 12(1), 53–66.
- 27 Maffulli, N., King, J.B., & Helms, P. (1994). Training in elite young athletes (the training of young athletes (TOYA) study): injuries, flexibility and isometric strength. *British Journal of Sports Medicine*, 28(2), 123–136.
- 28 Kadel, N.J., Donaldson-Fletcher, E.A., Gerberg, L.F. & Micheli, L.J. (2005). Anthropometric measurements of young ballet dancers: Examining body composition, puberty, flexibility and joint range of motion in comparison with non-dancer controls. *Journal of Dance Medicine and Science*, 9(3&4), 84–90.
- 29 Beighton, P.H., Solomon, L., Soskolone, C.L. (1973). Articular mobility in an African population. *American Rheumatoid Disease*, 32, 413–18.
- 30 Desfor, F.G. (2003). Assessing hypermobility in dancers. *Journal of Dance Medicine and Science*, 7 (1), 17–22.
- 31 Ruemper, A.C. (2008). *The correlation between hypermobility and injury in contemporary dance students*. Master's thesis. Trinity Laban: London.
- 32 Grahame, R., Bird, H.A., & Child, A. (2000). The revised (Brighton 1998) criteria for the diagnosis of benign joint hypermobility syndrome (BJHS). *Journal of Rheumatology*, 27(7), 1777–1779.
- 33 Laws, H. (2005). *Fit to dance 2: Report of the second national inquiry into dancers' health and injury in the UK*. London: Dance UK.
- 34 Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- 35 Quin, E., Frazer, L., & Redding, E. (2007). The health benefits of creative dance: Improving children's physical and psychological well-being. *Education and Health*, 25(2), 31–33.
- 36 Smith, R.E., Smoll, F.L., Cumming, S.P., & Grossbard, J.R. (2006). Measurement of multidimensional sport performance anxiety in children and adults: The Sport Anxiety Scale-2. *Journal of Sport and Exercise Psychology*, 28, 479–501.
- 37 Hill, R. W., Huelsman, T. J., Furr, R. M., Kibler, J., Vicente, B. B., & Kennedy, C. (2004). A new measure of perfectionism: The Perfectionism Inventory. *Journal of Personality Assessment*, 82(1), 80–91.
- 38 Nordin-Bates, S.M., Cumming, J., Aways, D., & Sharp, L. (2011). Imagining yourself dancing to perfection? Correlates of perfectionism among ballet and contemporary dancers. *Journal of Clinical Sport Psychology*, 5, 58–76.
- 39 Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The eating attitudes test: Psychometric features and clinical correlates. *Psychological Medicine*, 12, 871–878.



- 40 Tseng, M.M., Fang, D., Lee, M., Chie, W., Liu, J., & Chen, W.J. (2007). Two-phase survey of eating disorders in gifted dance and non-dance high-school students in Taiwan. *Psychological Medicine*, 37, 1085–1096.
- 41 Toro, J., Guerrero, M., Sentis, J., Castro, J., & Puértolas, C. (2009). Eating disorders in ballet dancing students: Problems and risk factors. *European Eating Disorders Review*, 17(1), 40–49.
- 42 Newton, M., Duda, J. L., & Yin, Z. (2000). Examination of the psychometric properties of the Perceived Motivational Climate in Sport Questionnaire–2 in a sample of female athletes. *Journal of Sport Sciences*, 18, 275–290.
- 43 Quested, E., & Duda, J.L. (2010). Exploring the social-environmental determinants of well- and ill-being in dancers: A test of basic needs theory. *Journal of Sport and Exercise Psychology*, 32(1), 39–60.
- 44 Quested, E., & Duda, J. L. (2009). Perceptions of the motivational climate, need satisfaction, and indices of well- and ill-being among hip hop dancers. *Journal of Dance Medicine and Science*, 13(1), 10–19.
- 45 Vallerand, R.J., Blanchard, C., Mageau, G.A., Koestner, R., Ratelle, C.F., Léonard, M., Gagné, M., & Marsolais, J. (2003). Les passion de l'âme: On obsessive and harmonious passion. *Journal of Personality and Social Psychology*, 85(4), 756–767.
- 46 Rip, B., Fortin S., and Vallerand, R.J. (2006). The relationship between passion and injury in dance students. *Journal of Dance Medicine and Science*, 10(1–2), 14–20.
- 47 Ames, C. (1992). Achievement goals and the classroom motivational climate. In Meece, J., & Schunk, D. (Eds.), *Students' perceptions in the classroom: causes and consequences* (pp.327–348). Hillsdale, NJ: Erlbaum.
- 48 Carr, S., & Wyon, M. (2003). The impact of motivational climate on dance students' achievement goals, trait anxiety, and perfectionism. *Journal of Dance Medicine and Science*, 7(4), 105–114.
- 49 Quested, E., & Duda, J.L. (2011). Antecedents of burnout among elite dancers: A longitudinal test of basic needs theory. *Psychology of Sport and Exercise*, 12, 159–167.
- 50 Bloom, B.S. (1985). *Developing talent in young people*. New York: Ballantine.
- 51 Côté, J. (1999). The influence of the family in the development of talent in sport. *The Sport Psychologist*, 13, 395–417.
- 52 Patrick, H., Ryan, A. M., Alfeld-Lido, C., Fredricks, J.A., Hruda, L. Z., & Eccles, J. S. (1999). Adolescents' commitment to developing talent: The role of peers in continuing motivation for sports and the arts. *Journal of Youth and Adolescence*, 28(6), 741–763.
- 53 Reinboth, M., & Duda, J.L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: A longitudinal perspective. *Psychology of Sport and Exercise*, 7(3), 269–286.
- 54 Boyce, B.A., Gano-Overway, L.A., Campbell, A.L. (2009). Perceived motivational climate's influence on goal orientations, perceived competence and practice strategies across the athletic season. *Journal of Applied Sport Psychology*, 21(4), 381–394.
- 55 de Bruin, A.P., Bakker, F.C., & Oudejans, R.R.D. (2009). Achievement goal theory and disordered eating: Relationships of disordered eating with goal orientations and motivational climate in female gymnasts and dancers. *Psychology of Sport and Exercise*, 10(1), 72–79.
- 56 Kipp, L., & Amorose, A.J. (2009). Perceived motivational climate and self-determined motivation in female high school athletes. *Journal of Sport Behavior*, 32(2), 108–129.
- 57 Weiss, M.R., Amorose, A.J., & Wilko, A.M. (2009). Coaching behaviours, motivational climate, and psychosocial outcomes among female adolescent athletes. *Pediatric Exercise Science*, 21(4), 475–492.
- 58 Norfield, J., & Nordin-Bates, S.M. (2011, June). Motivational climate, need satisfaction and psychological outcomes in community dance. Paper presented at *From Motivation to Movement: Towards an empirical understanding of the role of dance in health*, University of Bedfordshire, UK.
- 59 Walker, I.J., Nordin-Bates, S.M., & Redding, E. (2011). Characteristics of talented dancers and age group differences: Findings from the UK Centres for Advanced Training. *High Ability Studies*, 22(1), 43–60.*
- 60 Nordin-Bates, S.M., Walker, I.J., Redding, E., Quested, E., & Duda, J.L. (2009, June). Motivational climate and perfectionism in young dancers: Findings from the UK Centres for Advanced Training. Paper presented at *International Society of Sport Psychology 12th World Congress*, Marrakesh, Morocco.*
- 61 Nordin-Bates, S. M., Quested, E., Walker, I. J., & Redding, E. (In press). Climate change in the dance studio: Findings from the UK Centres for Advanced Training. *Sport, Exercise, and Performance Psychology*, 1.*
- 62 Scanlan, T. K., Carpenter, P. J., Schmidt, G. W., Simons, J. P., & Keeler, B. (1993). An introduction to the sport commitment model. *Journal of Sport and Exercise Psychology*, 15, 1–15.
- 63 Weiss, M.R., & Amorose, A.J. (2008). Motivational orientations and sport behaviour. In Horn, T. (Ed.), *Advances in sport psychology 3rd edition* (pp.115–156). Champaign, IL: Human Kinetics.
- 64 Figueiredo, A.J., Gonçalves, C.E., Coelho E Silva, M.J., & Malina, R.M. (2009). Characteristics of youth soccer players who drop out, persist or move up. *Journal of Sport Sciences*, 27(9), 883–891.
- 65 Hamilton, L.H., W.G. Hamilton, M.P. Warren, K. Keller, & M. Molnar. (1997). Factors contributing to the attrition rate in elite ballet students. *Journal of Dance Medicine and Science*, 1(4), 131–138.
- 66 Ommundsen, Y., & Vaglum, P. (1997). Competence, perceived importance of competence and dropout from soccer: A study of young players. *Scandinavian Journal of Medicine and Science in Sports*, 7(6), 373–383.
- 67 Helsen, W.F., Starkes, J.L., & Van Winckel, J. (1998). The influence of relative age on success and dropout in male soccer players. *American Journal of Human Biology*, 10, 791–798.
- 68 Walker, I.J., Nordin-Bates, S.M., & Redding, E. (In preparation). A qualitative investigation of commitment to dance: Findings from the UK Centres for Advanced Training.*
- 69 Walker, I.J., Nordin-Bates, S.M., & Redding, E. (In press). A mixed methods investigation of dropout among talented young dancers: Findings from the UK Centres for Advanced Training. *Journal of Dance Medicine and Science*.*
- 70 Walker, I.J., Nordin-Bates, S.M., & Redding, E. (In preparation). An interdisciplinary investigation of adherence to dance: Findings from the UK Centres for Advanced Training.*
- 71 Pelletier, L.G., Fortier, M.S., Vallerand, R.J., & Brière, N.M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion*, 25(4), 279–306.
- 72 Wyon, M. (2005). Cardiorespiratory training for dancers. *Journal of Dance Medicine and Science*, 9 (1), 7–12.
- 73 Wyon, M., Abt, G., Redding, E., Head, A., Sharp, C., & Craig, N. (2004). Oxygen uptake during modern dance class, rehearsal and performance. *Journal of Strength and Conditioning Research*, 18, 646–649.
- 74 Rafferty, S. (2010). Considerations for integrating fitness into dance training. *Journal of Dance Medicine and Science*, 14(2), 45–49.
- 75 Brown, A.C., Wells, T.J., Schade, M.L., Smith, D.L. & Fehling, P.C. (2007). Effects of plyometric training versus traditional weight training on strength, power and aesthetic jumping ability in female collegiate dancers. *Journal of Dance Medicine and Science*, 11(2), 38–44.
- 76 Crookshanks, D. (2007). Normative dance-specific musculoskeletal parameters for young female dancers in Australia. In R. Solomon, & J. Solomon (Eds.), *Proceedings of the 17th Annual Meeting of the International Association for Dance Medicine and Science* (pp.249–252). CA: IADMS.
- 77 Purnell, M., Shirley, D., Adams, R., & Nicholson, L. (2007) Screening results associated with female adolescent dance students. In R. Solomon, & J. Solomon (Eds.), *Proceedings of the 17th Annual Meeting of the International Association for Dance Medicine and Science* (pp.249–252). CA: IADMS.
- 78 Nemeck, S.M. (2004). Affective dimensions of, and prototypic data from, a flexibility lab in a dance kinesiology course. In R. Solomon, & J.

- Solomon (Eds.), *Proceedings of the 17th Annual Meeting of the International Association for Dance Medicine and Science* (pp.249–252). CA: IADMS.
- 79 Batson, G. (2010). Understanding balance: Applying science to dance training. *The IADMS Bulletin for Teachers*, 2(1), 14–16.
- 80 The IADMS Education Committee. (2001). Position stand: The challenge of the adolescent dancer. *Journal of Dance Medicine and Science*, 5(3), 94–95.
- 81 Brinson, P. & Dick, F. (2006). *Fit to dance? Report of the national inquiry into dancers' health and injury*. London: Calouste Gulbenkian Foundation.
- 82 Steinberg, N., Siev-Ner, I., Peleg, S., Dar, G., Masharawi, Y., Zeev, A., & Hershkovitz, I. (2011). Injury patterns in young, non-professional dancers. *Journal of Sport Sciences*, 29(1), 47–54.
- 83 Kadel, N. (2006). Foot and ankle injuries in dance. *Physical and Medical Rehabilitation in Clinical North America*, 17, 813–826.
- 84 Hincapié, C.A., Morton, E.J., & Cassidy, J.D. (2008). Musculoskeletal injuries and pain in dancers: A systematic review. *Archives of Physical Medicine and Rehabilitation*, 89(9), 1819–1829.
- 85 Nunes, N., Haddad, J., Bartlett, D. & Obright, K.D. (2002). Musculoskeletal injuries among young, recreational, female dancers before and after dancing in Pointe shoes. *Pediatric and Physical Therapy*, 14, 100–106.
- 86 Gamboa, J.M., Roberts, L.A., Maring, J., & Fergus, A. (2008). Injury patterns in elite pre-professional ballet dancers and the utility of screening programs to identify risk characteristics. *Journal of Orthopaedic and Sports Physical Therapy*, 38(3), 126–136.
- 87 Kimmerle, M. (2010). Lateral bias, functional asymmetry, dance training and dance injuries. *Journal of Dance Medicine and Science*, 14(2), 58–66.
- 88 Bakker, F.C. (1991). Development of personality in dancers: A longitudinal study. *Personality and Individual Differences*, 12(7), 671–681.
- 89 Bettel, N., Bettel, O., Neumärker, U., & Neumärker, K.J. (2001). Body image and self-esteem in adolescent ballet dancers. *Perceptual and Motor Skills*, 93, 297–309.
- 90 Marchant-Haycox, S. E., & Wilson, G. D. (1992). Personality and stress in performing artists. *Personality and Individual Differences*, 13(10), 1061–1068.
- 91 Garner, D. M., & Garfinkel, P. E. (1980). Socio-cultural factors in the development of anorexia nervosa. *Psychological Medicine*, 10, 647–656.
- 92 Ringham, R., Klump, K., Kaye, W., Stone, D., Libman, S., Stowe, S., & Marcus, M. (2006). Eating disorder symptomatology among ballet dancers. *Eating Disorders*, 39, 503–508.
- 93 Bos, A. E. R., Muris, P., Mulkens, S., & Schaalma, H. P. (2006). Changing self-esteem in children and adolescents: a roadmap for future interventions. *Netherlands Journal of Psychology*, 62, 26–33.
- 94 Barrell, G., & Terry, P. (2003). Trait anxiety and coping strategies among ballet dancers. *Medical Problems of Performing Artists*, 18(2), 59–64.
- 95 Miulli, M.K (2010). *Creativity, perceived motivational climate and self-esteem in professional dancers*. Master's thesis. Trinity Laban: London.
- 96 Smith, R.E., Smoll, F.L., & Cumming, S.P. (2007). Effects of a motivational climate intervention for coaches on young athletes' sport performance anxiety. *Journal of Sport and Exercise Psychology*, 29, 39–59.
- 97 Hamilton, L. H., Brooks-Gunn, J., & Warren, M. P. (1985). Socio-cultural influences on eating disorders in female professional dancers. *International Journal of Eating Disorders*, 4, 465–477.
- 98 Centres for Advanced Training Policy for the Prevention, Identification and Action on Disordered Eating. Written by Sanna Nordin-Bates in consultation with representatives from all CATs; Approved September 2009. *
- 99 Nordin-Bates, S. M., Walker, I., & Redding, E. (2011). Correlates of disordered eating attitudes among male and female young talented dancers: Findings from the UK Centres for Advanced Training. *Eating Disorders: The Journal of Treatment and Prevention*, 19(3), 211–223. *
- 100 Nordin-Bates, S. M., Quested, E., Cumming, J., Duda, J. L., Walker, I. J., & Redding, E. (In preparation). A longitudinal examination of well- and ill-being among young talented dancers: Findings from the UK Centres for Advanced Training. *
- 101 Schnitt, J. M., Schnitt, D., & Del'A'Une, W. (1986). Anorexia nervosa or thinness in modern dance students: Comparison with ballerinas. *Annals of Sports Medicine*, 3, 9–13.
- 102 Schluger, A. E. (2010). Disordered eating attitudes and behaviors in female college dance students: Comparison of modern dance and ballet dance majors. *North American Journal of Psychology*, 12(1), 117–128.
- 103 Neumärker, K. J., Bettel, N., Bettel, O., Dudeck, U., & Neumärker, U. (1998). The Eating Attitudes Test: Comparative analysis of female and male students at the Public Ballet School of Berlin. *European Child and Adolescent Psychiatry*, 7, 19–23.
- 104 Walker, I., Nordin, S.M., & Redding, E. (2009, October). Passion for dance: Relationships with self-esteem, anxiety and injury. Paper presented at *The 19th Annual Meeting of the International Association for Dance Medicine and Science*, The Hague, Netherlands. *
- 105 Butterworth, J. (2004). Teaching choreography in higher education: a process continuum model. *Research in Dance Education*, 5(1), 45–67.
- 106 Simonton, D.K. (2000). Creativity: Cognitive, personal, developmental, and social aspects. *American Psychologist*, 55, 151–158.
- 107 Chappell, K., Rolfe, L., Craft, A., & Jobbins, V. (2011). *Close Encounters: Dance partners for creativity*. Stoke on Trent: Trentham Books.
- 108 Smith-Autard, J. (2002). *The art of dance in education 2nd edition*. London: A & C Black.
- 109 National Advisory Committee on Creative and Cultural Education. (1999). *All our futures: Creativity, culture and education*. London, UK: DFEE.
- 110 Qualifications and Curriculum Authority (2008). Review and subsequent new secondary school curriculum further incorporating creativity.
- 111 Solomon, G. B. (2001). Performance and personality impression cues as predictors of athletic performance: An extension of expectancy theory. *International Journal of Sport Psychology*, 31, 88–100.
- 112 Wyon, M.A., Nevill, A.M., Dekker, K., Brown, D.D., Clarke, F., Pelly, J., & Koutedakis, Y. (2010). Effect of leg length on range of motion, vertical jump and leg dexterity in dance. *International Journal of Sports Medicine*, 31(9), 631–635.
- 113 Schmidt, B., Jarvis, C., & Slayford, V. (2005). *Constructing a pyramid of progression for talent in dance: Dancers of the future – what are we looking for in the search for exceptionally talented young dancers?* The National Academy for Gifted and Talented Youth, available at: www.ygt.dcsf.gov.uk/FileLinks/362_dr_ben_schmidt.pdf
- 114 Coatsworth, J.D., & Conroy, D.E. (2006). Enhancing the self-esteem of youth swimmers through coach training: Gender and age effects. *Psychology of Sport and Exercise*, 7(2), 173–192.
- 115 Smoll, F.L., Smith, R.E., Barnett, N.P., & Everett, J.J. (1993). Enhancement of children's self-esteem through social support training for coaches. *Journal of Applied Psychology*, 78(4), 602–610.
- 116 Oreck, B., Owen, S., & Baum, S. (2004). Validity, reliability and equity issues in an observational talent assessment process in the performing arts. *Journal for the Education of the Gifted*, 27(2), 62–94.
- 117 Oreck, B. (2005). A powerful conversation: Teachers and artists collaborate in performance-based assessment. *Teaching Artist Journal*, 3(4), 220–227.
- 118 Culver, D.M., Trudel, P., & Werthner, P. (2009). A sport leader's attempt to foster a coaches' community of practice. *International Journal of Sports Science and Coaching*, 4(3), 365–383.
- 119 MacNamara, Á., Button, A. & Collins, D. (2010). The role of psychological characteristics in facilitating the pathway to elite performance Part 2. *The Sport Psychologist*, 24, 74–96.



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