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# knowledge makes you better

**Anna Aalten**

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*excellence and well-being in dance*

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My grandfather was a scholar. He was a reader and teacher of Greek and Latin and when he was home he would spend most of his time in his study. I still remember vividly how, as a child, I would enter this room and feel in awe of the scholarly atmosphere, with every wall lined with bookcases full of books and my grandfather at his desk, reading. Books were his passion and he never tired of them. He was a gentle man, inspiring those around him with a desire for knowledge.

At first glance, the scholarly world of my grandfather and the daily reality of the young dancers who are trained here in the studios of Codarts, Hogeschool voor de Kunsten, do not seem to have much in common. But the desire for knowledge is, of course, not an exclusive trait of scholars. Dancers also want to gather knowledge, to learn, to master new skills. However, their source of inspiration is not primarily the kind of knowledge that can be found in books, but physical knowledge. This is the knowledge that is stored in the bodies of their teachers and of other dancers. It is the knowledge that comes from experience and from working within a tradition that is situated in the bodies of generations of dancers before them.

The shared desire for knowledge is not the only place where the worlds of scholars and dancers meet. Over the last twenty years, scholars have become more interested in the study of dancers, while dancers have started to look at scholars and researchers for new knowledge. This is particularly so when it comes to the theme of today's lecture, which is also the central theme of the professorial post I hold: excellence and well-being in the performing arts. Scholars and researchers from backgrounds as diverse as medicine, movement sciences, kinesiology, psychology, pedagogy and sociology are increasingly studying dance and dancers, and finding the profession and its practitioners a fascinating subject. The practice of dance itself and the incredible drive of dancers to excel in what they do make for an interesting group to study and do research. Dancers, on the other hand, have discovered the usefulness of the knowledge produced by these researchers for their daily practice. They realise that this new knowledge can be of assistance in dancing better and longer.

The importance of knowledge and the desire to know are the subject of this lecture. To clarify my argument, I make a distinction between two different types of knowledge. The first is the knowledge that dancers and dance teachers have as a result of their years of training and experience. This knowledge is present in the body of any dancer, where it develops and grows constantly as a consequence of new practices and experiences. Part of it is individual knowledge, because of the uniqueness of the dancer's body and personal experiences. But the dance community as a whole shares a large part of it. This is the experiential knowledge of different dance techniques, the dancer's anatomy, stretching the limits of the body, the meaning of pain, the exhilarating feeling when everything comes together, and all those physical and artistic capacities professional dancers are familiar with. This type of embodied, experiential knowledge is available to the dancer herself, often explicit in the sense that the dancer can tell precisely what she is doing and why. At an educational institution like Codarts, it

is made available to others, and particularly to dance students, with whom the dance teacher shares her knowledge in the practice of educating. But dancers also have much experiential knowledge that remains implicit; knowledge that is not put into words but is known physically to the dancer himself. In our quest for knowledge to contribute to the excellence and well-being of dancers, I propose to pay attention to this type of knowledge and engage in a special effort to make it accessible.

The second of type of knowledge is the knowledge that is produced by researchers who take dance and dancers as their subject of study. Coming from different disciplines, they produce new knowledge by doing scientific or applied research into physical, psychological, pedagogical and sociological aspects of dance. They publish their results and speak about their research in lectures and at conferences, thereby making this knowledge available to those who are interested. Unfortunately their writings are often rather inaccessible for non-specialists. Introducing this type of knowledge to the dance community and 'translating' it will also be a contribution to the excellence and well-being of dancers.

In the professorship, I propose to bring the two types of knowledge together. It is in the meeting of the experiential knowledge of dancers and the research-based knowledge of scholars that the future of excellence can be found. At the Rotterdam Dance Academy at Codarts, where young dancers are educated, the practical knowledge of the dance teacher can be made explicit and brought together with the theoretical, scholarly knowledge. By undertaking experimental, practice-based research on subjects that are inspired by the teaching and learning of dance, the professorship generates new knowledge that contributes to the excellence and well-being of dancers.

## The knowledge of dancers

To distinguish the knowledge of dancers from the other type of knowledge that I will be talking about later, I would like to take you back to my grandfather's study. There, in the books of the Greek philosopher Aristotle, we will find a treatise on the nature of knowledge that might be useful to us. According to Aristotle, it is possible to make a distinction between scholarly knowledge and practical knowledge, or, to phrase it differently, a distinction between knowing *that* and knowing *how*. The knowledge of dancers can obviously be defined as practical knowledge, which concerns itself with the knowing *how* to perform tasks intelligently.[1]

It is important to note here that, according to Aristotle, practical knowledge is a type of knowledge in its own right. If I learn how to perform a certain dance sequence, my performance demonstrates the knowledge *how* I have acquired, including the ability to execute the steps in the right order and with the required dynamics. The knowing *how* of my performance is not a function of a theoretical understanding that I now put into practice, but is embedded in the action itself. This is why practical knowledge must not be considered as theoretical knowledge put into practice, but as a specific type of knowledge in itself. Neither can it be seen as simply the ability to do something, because as a teacher, for example, I might no longer be able to do the sequence, but I still know how to do it.[2]

In the context of dance, practical knowledge concerns itself with knowing how to move and use the body. Although it might be interesting to know that, according to Newton's law, 'if body one exerts on body two a force of *F*12, then body two exerts a force on body one of *F*21, which is equal in magnitude but opposite in direction to *F*12', a dancer does not need to know this to be able to accelerate towards the front of a stage.[3] Nor does this theoretical knowledge help him to move any faster. The practical knowledge of a dancer shows itself in the performance of dance; in the mastery of movement and the body while dancing. But the fact that practical knowledge concerns the body does not mean that all bodies have it by nature or that it is knowledge that comes naturally.[4] Knowing how to use the body and how to move are learnt capacities and education is crucial in its development.

In 1934, the French anthropologist Marcel Mauss, in a now classic lecture at the French Society of Psychology, pointed out that the use of the body is not a *natural* phenomenon.[5] The 'techniques of the body', as Mauss called them, ought to be considered cultural phenomena that had to be learned. Human beings have to be educated to be able to walk, sit, eat, swim or perform any other technique of the body before they can do them. Even for a body technique that we consider as natural as walking, education is crucial. It is known that children who do not grow up with humans but are raised by animals, for example wolves or dogs, do not know how to walk on their two legs, because they have taken the four-legged walking technique of their educators as their example. Another important characteristic of the techniques of the body is their close relation to time and place. It is obvious that people in China do not eat as we do, we do not run as the Masai in Africa do, my children do not learn to swim as I have done, I cannot sit on my heels the way my friend from Indonesia can. In his lecture, Mauss presents us with a poignant example of cultural variation and its deeply ingrained character. Talking about World War I, where fighting was done from the trenches and British and French troops fought together against the Germans, he says: 'during the War I was able to make many observations on this specificity of techniques. E.g. the technique of *digging*. The English troops I was with did not know how to use French spades, which forced us to change 8.000 spades a division when we relieved a French division, and vice versa. This plainly shows that a manual knack can only be learnt slowly'.[6]

The value of Mauss' observation for a discussion on the practical knowledge of dancers is twofold. First, it stresses the importance of education in the process of acquiring this type of knowledge, and second, it makes it clear that once a specific technique has become part of the body's repertoire, it cannot be changed easily. Both elements are relevant in relation to excellence and well-being in dance and dance education.

A dancer learns the specific technique of the body that is called dance by listening to her teachers and imitating them, trying things out for herself, experimenting, feeling how her body moves, where its physical limits lie and how it can be

cajoled into reaching for the impossible. Acquiring the practical knowledge of the professional dancer is a long process, taking up many years. As Martha Graham wrote on the first pages of her autobiography: 'It takes about ten years to make a mature dancer. (…) First comes the study and practice of the craft which is the school where you are working in order to strengthen the muscular structure of the body. The body is shaped, disciplined, honoured, and in time, trusted. The movement becomes clean, precise, eloquent, truthful. (…) Then comes the cultivation of the being from which whatever you have to say comes'.[7]

The education of dance is based on these principles. Dance teachers train the dance student by telling him what to do, setting examples, stimulating him to imitate movements and to try them out for himself, to experiment, to feel how his body moves, to find out where its limitations are and to go beyond them. They explain the basic principles of a specific technique, present the student with images and metaphors to clarify their instructions and invite her to discover her own possibilities.

Each dance technique has its own 'extensive nomenclature, sometimes literal and sometime metaphorical, for designating key areas of the body and their relations. A dancer may be asked to 'lift the floating ribs', or to become 'a balloon expanding with air'.[8] The specific nomenclature offers dancers an interpretative framework, making it possible for them to conceptualize their bodies and develop and consolidate their knowledge of its possibilities.

Referring to their practical knowledge, Gigi Berardi has called dancers 'practicing kinesiologists', who know what they are doing from working with and understanding their own bodies and those of their students.[9] This is obviously a tribute to the skills and mastery of the body held by a professional dancer and an acknowledgement that this mastery is embedded in a thorough knowledge of dance techniques and a specific and detailed knowledge of his own body and its possibilities. But acknowledging the practical knowledge of a dancer does not preclude the value of a more theoretical understanding of dance movements. Or, as Berardi states: 'Dancers do not need to know the name, origin, and insertion of every muscle in the body. However, it can only improve performance and health to know, for example, that a tight hip flexor, such as the psoas, pulls the lower spine into hyperextension, interfering with the correct alignment of the lower body joints, because this muscle is attached to all the lumbar and the lowest thoracic vertebrae'.[10] In other words, theoretical knowledge can be used to enhance practical knowledge, helping the dancer to reach excellence with her own individual body.

In the past, a dancer was educated and trained in one specific dance technique. The aesthetic projects of, for example, ballet, Graham or Cunningham, were conceived as mutually exclusive and the physical training was aimed at creating a specific body. Throughout the training years, the dancer's body was shaped and disciplined in the particular vocabulary of the technique, incorporating the knowledge that was part of it. Ballet, with its 'prescribed pairings of positions and steps, and its emphasis on outwardly rotated legs and arms', creates a vertical, lifted, elegant body, while the 'restrained successive movements of Graham's contraction and release build a sinewy, tensile, dynamic body.[11] Training and experience provided the dancer with an understanding of the possibilities and limitations of her own body in relation to the technique. Her practical knowledge consisted of knowing what she was supposed to do and knowing what she could do.

Nowadays, dancers are expected to master various techniques. Most dance companies have a repertoire that includes works in a diversity of styles and contemporary choreographers experiment with eclectic dance vocabularies and interdisciplinary genres. This development has changed not only the demands that are now placed on dancers, but also the practical knowledge to which they have access. As a consequence of this, excellence in dance has been redefined, including a knowledge of, and flexibility in, different dance techniques. What does this redefinition of excellence mean for the education of dancers?

To prepare dance students for the demands that will be made on them as professionals, educational institutions now include a range of dance techniques in their curriculum. During their studies, young dancers are trained in a variety of dance vocabularies by teachers who have extensive experience in that particular technique. They will learn the techniques alongside each other, as languages that are different but equally important. The old antagonism between dance techniques like ballet and Graham, or between Graham and Cunningham has been replaced by mutual respect and recognition of the value of each of them.

The multiformity of training also means that a dancer's individual responsibility has increased. While in the past the dance student could rely on his teacher to tell him exactly what the possibilities or dangers were within one specific technique, now he has to find his own way. Faced with a diversity of dance vocabularies, the young dancer has to discover how a particular technique fits her own body, what its demands are and where its risks lie. Of course the teacher's experience can be helpful here. But because physical and emotional possibilities and limitations are so individual, the responsibility for the use of the body is now shifting away from the teacher to the student.

To be able to take this responsibility, a dancer needs to know and understand the basic principles of each technique he is studying. By being aware of the differences in aesthetics and underlying principles and knowing how his own body reacts to these, the dancer must become a 'thinking body'.[12] Both the thin, long-limbed dancer and the muscular, stocky one need to know what to expect in a Graham class and how to deal with its demands. Each must be capable of recognising the different vocabularies when faced with a choreographer who uses them eclectically, analysing the movements and knowing their implications for her own body. If she lacks this knowledge, she might not reach her own personal excellence, and possibly even endanger her health and well-being. For the educational process in dance, which in the past did not include individual coaching, this might mean giving more attention to the individual student and his needs.

Tradition is a significant and valuable source of knowledge in dance, and the importance of ex-dancers who work as teachers cannot be overrated. Most dance teachers are specialists, and they are invited to teach one particular dance vocabulary, usually the one most familiar to them through their own training and professional experience. This educational system, in which the teacher of the Cunningham technique class has been a Cunningham dancer himself, gives the dance student access to the knowledge of generations of dancers within this specific technique. There is, however, one possible drawback. Precisely because of the teacher's extensive dance experience, some of his knowledge will be implicit. For the dance student who is not yet well trained in the basic principles of each technique, it might be difficult to recognise the differences, running the risk of not knowing how to deal with them in relation to her own body.

There are two ways open to those who want to make their own practical knowledge explicit and accessible: by a deconstructive inquiry into the teaching process and an institutionalised exchange between the different techniques. Deconstructive inquiry is widely practised in literature and art criticism and has become an important method in the humanities and social sciences as well. While there is much more to say about its history and meaning for research, I shall limit myself here to a discussion of its possible use and value for the educational process in dance. The dance teacher who practices deconstructive inquiry into her own teaching constantly asks herself: 'What am I doing?' and 'Why am I doing this?' She scrutinises her own teaching, using both intuition and analysis to reflect on it.[13]

A comparison between two major dance techniques can serve to clarify my point. 'For Martha Graham, the dancing body must possess the strength, flexibility, and endurance necessary to provide the expressive self with a fully responsive instrument. (…) The exercises privilege movements originating in the torso and radiating out with restrained tension to the periphery of the body. (…) Exercises, repeated with slight variations composed by the teacher each day, cause the body to spiral around a spinal core, extending out and then pulling back into dynamic positions. (…) The principal metaphor explored in these exercises, that of contraction and release, promotes a connection between physical and psychological functioning'. With Merce Cunningham, the 'self does not use the body for its own expressive purposes (…). Exercises for the technique class vary from day to day as they systematically explore the body's segments and their possible range of movement. (…) The teacher presents movement sequences as problems to be solved. Students are asked to focus on and to demonstrate, through their articulacy, the choreography inherent in the movement sequences. The height of a jump or extended leg matters less than the clear presentation of complex directives – quick changes of weight or focus, polyrhythmic patterns in different body parts, carefully patterned paths of movement across the floor'.[14]

There are enormous differences between these two techniques; in their aesthetics, their conceptualisation and use of the body, and the role of the teacher. As we have seen, the 'restrained successive movements of Graham's contraction and release build a sinewy, tensile, dynamic body', while 'Cunningham's matter-of-fact inventory of the body's structural capabilities produces a lanky, intelligent, alert body that eloquently declaims its own physicality'.[15] The Graham teacher judges and evaluates the dance student's ability to perform the vocabulary correctly and asks him to fuse inner motivations with physical form, while the Cunningham teacher tends to approach her students as junior colleagues, instructing them to experiment. In the context of dance education, these differences have to be articulated in order to enable the dance student to make informed choices and develop a thinking body.

The second method to make the experiential knowledge of dance teachers explicit is by creating a situation of institutionalised exchange. In the dance class, as in any other form of education, it is not common for teachers to observe each other's lessons and share detailed information on its subject and approach. While the general content of the curriculum might be known to others, there is no discussion on its specifics on a day-to-day basis. This may have been a satisfying situation in the past, when a school's approach to dance techniques was more uniform, but it is clear that today's multiformity requires another course. Stimulating teachers to observe other technique classes and creating a platform for the exchange of experiences and ideas can enhance reflection on one's own knowledge. Self-inquiry and inquiry from others help to make knowledge explicit and more accessible.

An interesting example of a research project combining deconstructive inquiry with the exchange between teachers is described in the journal of *Research in Dance Education*. Three dance teachers worked together to examine how a specific method of somatic education, in this case Feldenkrais, informed contemporary technique classes in a professional dance studio in Montreal, Canada. All three had experience in Feldenkrais and knew implicitly that this altered their approach towards teaching dance technique, but they were unable to articulate how this occurred and to what extent. Over a two-week period, the teachers/researchers observed each other's classes and videotaped and made notes on their own teaching on a daily basis. The resulting material was shared and discussed. The analysis of the material revealed that the Feldenkrais method helped the dance teacher not only to rely on the visual senses ('look what I am doing and repeat that'), but also to actively use other cues, mainly verbal, by careful and elaborate explanations, and sensory, by tactile feedback and by putting into words how a movement feels, in teaching students a specific movement. The research also showed that the multiplicity of directions used by the teacher was helpful in informing the kinaesthetic sense of the students.[16]

Knowing how to dance is the domain of dancers. To develop this type of knowledge, which is embodied and experiential, dancers need the daily practice of dance technique classes, years of training, inspiring teachers and cooperation with choreographers and other dance-specific sources. Knowing how to dance involves not only knowledge of the steps and movements, but also self-reflection and inquiry. Only when a dancer really knows her own possibilities and limitations can she reach excellence.

## The knowledge of scholars

The past twenty years has seen a steady growth in the number of studies on the health and well-being of dancers.[17] Medical doctors, orthopaedists, movement scientists, physical therapists, other practitioners in the medical and paramedical sciences, and an increasing number of psychologists, who were treating dancers, have been gradually expanding their body of knowledge by doing research and publishing their results in new journals like *Medical Problems of Performing Artists* (since 1985), the *Journal of Dance Medicine & Science* (since 1997), and several others. In the early nineties, new organisations were formed, such as the International Association of Dance Medicine and Science, which brought together medical practitioners and researchers who wanted to share and increase their knowledge. A wide range of topics is covered, including the investigation of the causes of dance injuries, injury care, rehabilitation, injury prevention, nutritional concerns, kinesiological studies (e.g. the biomechanical and physiological aspects of dance) and psychological issues. In the wake of these studies, guidebooks are published on health-related issues, written for medical practitioners who work with dancers, and for dancers themselves.[18]

The knowledge that is generated by these scholars shows an incredible variety. Unfortunately, the language used to present the results is often dense and inaccessible, making it difficult for non-specialists to read and understand, even if they are 'practising kinesiologists'. This might be one of the reasons why new knowledge that is produced by scientific research may not be taken up and integrated into dancers' education, training or injury treatment. The knowledge itself, however, is valuable enough and could definitely enhance the understanding of teaching, training and performing dance. An effort should be taken to 'translate' the results of scientific research for the dance community to ensure that this knowledge does not remain confined to universities or the medical profession, but can be accessed by those who can put it into practice.

Reviewing the dance medicine and science publications, it becomes apparent that certain subjects attract more attention than others. In recent years, the psychological aspects of dance, including stress, seem to have become the 'hottest' topics. Other subjects covered extensively by scientific research are: the teaching and training of technique, injury/injury prevention (with specific attention to overuse injuries), fitness/conditioning/aerobics, nutrition/eating disorders, menstruation/amenorrhea, alignment, rehabilitation and turnout.[19] In the next section of this lecture, I discuss research on three of the topics that have attracted ample attention from the scientific community: injuries, fitness and nutrition.

*Injury, injury prevention and the dangers of overuse*

Dancing is a physical profession and like all physical professions it involves specific health risks. Does this mean that dancing is a dangerous profession? The American journalist Joseph Mazo, who spent a season with the New York City Ballet in the early seventies and wrote a sensitive and highly entertaining book about his observations, seemed to think so. One of his chapters opens with a variation on the phrase that can be found on cigarette packs all around the world: 'Warning: It Has Been Determined That Ballet Dancing Is Dangerous To Your Health'.[20] Gigi Berardi poses the same question in the recently revised edition of her guidebook for dancers, but her answer is quite different from that of Mazo. Berardi states: 'Is dancing hazardous to your health? (…) Not if you know what you're doing and you're physically capable'.[21]

It is important to realize that for a dancer 'risk' does not necessarily mean accident or trauma. On the contrary, research in the world of professional dance has repeatedly and convincingly shown that only a small part of the injuries can be considered as unforeseen or acute. The exact figures differ slightly, but it is generally believed that around two third of the injuries are the result of a chronic overburdening or overuse of the body.[22] In other words, the majority of injuries can be prevented if intervention occurs early.[23]

Why do dancers overburden their bodies or continue dancing with minor injuries that then turn into major ones? The available research offers some answers to this question. Financial considerations and the difficulty of finding medical professionals who are trained in dance medicine are some of the practical barriers to dancers seeking treatment.[24] But the main reasons why dancers do not seek early treatment are not practical, but social and psychological. Many dancers have little job security. Their fear of loss of employment may prompt them to ignore the early signs of injury and continue dancing with pain and discomfort. Competition is fierce, and dancers are aware of the fact that they are easily replaced when they miss a training or performance because of an injury. Dancers also know that a dancer's career is short, which is another reason why they continue as long as possible. Or, in the words of the British dancer Darcey Bussell: 'Dancers are always so desperate not to miss any part of their careers that we find it tempting to work through injuries if we possibly can. When we first join the company we're especially determined to prove ourselves, and I know many dancers who have been injured but who have carried on working without telling anyone'. Bussell continues her story by telling us that she knows it is not healthy to continue working while suffering from an injury and it will makes matters worse, but that she herself still does so every now and then. But 'every time, afterwards, I cannot believe I've taken such a stupid risk'.[25]

Other answers to the question why dancers overburden their bodies are found in the occupational culture of the dance world and the close intertwinement of the act of dancing and the dancer's identity. Physical pain is part of the daily life of dancers, and is considered an inevitable aspect of the profession. 'Dancers seem to view injuries as a fact of life and simply accept the need to live and work with associated pain and discomfort'.[26] Writing about the occupational culture in four major dance companies the anthropologist Helena Wulff even speaks of a 'culture of injury and pain'.[27] The dominant idea that 'the show must go on' fosters an environment where seeking treatment might be considered as lack of motivation or will power and to continue dancing with pain connotes certain heroism.[28]

The close intertwinement of the act of dancing and a dancer's identity strengthens his or her reluctance to give in to pain and minor injuries.[29] To stop dancing, even for a limited period, does not only signify the loss of a daily occupation, but also threatens a dancer's identity. As New York City Ballet dancer Toni Bentley so aptly put it: 'one day without dancing and one feels one is no longer a dancer. After all, there is no proof that one can dance unless one is dancing!'.[30]

Overuse injuries are not unavoidable. Even allowing for the dancer's need to repeat certain movements until they have become part of the body's repertoire and the busy schedules that most dancers and dance students are accustomed to, it is possible to take preventive measures. All these measures start with 'knowing what you do'. The dancer who knows her technique and who is knowledgeable about the anatomical and biomechanical possibilities and limitations of her own body is able to recognise the early signs of an injury. For example, when a dancer repeatedly tries to deepen her demi-plié beyond the bony limits of her own specific anatomy or the flexibility of her Achilles tendon, injuries will occur.[31] Developing this physical and technical knowledge starts in the early years of training, but continues throughout a dancer's life. Technique analysis, the observation of biomechanics and imagining exercises can be helpful, as well as the insights of knowledgeable teachers and medical workers.

Strength training is another tool in preventing overuse injuries. For many dancers, the training gained in the technique classes is not enough, so specific strengthening exercises are needed. Useful specific strengthening exercises are, for example, exercises for the abdominal muscles to gain better core stabilization, for the quadriceps/vastus medialis to deal with knee complaints and for the tibial and peroneal muscles for ankle complaints. In order to gain the necessary knowledge, dancers do not have to limit themselves to dance, but can also take advantage of the knowledge from conditioning programmes and other somatic disciplines, like yoga, Pilates, Alexander Technique, Gyrotonic work and Feldenkrais, to help them develop the strength they need individually. It is important to note that the one-size-fits-all training that is common in dance might be one of the causes for injuries. The training programme that fits the physical demands of one dancer might not meet the needs of another.

In an experimental study on early identification of injuries, students at a pre-professional ballet school in the United States were offered easy access to medical care. Over a period of 20 months, a weekly clinic was offered on-site, staffed by physical therapists, a podiatrist and an orthopaedic surgeon who were all experienced in providing care for dancers, at no cost to the students and at a time convenient for them. The research showed that many of the students' complaints were an indication of later injuries, often of the overuse type. The conclusion was that by registering early complaints and teaching dance students how to deal with the first symptoms of injuries, minor or otherwise, many serious injuries can be prevented.[32] It is especially important to provide young dancers with the necessary knowledge and information and to help them discover their own possibilities, so that they are able to make the right choices.

Maintaining one's general health is the best way to prevent small injuries from turning into serious ones. Developing and maintaining an adequate level of fitness, healthy eating habits, and a good balance between exertion and rest cannot, of course, prevent all injuries, but they are the best defence against overuse injuries and a definite aid to recovery. I will come back to the importance of knowledge on conditioning and food later in this lecture. The significance of rest in relation to injury prevention has recently gained more attention, partly as a consequence of the growing interest in sport science.

In the world of sport, the concept of 'overtraining' is well-known. Overtraining occurs when the body is not allowed to recover enough after an intensive training or other physical exercise. Dancers who suffer from overtraining are highly susceptible to infections and injuries. Dancers who want to prevent overtraining need to be alert to its symptoms: fatigue, concentration problems, sleep disturbance, lack of appetite, anxiety and irritability. A dancer who repeatedly complains of fatigue and feels exhausted most of the time can see this as a serious warning to take more rest.[33] Teachers and company directors who are aware of the dangers of overtraining, pay attention to these signs and organise their class schedules and rehearsals in such a way that no sudden increases of the workload occur.[34]

The body of knowledge on injury and injury prevention is growing. The research on injuries and overuse in dance produces valuable new material that can help dancers and dance teachers to make informed choices about training and rest. Individual dancers can develop the knowledge about technique and their own personal physiological possibilities and limitations in order to avoid overuse. Knowing how to balance work and rest is another important factor.

*Fitness and conditioning*

The incredible amount of physical work that is done daily by every dancer, whether in class, rehearsal or performance, calls for a high level of fitness. Fitness refers to the ability to sustain a continuous movement of moderate intensity for a certain amount of time. Everybody knows that stamina is needed to keep up with the high demands of dance training and contemporary choreography. So when, ten years ago, a national inquiry into dancers' health in the United Kingdom came to the conclusion that most dancers appeared to be rather unfit, the dance world was bewildered.[35] Many questions were raised, new research was prompted on the causes of the lack of fitness in dancers and a search for possible remedies began.[36]

Fitness is not only necessary for a dancer to be able to keep up with the demands of daily training and choreography. It assists in decreasing the time that is needed for recovery between movement sequences and it helps to increase endurance. It also plays an important role in the prevention of injuries and it 'enhances the function of energy pathways involved in the execution of various exercises and dance routines, perhaps improving the capacity for fast dance moves'.[37] A high level

of fitness helps the dancer through the day, makes her less vulnerable to injuries and probably makes her a better stage performer.

Why do dancers lack in fitness and how can it be improved? To develop fitness, it is usually necessary to do exercises that increase cardio-respiratory endurance levels, training the body to take up, utilise and transport more oxygen in order to release energy. Although dancers move a lot, most dance work cannot be characterised as conditioning or endurance exercises, because of its intermittent nature. To train endurance, it is necessary to move steadily for about 15-20 minutes, maintaining a heart rate of 55-85 % of the maximal heart rate.[38] Studies that were done in response to the results from the inquiry mentioned above show that most classes and rehearsals do not facilitate this. During class and rehearsals dancers are usually required to move for a few minutes and then stop to listen to the teacher's or choreographer's instructions, causing the heart rate to slow down again.[39] This does not mean that a dance class cannot be used to train endurance, but to do so adjustments would have to be made to the type of exercises and the tempo of the class. Most studies conclude that generally dance training alone is not sufficient to train the body's endurance capacity to the level that is needed for a dancer who wants to perform at his best.

This conclusion has generated much debate in dance, calling into question one of the traditional pillars of the training process: the daily class. If we accept the conclusion that dance training in itself is not enough and dancers need additional conditioning training to develop fitness and stamina, does this mean that traditional schedules have to be reconsidered? In some dance companies, the age-old habit of starting the day with a technique class and having rehearsals in the afternoon have become a topic for discussion, while dance schools are faced with the question of whether and how to include conditioning classes in the curriculum. While the benefits of condition training are apparent, the already overfull schedules of dancers and dance students threaten to become even heavier if extra training sessions are added to the programme. Questions are also raised about what kind of conditioning would be appropriate and concerns are voiced about the probability of harmful effects on dancers from the available conditioning programmes that come from the sports world. Another point of concern is the question of whether all that attention for physical fitness will override the artistic quality of dance.

From the studies that have been done so far, within both dance and sports, some insights are valuable for determining what kind of conditioning exercises can be beneficial for dancers and how to include these in their training programmes. It is generally agreed that supplementing the dance training with at least 20 minutes of conditioning exercises three times a week is a good starting point. The frequency, duration and intensity can be varied as long as the exercises provide an adequate load to the heart and vascular system and develop the aerobic capacity of the muscles. There seems to be most agreement about the need to have at least three sessions a week, although some authors maintain that two may be enough.[40] Opinions also vary as to the duration, with some claiming that conditioning sessions should last at least 30 minutes to result in more fitness and others promoting short 10-minute sessions throughout the day. It is clear that the effects of the exercises depend on both duration and intensity of the training. Given the time constraints of dancers, it might be easier to fit in several shorter sessions more frequently. A warning is given to dancers who engage in high-intensity endurance activities such as running, because of the danger of injuries.[41]

Variation and training specificity are keywords when it comes to developing exercise guidelines for dancers. Variation is important both from a physiological and a psychological viewpoint. To increase the stamina needed in class and performance, dancers aim for varied progression, i.e. a progress that prepares them for the range of different movements and activities in a dance performance. Variation is also a good way to prevent boredom. After all, dancers are not doing the exercises for the sake of moving but to reach excellence in dance. The concept of training specificity means that conditioning exercises should be specific for the kind of dance style or performance that the dancer is preparing for. Dancers preparing for classical ballet might benefit from other conditioning exercises than those who dance mainly contemporary work.

The importance of fitness for dancers has become uncontested as more information on its role in injury prevention and recovery becomes available. Research is being done on the level of fitness of dancers in different fields, the possibilities and limitations of endurance training in conventional technique classes and the development of dance-specific conditioning. As more knowledge is produced, dance companies, schools and individual dancers will be able to benefit and increase their understanding of the dancer's body and what it needs to reach excellence.

*Nutrition, weight management and eating disorders*

To say that good eating habits are essential for dancers, because food is the fuel for the body, may sound like stating the obvious. However, eating sufficiently and healthily is not as common among dancers as one would expect it to be. International research shows that many dancers have disordered eating patterns, often consuming less than the recommended intake, especially when the physical strain of their daily activities is taken into account. Female dancers in particular show a tendency to eat much less than they need.[42] This is even more problematic considering the fact that nutrient imbalances in women can lead to amenorrhea (menstrual irregularity), which in turn may heighten the risk of osteoporosis (bone loss).[43]

So the unhealthy eating habits of female dancers do not only deprive them of their badly needed fuel on a daily basis, but also make them more vulnerable to fractures and health problems in the future. Eating enough and eating well is vital for dancers who want to prevent injuries and perform at the height of their capacities.

The body of knowledge on nutrition, weight management and eating disorders is constantly growing. In recent years, research has been carried out on the nutritional needs of dancers, the occurrence of eating disorders, the relation between eating

habits and body image and other related subjects. In terms of nutrition, dancers are like high-performing athletes, as they need more carbohydrates than the average population and they have to plan their meals well to prevent shortages that may damage their performance. Carbohydrates are stored in the muscles and the liver as glycogen, which gives easily accessible energy necessary for dancing. When the glycogen stock is depleted, the body starts to 'eat away' muscle tissue, which for dancers, of course, is counterproductive. Long periods (4-6 hours) without food produce a dramatic drop in blood glucose levels, having an equally bad effect on performance. An inadequate diet may also trigger injuries and prolong rehabilitation. Disordered eating can lead to difficulty in concentrating, sleep disturbance, irritability and anxiety.

There are three main reasons why dancers may develop unhealthy eating behaviour: lack of time, lack of knowledge and as a consequence of their attempts to attain the dancer's ideal of a super-thin body. The first two are practical and might be remedied by producing and providing more knowledge. The third is part of a larger cultural phenomenon that needs to be addressed on several levels to affect change.

The working day of the dancer or the dance student is scheduled around technique classes, rehearsals and performances. Most dancers do not like to dance on a full stomach, which can make the scheduling and spacing of meals complicated. But the body needs food regularly, especially during training. Keeping their energy balanced is extremely important for professional dancers and dance students. Breakfast is necessary and should always contain both carbohydrates and protein. Every training session, even a short one, demands energy and depletes the store of glycogen in the muscles. Therefore, it is important to keep the supply in balance and to charge it whenever necessary. The time needed to charge the glycogen storage may vary from 10 to 36 hours. In the first two hours imme-diately after training the muscles are most capable of replenishing the supply. Eating or drinking something rich in carbohydrates shortly after a training session ends is therefore the best option.

In the past, the general lack of knowledge about the nutritional needs of dancers presented a serious problem. General information on nutrition often does not apply to dancers, because they move so much more and spend more energy than the average person. A nutritionist's advice to a dancer needs to take this into account. But on the other hand, although a dancer's nutritional needs resemble those of athletes, dancers are *not* athletes. Their performance is of a different nature and their bodies need to conform to the aesthetics specific to dance. While I was doing research for my book on ballet, I heard many stories about the lack of information.[44] Dancers and dance students shared their search for knowledge with me, often telling me about hilarious or sometimes horrifying experiences. In many schools for professional dance education lists of 'forbidden food' ('never eat peanuts!') were handed out. The well-meant advice from a nutritionist who was not specialized in dance was often not useful or raised even more questions for the dancer who wanted information on her diet. One of the young dancers I interviewed remembered being sent to the nutritionist at school to help her lose weight. The nutritionist told her never to eat potatoes or drink any fruit juices. Myths about the 'dangers' of specific foods abounded among dancers. I have had professional dancers telling me serious stories about the dangers of eating meat, potatoes, spinach, yoghurt and other potentially healthy food.

Much has changed in recent years. More information is available, not only from the world of sports but also from nutritionists who have specialised in dance. Many professional dance schools and some dance companies employ a knowledgeable nutritionist to give advice and help dancers to develop a healthy diet that is high in carbohydrates for energy and contains enough protein for strong bones. Most dancers now not only know that they need food to sustain their bodies and be able to perform at the height of their abilities, but they also know where to find the necessary information.[45]

Unfortunately, knowing and practising what you know do not always go hand in hand. Julia Buckroyd, a researcher who has published widely on eating behaviour both in the dance world and outside it, has developed a special workshop with dance students to facilitate the 'shift from passive to active knowledge'. Buckroyd begins by stimulating the students to talk about what they know about food and the specific nutritional needs of a dancer. The information, which is usually fairly accurate, is written on a flip chart for everyone to see. She then asks the students to work in pairs and to devise lists of the kind of meals that would be appropriate for dancers to eat, using the information on the charts. Her next request is for the students to write down what they ate the previous day. 'At this point the group usually laughs because it is immediately apparent to them (…) that what they know and what they do are not the same thing'. The rest of the session is spent discussing the reasons why this is so, and trying to find solutions for the obstacles raised. Buckroyd stresses the necessity of including attention to the emotional aspects of food, and eating and not eating, and of creating an atmosphere of support and encouragement. Her aim is to start a process whereby the students can take ownership and responsibility for the way they use food.[46]

The pressure to conform to a specific body image is the third reason why female dancers in particular may develop unhealthy eating habits. Recently, a study was conducted on whether the improved education for dancers about nutrition had made a positive change in the lifestyle of female dancers. The findings indicated there was indeed a positive change in the level of knowledge, but that this did not always lead to a healthier eating pattern. Dance students, for example, definitely knew what a dancer's diet should look like, but they often chose to ignore this knowledge in favour of an eating pattern that would, in their own expectation, keep them as thin as possible. The researchers state that: 'Whilst dancers in training were better informed, pressures related to the body inside the profession dominated attitudes and behaviour'.[47]

The demand to be thin is strongest in ballet, but can be found in other dance forms as well. The first to describe the phenomenon at length and its consequences for the health of dancers was

Lawrence Vincent, a medical doctor with the New York City Ballet in his book *Competing with the Sylph* (1979). He directed his words to the dance community and to individual dancers, urging them to have a closer look at what the aesthetic ideal of the super-thin dancer's body and the resulting eating behaviour did to their own material bodies. Vincent's critique of the way the professional dance world handled the problem was well-informed and strong. He knew what he was talking about and did not spare his audience. Other publications followed.[48]
Yet it took the professional dance world many years to acknowledge the fact that the aesthetic ideal can be the cause of serious eating disorders in female dancers and that these disorders are a health risk for the profession. The aesthetic ideal and the body practices associated with it were so much part of the occupational culture of ballet that its participants preferred to close their eyes to the negative consequences. More than twenty years after the publication of his book, Vincent edited a special issue on eating behaviour for *Dance Medicine & Science*. In his introduction, he states that the situation had not improved much since then. 'The reason', Vincent writes, 'is our failure to confront the root of the problem, because it is a cultural and aesthetic, not a scientific or medical one.'[49]
In 1994/95, the Dutch psychologist Gea Procee did a study on social determinants of eating disorders at an institution for professional dance education in The Netherlands. The results of Procee's study also point to the importance of aesthetic norms in the dance world. All students were aware of the existence of these norms and most of them were in the habit of constantly comparing their own bodies with those of other students around them. Students who were insecure about what the precise requirements were and whether their own bodies needed to change, were at a greater risk of developing eating disorders. Procee's conclusion was that in order to prevent eating disorders among dance students, teachers should clearly distinguish between aesthetic and technical requirements and be very precise about what they expected from students.[50]
The pressure to be thin and the importance of body image are part of a larger cultural phenomenon. The occupational culture of dance, and ballet in particular, is characterized by a general belief in the malleability of the body. Dancers work hard to create a body that fits the requirements of technique, style, energy and aesthetics. Body weight is relatively easy to control, which makes it a feasible target for the dancer who wants to change her body to reach for the ideal. Many female dancers also believe that a lower body weight will make them a better dancer. These beliefs are a strong and vital part of the culture of dance, which cannot be changed overnight by providing factual information on carbohydrates and proteins.[51]
Knowledge on the nutritional needs of dancers has become more available and widespread. There is a growing body of research on the eating behaviour of dancers and its relation to injuries and stress. The acknowledgement of the importance of body image in relation to the occurrence of eating disorders with female dancers has lead to more awareness and research into this specific subject. It has become an important issue in the field of dance medicine and dance education, attracting attention and stimulating new research that is presented at international conferences and in scientific journals and dance magazines.



## *Bridging the gap*

Knowing how to dance and knowing that a dancer needs, for example, to have a diet that is rich in carbohydrates are both equally important types of knowledge. A dancer obviously needs the first type of knowledge for excelling at dancing, but the second type comes in useful for doing so while remaining healthy and emotionally balanced. Dancers need not become scholars, and scholars have very little chance of becoming dancers, but the meeting of both worlds has now become necessary.
Earlier in this lecture, I described how the definition of a dancer's excellence has changed recently, including a knowledge of, and flexibility in, different dance techniques. Nowadays, dancers need to be skilled in a variety of techniques and capable of adapting to the eclectic dance vocabularies of contemporary choreographers. It is my strong conviction that to reach this level of excellence, dancers need more knowledge. Not only do they have to know how to use their bodies according to the various techniques, but they also need to know about anatomy, nutrition, fitness training, periodisation, mental preparation and other vital elements of a dancer's professional life. To find a place in the world of dance and enjoy it there, a dancer needs to know his own individual physical and emotional possibilities and limitations, be able to set them against the demands and make informed choices about where he wants to be.
Codarts, Hogeschool voor de Kunsten, has recognised the challenge this presents to the educational institution where young dancers are trained and educated. Dance students must be given access to as much knowledge as possible to enable them to dance to the best of their abilities. A dance academy is the ideal place for creating a platform where the worlds of dancers and scholars can meet.
Initially, encounters between dancers and scholars were few and far between. Dancers regarded the work of scholars as too theoretical and not useful for their own practices. Researchers were used to presenting the results of their studies to colleagues without having to deal with its possible implications. In recent years, there have been occasional meetings between dancers and researchers. The international conference Not Just Any Body in 1999 in The Hague was a memorable event, where knowledge on dance was presented and exchanged in a way that had not happened before.[52] The participants of this conference were dancers, ex-dancers, dance researchers, artistic directors, choreographers, medical doctors, dance teachers, and many others, who talked and listened in an atmosphere of mutual interest and curiosity. A year later, the Healthier Dance Programme of Dance UK organized a similar event in London under the title Moving Matters, and in 2003 the experience was repeated again in The Hague at the Not Just Any Body & Soul conference.[53] These conferences were an important impetus for

the growing awareness that the science of dance can enhance the understanding of dance teaching and performing. The same message is carried by organisations like the Stichting Gezondheidszorg voor Dansers in the Netherlands, The Healthier Dance Programme in the United Kingdom and Tanz Medizin Deutschland in Germany.
In 2003, the Rotterdam Dance Academy initiated an inventory of the existing health practices at the school. This resulted in a research report that underlined the importance of attention to health and well-being as part of the curriculum.[54] The application for a professorship on excellence and well-being was the next step in the policy of an institution that wanted to take research into dancers' health seriously. In 2004, with the financial help of the Stichting Kennis Ontwikkeling (SKO), this resulted in the appointment of a professor. For this post, Codarts invited a scholar who was committed to conducting research on excellence and well-being in close interaction with dancers and who could bring their practical knowledge into play.
I would like to conclude my lecture by showing you how we do this.

*Injury and injury behaviour*
In the injury behaviour project, organized by the professorship, and initiated and conducted by Gaby Allard, we started by registering all the injuries, big and small, that were reported by 1st-year students in the year 2004-2005. We are continuing to register them in the year 2005-2006, so we now have information on injuries and injury behaviour with regard to all the 1st and 2nd-year students. Injuries are registered according to type: lower extremities, shin splints, knees, hip area/hamstrings, back and other injuries. We keep track of the period in which the injury occurred and whether a student has more than one injury. We also register the possible cause of the injury, discriminating between trauma, overuse or overcompensation, physical limitations (ROM), faulty technique or a former injury.
Among students the most common cause of injuries is overuse and overcompensation. While it will be impossible to completely prevent this type of injury, the available research from other sources offers directions that could be taken for improvement. More attention to the right technique, individual coaching, information on anatomy and injury prevention, lessons on nutrition and the need for rest are some of the possibilities.
Analysing the results of the first year was interesting. There are three different groups of first-year dance students at Codarts, divided according to dance level and experience. We discovered that the group with the most experience and training in dance suffered many more injuries than the other two groups. Members of this group also had multiple or recurrent injuries. On the basis of the material, we could not give an explanation for this difference and have therefore decided to start another research project that will provide some answers.
Another result of the registration is the insight it gives into the existence of injury peak periods. From the figures, it became obvious that injuries, more specifically problems with the lower extremities, occurred more frequently in the weeks just after the holidays and around audition periods. This result prompted new research questions and an experiment with periodisation, which will be discussed below.
After 20 months of registration, there is much more to be said about injuries, but this will be done in a separate report. The registration of the students' injuries continues. Each ensuing year offers more material on the injury rate of the dance students at Codarts, which can be used to make adjustments and to optimise the educational environment.

*Interviews with 1st-year students*
There are marked differences in the technical level and former dance experience between the different groups of students in the 1st year. One of the reasons for these differences is the policy of the Rotterdam Dance Academy towards men. The school has committed itself to create an environment that is stimulating for young men to become professional dancers. Men who audition and show real potential but lack dance experience are given a year to develop. These young men, together with some young women who also have insufficient technique or experience, are placed in a 1st-year group that receives extra coaching classes. Doing these classes increases their weekly workload, but offers them more technical information and insight.
One of the puzzling results from the injury registration was the fact that the injury rate in the less experienced group was significantly lower than in the groups with students who had more dance experience. As a follow-up, the professorship therefore initiated an interview project with 1st-year students from this group and the group that is considered the most experienced and technically advanced. In the interviews, which were conducted by Caroline Harder, Brigitte Martin and Noortje van Amsterdam, we focused on differences in background and training, the coaching classes and the students' individual injury behaviour.
This project is now in its final stage. The interviews have been conducted and transcribed. We expect that close reading of the transcripts and an analysis of the material will provide us with more information on the injury behaviour of 1st-year students, which will help us to develop a sound programme of injury prevention.

*Periodisation*
The injury registration also showed that over the course of one year more injuries occurred in certain periods. The injury rate of the students went up immediately after the holidays and around the auditions. An experimental, practice-based research project on periodisation was initiated by the professorship, and designed and carried out by Gaby Allard.
In the project, teachers of the technique classes were asked to adjust their material during the first week in January 2006 after the Christmas break. General guidelines were given, but each teacher was responsible for his own class. The weekly programme itself was the same in hours, but the material offered was more adapted to the students (for example, less jumping exercises) and there was a different focus.
After the experiment, evaluative interviews were conducted with the participating teachers. This material was analysed. The

registration shows that contrary to last year, the injury rate of the students did not increase in this period. More importantly, consciousness was raised, which affected the injury figures in the weeks afterwards as well. Some interesting conclusions can be drawn from the interviews with the teachers. One is that each teacher adjusted the material according to their own ideas, fitting the general guidelines to their own approach. Reflection on one's approach and the choices that were made was stimulated by the project itself and the evaluative interviews afterwards. The project also prompted teachers to discuss their approaches with colleagues, creating a situation where knowledge was made explicit and shared. So the project was valuable not only because it helped to decrease the injury rate of students, but also because it stimulated inquiry and exchange.

*Fitness for elite young dancers*

The fitness for elite young dancers project, initiated by the professorship and designed and conducted by Yvonne Beumkes, is also experimental and practice-based. Through studying the available literature on fitness, it had become clear that although the knowledge on the need for fitness for dancers was growing steadily, there was no material on fitness and dance in relation to pre-professional students, aged 12-17. Because the Codarts dance academy works in close cooperation with the HAVO voor Muziek en Dans, where teenagers are prepared to enter a professional education as musicians or dancers, we decided to conduct a study on this particular age group.

Two cardiovascular training programmes were designed; a regular, sports-oriented programme and another that was dance-oriented. The latter was developed at Codarts. These programmes were offered by four different teachers to two different groups of students in the period between November 2005 and April 2006. The fitness of the students was tested in November 2005 and again in March 2006.
Several research methods were used during the experiment. The researcher was also one of the teachers of the dance-oriented training and she kept a research diary. Questionnaires were distributed among the students at the beginning, after one month and at the end of the research period. Interviews were conducted with students and with the participating teachers.
The project has generated interesting results. Both students and teachers enjoyed the training and experienced a growing awareness of its importance for the general fitness of dancers. Students felt fitter and more confident as a result of the training and they enjoyed the element of competition it introduced. Teachers found it difficult to fit the training into the normal schedule, feeling that it took time away from the dance technique classes. The experiment with two different types of training was an innovative part of the research, producing interesting material that raised several questions. Students apparently liked both types, but the dance-oriented training was experienced as more challenging and ultimately more rewarding. The teachers preferred the dance-oriented training, because it had a direct relationship to the dance class and helped to develop dance-based muscular patterns. They recognised the need to revise the training regularly, which adds to the workload of the teacher. Although they stressed that cardiovascular training can be developed from most dance techniques, it should not be considered a substitute for dance technical training. Time used for cardiovascular training ultimately leaves less actual teaching time.
The fitness for teenagers project has confirmed earlier research and produced new knowledge, specifically about this age group and about the comparison between sports-oriented and dance-oriented training. It also stimulated the cooperation of dance teachers who participated in the project. Because they had to integrate the cardiovascular training in their own technique class, these teachers were required to reflect on the set-up of their class. Inquiry and exchange were thus a vital part of the project. The importance of fitness training for this age group has been recognised, several possibilities have been tested, and some practical and structural difficulties have been identified. The next step will be to fully apply and integrate this knowledge and make some changes in the educational programme.

*Food for dance*

Nutrition for dancers is a focus of the professorship. Disseminating information on nutrition among students and teachers and doing research on food and eating behaviour at the Rotterdam Dance Academy have been part of the activities since its beginning in 2004. Several projects have been undertaken to increase knowledge on nutrition and stimulate debate on related subjects.

Dance students at Codarts come from all over the world, so their eating habits vary widely. Because of their busy training schedules they spend most of their days and sometimes part of the evenings in the school, which leaves little time for shopping and making elaborate meals at home. One might say that this is a fitting preparation for their future lives as professional dancers.
The first project on food that the professorship undertook was a survey among dance students to gather information about their daily eating habits and to get their opinion on the food offered at the Codarts canteen. Most students apparently brought their own food, because they thought the food offered in the canteen was too expensive, unhealthy, too oily and not suited to their own eating habits. The results of this study have been presented to the management of the school. Unfortunately, they have not yet been able to find another caterer for the canteen.
A small-scale interview project among dance students, done in 2005, showed that information on nutrition is still rather sketchy. Students are aware of the importance of good nutrition, but their knowledge of it remains incomplete and they are often doubtful where to get specific information.
Following up on the results of both projects, the professorship has taken the initiative of creating information sheets on nutrition that are distributed among the students at Codarts and the HAVO voor Muziek en Dans. The sheets are designed especially to be kept and carried around. The first of the sheets, a general text, has been distributed recently and other more specific sheets will follow soon.

It is clear that the subject of nutrition and dance is not limited to information on food. An important part of it is attention to body image and body ideals. The Rotterdam Dance Academy prides itself on being a professional dance school where not one specific body type is favoured over another. A conscious attempt is made to change the general attitude toward food, regarding it not as an enemy, but as the necessary fuel it really is. Students who want to lose weight are told about the importance of eating well and supported in finding ways to achieve the desired body shape without resorting to stopping eating.
More research can be done on nutrition in relation to the time constraints of students, the availability of food, the importance of body image, and on differences between male and female students in relation to food and body image.

*The meaning of pain*
The available research shows that overuse or overburdening of the body is a major cause of dancers' injuries. One of the reasons may be that injuries are exacerbated because dancers do not know when to stop. Pain is a constant feature in a dancer's life; she is accustomed to it, complains about it, tries to 'work through' it and sometimes embraces it as a sign of progress or will power. Listening to pain is a concept with multiple interpretations for a dancer. What message does he hear? And what conclusions does he draw from it?
There is no research available on the meaning of pain for dancers and dancers themselves are remarkably silent on the subject in their autobiographies or other texts.[55] This is one of the reasons why the professorship has initiated a multifaceted research project on the meaning of pain. The project consists of several smaller projects and is carried out by Anna Aalten, Mirjam van der Linden and Noortje van Amsterdam. The main question is: 'What is the meaning of pain for dancers and how does this influence their experience of pain and pain behaviour?' The researchers started with an extensive literature research on the subject of pain, looking at material from various sources, both within dance and outside. In the next phase, systematic observations were made in dance technique classes. One part of the project consists of qualitative interviews, conducted with carefully selected elite dancers who have considerable experience in contemporary dance. Another part of the project is the collation of interview material from dance students.
It is obvious that this project is only possible as a collaboration between dancers and scholars. Working together, they will provide us with a better picture of when pain is normal or functional, and when it is, or should be, an alarm signal, thereby offering new insights in the meaning of pain for dancers.

All the research projects mentioned above have one thing in common. They rely on bringing together the practical knowledge of dancers and the scholarly knowledge of researchers. Let me stress here that this is only the beginning. The decision to establish the professorship *Excellence and well-being in the performing arts* at Codarts, Hogeschool voor de Kunsten in Rotterdam has been an important step towards bridging the gap between the world of dancers and the world of scholars. The practical knowledge of dancers, which is present in their bodies and their experience, can be made explicit and accessible, while the scholarly knowledge of researchers can become more grounded in the daily practices of dance. The results of this cooperation will contribute to excellence and well-being in dance.

I cannot remember ever seeing my grandfather dance. Maybe he never did. But I am certain that he would have appreciated the particular hunger for knowledge that is shown by the students of this school. He knew – as they do – only too well that knowledge is power. Let us make the most of it, together.

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## Notes

1 The distinctions between scholarly and practical knowledge is explored in Aristotle's *Nichomachean Ethics*, especially in Book VI. For the purpose of this lecture, I have used the Dutch translation, *Ethica* (1999).

2 This example is elaborated in an article by Anna Pakes (2003), who has derived it from a text by Carr (1978).

3 See the explanation of Newton's laws of motion in Law and Harvey 1994: 189. The book, *Physics, Dance and the Pas de Deux* (1994), a collaboration of Kenneth Law, a professor of physics, and Cynthia Harvey, a dancer with the American Ballet Theatre, is an interesting example of the meeting of scholarly and practical knowledge. The British dancer Deborah Bull created something similar in her 2002 series *Dancer's Body* with the BBC.

4 The recent discovery of a 'dance gene' might give the impression that there is such a thing as a 'born dancer'. But the presence of a certain gene will obviously do nothing more than presenting a possibility. I think most dancers would agree that to become a dancer one needs more than a gene.

5 The lecture was given at a meeting of the Société de Psychologie on May 17, 1934 and first published in the *Journalde psychologie normal et pathologique*, 1935: 271-293. It was translated and published in *Economy and Society* 1973: 70-88.

6 Mauss 1973: 71.

7 Graham 1991: 4.

8 See Susan Foster 1997: 238.

9 Kinesiology is usually defined as the 'science of movement'. Berardi uses the term in her book *Finding Balance* (1991), a guide book for dancers that offered not only information on injuries, but also on fitness, nutrition and other aspects of health. In 2005, a second, revised edition came out. The term '*practicing* kinesiologists' is used in both editions (Berardi 2005: xxiii, original emphasis).

10 Berardi 2005: 80.

11 See for a detailed description of the instruction of dance techniques Foster 1997: 241-253.

12 This term is derived from the title of educator Mabel Todd's book *The Thinking Body* (1937).

13 A detailed description of one particular example of deconstructive inquiry can be found in Eeva Anttila's thesis *A Dream Journey to the Unknown. Searching for Dialogue in Dance Education* (2003).

14 Foster 1997: 247-248.

15 Idem p. 252.

16 See Fortin, Long & Lord 2002.

17 According to Ruth and John Solomon, two leading scholars in the field of dance, medicine and science, who published a statistical review of the publications on the subject since the early seventies, the increase was most dramatic between 1977 and 1988. Although the quantity of publications has decreased somewhat since then, the interest is still growing, judging from the steadily increasing membership of several associations and the number of international conferences (Solomon and Solomon 2004).

18 See Ryan and Stephens 1987; Solomon, Minto & Solomon 1990; Watkins & Clarkson 1990; Koutedakis and Sharp 1999; Berardi 2005 [1991]. These are just some examples of books that were published. My aim here is not to give an extensive overview of the publications in the field, which can be found elsewhere (Solomon and Solomon 2001).

19 Solomon and Solomon 2004.
20 Mazo 1974: 230.
21 Berardi 2005: 31.
22 These figures vary. According to dancers' self-assessment in a recent quantitative study in the Netherlands, 60% of their injuries were chronic, either due to fatigue, overwork, ignoring early warning signs, an incorrect technique or a combination of these (Schärli 2005: 18-20). See also Krasnow, Kerr & Mainwaring 1994; Brinson and Dick 1996; Garrick 1999; Liederbach 2000; Liederbach and Compagno 2001; Mainwaring, Krasnow & Kerr 2001.
23 In her book, Gigi Berardi presents six common overuse injuries of the lower extremities and their risk factors or possible causes. The injuries are: stress fractures, plantar fasciitis, Achilles tenditis, shin splints, patellar injuries and the 'snapping hip'. Risk factors range from anatomical or biomechanical anomalies of limitations to an overload in training, unhealthy eating habits, inadequate warm-up, fatigue, over-anxiety and suboptimal equipment (Berardi 2005: 33).
24 Krasnow, Kerr & Mainwaring 1994: 7-8.
25 Bussell 1998: 149-150.
26 Krasnow, Kerr & Mainwaring 1994: 7
27 Wulff 1998: 105.
28 The connotation of heroism in relation to dancing with injuries and pain is described in the few sociological and anthropological studies that have been done on the occupational culture in dance. See Hall 1977; Wulff 1998; Aalten 2003; Wainwright and Turner 2004; Aalten 2003; Aalten in press.
29 See Mainwaring, Krasnow & Kerr 2001; Wainwright, Williams and Turner 2005.
30 See Bentley 1982: 63-64.
31 See J.Christopher Potts and James J. Irrgang, 'Principles of rehabilitation of lower extremity injuries in dancers', *Journal of Dance Medicine & Science* 5/2 (2001): 59 .
32 Garrick 1999.
33 Although there is much more known about the relationship between fatigue and injuries in sports, some research has been done with dancers. See Koutedakis 1999, Koutedakis 2000, Liederbach and Compagno 2001 and Luke et al. 2002.
34 Organising schedules to adjust the dancer's workload and to prevent overload is called periodisation. See Wyon 2004.
35 This conclusion was part of a larger study on the health of dancers in the United Kingdom (Brinson and Dick 1996).
36 At the first Not Just Any Body conference on health, well-being and excellence in dance, 1999 in The Hague, several workshops were dedicated to fitness. The report of discussions can be found in the section 'The Dancer as Athlete' in the conference report (see below). See also Clippinger 1997; Koutedakis and Sharp 1999; Rossum, van, 2002; Redding and Wyon 2003; Schärli 2005
37 Berardi 2005: 115.
38 See also Fitt 1988, chapters 14 and 19.
39 Berardi offers some information on the duration and power requirements of certain dance movements. For example, a *tendu en croix* requires a moderate intensity during 30 seconds, while a *ronde de jambe with allegro component* requires the same intensity during 60 seconds (2005: 142). See also Wyon et al. 2002.
40 Koutedakis and Sharp 1999: 104.
41 Berardi is specifically concerned with the weight-bearing aspect of running. She advises dancers to check whether they run the risk of hurting themselves by 'imagining a line that runs down their chest and extends between the legs and feet. As they run, their feet should be on each side and parallel to the line – not toed-out' (Berardi 2005: 145).
42 It is impossible to give exact figures on the occurrence of eating disorders among female dancers as the information available and the definitions used in the different studies vary widely. In the latest quantitative study among professional dancers in the Netherlands nearly half of the female dancers reports to have suffered from an eating disorder at least once in her lifetime (Schärli 2005, 34). However, the sample of this study was based on a majority of modern dancers working freelance, while there is some evidence that eating disorders occur more frequently among ballet dancers than among modern dancers. See for more research also Benson et al 1988; Bonbridge 1989; Warren 1989; Brinson and Dick 1996; Haight 1998; Koutedakis and Yamurtas 2004.
43 See Pacy 1999 and Wolman 1999.
44 Aalten 2002.
45 See for example Chmelar and Fitt 1990; Koutedakis and Sharp (ed) 1999; Berardi 2005, Dyke (ed) undated, and the various websites.
46 Buckroyd 2000, chapter 10: 162-183.
47 Benn & Walters, 2001: 139.
48 The fact that Vincent was a medical doctor with a major dance company made his voice that of an insider in the dance world. Several years later, Suzanne Gordon, a journalist, published an equally critical description of the body politics in ballet, after having spent more than a year doing research (1983). Other descriptions of the consequences of the body ideals in ballet can be found in dancers' autobiographies, for example Bentley 1982; Brady 1982; Seymour 1984; Kirkland and Lawrence 1986; Porter 1989; Kent 1997. Apart from Kirkland and, to a lesser extent, Kent, most dancers' autobiographies are not critical about the occurrence of problematic eating behaviour, but seem to accept it as part and parcel of the culture of dance.
49 Vincent 1998: 4.
50 Procee 1995: 85-93.
51 See also Aalten 2002.
52 A report of this conference, *Not Just Any Body. Advancing Health, Well-being and Excellence in Dance and Dancers*, was published in 2001 by Ginger Press, Ontario, Canada.
53 See Van der Linden (ed) 2004.
54 Margot Rijven, *Gezondheidszorg RDA op de kaart*, 2003.
55 Although attention to pain is paid in several research projects on injuries (Aalten 2004; Williams, Wainwright and Turner 2005; Aalten 2006), none of these takes pain as the central focus. I know only of one study on pain, in which the pain coping styles of dancers are quantified and compared with those of athletes (Encarnation et al, 2000).

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Anna Aalten studied social and cultural Anthropology at the University of Amsterdam and obtained her PhD at the Rijks Universiteit Groningen in 1991 She held positions at the Rijks Universiteit Leiden and at the Vrije Universiteit and currently holds a post as an associate professor at the Department of Sociology and Anthropology of the University of Amsterdam. In 2004 she became professor at Codarts, the Professional University for the Performing Arts in Rotterdam, where she directs a research program on 'Excellence and well being in the performing arts', which is financed by the Stichting Kennisontwikkeling (SKO). She is a staff member of the Amsterdam School for Social Research.
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