LUCA
SCHOOL
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ARTS

Campus Lemmens

Musician's Physical and Mental Health

Why and how to preserve it

PAPER, als reflectief luik van de bachelorproef, aangeboden tot het behalen van de graad van Bachelor in de Muziek, afstudeerrichting
Instrument, specificatie klarinet.

door **Ezio ZAPPALÀ**

Promotor: Tom Goossens
Hoofdvakdocent: Roeland Hendrikx

academiejaar 2021– 2022

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Abstract - Nederlands

De laatste jaren is de belangstelling voor kwesties in verband met muzikale activiteit sterk toegenomen en hebben veel specialisten op verschillende gebieden belangstelling getoond. Terwijl zij vroeger alleen keken naar het educatieve, pedagogische aspect en de voordelen die het bestuderen en beoefenen van muziek met zich mee kan brengen, zien zij nu, bij nadere beschouwing, de risico's die het nastreven van een professionele carrière met zich mee kan brengen, zowel lichamelijk als psychologisch. Uit onderzoek blijkt dat tussen de 40 en 90 procent van de musici, zowel studenten als professionals, te maken heeft of heeft gehad met problemen als Music Performance Anxiety (MPA), PRMD (Playing-Related Musculoskeletal Disorders) en andere problemen. Dit wordt veroorzaakt door vele factoren, waaronder lange studie- en trainingsuren, een omgeving met veel competitie en hoge eisen, audities en optredens van uiteenlopende aard. In deze dissertatie worden gegevens en bevindingen uit de vele onderzoeken weergegeven, de belangrijkste risicofactoren en technieken en strategieën om deze in te dammen geanalyseerd. Dit met het doel om nieuwe factoren en/of nieuwe strategieën te vinden die tot nu toe niet in overweging zijn genomen.
Wat zijn de belangrijkste factoren die stress, angst en lichamelijke problemen veroorzaken? Welke technieken en activiteiten beoefenen de studenten om met bepaalde problemen om te gaan? Hoe bewust zijn zij zich van hun risico's? Om deze vragen te beantwoorden werd niet alleen de bestaande literatuur geanalyseerd, maar werd ook een vragenlijst verspreid onder studenten blaasinstrumenten, dit om er zeker van te zijn dat het doelpubliek specifiek was en dus vergelijkbare kenmerken had. De vragenlijst was verdeeld in drie delen: het eerste deel over stress, het tweede over "Music Performance Anxiety", en het derde over "Playing-Related Pain". In alle onderdelen wordt gevraagd naar de belangrijkste triggers en de technieken die studenten gebruiken om daarmee om te gaan. Hoewel het onderzoek geen groot aantal studenten betreft, laat het interessante gegevens zien en toont het, in lijn met ander onderzoek, aan dat studenten met veel problemen kampen en vaak niet over de juiste kennis beschikken om daarmee om te gaan.
Bovendien wordt veel belang gehecht aan de rol van leraren en instellingen en hoe zij een primaire rol spelen, niet alleen bij het promoten van dit onderwerp, maar ook bij het actief deelnemen, het creëren van de juiste omgeving voor de professionele groei van studenten en hen de instrumenten en kennis aanreiken die nodig zijn om bepaalde problemen aan te pakken.

Abstract – English

In recent years, interest in issues related to musical activity has grown greatly and has interested many specialists in different fields. While previously they looked only at the educational, pedagogical aspect and the benefits that studying and practicing music can bring, now, looking more closely, they recognize the risks that pursuing a professional career can bring, both physically and psychologically. Research shows that between 40 and 90 percent of musicians, students and professionals, have experienced or are dealing with issues such as Music Performance Anxiety (MPA), PRMD (Playing-Related Musculoskeletal Disorders) and other problems. This is given by many factors, including long hours of study and training, environment with much competition and high standards, auditions and performances of various kinds.
In this thesis, data and findings from the many research studies are shown, the major risk factors and techniques and strategies to curb them are analyzed. All this with the aim of finding new factors and/or new strategies not considered so far.
What are the main factors that cause stress, anxiety and physical problems? What techniques and activities do students practice to cope with certain problems? How aware are they of their risks? To answer these questions, not only was the existing literature analyzed, but a questionnaire was distributed to students of wind instruments, this was to make sure that the target audience was specific and thus had similar characteristics. The questionnaire was divided into three parts: the first section on stress, the second on Music Performance Anxiety, and the third on Playing-Related Pain. All sections ask about the major triggers and the techniques students use to cope with them. Although the study does not involve a large number of students, it shows interesting data and demonstrates, in line with other research, that students face many problems and often lack the proper knowledge to deal with them.
In addition, much importance is given to the role of teachers and institutions and how they play a primary role not only in popularizing this issue, but also in being an active participant, creating the right environment for students' professional growth and giving them the tools and knowledge needed to tackle certain problems.

Acknowledgements

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1. Introduction

1.1. Subject

In the last decades, thanks to numerous studies in different fields such as medicine, psychology and neurology, experts have made enormous progress in understanding how music benefits people. Playing an instrument engages pratically every area of the brain, especially the visual, motor and auditory cortices and all the parts related to emotions, creativity and language. We can affirm that listening to and playing music is like a complete workout to our brain and, as any other workout, musicians with their organized and rigorous practice strengthen those brain functions bringing that strength to other activities in everyday life.
This is the reason why music therapy is used to repair brain damage, is used with people with ADHD (attention deficit hyperactivity disorder) as well as with ASD (autism spectrum disorder). Furthermore playing music helps with depression symptoms, it improves mathematical and spatial skills as well as memory and executive funtions (strategizing, planning, attention to details, storing and retrieving memories etc.) (Schlaug, 2015).
At the same time, in the last decades, while music has been linked with enhanced wellbeing across a wide variety of contexts, the professional pursuit of a music career has frequently been associated with poor health, including: performance related pain, physical discomfort, hearing loss, performance anxiety, psychological illbeing (anxiety and depression) (Ascenso et al., 2018; Healty Conservatoires, 2020). The reason is that musicians have to face a lot of challenges and perform different tasks at the same time, such as reading and memorizing long pieces of music of high difficulty, decode the musical notation and then tranform it into coordinated movements with specific techniques depending on the instrument, listen to the other musicians in order to play together, with balance and in tune. And these are just some of the factors involved. In other words musical performance requires the ability to master a complex integration of highly specialized motor, cognitive, and perceptual skills developed over years of practice. Everyday musicians play in awkward asymmetrical postures and performe mostly repetitive movements. Moreover, it often means being able to deal with considerable pressure within dynamic environments. Consequently, many musicians suffer from health-related problems and report a large number of physical and psychological complaints (Antonini Philippe et al., 2019).
We can state that music at a professional level is physically and psychologically demanding and these problems can lead to an impaired level of playing and in some cases musicians are even compelled to stop playing entirely.
Considering the numerous researches, testimonies and the attention of the specialists, it seems evident that there is a growing need to care about musician's physical and mental health.
The profession of orchestral musician is often linked to musculoskeletal problems, hearing disorders, and struggles with stage fright (Gembris et Al., 2018), international surveys report that this problems affect between 40% to 90% of musicians as showed, for example, in a study by Healthy Conservatoires (2017) where 79.7% of musicians reported pain in the upper

body with no difference between musicians whose performance require symmetrical or asymmetrical body alignment. Furthermore, music students reporte higher prevalence of mental health disorders, such as anxiety disorders and depressive disorders, compared to the general student population (Vaag et al., 2021).
These data paint a problematic picture and raise numerous questions about how to prevent these physical and mental issues.
In this thesis I explore, according to existing literature, what we already know about the most common problems, their causes and what musicians can do to stem them. In the last chapter the results of the questionnaire are shown. The questionnaire surveys a group of wind instrument players from several conservatoires, with the aim to gain data about the overall wellbeing status, stress, playing-related pain and coping techniques. The latter one is the most important in my opinion, cause it gives hints on what usually works and what not.
In addition to provide information about the topic, I also hope this study can help to normalize the taboos associated with health issues among musicians, because there is a tendency, especially among students, to ignore the problems or to give them not proper importance. Studies, as evidence, indicate that music students' perceptions, attitudes, and behaviors toward health and healthy living are less than optimal, especially considering the multiple physical and psychological demands of their day-to-day work (Araùjo et al., 2017; Healty Conservatoires, 2018). The research conducted by Spahn and collegues (2004) points to a gap between students' perceptions and beliefs versus their actions. This suggests that there is more need for health education in all the institution involved (high school, conservatoires, academy, clinics) in order to have more aware musicians.
It is essential, therefore, to get example of the health profiles of music students at early stages in their careers to understand better their specific health needs and identify areas for action to prevent physical and psychological problems. Moreover, while acknowledging that music students in specialist higher education face specific challenges (e.g., constant scrutiny, pressure to excel, and intense competition), they also share many of the same difficulties experienced by peers studying in other subjects. These include adjusting to new environments and to levels of study that demand advanced learning skills and specialist knowledge while also facing new personal, social, and financial constraints that may impact on their health, wellbeing, and performance (Vaez and Laflamme, 2003; Davoren et al., 2013). Of course it is important not to consider only factors as posture, quality of practice, healthy lifestyle etc., but other factors considerably affect a musician's career such as subjective wellbeing[1] and quality of life[2].
However, when we talk about health we have to consider many aspects, but this thesis is focused on problems directly related to music ptractice and performance, on that habits in which students and teachers can act to avoid or reduce incoming problems, with the goal to give young students an healthy career where enjoying playing with the only purpose to solve artistic problems.

1 Subjective wellbeing consists of three interrelated components: life satisfaction, pleasant affect, and unpleasant affect. Affect refers to pleasant and unpleasant moods and emotions, whereas life satisfaction refers to a cognitive sense of satisfaction with life (Diener and Suh, 1997).

2 The World Health Organization defined quality of life as: an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment (World Health Organization, 1997).

1.2. State of the Art

The literature on this topic is varied and extensive. A large number of researches focus on giving data about the most common issues and their connection with different target (students or professional, young or adult, male or female etc.); other studies collect data on the connection between instrument, posture and related pain or other factors like time of practice, diet, sleep and general lifestyle. On the other hand only part of the literature is focused on practical solutions that can help musicians to cope with arising problems, such as musculoskeletal disorders and anxiety, that can negatively affect performance.

1.2.1. Playing-Related Musculoskeletal Disorders

"*There is no exercise, though never so healthful and innocent, but what may produce great disorders, if it is used with intemperance*".

These are the words of Bernardino Ramazzini, the first who described in 1713 an overview of occupational diseases of musicians. The interest grows during the nineteenth century when a number of physicians turned their interest to some specific musicians' complaints like musicians' cramp. It is a curious fact that tenotomies of the finger flexors were performed in order to improve finger independency among pianists. However, real interest in the health and wellbeing of musicians by medical practitioners, researchers and music professionals was developed since the 1980s.
This was reflected in a growing number of publications, journals, conferences, and organizations focused on the health of the performing artists. Nowadays, the level of knowledge on this topic and the necessary specialized healthcare is still in a developmental stage when compared to, for instance, sports medicine, and thus room for improvement remains (Sataloff et al. 2010; Bejjani et al. 1996).
PRMD (playing-related musculoskeletal disorders) was defined first by Zaza (1998) as "pain, weakness, numbness, tingling or other symptoms that interfere with the ability to play the instrument at the level you are accustomed." This term has the benefit of excluding minor pain symptoms and symptoms without an impact on the act of making music.
It is well-known that professional musicians often suffer from physical complaints and pain when playing and that amateur musicians report better physical health than college music students. This is not surprising, as it is well known that music students frequently report pain or discomfort linked to bad posture, excessive practice on their instrument, and performance anxiety (Antonini Philippe et Al. 2019). Numerous studies demonstrate that between 60 and 90 percent of professional musicians suffer from pain of the musculoskeletal system, with a prevalence in string players and woman (Gohil et al., 2016; Kok et al., 2015; Baadjou et al., 2016; Zaza and Farewell, 1997). This is also confirmed by a study carried out with professional orchestra musicians from the three main professional orchestras from the North of Portugal, where about two third (62.5%) of the interviewed musicians presented playing-related musculoskeletal disorders during the time of the interview and it results that playing-related musculoskeletal disorders are more common in string players and more intense in wind players (Sousa et al., 2017). But PRMD doesn't concern only professional musicians, it starts at a young age in music students. Yeung and colleagues (1999) indicated that less experienced musicians are more likely to develop musculoskeletal complaints than more experienced musicians. Besides, health problems in this population can lead to study delay and even drop-out of study.

Most of the students complain discomfort and pain located in the neck, wrists, fingers, upper and lower back areas and, again, girls complain of musculoskeletal pain significantly more often than the boys (Nawrocka et al., 2014). The same problems are reported in the large-scale study made in Germany with highly musically gifted participants (from 9 to 24 years old) at the national level of the "Jugend Musiziert" contest (Gembris et al., 2020). Here about three-quarters of the surveyed participants stated that they had experienced pain during or after playing their instrument and, as shown above, female musicians were significantly more frequently affected. In addition, with increasing age, the prevalence of playing-related pain rises.
There are two influential factors to consider, especially if we want to find solutions to these problems. The first one is the clear relationship between the duration of the practice and the prevalence of playing-related pain (PRP). It gives a clear idea of the need to educate students on the quality of practice and not on the quantity. In fact it is likely that when PRMD arise, musicians do not want to adapt their playing routine; they often feel obliged to continue playing even though they experience pain while doing so.
The second one is the need to highlight the differences between the various instruments (string, keyboard, wind, percussion) with their usual position and the parts of the body where tension is focused.
To put it in another way, in the context of research into prevalence of PRMD, with the aim to stem and avoid the arising of pain, it is necessary to consider not only the instrument and duration of practice as a factor, but also qualitative aspects such as practice habits or practice strategies, attention to breaks, warm-up and cool-down, posture, mental practice etc.

1.2.2. Mental Health

PRMDs are not the only health issue confronting musicians; an equal source of concern is their mental health. Recent studies have shown that mental health issues like stress, depression and anxiety are more common in musicians than in the general population (Spahn et al., 2004; Steemers et al., 2020). Therefore, when pursued professionally, the demands of musical training and performance can interfere with musicians' wellbeing and health.
The first issue we encounter when we talk about mental health is definitely music performance anxiety.
Music performance anxiety (MPA) has been defined as the experience of marked and persistent anxious apprehension related to musical performance, manifested through combinations of affective, cognitive, somatic and behavioral symptoms (Juslin and Sloboda, 2011). It can be distressing for many young people studying music, and may negatively impact upon their ability to cope with the demands and stressors of music education (Braden et al., 2015).
For some musicians, in fact, performances are characterized by fear and dread, and experienced as an overwhelming challenge that must be endured.

Chopin was one of these musicians:

I am not fitted to give concerts. The audience intimidates me,
I feel choked by its breath, paralyzed by its curious glances,
struck dumb by all those strange faces.

He was not alone in this kind of antipathy to public performance. Some other unlikely sufferers of music performance anxiety (MPA) include Vladimir Horowitz, Ignacy Paderewski, Sergei Rachmaninoff, Luciano Pavarotti, Enrico Caruso and Maria Callas (Jachimecki, 1937; Ostwald, 1994; Schonberg, 1963). Importantly, it should be said that the way these musicians have experienced music performance anxiety is not the same for each of them.

Kenny (2011) describes MPA as a complex phenomenon with multiple causes encompassing genetics and environmental factors, but also personal experience, thoughts, emotions, and behaviors. Although a certain level of arousal can facilitate optimal performance and a certain degree of anxiety is part of the normal bodily response to perceived threat, it impairs performance quality when excessive. The differences between facilitating and debilitating anxiety, and between anxiety as a normal response to a relevant situation or context and anxiety as a mental disorder, may not be made explicit often enough (Miller and Chesky, 2004). A range of interventions has been explored to address it. However, the poor methodological quality of such studies and the complexity of this issue should mobilise further research resources in this direction (Matei and Ginsborg, 2017).

Several factors can make the experience of performing feel threatening to musicians. These include that a high performance quality is an important goal to the musicians' self-identity, that the performance requires the display of high-level skills, that the performance is evaluated implicitly or explicitly by others and that there are elements that are uncontrollable and unpredictable (e.g. performance of other musicians, size, composition, and behavior of the audience). In line with this view, self-reported anxiety, distress, nervousness, bodily complaints, and negative perceptions are in most musicians greater before and during public performances compared to practice (Craske and Craig, 1984). Analyses of the respiratory responses, for instance, showed that the general MPA level changes significantly, from a private to a public performance, levels of end-tidal carbon dioxide[3], total respiratory variability and sigh rate (Guyon et al., 2020; Studer et al., 2012). To give an illustration of what it means, let's look at the study conducted by Guyon and colleagues (2020), where the participants exhibited significantly more breathing symptoms during the public session than the practice session, and before the performance than after the performance. In view of this they concluded that respiratory variability and sighing are sensitive to the performance situation and to musicians' general MPA level. Moreover, anxiety, tension, breathing symptoms, and respiratory responses co-vary significantly in the context of music performance situations. Respiratory monitoring can add an important dimension to the understanding of music performance situations and MPA and to the diagnostic and intervention outcome assessments of MPA.

Another compelling study was conducted with a sample of 880 students, with the aim to investigate the prevalence of symptoms and self-reported disorders of anxiety and depression, compared to the general student population. The proportion of students scoring above the cutoff for severe anxiety and depression symptoms was significantly higher among music and arts students compared to the general student population . Similarly, the prevalence of mental disorders was also significantly higher among the music and arts students, as well as psychotherapy use (Vaag, Bjerkeset and Siversten, 2021).

All things considered, it seems reasonable to assume that there is a strong need for psychological health awareness, education and intervention. The treatments can be different depending on several factors, including level and origin of the symptoms. Three systematic reviews of interventions aimed to reduce MPA (McGinnis & Milling, 2005; Kenny, 2005; Brugués, 2011) and an unpublished meta-analysis (Goren, 2014) have been conducted. McGinnis & Milling (2005) suggested that the most effective treatments incorporate

3 End-tidal carbon dioxide (ETCO2) is the level of carbon dioxide (CO2) that is released at the end of an exhaled breath. ETCO2 levels reflect the adequacy with which carbon dioxide is carried in the blood back to the lungs and exhaled.

cognitive restructuring[4] and exposure therapy. The other two incorporated other studies, with Brugués (2005) reviewing an additional five and concluding that cognitive–behavioural therapy (CBT)[5] might be particularly effective. Brugués also concluded that, although the use of beta-blockers might reduce some physiological manifestations of MPA, they also increase salivation. As they can thereby interfere with singers' and wind players' performance, Brugués recommended that beta-blockers be used cautiously, generally alongside psychological techniques.
In conclusion, despite the existing literature and the growing interest of specialists, it is still necessary to give the right knowledge and tools to students and teachers, in order to build awareness and create a safe, pleasant and stimulating environment that can help the artistic growth.

1.3. Problem definition

Once highlighted the various problems that may arise when pursuing a professional music career and their main causes, it is important to understand which are the coping strategies that we already know, the one that work the most and the one students already use. It would be interesting to try to find a serie of habits and excercises to combine to the practice routine of music students.
As already mentioned it is not possible to have an unique solution for all students and for all issues, cause we have to consider several factors (instrument, age, gender, time of practice etc.), therefore it is essential to divide groups with similar characteristics. This is the reason why this research is focused on wind instrument players. Of course, in the future, the same investigation can be applied on other samples.
This study has three main purposes: first, to examine sources of stress and anxiety; second, to examine the most frequent parts of the body where playing-related pain occurs; third, examine existing methods of controlling anxiety and stress, and to stem and avoid pain. This information can also be a tool for other music students needing help with those issues.

1.4. Research question

The questions of the study are:

What are the main factors that cause stress and anxiety?
How often and where do students have discomfort or pain while playing?
What coping mechanisms do students practice to alleviate them? And how effective are these coping mechanisms?

It is important to discover what music students already do that is helpful in their own problems management. This gives a better idea of what management tools are lacking and what students still need.

4 Cognitive restructuring (CR) is a psychotherapeutic process of learning to identify and dispute irrational or maladaptive thoughts known as cognitive distortions (such as all-or-nothing thinking (splitting), magical thinking, overgeneralization, magnification and emotional reasoning) which are commonly associated with many mental health disorders.

5 Cognitive behavioral therapy (CBT) is a type of psychotherapeutic treatment. It helps people learn how to identify and change destructive or disturbing thought patterns that have a negative influence on behavior and emotions.

1.5. Research design

In order to find answers to those questions a descriptive research design is used, with the aim to gather, analyse, and present collected data. Seconldy, the data are compared with the existing literature and, in the end, a connection between most common coping techniques and their effectiveness should be found. For this purpose not only data from the surveyed students are taken into account, but also suggestions and guidelines from other institutions and professionals are compared.
What's more, a chapter is devoted to the importance of introducing proper health promotion in music schools, creating intervention strategies, not to mention the role of specialists such us physiotherapists and medical practitioners.

1.6. Methodology

As mentioned in the introduction, playing-related musculoskeletal disorders are more common in string players and more intense in wind players (Sousa et al., 2017), this is the reason why this research is addressed to wind intrument students. With the intention of collecting data and identifying patterns, a questionnaire is delivered to conservatoire wind instrument students. This is the most suitable approach to answering the research questions because it gives the opportunity to compare data from different sources and to have a direct description of symptoms and coping strategies from the students. Moreover, due to the limited time available, it is not possible to conduct a study with the same sample group in two different period, before and after an health education course or a period with a specific practice routine or lifestyle, to see if there are differences in their awareness, coping strategies and techniques.
The questionnaire is divided into two parts: the first concerns the levels of stress and anxiety, stressors, habits or practices to stem them; the second one maps the parts of the body mostly affected by playing-related pain and, as the firs part, the actions that students take to deal with them.
There are open-ended questions and closed-ended questions using the Likert scale.
The Likert scale is a rating system used in questionnaires, designed to measure people's attitudes, opinions, or perceptions. It is a type of psychometric response scale in which responders specify their level of agreement to a statement typically in five points (for exaple from 1, strongly disagree , to 5, strongly agree).
While closed-ended questions give us direct respons on the levels and spread of the issues, open-ended questions give students the opportunity to express a personal feeling, thus to give a unique feedback. This may raise other questions about factors that have not been considered before.

1.7. Conclusion

In summary, musicians' life is characterized by a steady pressure to achieve a high-level performance, long hours of practice everyday, an environment with continue comparison and competition with other musicians, emotional work to give personality and artistic ideas to music and lots of other factors that cause weak health, both psychologically and physically.
The knowledge in this sector is growing quickly in the last decades, nevertheless there is still need to make musicians, especially young people who approach this discipline, aware of all the factors involved in making music.
To that end it is important to try to find out excecises, routines, lifestyle habits and other tools that can help to cope with the arising problems, thus is important not only to involve music students but also teachers and other music professionals.
This study is a little part of the work that has to be done but the results, despite this, can lead to new questions and new understanding in this field. Furthermore, it can give new ideas on other research that can be done and last but not least, this study with the information it gives can also be a tool for music students needing help with music performance anxiety and musculoskeletal disorders.

2. Causes and treatment of common musician issues

2.1. Playing-Related Musculoskeletal Disorders

Variations in physiological signs of stress, energy expenditure, and cardiac demands have been documented and related to musicians' physical characteristics, instrument type, and the tempo of music performed, suggesting that the physical demands of performance are multiple and changeable.
Consequently, musician, who are sometimes referred to as 'athletes of the upper body', could benefit from being physically and mentally fit in order to perform at the highest levels. It must be said, therefore, that a lack of physical activity is one of the biggest causes of work related pain. In this case, looking at music activity, the source of PRP stem from a lack of physical activity combined with stressful working environments that encourage long periods of practice with repetitive movements. This can lead to negative health consequences including musculoskeletal problems (Baadjou et al., 2015).
One of the most common diagnoses given for pain among musicians is overuse syndrome. This definition refers to a condition arising as consequence of exceeding the biological or physical limits of the tissue (for example muscle, tendon, nerve, or joint).
As Watson points out in "The Biology of Musical Performance and Performance-Related Injury" (Watson, 2009) this term not only may not really reflect the root of the problem, but his description can also suggest imminent physical collapse and the end of a career. It appears that the definition probably misses the point. In fact it is possible to play for years without problems and then start to experience pain. I find Watson's definition of it more appropriate. He affirms: "*delayed treatment syndrome* might be a more illuminating term in many cases, as prompt recognition and diagnosis of the injury will go a long way to prevent the appearance of chronic symptoms."
As mentioned above, the physical demands experienced by musicians have many similarities with those of athletes, so an example with a sport analogy should make things clearer.
Let us suppose that you train yourself for many years running, playing football or any other sport and at a certain point you decide to change sport habits and you want to get your exercise by rowing instead. Of course you regard yourself as fit, so when you get in the boat and start training you push to achieve the same level of exercise you used to get from your daily run. Your performance in the boat probably improves in a gratifying manner over the first few sessions, then suddenly you start to get low back pain and feel discomfort in the middle of the back and one side of the chest. You put this down to the usual muscle discomfort associated with getting fit, but after a couple more sessions you have to admit that you have pulled a muscle connecting the shoulder blade to the ribs and must stop rowing. This and the back pain are technically overuse injuries, but only in the sense that you have exceeded the capabilities of the muscles at their current level of training (Watson, 2009).

Going back to music, this kind of problem can occur in many different situations. The commonest is when a violin player transfers to the viola or vice versa. The difference in size

and weight of these two instruments creates additional strains to which the performer is unaccustomed. A similar relationship exists between the oboe and cor anglais, the latter instrument is slightly larger and heavier, though mainly with the same fingering. The same if we talk about the wide variation between the size and shape of the many members of the clarinet and saxophone family and the strain that transfer from one of these instruments to another can cause is not always taken into account. Spinal scoliosis or rotational twist also causes a problem with the cello since the spine is slightly rotated with the pelvis additionally fixed against the instrument. Although the double bass is a larger, more cumbersome instrument, the player has more freedom of spinal movement so this is less likely to occur (Bird, 2013).

As already said in the introduction, Performance-related musculoskeletal disorders have been defined as symptoms that have a negative impact on the ability to play. A wide range of risk factors is associated with PRMDs. These can be psychosocial, such as anxiety, stress, perfectionism, and/or physical, including playing conditions such as length of rehearsals and performance, insufficient break periods, awkward posture and instrumental technique, poor fitness level and suboptimal injury management.

Gembris and colleagues (2020) highlight the main factors that can affect the body response to musical activity. A first important factor is the kind of instrument played. Each instrument requires a different posture and different part of the body are employed. For example, in violinists the whole upper body is interested, and that is why PRMD is more common in string players. In wind instrument the back and the arms are usually more affected. For pianists the back, arms and fingers are the interested parts. Therefore it is important to know how to improve posture and tensions in the body while performing and especially while practicing.

A second risk factor is the duration of practice, which can vary considerably from instrument to instrument. It is obvious that musicians who practice six to ten hours are more likely to develop pain or discomfort. Brass instrument players, for example, need to stop after few hours because the muscles of the lips and of the mouth in general get too tired/stressed. A further aspect of duration of practice is the number of years an instrument is played, in fact, the prevalence of PRP seems to increase with each year of practice, at least among students who practice intensively.

A third risk factor of importance are practice habits. Sudden changes in practice habits, as showed above in the example with sport analog, can lead to overuse syndrome, but also practice without rest and without warm-up/cool-down is related to an increase in PRP.

As a fourth risk factor, gender differences may also play a role. Generally, in fact, as already said in the previous chapter, female musicians are more frequently affected than male musicians.

Last but not least, it is important to work on the musician's attitude towards health, because there is a tendency to ignore physical problems, not giving them the proper importance, and sometimes to hide them, avoiding talking to someone. Watson (2009) highlight this problem and states that there may be many reasons why players stoically soldier on in the face of pain. First, the outmoded concept of "no pain-no gain" may still hold sway. But as we have noticed, discomfort from exhaustion is one thing (and is probably what the old adage originally referred to), but pain as a result of a bad habit or overexertion leading to tissue damage is quite another. Other reasons why musicians try to ignore pain may be a fear of revealing a physical weakness in a highly competitive profession, or a worry that they may be ordered to

stop playing for a prolonged period or, in limited cases, the fear of the need of a risky intervention such as surgery. It is easier to prevent and to solve a problem when talking to a professional, thus being aware of the problem itself.

2.2. Music Performance Anxiety

Anxiety can be described as a cognitive process in which danger is exaggerated, misperceived, or misinterpreted. Therefore we can state that anxiety is experienced primarily as a result of distorted cognitions that arise from faulty information processing that triggers inappropriate motor, physiological, and affective responses. Like other forms of performance anxiety, including those related to test-taking, public speaking, and writing, MPA is a complex phenomenon with multiple causes encompassing genetics and environmental factors, but also personal experience, thoughts, emotions, and behaviors (Kenny, 2011).
Izard (1993) has attempted an integrative theory of emotion involving four subsystems—neurobiological, motor/behavioural, physiological/motivational, and cognitive. These four systems combine with environmental contingences, learning, and individual characteristics to produce emotional experience. Thus, anxiety is defined as a complex and learned emotion in which fear is combined with other emotions such as anger, shame, guilt, and excitement. This theory suggests that music performance anxiety may form part of a more generalized anxiety disorder, can be related to other more specific anxiety disorders such as social phobia, or can simply be focal and restricted only to the music performance setting.
Although the huge number of researches addressed in this field, it is still not very clear how to evaluate music performance anxiety levels and there are not only few common aspect that can influence its onset. In fact, in the previous chapter it was highlighted that it is totally regular to have a certain level of anxiety and that this can facilitate the performance, but at high levels it becomes debilitating. This type of reaction, as we will see below, also depends a lot on personal factors. This is one of the main reason why it is not easy to mark a line betweeen facilitating and debilitating anxiety.
Evidence suggests that personal and environmental factors are associated with MPA, this shows that anxiety may be caused by internal and external stimuli. Moreover, there is a strong relationship between personality and performance anxiety.
Environmental factors refer to any circumstances surrounding a performance that may have an impact on levels of MPA experienced by the musicians, such as an accompanist arriving late, another musician playing the same repertoire, presence of press in the event or special jury members etc.
Regarding the internal factors, personality traits such as neuroticism, introversion, low self-esteem and perfectionism have been associated with MPA. Also parents and teachers contribute to performance anxiety by placing unrealistic expectations on music students.
Another aspect are the experiences musicians face. Kenny (2011) states that previous experiences, in fact, have the power to alter the subjective appraisal of forthcoming performances: bad experiences may create fear about performing again and if the performance is impaired or is perceived to be impaired, the negative emotions, bad self-evaluation and the fear that follow may increase the anxious apprehension and trigger further alarms, which in turn increase the risk of impaired performance, in a vicious circle until the performance setting itself triggers conditioned alarms, even before the performance has

taken place. On the other side positive experiences may increase the performer's confidence and eventually reduce the amount of anxious apprehension experienced before performances.
Apart from environmental and personal factors, certain situations are known to be more anxietyinducing than others. Cooper and Wills (1989) made interviews where popular musicians reported the following sources of stress: public ignorance, low self-esteem, work overload or under-load, career development worries and relationships at work. A year later, Salmon (1990) suggested that causes accounting for increased anxiety included poor technical skills, rigid performance rituals, inappropriate repertoire, and insufficient or inappropriate practice habits.
Of course those above are a part of the causes of MPA, the list could be wide: not knowing how to manage physical arousal, inadequate support from people close to you, concern about audience reaction, thus fear of negative evaluation, pressure from conductor, section leader or competitive peers etc. At the same time the ways to cope with it are multiple, from Yoga and other similar practices to Behavior Change Techniques (BCT), going through little practice before going on stage such as self talking, breathing excercises, imagery technique. Due to the highly personal nature of MPA, all of these practices do not work the same with all performers and sometimes may not work at all, so it is a good choice to experiment and to find what works better for yourself and, if the level of MPA is too high it is always wise to talk with a specialist.

2.3. What music students can do now

In this chapter I have tried to put together and organize all the advices given to music students by different institutions and music comunities, such us *Healthy Conservatoires*, *The Associated Board of the Royal Schools of Music*, the *Canadian Network for Health in the Arts*, *The University of Nevada Las Vegas*, *BAPAM* (British Association for Performing Arts Medicine) and the *Royal College of Music*. These institutions actively promote health education and also added lectures, classes and other activity in their curricula.
The following advices have the purpose to suggest the musician some good habits to improve their lifestyle in order to ensure a healthy music career, to prevent stress and physical problems, thus to enhance performance quality. The first thing they focus their attention on is a healty lifestyle. In fact, having a balanced lifestyle, not only allows to reduce stress levels, increases concentration and decreases the sense of fatique on the body, it also helps to face the obstacles we can meet everyday with more energies and mental clarity .
Before getting into the different actions students can take, it is always suggested to stay informed. Awareness is the key. Like many health-related issues, prevention is much easier and less expensive than cures. Therefore, it should be a good habit to take time to read available information concerning issues associated with music activity or with the specific instrument played.

2.3.1. Healthy Lifestyle

But what does it mean to be healthy or to have a healthy lifestyle?
When we think of our health it is all too easy to think first on what is unhealthy and, usually, we focus our attention on what is probably far, at that moment, from our personal perception of our health. For example, when we think of wellbeing we focus on illness and injury, on symptoms, statistics, on treatments and tests. But, as Waddell affirms, health is not defined only in these negative terms any more than we define a great performance by a lack of wrong notes. The same concept can be found in WHO's definition of general health contained in its constitution: "Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" (World Health Organization, 2005). To be healthy, in fact, is to be well not only physically but also mentally and socially, allowing us to thrive in our lives and navigate the difficulties we face.
What is possible to do, first as a normal person and then as a musician, to take care of the body is:

- Eat a balanced diet focusing on fruit, vegetables, legumes etc., and drink lots of water. Also the WHO (World Health Organization) suggests a plant-based diet, avoiding saturated fat, processed meat and other substances that are dangerous for the body.
- Aim for at least 30 minutes of mild activity per day, like a brisk walk, and at least 150 minutes of moderate activity (cycling, dancing, football) per week.
- Get plenty of good sleep, at least 6-8 hours per night.

In his study Araùjo (2017) highlight how limited engagement in regular physical activity and low self-rated health suggest that music students' overall health status is poor. This raises some concerns, in particular with regards to how music students' lifestyle and perceptions of health impact on the way they engage with music learning and performance.
In the same study sleep quality of music students was not at the level of clinical disorder, but the overall score was poor when compared with the general population. Sleep has an important restorative function with impact on memory and learning, so it is relevant to monitor sleep quality and quantity since a bad management can lead high level of stress up to burnout, but a good night's sleep may be difficult to achieve for many, due to their busy schedules, late working hours, and constant pressure to excel (Araùjo et al. 2017). It is important to bear in mind that sleep have a strong impact on learning and performance, Harvard experimenters observed subjects with burnout who took afternoon naps as opposed to those who did not. They found that napping stopped or reversed mental deterioration endured during the day. Researchers concluded that sleep consolidates information stored by the brain. This lets the brain "re-open" to learning new material. According to Dr. Palladino, "After a nap, the brain no longer needs burnout to prevent the loss of recently stored information" (Harrell, 2000).

2.3.2. Environment

In a music student's life the environment can significantly influence the arising of stress, anxiety, tentions, physical discomfort and so on. Environmental stressors are probably the first source of health instability and, as said above, one of the sources of MPA. Environmental stressors can be: competitive peers, lack of resources such us counseling services or practice space, overburdened schedules, high standards and expectations set by the institutions etc. Therefore, it is essential to create a supportive environment, not only inside the work space, but also outside, in order to live a life without unnecessary stress and anxieties. Mental health, in fact, is one of the main factors that can lead to not reaching one's goals, leading to a cycle of frustration, misperception of the surrounding environment, anxiety, tensions, up to physical health instability. For a musician this means not to improve skills on the instrument, having practice sessions with no results, then unsatisfying performances.
One of the most widely disseminated definitions of mental health is the one proposed by the World Health Organization (WHO): "a state of wellbeing in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" (World Health Organization, 2005). In order to reach this state it is necessary to take care of different factors that influence multiple aspects of our daily life and that affect our emotions, thus our actions.
Getting right to the point, what are these factors? As said before, wellbeing is not only lack of disorders, injuries or illness, we need to focuse on what is good and positive in life. Researches in the field of wellbeing have generally encompassed two different perspectives: the hedonic and the eudaimonic. For the first wellbeing is generally defined as the optimal balance between positive and negative affect in human experience. For the second perspective wellbeing is achieved through self-actualization and having a meaningful purpose in life. In recent years, researches have highlighted the relevance of re-equating wellbeing as a combination of both hedonic and eudaimonic components (Ascenso, 2018).
Seligman, an American psychologist and educator, in order to reconcile both aspects, developed a Wellbeing Theory also known as PERMA model. Seligman put together five components that represent the core of happiness and wellbeing. He selected these five components because they are intrisically pursued by people and they contribute to wellbeing, they include both hedonic and eudaimonic components and, moreover, they are pursued for their own sake and are defined and measured independently of each other (Seligman, 2012).
These elements componing PERMA are:

Positive emotion: this is not only about simple happiness, it includes compassion, love, joy, hope, gratitude etc. When you explore and integrate positive emotions into daily life you improve habitual thinking and acting.

Engagement: according to Seligman engagement can be described as the moment when you are in "flow". It means that state where you are completely absorbed in an activity, when you lose track of time. Usually people experience this state when they use their character strenghts. Trying to use your strenghts in new activities improve the overall wellbeing level, reducing stress and depression.

Relationships: this refers to positive relationships, refers to feeling loved, valued and supported by others. Relationships includes all interactions people have with friends, partners, family, collegues etc.

Meaning: This is another intrinsic human quality, searching for a sense of value, worth and so meaning. Seligman describes meaning as "belonging and serving something you think is bigger than the *Self*". Having a purpose in life, finding a meaning, can be different for everyone (someone can pursue meaning through a profession, social or political cause, a spiritual or religious belief) but having one helps individuals focus on what is really important when they face any kind of challenge.

Accomplishments/Achievements: the sense of accomplishment comes after working toward and reaching a goal, it is also about having self-motivation to finish what you set out to do. Everyone, after achieving his own goal can look at his life with a sense of pride, this contributes to wellbeing (Seligman, 2012; Madeson, 2022).

There are several actions and habits that a music student can do in order to build these components. Spending time with people you care about, doing activities that you enjoy, reflecting on things you are grateful for and what is going well in your life help to build positive emotions. To feel engaged, it is helpful to participate in (extracurricular) activities where you lose track of time when you do them or learn about your character strengths and do things that you excel at. Spending time in nature, watching, listening, and observing what is going on around you not only increase engagement, but also decreases stress and anxiety levels. Taking care of relationships is another important factor, you can spend more time with people that make you feel loved, you can ask questions of people you don't know well to find out more about them and you might get in touch with people you have not spoken to or connected with in a while. Getting involved in a cause or organization that matters to you, trying new and creative activities to find things you connect with, and even thinking about how you can use your passions to help others are good ways to build meaning. And finally, creative ways to celebrate achievements and reflecting on past successes help give you more of a sense of accomplishment.

Building a positive and supporting environment is probably the foundation to have a good mental and physical health and cannot be isolated from all the other actions that can help musicians have long and healthy careers. In fact, it is easy for students, especially musicians or other types of performers, to neglect their social sphere and all those activities that contribute to maintain and increase quality of life, thus their overall wellbeing and happiness. This is not only due to the tight schedules of classes, labs, projects and exams, but also the practice sessions in total solitude that counteract the natural need for social activity.

2.3.3. Smart Practice

As a musician it is important to make sure that the daily practice sessions, that can last several hours, do not damage the body with incorrect movements, posture, tensions or with overload of work. Good habits in this way can be[6]:

- Warm up before practice and performance, take breaks and cool down afterwards.
As an athlete would not begin a vigorous physical activity without warming up, a musician must warm up carefully before practice or performance.

- Take breaks to stretch and relax. Take short breaks every few minutes and longer breaks each hour. Two or more shorter rehearsals each day are more productive than marathon single sessions. Even in performance, find those opportunities to relax a hand, arm, or embouchure to restore circulation. This helps not to overburden the muscles.

- Pay attention to your body. Pain is the mechanism by which your body tells you that something is wrong. Listen to your body, be mindful of how you are using it while you work, whether sitting with a screen or practising your repertoire. Watch for tension and pain and take steps to reduce them and, if it hurts, stop what you are doing. As mentioned above "no pain, no gain" is a potentially catastrophic philosophy for a musician. Know when enough is enough, and learn to say 'no' to certain performances or lengths of performing that might result in injury.

- Check out your instrument. Does your instrument place undue stress on your body? Is your instrument set up optimally for you to relieve pressure on hands, joints, etc.? Is there a strap, carrier, or stand available to relieve the stress? This is important especially for those musicians who plays different instruments, they are more likely to have physical discomforts and to experience overuse syndrome as mentioned above. Therefore, it could be of great help to find ergonomic solutions to reduce tensions.

- Evaluate other activities. Pains and injuries affecting your music making could be caused by other activities in your daily life. For example computer use is notorious for causing afflictions including carpal tunnel syndrome and tendinitis and this affect music making.

Musicians, like other performers or athletes, push themselves to learn and do things most people only dream of being able to accomplish. The achievement of these goals brings with it a huge amount of work, efforts and sacrifices. Therefore musicians need to take particular care to make sure that they do not overextend themselves at the risk of their mental and physical health. For this purpose I found so helpful the *SMART* approach proposed by Waddell. He suggests to make sure your goals are *SMART*:
Specific: Focus on what exactly you want to accomplish. Having a clear idea of the goal you want to achieve helps in planning the practice session, without being distracted by other factors. Moreover, it is more productive to work on a single problem for a specific period rather than trying to reach several results at once.
Measurable: How will I know that I'm getting closer, or have achieved my goal? Self-analysis is always a good tool, you can create a diary in which you write down all the

6 Source: The Associated Board of the Royal Schools of Music and the Canadian Network for Health in the Arts

excercises you are doing and the results they bring. Of course, improvements must also be monitored by talking to your teacher and colleagues.
Achievable: It is of primary importance to create realistic goals, possible to achieve at your current personal level. Unrealistic goals only create more frustation, stress and fatigue.
Relevant: The goals you choose not only have to be realistic, they also have to be preliminary to the next one. So make sure that short-term goals help to achieve long-term goals
Timely: This is closely related to the previous point. Make sure that your goal is the right one to work towards first, without skipping other steps.

2.4. Health Education

By now, it should be clear that there is a need for appropriate health education and prevention in music schools. Findings of numerous studies point to the need for more, and more efficient, health education and promotion initiatives within music education. According to Araùjo and collegues (2017) the need for psychological health education and intervention from early career stages is urgent and should be considered before health problems arise. In particular, musicians should be better equipped with mental skills to cope with constant pressure to excel and high stress levels. Still according to Araùjo this is because music students' engagement in health responsibility is low and, along with a field that is characterized by high pressure, competitiveness and a limited knowledge of coping strategies and perfectionism tendences, generates an alarming mental health forecast.

Many music schools and other institutions already have included wellness courses in their curriculum as mentioned above (University of North Texas, The University of Nevada Las Vegas, Healthy Conservatoires etc.). The courses are offered to students in all grades and are constructed in such a way to teach health lessons through music so that the lessons are applicable to all occupations.
The first conference for the Health Promotion in Schools of Music (HPSM) Project was held in 2004 at the University of North Texas in response to the National Association of Schools of Music (NASM) directive to include health information in every music curriculum. In 2007 the Music Education National Conference (MENC) published a Health in Music Education Position Statement containing information and guidelines addressed to music schoool teachers in order to promote overall health in music students. The three areas covered in the statement, that music teachers must be aware of and should take precautions, are hearing, physical and psychological health. Regarding the psychological aspect, the risk addressed is performance anxiety. As Dr. Chesky has affirmed at the Music Educators National Conference, prevention and treatment is all in teaching. In fact music teachers are the first source capable of shaping behaviors and influencing attitudes surrounding musical practice: "Music educators are the primary channels for changing how music is taught and played. Music educators need to become substantially involved in prevention by teaching health-conscious music-related practices to students."[7] Just as knowledge of music-related physical

7 *Health In Music Education (Position Statement)*. (2014, May 28). NAfME.

injuries has grown in recent decades, so is awareness of anxiety and stress as they relate to music and music education.
Of course, this cannot be addressed by teachers alone, but there is a need for support from other specialists, especally when musical activity is practiced on a professional level. This is also shown in the results of the study led by Antonini Philippe at Al. (2019) where there are differences between groups of musicians in terms of overall quality of life and general health, so as the physical health dimension, where professional musicians or advanced students scored lower than the amateur musicians. This points out, once again, that while music making carries with it health protective effects, there is a need for health awareness and promotion among advanced music students. This research highlights the importance of involving different actors (not only teachers but also support staff and other professionals) with the aim to facilitate healthy music making. Regarding psychological health this refers to psychologists and counselors in case of problem to a clinical level and performance coaches in order to enhance performance quality and to help dealing with stage fright, anxieties and stress. Likewise, physical care has to be administered by professionals, ensuring postural quality and musculoskeletal health.
But it is important that professionals are specialized in working with musicians, knowing all the peculiar issues, and their causes, that music making can lead. Hughes (2013) points out that although musicians often have a high degree of self-awareness, when a problem occures the physical, emotional and psychological effects can be devastating and they require sensitive and discreet handling. If the medical practitioner is fully aware of the job the musician does, as well as the inner workings of the musical body, a solution can be achieved more effectively.
Although few health education courses have been evaluated to date, The Health Promotion in Schools of Music (HPSM) project recognizes their efficiency and has recommended that health education should be included in core curricula. Matei at al. (2018) led a study in a UK conservatoire of music with the aim to design, implement and evaluate a compulsory health education course. There were significant increases for perceived knowledge of all topics covered in the course: ergonomics and posture, learning and memorizing strategies, effective rehearsing strategies, effective practicing strategies, life skills and behavior change techniques etc. There was a significant increase especially for the awareness of performance factors related to musculoskeletal injuries and knowledge of how to deal with health and safety issues associated with learning and playing a musical instrument.
On the other hand, it must be said that these courses have a limitation, as highlighted by specialists of Performing Arts Medicine (PAM) who have identified numerous health conditions that interfere with musicians' careers and leisure activities. To date, health promotion initiatives have focused and gave attention to education and training for musicians, attempting to help them understand their bodies and convince them to engage in health promoting behaviours. However, such initiatives often focus on isolated bodily systems (e.g. musculoskeletal, vocal or hearing health, or psychological wellness). PAM specialists have started to recognize that effective health promotion initiatives require a new and robust theoretical framework that takes into accounts the interplay among all the different factors that influence musicians' lives. The same concept is formulated by Norton (2020) who states that musicians' behaviors are an important factor to consider in relation with PRPs and that such behaviors should be the target of health promotion interventions.
Above all, it seems pertinent to consider health education as an essential tool to be provided

to young students and professional musicians early in their careers. By including learning and support services related to health and wellbeing in students' timetables we can increase: knowledge, active participation and responsibility for health (Healty Conservatoires, 2020). Moreover, all things considered, providing this tool to musicians not only helps them have long and satisfying careers, but also creates a future generation of knowledgeable and aware educators.

2.5. Conclusion

It is not simple to summarize the causes of playing-related pain and performance anxiety because they both stem from a big variety of factors and they are often connected. That's why most of the time it is not possible to make just a simple list with causes and/or solutions that can be the same for all musicians. It is better, instead, to look at the whole background of the single musician everytime a case of PRMDs or MPA arises.
But on the other hand, as we have seen, musicians can already take action to prevent the arise of issues. This is a big step forward, but it is not enough if there is not support from all the actors involved. We have also seen that the knowledge about Playing-Related Musculoskeletal Disorders (PRMD) and Music Performance Anxiety (MPA) has increased by leaps and bounds and the interest among professionals is growing.
On the other hand, there is a lack of awareness among musicians and a lack of collaboration among all professionals involved in the music and health field. As Araùjo and collegues (2017) state, there is still need to work throughout the system of teaching and making music. Music educators, administrators, and policy makers must play an active role in providing supportive environments where health and wellbeing is considered integral to expert music training.
Moreover, in the last years, researchers and healthcare professionals are highlighting the need to consider health and wellness holistically and not in relation to isolated body systems, emphasising at the same time their interdependence. This not only calls for inter-disciplinary collaboration between Performing Arts Medicine (PAM) and music specialists, but also points out the importance of a theoretical framework that considers the whole person and all the factors that can influence his musical activity (Norton N., 2020).
In conclusion, I find Professor Howard Bird's words about health care for performers and the role of professionals interesting and accurate: "I like to think that the health care of the performer has developed considerably over the last thirty years,although some problems still remain. This remains one of the most challenging areas of occupational health, since both musicians and certainly dancers are athletes, yet there is still sometimes resentment on the part of General Practitioners at apparent outside interference under the auspices of charities such as BAPAM and Dance UK. But overall, I think the last thirty years have brought a much increased awareness of the needs of the performer within the medical profession and with further input from current new initiatives. The future can only look rosier".[8]

8BAPAM. (2013). Interview with Professor Howard Bird. *The Journal of the British Association for Performing Arts Medicine*, *June*(1), 7–9.

3. Research Findings

The questionnaire, addressed to wind instrument players, was completed by a group of 77 students from different conservatoires (mainly Belgium, Italy and Spain) attending a bachelor's or master's degree program.
The questionnaire was divided into three sections, and the same order will be used to analyze and comment the results: *stress management*, *music performance anxiety* and *playing-related pain*.
One of the purposes of this questionnaire was to take a closer look at music students' perception and behavior toward wellbeing, trying to understand where their knowledge is lacking and thus what can be done to fill in the gaps. The reason lies not only in the large number of researches focusing on this aspect of music education and musician's health in general, but it also lies in personal experiences and in a series of conversations with fellow students. The firt reason leads to the need to know more about the current situation of music students, the second one made me realize that there is still a lot of work to be done among students in order to normalize this topic (which, as mentioned in the introductory chapter, is still perceived as taboo for several reasons). Both show how a lot of work still need to be done to give the right tools to prevent, cope with and overcome any kind of problem.

3.1. Results

3.1.1. Stress management

In this first section there were four questions. The first one was "*What is your overall stress level as a student?*" and the second one continued "*What is your stress level related to practice, rehearsal and performance with your instrument?*". In general, overall stress and stress related to music study specifically were found to be consistently high. In the first question (Fig. 1) only 19,5 percent rated his stress as little, very little or N.A. (not applicable), while all others rated it as moderate (33,8%), high (39%) and very high (7,8%). It is interesting to notice that in the second question (Fig. 2) the number of students who rated their stress as litte, very little or N.A. decreased (15,6%) and the number of students who rated it as very high increased slightly (13%), with no change in moderate stress and a slight descrease in high stress (37,7%).
With these first two questions we can observe that more than half of the students rate their stress with high levels and this perception increases when it comes to musical studies and performance. Only a few students report having little or very little stress.
The third question asked to rate how the effectiveness of some practices to relieve

stress. Most of practices were rated with 4 (Fig. 3) (i.e., effective). 'Sleeping 7-8 hours a night' was the the highest scoring practice, followed by 'time with family and friends' and 'exercise'. 'Eating well' had a good rating (mainly 3 and 4) along with 'breathing exercises'. 'Meditation' and 'medical attention' had a different grade distribution with more students rating them as N.A., probably due to a lack of knowledge or experience (as far as meditation is concerned) or simply a lack of need for medical care. In general, the results were high, which means that most of the students know how to cope with stress outside the accademic environment. This is closely related to the fourth question (open-ended question) which asked what factors elevate stress levels. Most of the students feel stressed because of performances (auditions, exames, lessons), others specify that it depends on the context and audience, others feel more stressed because of not enough practice and do not feel well prepared. This is connected with time and overloaded schedules, these two were the most frequent responses. Students need to know how to organize their time, especially when they are overbudened with deadlines, many projects and exams all at the same time. Time management, performance, practice and lack of sleep were the most mentioned factors, followed by unencouraging teachers or poor comunication with professors. Personal factors, such as family, were also cited.

3.1.2. Music Performance Anxiety

This second section explore the different factors that contribute to increase anxiety levels. In these questions students had a series of statements and they had to indicate how much they agree or disagree, with a five point Likert scale (5, strongly agree – 1, strongly disagree).
The first two statements (Fig. 4) help to understand whether students define themselves as anxious subjects or not, both in relation to musical performance and in daily life. In the first *"I suffer from musical performance anxiety"*, 61 percent agreed and strongly agreed, 20.8 percent said they were neutral, and only the rest disagreed or strongly disagreed. In the second statement "*I am an anxious person in my daily life*", students who agree or strongly agree decrease to 38.35 percent, neutral 19.5 percent and the rest (42.15 percent) disagree or strongly disagree. These early data already point out that most students, while not prone to anxiety outside the music context, or during normal academic activities, claim to suffer from music performance anxiety.
The next statement aimed to understand what factors increase the level of anxiety (Fig. 5). Among the most influential factors are the type of performance (audition, exam, etc.) and lack of preparation/lack of sufficient time to be prepared, for which students responded that they agreed or strongly agreed with 88.3 and 81.8 percent respectively. Other factors where most students agreed or strongly agreed, but with a different distribution of responses, are: *a difficult repertoire* (74 percent); *low level of self-confidence* (61 percent); *an intimidating audience* (58.4 percent); *presence of significant others* (54.5 percent). In these factors, students who declared themselves

neutral varied from 7 to 29 percent; the rest disagreed or strongly disagreed. The factors with the highest percentage of disagree or strongly disagree are: *an unfamiliar performance environment* (33.7% with more responses disagreeing and fewer strongly disagreeing); *other musicians with whom I perform* (33.7% with the same number of responses between disagreeing and strongly disagreeing).
It is also interesting to see how performance anxiety is perceived differently by each student also through the following statements. These refer to the time when the student feels the peak of anxiety (Fig. 6). 39 percent said they were neutral one week before the performance while 33.8 percent agreed or strongly agreed that they felt anxious, the rest disagreed. The situation changes one day before the performance, where students who agreed in feeling anxious are 66 percent and the rest divided between neutral and disagree. The highest peak is definitely in the moment before going on stage where 81 percent agreed or strongly agreed. Two other moments when most students suffer from anxiety are during the most complicated piece (74 percent) and during the first piece (68.8 percent).
In the other statements the answers are distributed in a more homogeneous way between those who agree, those who are neutral and those who do not agree. This shows how musical performance anxiety is the set of different factors closely related to the individual (Fig. 7). In statements like '*I fear that I am not good enough as a performer*', '*I am afraid of making mistakes*', '*negative thoughts and worries interfere with my performance*' more than half (around 60 percent) responded by agreeing or strongly agreeing. 85.7 percent agree that during the performance anxiety decreases. With claims like '*I feel out of control*' '*I find it hard to concentrate in front of people*' most have indicate to be neutral or disagree.
With the question about practices to alleviate anxiety you can notice that most students rated most of the practices as little effective or not effective, and practices such us meditation, imagery technique and self talk have been rated as N.A (around 39 percent rated them as effective or very effective). On the other side, practices such as warm up and breathing excercises had more positive responses (Fig. 8).
The section on anxiety closes with an open-ended question asking to list anything, not listed previously, that they do to relieve stress and/or anxiety. It is possible to divide the responses into three groups: in the first group there are students who need to talk with someone to help relieve their anxiety before a performance, which can be a friend, a relative, a teacher or another music student; on the other hand, in the second group, students said that they do not want social interactions before going on stage and they prefere to walk alone, listen to music (“anything but not classical”), watch some videos or even sleep; in the third group there are students who play some passages of the pieces they are about to perform (usually the most difficult passages), someone just goes over the fingering without playing, someone else blows very loudly into the instrument. The rest is a variety of responses, some people smoke a cigarette, some drink coffee, some pray or dance, etc. Some responded that they only think about enjoying music.

3.1.3. Playing-Related Pain

The first question in this last part of the questionnaire is, "*Have you ever experienced pain or discomfort, in any part of the body, while playing?*". Thirty-nine percent answered yes, mentioning also the affected part of the body, mainly neck, shoulders, back, arms and lips. The rest of the students answered no or with pain apparently unrelated to musical activity.
The second question (Fig. 9), "*What do you do when you have pain? And how effective is it?*" gave several options and these are the ratings: the practice that received the highest score, 75.3 percent of students gave 4 and 5, was taking a break; the second most functional, or most used, practice was giving massages, where 53 percent gave a value of 4 or 5. Other options such as 'practice less' and 'stop playing for the entire day,' received lower scores and more students chose the 'I never do it' option. While in 'take medicines' 36.4 percent said they never do it, making it the option with the highest percentage of this response.
The next question (Fig. 10) was "*How often do you have pain in these body parts?*" Here the students who indicated ‘always’ or ‘often’ never exceeded 18 percent, except, as somewhat expected from the baseline research, for the parts involved in wind instruments, namely: 'neck and shoulder area' (42.8%); 'back' (35%); 'lips' (53%). However, the percentage of students who reported having pain a few times or sometimes remains high: 'hands' (63.6%); 'arms' and 'wrists' (49%); 'fingers' (48%); 'head' (44%). 'Lumbar area' and 'legs' are the parts where most students say they never have pain (46.7% and 54.5%, respectively), but there still remains a good portion of students who happen to have pain albeit a few times.
In the last question, "Have you ever spoken to someone about PRP (Playing-Related Pain)? If so, with whom?" about 50 percent answered that they had talked about it at least once. Most talked about it mainly with colleagues and professors, others also with doctors, chiropractor or physical therapist. The rest have never talked about it, and some say they have not had the need to do so.

3.2. Discussion

With the first section of the questionnaire, regarding stress levels and coping strategies, it was immediately apparent how high the general stress levels are and how much these increase when referring to the actual musical activity. Students seem to be able to cope with stress, but this relates only to tools that are not strictly related to academic activity. In fact, getting enough sleep, eating well, and spending time with loved ones help to decrease stress levels in everyday life, but they are not enough when looking at the main causes from which such stress arises and, to be more precise, are not practical tools in a student's daily life. It can be observed that the main causes of stress are lack of time and work overload, both of which automatically take away valuable time to get enough sleep and time for social interactions. The

student feels the need to sacrifice time to meet deadlines, exams, projects, etc. This suggests that students need other tools to cope and manage their stress, and that these tools are effective in counteracting the stress that comes from the different sources reported by students, thus, in addition to lack of time and work overload, also managing stress from the pressure of certain contexts such as auditions, exams and performances of different kinds. This information points out how students need to learn to organize and manage their workload, but also how institutions need to create appropriate curricula that help students thrive and achieve what they are interested in.

Interestingly, stress and anxiety are closely related. The main factors that increase stress levels are the same as those that increase anxiety levels. Lack of time to prepare for a performance thus becomes a crucial factor for the student and, in the run-up to an exam or audition, increases in him a whole series of thoughts and doubts that lead to a drop in self-esteem, another of the main factors that increases anxiety in students. This kind of process leads the student to a drop in performance, probably to unsatisfactory performance and thus to bad experiences. As seen previously (see Causes and Treatment - Music Performance Anxiety) this can turn into a vicious cycle in which the previous negative experience creates false alarmism and begins to affect subsequent experiences (Kenny, 2011). Therefore, it becomes essential to give students the right guidance, tools and advice to make them aware and in control of their thoughts and emotions. In this the teacher's work becomes indispensable, not only in giving the right support, but in making him aware of his own strengths, in not making him feel perpetually judged and also in making him understand that he has with him a support and a guide he can trust. This may seem trivial or obvious, but several students have mentioned unsupportive professors as a cause of stress. Therefore, for a student who is in the period of his life when he is being formed professionally, artistically and also humanly, it becomes essential to have a support figure to guide him in the right direction, otherwise the student is prey to his negative thoughts. This is another factor that increases anxiety levels, in fact more than half of the students agreed with the statement that negative thoughts and other worries interfere with performance.

Another aspect in which the student can be helped is to prepare mentally in the moments before the performance. We often think only of the technical aspect, but it is not the only element that makes a good performance. In fact, once on stage, being 'alone' in front of many or a few people, and perhaps they are there to evaluate the performance, for many musicians a real shock can occur that can result in a total block, stiffening of certain parts of the body, increased heart rate and changes in breathing activity. These signs may occur in part, and for many musicians this kind of anxiety can help them focus and give more, for others it just turns into a bad experience. Every musician deals differently with the moments before going on stage, and often, facing these situations with confidence and serenity is also the result of much experience. But the psychological work to be done to turn bad experiences into tools that work to our advantage is enormous. Nowadays, there are many techniques

for relaxing, increasing concentration, controlling the breath, and generally keeping the mind and body in check before a stressful event which requires a lot of energies. Not many options were included in the questionnaire, but the few that were included, such as meditation, imagery technique or self-talk were rated as N.A., meaning that a large proportion of the students are not familiar with them or have never had a chance to deepen their knowledge and experience about them. The ways in which anxiety arises are numerous, as well as the ways to deal with it. To this end, students must have the opportunity to learn about them to gain experience and find what works best for them.

Regarding the last part of the questionnaire, while we do not have high percentages of students with PRP, these results should not be underestimated. There is, however, a good number of students who experience problems, and this can, of course, not only affect the quality of performance, it can also slow down their course of study, and in more extreme cases, if not given the proper importance, it can cause them to drop out of music, either voluntarily or involuntarily. The biggest concern lies, in my opinion, in the second question. A large proportion of the students said that they take a break or give massages in case pain arises, but in the other options, such as practicing less or not practicing all day, a large proportion of the students said they never do so. This is undoubtedly the result of too rigid thinking in an environment based on competition, high standards and perfectionism, where every day spent without practicing is a day lost, with no improvement or even worsening, in which one loses sight of the goal. But it should be understood that pausing is part of the body's work. Like any kind of sporting activity, or one that requires the use and exertion of certain parts of the body, in case of discomfort or pain, one should stop the activity immediately, because the affected part is exerting itself too much, incorrectly or is already damaged. You will never see a football player training or playing a game with thigh pain, or a volleyball player with wrist pain. That is why it is important to recognize the type of pain, its nature, and the actions that can be taken about it. It is also important to give students the right knowledge about habits that can prevent the onset of pain and actions to take when it occurs. Of course it is not something that the student can do alone, but also here, as well as the psychological aspect, he needs the guidance of the teacher and, possibly, a professional who knows how to respond to the doubts and needs of the musician. In this area, too, there are many resources that musicians have at their disposal to keep the body in good health, to control and release tensions created, and to correct bad habits. Alexander Technique, Body Mapping, Feldenkrais Method, Yoga, Pilates, Shiatsu etc. are just some of the options, and there are many professional musicians who use them. In general, of course, practicing physical activity regularly helps the body stay fit, self-correct and also helps to decrease stress and anxiety levels.

3.3. Conclusion

In conclusion, knowledge about MPA and PRP has made great strides in recent years, and many professionals are working to give musicians the right tools to approach their performing careers in the healthiest way possible. There is much research that shows that so much can already be done and so much more remains to be discovered. Perhaps the biggest wall to overcome is that of students and educational institutions. Both sides often fail to recognize the importance of these aspects of the musician's life. Instead, one must accept the fact that this work requires great commitment not only artistically, but also physically and mentally. The first step is to consider the mind and body as integral parts of musical activity, and as solid foundations in the life and career of every performer. It is important to recognize one's body not as a mere support to the musical instrument, technical skills or artistic potential, but as a primary and central tool in artistic creation. Therefore, it is important to train the mind and body to work with certain rhythms and dynamics, in the same way that one trains instrumental technique or takes care of one's instrument and its mechanics. In this way the musician can reach a state in which performer and performance work as one organic whole.

What can be done is to create an information network, not only to make the topic usable for everyone but to create interest and make all parties involved active, thus, to give the opportunity to deepen and improve knowledge in this field. I believe there are three main stages: knowledge, awareness and action. With the first one we ask questions, open the door to new topics, points of view and understand how something can affect something else, in this way awareness is created. By being aware one can take a closer look at risk factors, gaps that need to be filled or simply the most frequent mistakes and bad habits, in this way one can take action using the knowledge gained and finding new ways to prevent or stem problems that may arise.

This can be done, for example, by creating new courses that aim at not only theoretical but also practical knowledge, involving third parties who may be professionals in various fields, such as psychologists, massage therapists, and doctors who can give useful tools to musicians in order to manage their training in the best possible way. But it is also possible, and would be interesting to explore, to involve other types of performers, such as actors and dancers, who work much more with the body and with different mental mechanisms. These kinds of workshops can lead to an unlocking of many artistic resources and also to the development of new techniques and methodologies that can help the musician deal differently with music study, auditions, performances of various kinds, and music making in general.

If there is anything that this thesis can point out, it is that there is a strong need to shorten the distance between the professionals who care for the health of musicians and the musicians themselves who seem too focused on meeting high standards and perfectionism, and often do not look at the big picture. This is probably the only way to give possibilities for more improvement in this field. In addition, this thesis can be

seen as an introduction or starting point for new research in the field that may involve various students, teachers and other professionals.
Being a performer requires a lot of work with oneself Emotional, psychological, physical, and artistic work, so it is a complex process involving many aspects, and if as musicians we want to fully enjoy our achievements and a long career, we must make everything work in harmony as a whole.

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5. Appendix

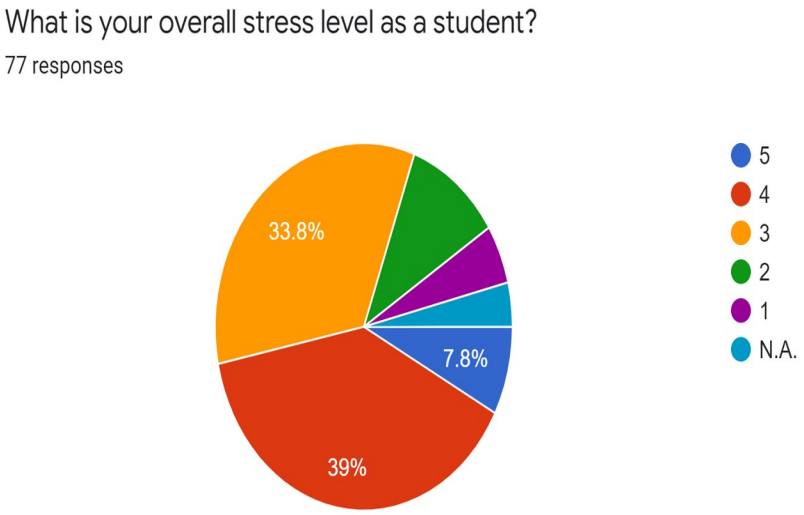

Fig. 1


And what is your stress level related to practice, rehearsal and performance with your instrument?
77 responses
33.8%
11.7%
13%
37.7%
5
4
3
2
1
N.A.

Fig. 2

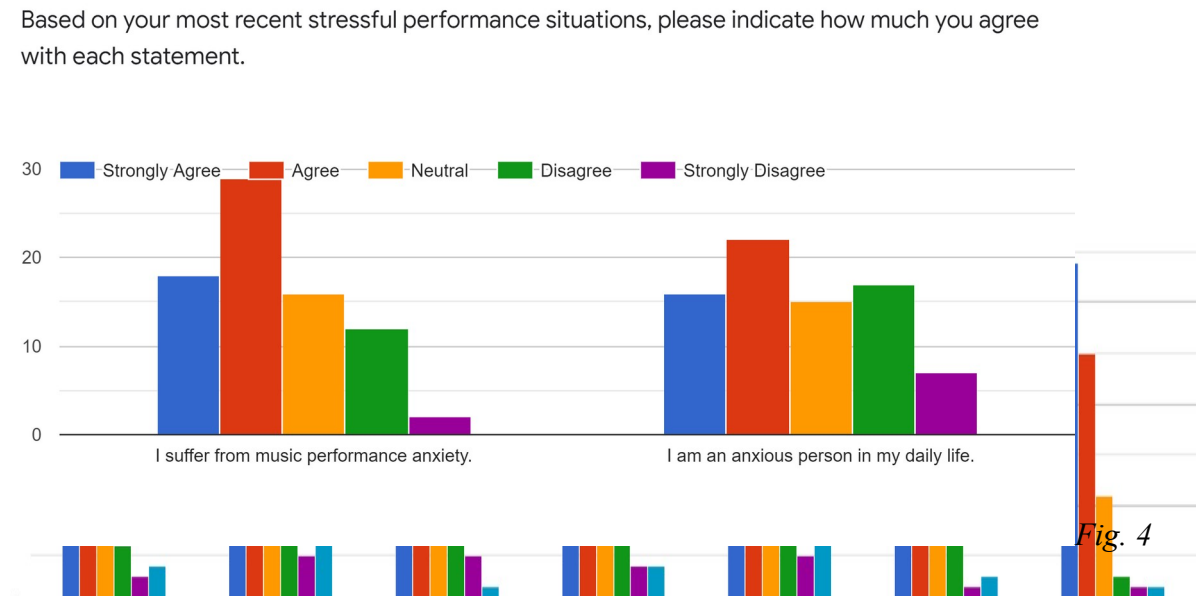
Based on your most recent stressful performance situations, please indicate how much you agree with each statement.
30
20
10
0
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
I suffer from music performance anxiety.
I am an anxious person in my daily life.

Fig. 4

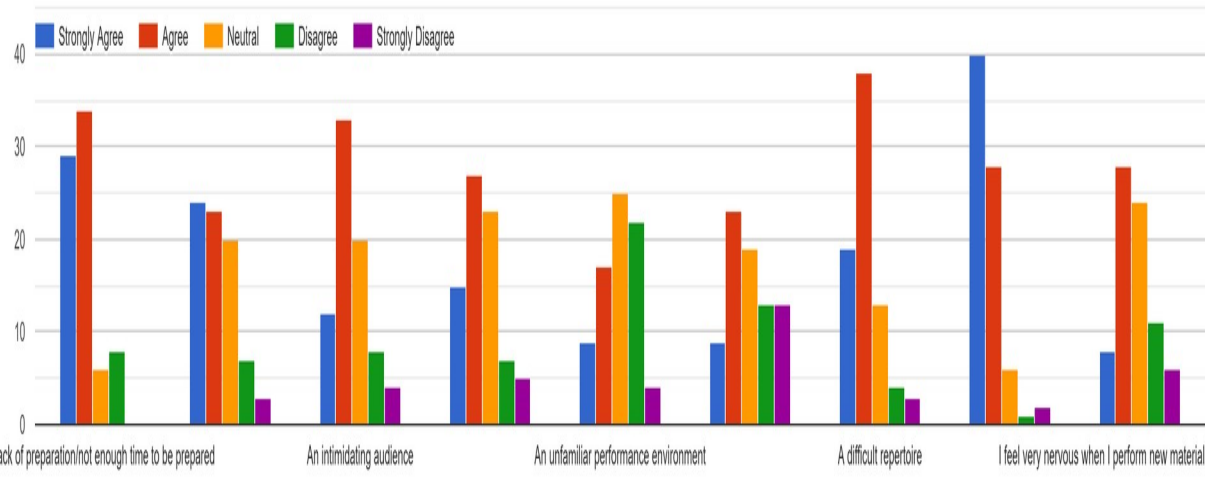
My level of performance anxiety increases significantly due to:
40
30
20
10
0
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
lack of preparation/not enough time to be prepared
An intimidating audience
An unfamiliar performance environment
A difficult repertoire
I feel very nervous when I perform new material

Fig. 5

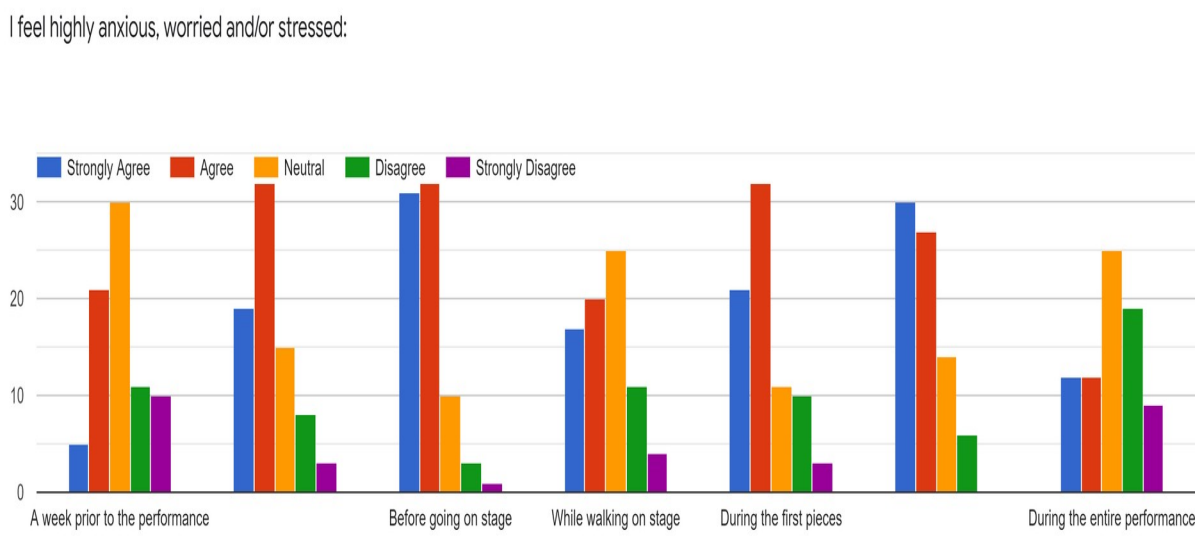
I feel highly anxious, worried and/or stressed:
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
30
20
10
0
A week prior to the performance
Before going on stage
While walking on stage
During the first pieces
During the entire performance

Fig. 6

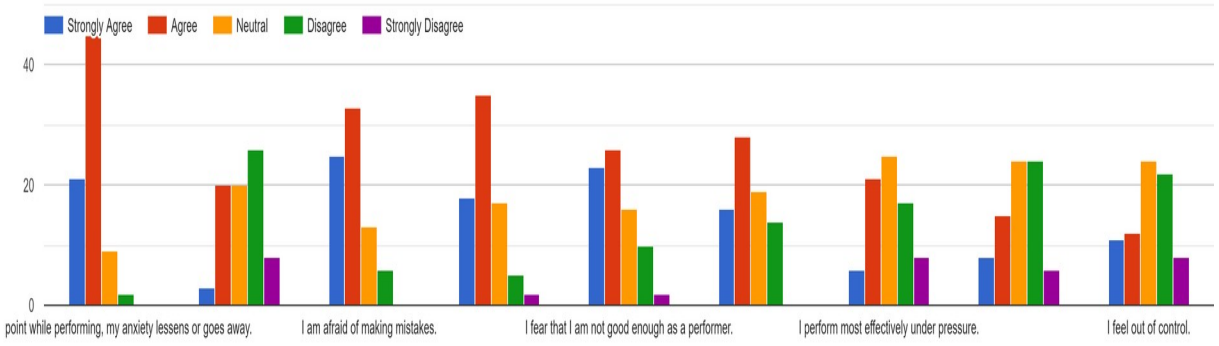
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
40
20
0
point while performing, my anxiety lessens or goes away.
I am afraid of making mistakes.
I fear that I am not good enough as a performer.
I perform most effectively under pressure.
I feel out of control.

Fig. 7

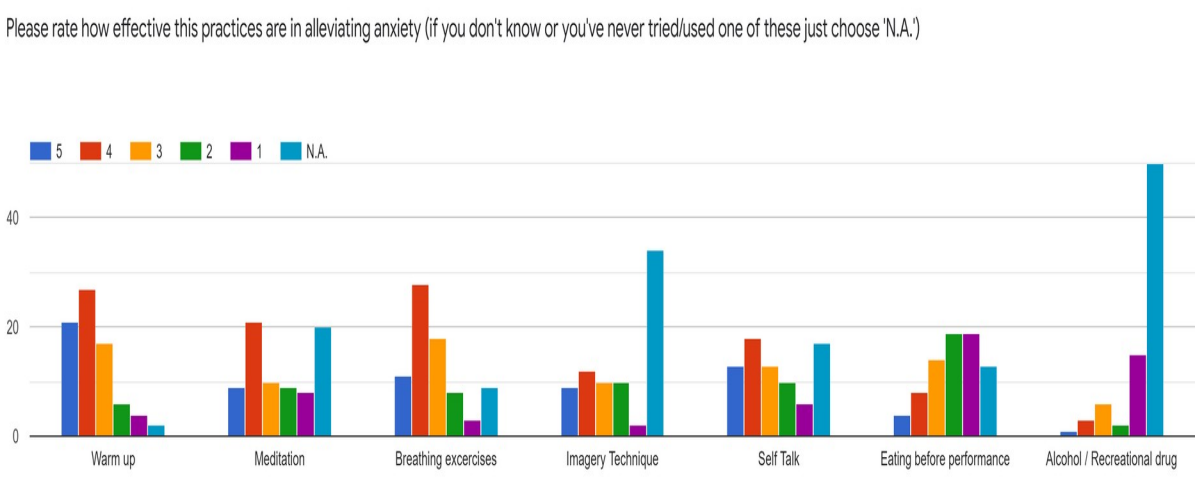
Please rate how effective this practices are in alleviating anxiety (if you don't know or you've never tried/used one of these just choose 'N.A.')
5
4
3
2
1
N.A.
40
20
0
Warm up
Meditation
Breathing excercises
Imagery Technique
Self Talk
Eating before performance
Alcohol / Recreational drug

Fig. 8

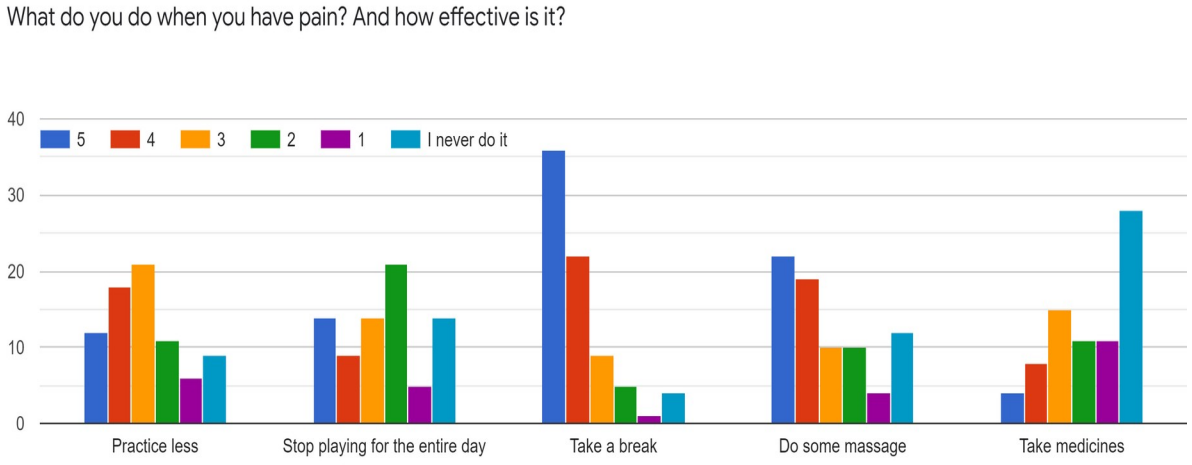
What do you do when you have pain? And how effective is it?
40
30
20
10
0
5
4
3
2
1
I never do it
Practice less
Stop playing for the entire day
Take a break
Do some massage
Take medicines

Fig. 9

How often do you have pain in these body parts?

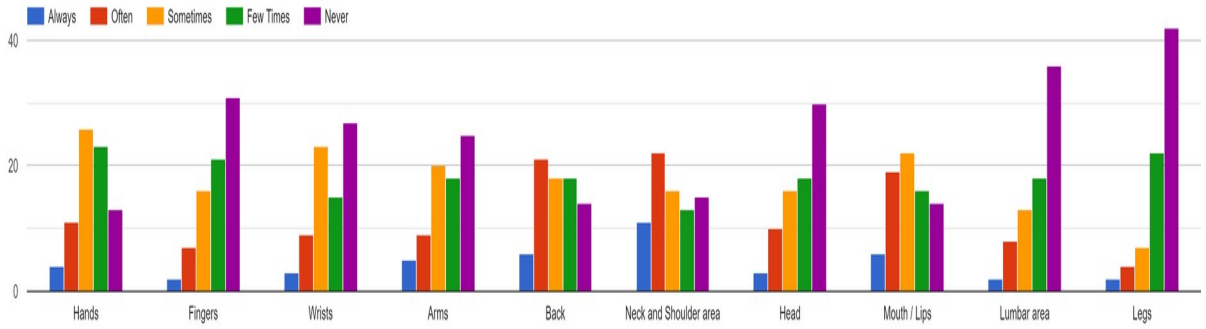

Fig. 10

Abstract - Nederlands

De laatste jaren is de belangstelling voor kwesties in verband met muzikale activiteit sterk toegenomen en hebben veel specialisten op verschillende gebieden belangstelling getoond. Terwijl zij vroeger alleen keken naar het educatieve, pedagogische aspect en de voordelen die het bestuderen en beoefenen van muziek met zich mee kan brengen, zien zij nu, bij nadere beschouwing, de risico's die het nastreven van een professionele carrière met zich mee kan brengen, zowel lichamelijk als psychologisch. Uit onderzoek blijkt dat tussen de 40 en 90 procent van de musici, zowel studenten als professionals, te maken heeft of heeft gehad met problemen als Music Performance Anxiety (MPA), PRMD (Playing-Related Musculoskeletal Disorders) en andere problemen. Dit wordt veroorzaakt door vele factoren, waaronder lange studie- en trainingsuren, een omgeving met veel competitie en hoge eisen, audities en optredens van uiteenlopende aard. In deze dissertatie worden gegevens en bevindingen uit de vele onderzoeken weergegeven, de belangrijkste risicofactoren en technieken en strategieën om deze in te dammen geanalyseerd. Dit met het doel om nieuwe factoren en/of nieuwe strategieën te vinden die tot nu toe niet in overweging zijn genomen.
Wat zijn de belangrijkste factoren die stress, angst en lichamelijke problemen veroorzaken? Welke technieken en activiteiten beoefenen de studenten om met bepaalde problemen om te gaan? Hoe bewust zijn zij zich van hun risico's? Om deze vragen te beantwoorden werd niet alleen de bestaande literatuur geanalyseerd, maar werd ook een vragenlijst verspreid onder studenten blaasinstrumenten, dit om er zeker van te zijn dat het doelpubliek specifiek was en dus vergelijkbare kenmerken had. De vragenlijst was verdeeld in drie delen: het eerste deel over stress, het tweede over "Music Performance Anxiety", en het derde over "Playing-Related Pain". In alle onderdelen wordt gevraagd naar de belangrijkste triggers en de technieken die studenten gebruiken om daarmee om te gaan. Hoewel het onderzoek geen groot aantal studenten betreft, laat het interessante gegevens zien en toont het, in lijn met ander onderzoek, aan dat studenten met veel problemen kampen en vaak niet over de juiste kennis beschikken om daarmee om te gaan.
Bovendien wordt veel belang gehecht aan de rol van leraren en instellingen en hoe zij een primaire rol spelen, niet alleen bij het promoten van dit onderwerp, maar ook bij het actief deelnemen, het creëren van de juiste omgeving voor de professionele groei van studenten en hen de instrumenten en kennis aanreikendie nodig zijn om bepaalde problemen aan te pakken.