UNIVERSITY OF AGDER

Brain Play

Some psychological perspectives in flute performance training

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This master's thesis is carried out as a part of the education at the University of Agder and is therefore approved as a part of this education. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

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Summary

Both the field of psychology and that of neurology can provide important insights into the musical functions of the brain. This thesis aims to provide a pragmatic theory of how to incorporate aspects of these fields into music performance and education in a flute context. It is divided into two parts where Part I focuses on the theoretical methodologies that can be used for this purpose, including neurology, cognitive and social psychology, philosophy and how habits affect our lives. Part II combines the conclusions from Part I into a three-point 'checklist' that aims to provide a practical way of applying the theories to real-life practise, performance and educational settings.

Keywords: Music psychology, music performance, music education, neurology

PART I

1. Introduction

A fair share of students studying music, both performance and education, seem to lack a certain understanding of how our bodily systems allow us to handle musical instruments, and to present an emotional experience to those listening. As performers, our main incentive is to connect with our audience and produce a positive musical experience for them to perceive. As educators, we aspire to convey passion about music to the next generation, teaching children how they in turn can create positive musical experiences for themselves and others. Because of this important role, I have chosen to write a thesis that focus on the underlying psychological and neurological aspects to music making. This thesis will be divided into two parts. In Part I, I will present the idea suggesting that if you, as a performer, are aware of the neurological processes underlying each performed note,[1] and the different psychological disciplines used to describe such phenomena, you may be able to use these in a way that favours your performance, making you more efficient as a conveyor of your musical expression. The psychological disciplines are important as they, through their individual perspective, highlights various important aspects of musicianship. Part II will be devoted to how this knowledge can be utilised in every-day musical activities like practising, performing and teaching.

As the subtitle of this thesis suggests (i.e. '*some psychological perspectives in flute performance training*') I will be focusing on the psychological aspects of music performance and education in a flute context. By evaluating different psychological concepts and their accompanying methodologies, I wish to unveil what contribution they may provide to the pragmatic, musical performer, as well as how they can be used in a teaching situation. My concern is to present a functional methodology enabling the general musician to understand and work *with* the brain rather than against it. A pragmatic approach to this will be presented in Part II. The actual methods that will be discussed in Part I are those of neurology, including cognitive and auditory neuroscience, philosophy, cognitive psychology, psychoanalysis and social psychology. This section will discuss the pros and cons of the different methodologies, and point out directions for future research in the field. In Part II, we

[1] As I am no neurologist and this thesis is intended for musicians without vast previous knowledge of this field, what will be explained here is not as extensive as what you would get from an introductory text on neurology. In this section, I will mainly be focusing on the central nervous system (i.e. the brain and spinal chord) rather than the peripheral nervous system in the rest of the body.

will combine them with three different learning strategies, which will result in a suggestion on how to combine psychology and neurology with music performance and training.

Those whom take interest in reading publications on neurology can soon be left with the feeling of 'so what? This is all well and good, but what do I use it for?' Personally, I believe that psychology and neurology are two of the most important fields to study to a musician because it illustrates how everything we do is related to the activities in the brain. The first section of this thesis will concentrate on different methodologies and disciplines that can be used for conveying both the neurological and the psychological 'message' to musicians. My aim is to give ideas of fields for further research, as well as giving the average musician a different and new way of thinking about their profession.

1.2 Towards a methodology

Instead of writing a chapter on what methodologies have been utilised to produce this thesis, I have made methodology the main concern. I will throughout Part I concentrate on outlining a suitable methodology that can be incorporated into music education and performance. To reach the point where I can present such a methodology, many different disciplines and methods will be discussed in an endeavour to make clear what I perceive to be their strengths and weaknesses in the context of a musician friendly, pragmatic approach. It is evident that each psychological concept relevant for this project cannot be discussed in full detail since they are all extensive subjects with far-reaching traditions. Below I will discuss different psychological concepts in turn focusing on their methodologies, rather than their history. In the theoretical discussion at the end of Part I, I will draw all of these together, focusing on musicological approaches to the concepts discussed throughout this section.

Part II uses the same literature based methodology as Part I; focusing on reviewing and combining other researcher's works, and merging them with my own more experience-based opinions.

2. Neurology

Many scientifically inclined musicians — not to mention musically inclined scientists — would be very interested to know what happens in your brain whilst playing, and to be able to make a recording of it. It is possible to do this through the use of neurology. The main focus of neurology is how different cell types communicate and constitute the essence of who we are, and how they provide the machinery that enables our bodies to function properly. Following is a chapter on the anatomy of the brain, to establish a terminology that can be understood throughout this thesis. It will also include an overview of methods used in neurological studies, as well as examples of how and in what context they are used.

2.1 Neuroanatomy and neurological methods

What make the brain function are all the little cells in the brains called *neurons*. Signals are passed from one neuron to the next at connection points, called *synapses*, through chemical neurotransmitters such as amino acids, dopamine or serotonin. Some synaptic transmission can also be electrical, for example when information must be communicated quickly. Within each neuron, stimuli are transmitted through electro-chemical reactions (Gazzaniga et al., 2013, pp. 27-35). Our most basic behaviour — like breathing, body temperature and heart rate — is being controlled by the *brainstem* located at the very base of the brain and linked to the spinal chord. This means that damage to the brainstem could be life threatening. Right on top of the brainstem perches the *thalamus*. This is a centre that receives almost all sensory information before it continues to the cortical areas that handles them. Another important area of the brain is the *basal ganglia*, situated close to the thalamus in the centre of the brain. It is involved in several vital brain functions like action selection and gating, motor preparation, reward-based learning, timing and more. It is also the area where scientists suspect habitual behaviour originates from. When looking at a brain, the most prominent feature is the folded and wrinkly tissue wrapping it all up: the *cerebral cortex*. In higher mammals and humans, there are many of these Infoldings, whereas in for example a rat, the cortex is relatively smooth. To make the connections easier to understand, the cortex has been divided into distinct regions based on what motor- or sensory system each area is linked to. For example, the *frontal lobe*, situated at the front and only existing in high mammals and humans, is

for cognitive control, planning and execution of movements, while the *parietal lobe*, a bit behind the centre at the top, is involved in coordinating actions and coding space, as well as receiving sensory information about pain, touch and limb position. At the back of the brain lies the *occipital lobe*, which processes visual information, while the *temporal lobe*, just by your ears, process auditory, multimodal and visual information (Gazzaniga et al., 2013, pp. 40-57). It should be noted however, that although these areas are divided and have separate names, all human brains are unique; also, the cortex shows incredible plasticity in that it can reorganise itself to support learning (Tyson et al., 2011, p. 96).

Scientists within neurological sciences have utilised a vast array of different methods and technological equipment to be able to further understand neurological processes. Some of the most common are computed tomography (CT) and magnetic resonance imaging (MRI). Both of these are like a tree-dimensional X-ray, the MRI being of higher-quality resolution especially of the white matter[2] of the brain. Position emission tomography (PET) and functional magnetic resonance imaging (fMRI) are slightly different, as they detect the neurological changes in the brain while the participant is involved in cognitive tasks. These neurological changes are normally fluctuations in the blood flow to different regions of the brain, showing the researchers which brain regions are active during these tasks and test hypotheses about functional anatomy (Gazzaniga et al., 2013, pp. 91-105). There are, of course, positive and negative sides to incorporating these methods into more artistic areas of study. Although there have been done experiments where participants have been scanned while playing an instrument, it is nigh on impossible to create e.g. a concert setting.

A common way of researching certain parts of the brain and what these do in all of the neurosciences, is by studying the given part in a healthy individual and then comparing it to one or more patient with different brain damages. This is called pathology, and has been used since the very beginning of neurology. It is normally not easy to pin-point a specific area of the brain to behaviours or sensory systems, so a natural way to solve this problem was by studying the brains in patients with different neurological damages (Gazzaniga et al., 2013, p. 79). There are many ways

[2] White matter is one of two components of the central nervous system, concerned with coordinating communication between the neurons. It mostly consists of glial cells and myelinated axons, which also provide structural support to the brain. The other component of the central nervous system is the grey matter, consisting of neurons (Gazzaniga et al., 2013, pp. 35-39).

in which a brain can be damaged, but among the most common are vascular disorders, tumours and traumatic brain injury. The most known of the vascular disorders are strokes, which occur when the blood flow to the brain is disrupted. This causes the tissue supported by the affected artery to die, and eventually become absorbed. Clearly, this is not good for cognitive abilities or neurological functions.

Neurological disorders are, of course, not directly related to which psychological methods are suitable for studies in music performance, but they can be interesting from a therapeutic point of view. It is well known that musical therapy after severe brain damage can have an improving effect on the patients. Although music therapy will not be discussed to any length in this paper, it is wise to keep in mind the remarkable effects music can have on the human mind and brain, even after more basic functions like speech or sensory perception is no longer present.

2.2 Cognitive neuroscience

Cognitive neuroscience is an interdisciplinary field that draws on ideas and methodologies from neurology, cognitive psychology, computer science and the neurosciences (Gazzaniga et al., 2013, p. 114). That we do not perceive and act directly in the world, but rather that our perceptions, thoughts, and actions depend on internal transformations or computations (Gazzaniga et al., 2013, p. 74) is one of the most important principles of cognitive psychology, and consequently cognitive neuroscience. In other words, our brains are considered as computers that receive input that goes through certain channels, gets added up and transformed into a coherent message – very much like the binary code of a computer hard-drive. This is an issue that will be discussed further in the chapter on cognitive psychology, but we can ask ourselves if this is the only right way of viewing how our brain works.

As cognitive neuroscience is a branch of neurology, it has a more clinical approach than cognitive psychology. Although the two focus on the same areas of understanding how the brain learns, cognitive psychology focuses on the way objects or ideas are represented in the brain and how these representations are operated, whereas cognitive neuroscience will focus more on what genes and neurons are responsible for what actions (Gazzaniga et al, 2013, p. 78). It is this view we will look at in a bit more detail in this section.

The cognitive neuroscientist will, like the neurologist, use tools like CT scans and fMRIs to investigate the neurological pathways and activities in a human brain. A more recent development has made it possible to record the activities in single neurons. Single-cell recordings are almost always conducted on laboratory animals, but recordings from human brains happens occasionally. What these recordings do, is determining what alterations produce a consistent change in the response rate of an isolated cell. In terms of cognitive neuroscience, this is very interesting as it provides the scientists ways of connecting e.g. artificial intelligence to the cognitive abilities in the human brain (Gazzaniga et al, 2013, p. 95).

Over the last few years, a new branch of neuroscience called social cognitive neurology has appeared. The basis for this field of study is to 'tackle the problem of understanding how brain function supports the cognitive processes underlying social behaviour.' (Gazzaniga et al, 2013, p. 560). In other words, it focuses on the social interactions between humans and its underlying neurological mechanisms. This will be explored further in Part II.

In relation to music, cognitive neuroscience can be interesting in the same way that cognitive psychology can be interesting. Because this field of study is concerned with the way the neurons in our brain physically works together to acquire new knowledge, it should be common knowledge among musicians. As we shall see in Part II, it is possible to include neurological approaches to how we look at our own performance and teaching. It is complicated material, however, and for it to reach musicians at a more general level, literature aimed at musicians should be published.

2.3 Auditory neuroscience

Unlike cognitive neuroscience, which has a more general approach, auditory neuroscience is a branch of neurology focusing directly on auditory processing and perception. The purely scientific view on sound is that it is a pressure wave that proliferates through the air. As Schnupp, Nelken and King points out in their book on auditory neuroscience: 'That is, of course, entirely correct, but it is also somewhat missing the point' (2011, p. 1). What they mean by this is that our auditory system is so complex and refined that disparaging it to simply relating to pressure waves and vibrations would be foolish. Our ears can distinguish a vast number of sounds, and it is a sense it is easy to take for granted until we lose it. Sound is around us

everywhere, all the time, and it constantly provides us with information about the world around us.

As mentioned in the introduction to neurology, auditory neuroscience focuses on auditory processing and perception. This will evidently include maths and physics; after all, how and why sound is transmitted the way it is, seen from a scientific perspective, is deeply rooted in physics. Because of this, many musicians will have difficulties in seeing the relevance to their every-day life and work. Although mathematics and music are closely related, many musicians will most likely not have studied maths extensively and will thus find this to be too complicated to spend a lot of time on. This will be discussed further in chapter 7, which concludes Part I of this thesis.

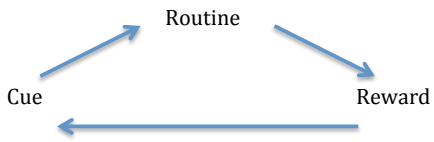
One relevant topic that can be related to this branch of neuroscience is the study of acoustics. This is something that all musicians, regardless of genre, actively seek and use every day. Again, the theory behind this is beyond the scope of this paper, but it is a fascinating field. Although there are a number of publications on this topic, this is another area where we are faced with the problem of it being written for the scientist with musical interests, rather than the musician interested in science, and more concrete literature needs to be devised for the latter group.

3. Habits

Unlike the hard science of neurology, the works of habits are somewhat easier to grasp, although how they come to be in the first place is entirely down to neurological patterns. Habits form who we are and how we act. As musicians, these, often unconscious, patterns can make the difference between a healthy and proficient life in music making, or a vicious circle of ailments, lack of creativity and low self-esteem. Habit learning can be generally defined as 'the acquisition of associations between stimuli and responses.' (Gasbarri et al., 2014, p. 198). To understand how they work, researchers have devised a habit loop to illustrate this. Habits form when our brains learn that we get a reward when doing certain behaviours at a certain cue. This behaviour changes from a conscious action into a habit after a number of repetitions of an identical loop, i.e. the cue-routine-reward loop (see fig. 1). It becomes more and more automatic, and the behaviour moves from the conscious goal-oriented actions of the prefrontal cortex, to the automated and unconscious actions of the basal ganglia

(Duhigg, 2012, p. 15-19). Because of this shift, it is said that habits is no longer reward-based even though they come to be for this reason; they are behaviours triggered by the stimulus without much regard for the rewarding outcome (Gazzaniga et al, 2013, p. 511). The good news is that all habits can be changed, even the bad ones; the bad news is that the 'wiring' for the old habits will never truly disappear from your brain and can resurface if willpower is low, and the newer habits are not strong enough. However, by finding the right small change to focus on, the 'keystone habit' as the researchers in the field call it, we can manage to change and create habits that can help promoting a healthier lifestyle, better social interactions or more efficient work (Duhigg, 2012, p. ixv).

Figure 1



Illustrating the cue-routine-reward loop as based on illustrations in Duhigg (2012).

It is common knowledge that we resort to old, generally bad habits when stressed, tired or otherwise low in willpower. Recent studies, however, show that our *good* habits are just as likely to be followed as the bad habits (Neal et al., 2013, p. 959). In other words, if we make sure to create strong habits that help us reaching our goals, these habits will still kick in when we are low in willpower. It is hard to imagine this not being of use in any profession, and it is no exception for musicians. In our profession, both physical strain injuries and more psychological problems are common. Through understanding how our habits influence how we go through our day-to-day activities, it is tempting to say it is possible to change almost anything. How to incorporate habits into every-day performance and teaching, or rather understanding how they already form these activities, will be one of the main themes of this thesis' Part II.

4. Cognitive psychology

Just as cognitive neuroscience explains the concrete neurological backdrop for forming habits, cognitive psychology can help explain why they appear. This is another aspect that will be debated to a much larger extent in Part II, but first an introduction to the field is necessary. Cognitive psychology has come to be a most popular field of study, attracting attention from scholars and non-scholars from many different disciplines, and one that should be studied more by musicians. Just like cognitive neuroscience, the material is complex and texts aimed specifically at musicians would be essential. As mentioned in the chapter on cognitive neuroscience, the term *cognition* 'describes the acquisition, storage, transformation and use of knowledge' (Matlin, 2009, p. 2). Fascination with the human thought process has been present among philosophers and other theorists since the time of Aristotle and Plato, however, psychology as a discipline did not emerge until the late nineteenth Century, and cognitive psychology not until the mid-1950s. This new interest in the cognitive processes was motivated by the opinion that it was necessary with a new theoretical approach, as well as the increased interest in linguistics, developmental psychology and memory (Matlin, 2009, p. 8). The development of more sophisticated computer and scanning equipment has also contributed as this makes it possible to actually see what is going on in the brain.

One of the first musicologists to seriously undertake the mission of uniting music and psychology was the American Leonard B. Meyer. In 1956, he published what was to become a crucial text on the link between the structure in music and how we perceive it (as either good or bad), titled *Emotion and Meaning in Music.* He came across Claude Shannon's 1948 article 'A Mathematical Theory of Communication' shortly after his 1956 publication, and found many parallels to his own writing (Meyer, 1967, p. 5). It was this article by Shannon that formed the basis of what is now known as Information Theory, which mainly concentrates on the transmission of information. In information theory, the meaning of the message is ignored, the main focus being whether the 1s and 0s of binary code are being transmitted correctly (Savage, 2011, p. 16), similarly to the principles of cognitive neuroscience mentioned above. As a musicologists, Meyer applies this concept to music, arguing that the cadence I-ii-V^7-I in Western art music would be highly predicable to the listener, and the arrival at the tonic would pass without any conscious emotional response. It is thus low on information. Likewise, an unpredictable musical event is high in

information, e.g. if the cadence ended with V^7-VII. In other words, in line with information theory, the music's value increases with the information content.

There are several problems with this approach, although Meyer argues his case well and have a number of interesting and cognisant ideas. One of the major issues is that although Meyer argues that the higher information content, the more value the music possesses, this is not applicable to atonal music. The sheer randomness of this music, argues Meyer, made it impossible to deem it more valuable or of higher information content. Consequently, when dealing with other musics than the Western 'classical' canon, Meyer's theory becomes unsuitable.

In terms of cognitive psychology, Meyer's theories and way of thinking was one of the first to apply the information-processing approach on a big scale. Similarly to information theory, the scientific information-processing approach is based around the idea that (1) mental processes can be compared to the operations of a computer, and (2) that mental processes can be interpreted as information processing through the system in a series of stages, one step at a time. As the cognitive sciences focus on the storage and use of knowledge, it is clear why this has been the prevailing view for many decades. More recently, however, scientists have begun to see the human mind as more flexible and complex than a computer, although the computer allegory is still popular (Matlin, 2009, p. 9-11).

The psychology behind how we learn is to a certain extent already present in prominent learning theories such as those presented by Vygotsky and Piaget. However, their focus on cognitive development will be left for Part II as this section aims at clarifying the theories behind known practice.

4.1 Visual perception and intuition

In the previous chapter on auditory neuroscience, the physics behind how we perceive sound was discussed. Cognitive psychology also focuses on visual perception, and this section will look at visual perception in relation to a musical practice. Particularly for classical or note-based music, the visual aspect is naturally important. Many researches in this field of study ask themselves 'how do we obtain any meaning from a selection of dots and dashes on a piece of paper?'. Although an answer to this will not be attempted in this thesis, we will look at a few pointers as to how it might be possible.

In general, perception is an incredibly complex skill. For example, scientists can create a machine that beats a human chess master, but it has not been possible to create a machine that will beat the visual skills of a child (Matlin, 2009, p. 33). The reason for this is, of course, that perception uses previously gathered knowledge and information to interpret the stimuli that has been registered by the senses. This is part of the cognitive development that will be looked at in greater detail in Part II. For musicians, it is the recognition of structures and patterns that are the most prominent features. This involves cognitive skills just as much as it is visual perception, in the way that the written music is a new language to learn. When this language is established in the musician's mind, the sometimes large discrepancies in typesetting or handwriting does not affect the understanding. Comparing music and language, however, is a disputed but extensive field of study, and we will come back to this both in the chapter on semiotics and in the theoretical discussion towards the end of Part I.

Intuition, or intuitive thinking, is very similar to perception: It is effortless and rapid, in contrast to deliberate thinking, which is critical, analytic and reasoning-like (Myers, 2002, p. 1). Much of our intuition is based on visual cues,[3] and guides us through many life events without having to consciously consider our reaction. Thus, it is also closely related to the automated behaviour we see when studying habits. Through experiments, scientists have shown that humans decide whether they like or dislike a thing or another person within a quarter of a second, based on spontaneous recognition of learnt responses to facial expressions or other more complex contextual cues. Ultimately, intuition is principally very advanced pattern recognition (Myers, 2010, pp. 372-373). It is often crucial in creative work as it can guide you to judge how, through previous experience, an audience will react to a performance or a specific type of art. However, as humans have a tendency to overestimate their own control over situations, it would be wise to not rely too heavily on pure intuition in daily musical activity.

[3] Auditory cues are also prominent in intuitive actions, but I chose not to take those into consideration as this chapter focuses on visual perception in relation to music.

5. Philosophy

Due to the sheer vastness of philosophy as a field of study, it will not be possible to discuss everything in great detail, but this section will rather look at a few general views that are the closest linked to musical perception. The musicological aspects to these philosophical views will be reserved for the theoretical discussion at the end of Part I however, as including it to any extent in this chapter would obscure the links between the theories. Some of the theories that will be discussed are structuralism, deconstructionism, hermeneutics and phenomenology, and Foucault's writings on the relationship between power and knowledge. As can be seen below, semiotics has been given its own section. This is because it touches on a vast amount of issues related to musicology, both positive and negative sides to this interdisciplinary practice, which will be discussed at the end of that section.

Many philosophical theories up through the ages have centred around the idea that identity and memory are inextricably intertwined (Dooley & Kavanagh, 2007, p. viii). Traditional thinkers like Plato and Hegel are famous for their ideas and theories on this, but other more modern philosophers like Kierkegaard, Nietzche and Derrida were also concerned with this, although from a different perspective. Let us begin with a look at a few of the ground-breaking philosophical trends in the nineteenth Century.

Structuralism was originally a linguistic theory, looking at the relationship between the signifier and the signified in any language as a whole rather than focusing on the details in an individual language. This theory was reinvented in the 1950s and 60s to be applied to all aspects of culture and society. Two of the main ideas that the structuralists held were that binary oppositions[4] dominated all human relationships, and that humans are not free to think anything outside the rules of their language as the structure of language is the dominant force (Fillingham, 1993, p. 92-95). In others words, your ability to communicate in a language determines to what extent you are able to live your life.

Deconstructionism approaches subjects from a somewhat different angle than structuralism by how it denies the possibility of a pure presence in any aspect of our lives. It emerged in the 1960s and is a semiotic philosophy (Merriam-Webster, 2014), thus mostly concerned with the role of language. Somewhat unfair, the

[4] For example up/down, good/bad, male/female.

deconstructionists have got a reputation of attempting to ruin our values and traditions, like the appreciation of time, language, and the society around us. They argue, however that in order to keep our traditions and ideals, we need to question everything and be ruthlessly critical of everything. Rather than simply accepting our past, we need to continuously confirm it and keep it alive in order to take the risks of the future (Dooley & Kavanagh, 2007, p. 18).

Hermeneutics as we know it today is a philosophical linguistic theory that concerns itself with the questions of how to communicate what we read and write (Ramberg & Gjesdal, 2013). The field of hermeneutics stretches all the way back to ancient Greece, and was a crucial branch of Biblical studies in the Renaissance and the Middle Ages; particularly during the Reformation when attempting to challenge the Catholic's reading of the Bible. From the early nineteenth Century onwards, hermeneutics gradually changed and expanded into how meaning could be comprehended and which methods to use that would permit an objective understanding of any kind of texts or utterances (Warnke, 1987, p. 2). Another philosophical school that emerged from the political and philosophical climate in Europe just before World War I was phenomenology. This is a school that, as opposed to e.g. hermeneutics, focused on the subjectivity in the world and sought to avoid every unjustified construction. In other words, we understand the world from our own perceptions and experiences, and our consciousness lives with these objects rather than in its own enclosed and locked up world of representations (Gadamer, 1976, p. 131).

Michel Foucault was one of the most prominent thinkers in the mid-twentieth Century, in a vast array of fields. He was an intellectual who studied at several of the most prestigious universities in Paris, initially most interested in history. While preparing for the entry exam to the École Normale Supérieure in Paris in the mid-1940s, Foucault became aware of the history of philosophy, and the dynamic relationship between philosophy and history, something that would become a significant part of his intellectual enterprises (Horrocks & Jevtic, 2009, p. 10). His interests were in the examination of the reason behind the historical effects, its limits and what price it takes. However, Foucault is a man of many places, and his theories can be demanding to apply to other fields than their original intent as depending on which of his arguments you focus on, you enter into quite different disciplines. On the other hand, what Foucault does bring to mind is how society is constructed,

maintained and controlled through the balancing of power-relations. In terms of musicology, it is this side of Foucault that is the most interesting and practical to further musicological arguments within the social perspective. Although this is an extremely interesting topic, it could be the subject of an entire thesis in itself. Because of that, this thesis will be focusing on literature based empirical studies, rather than the theoretical and philosophical approach of Focualt, and his theories will not be discussed further.

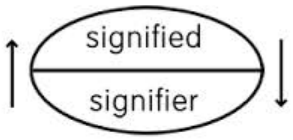
5.1 Semiotics

Semiotics, or the study and theory of signs, is traditionally divided into three fields: Semantics (the study of meaning), syntax (the study of structure, both the grammatical surface structure as well as the deeper structure) and pragmatics (extra-linguistic purposes and communications) (Lyon, 2005, p. 864). These are all evidently based on linguistics, however they have been applied to music by many thinkers previously. Semiotics must not be confused with hermeneutics, although at first sight it might look similar, as it indeed is. As with hermeneutics, semiotics have their first precursors in ancient Greece, where Plato and Aristotle pondered the origins and studied the functioning of sing systems in language (Cobley & Jansz, 2010, p. 4). The topic of semiotics has been put in its own section because of the relevance it bears to music through the links to language. Some of the problems with this link will be discussed at a later point, nevertheless, there is a strong relationship between the interpreted signs in language and considering music as a pattern of non-verbal signs.

Semiotics as we know it was first introduced by Ferdinand de Saussure in 1906 when he held a course in general linguistics at the University of Geneva (Cobley & Jansz, 2010, p. 8). Although he had never undertaken a subject like this before, Saussure provided a new way to think about linguistic signs, and was the first to introduce the way that is now common to think about semiotics; the signifier and the signified on each side. The *signifier* is wholly materialistic whereas the *signified* is the mental concept that comes to mind. As an example we can use the word “cat”. This sign is made up of the phonemes (or individual sounds) /c/, /a/ and /t/. These phonemes make up the signifier “cat” as they are physical sounds. However, the signified (or the mental concept) that is created by the hearer is not the *real* cat, but rather a general mental concept of “catness” (Cobley & Jansz, 2010, p. 11). As this is

highly subjective, all signifiers will produce slightly different signifieds in each individual. To elaborate on the cat-example: Most people will probably associate "cat" with a feline quadruped, while you once had a much-loved cat with only three legs due to an accident and thus the image of this animal appears in you mind when someone offers the signifier "cat". Saussure introduced the concept of the signifier and the signified existed in a two-way entity, with none being able to exist without the other:

Figure 2



Illustrating the co-dependant relationship between signifier and signified, as defined by Ferdinand de Sassure.

This figure shows that the two are indeed inseparable, however, this is only because we live in a society with set linguistic, and conversely semiotic, rules. In other words, the signifier only cause the signified because there is a conventional social relationship there. Social semiotics goes deeper into the issue of the consequences of this social relationship. While still concerned with the signs of language, scholars of social semiotics are also interested in the multimodality of e.g. opera, film or other interdisciplinary fields. Nevertheless, there has been some criticism that even though social semiotics' professed aim is to move away from the use of language as the main model, this is still widely in use. This causes problems when trying to study the relationship between signified and signifier and understanding the specific role of language in multimodal texts (McDonald, 2013, p. 318).

Although music and language are very similar in many ways, there are also a number of differences, which can make applying linguistic theories to musicology complicated. Written language, the neutral, clinical words, has the same function that each detached note on a piece of manuscript paper has. To be able to get some sort of understanding out of the written music, you will need to have had a basic musical education in the same way that an understanding of the language in question is necessary to read the words. However, it gets more complicated with spoken language in contrast to performed music. Again, if the focus is on the meaning of the actual

words, the contrast to music is striking, as there is no directly understood meaning in music. Some view music to be entirely connotative, relying in entirety on context for its signification. A single note cannot have any signification in itself, since no 'literal' meaning can be attributed to musical terms (Monelle, 1992, p. 15). Despite this, music is often seen as a universal language that everyone understands regardless of nationality or ethnicity, while the spoken word only reaches the people proficient in that language. On the other hand, to convey the emotion behind a spoken message, the intonation and body language of the speaker supports and reinforces the intention. This is the same as in music, where the colour of the sound, the varying pitches and body language of the performer conveys the emotions of the piece. It is because of this duality that the relationship between music and language is somewhat unclear: On the one hand it relates to the same principles of conveying emotions, on the other, they convey them on relatively different terms and in different ways.

6. Social psychology

Since the first outset of what we now know as psychology, the field has developed and expanded to include concepts and ideas the original psychologists would only dream of. Psychology in general is often defined as the science of mind and behaviour, as previously mentioned and emphasised in the chapter on cognitive psychology. Social psychology, the next branch to be considered, questions and challenges many of the beliefs in mainstream psychology, and it covers people's interpersonal and group behaviours (Tyson, Jones & Elcock, 2011, p. 9).

Because of the diversity of modern psychology, a new definition of the term was proposed by Tyson, Jones and Elcock: 'The systematic study of mental life and behaviour' (2011, p. 5). When considering areas like social psychology, it quickly becomes evident that this definition is more suitable. Generally, there seems to be a bias to the scientific method within research in all areas of psychology. While this is not necessarily a bad thing, it is essential to understand that *psychology is inherently a subjective field*. The process of the scientific method begins with an observation of a phenomenon. From this, the scientists (or psychologists) can make a hypothesis to explain the observation and/or make predictions drawn from it. The next step is to design experiments which test the hypothesis. These experiments cannot prove if the

hypothesis is true or not, rather, they can support it. Experiments can also be used to disprove a hypothesis, indicating how an idea must be modified. By repeating this process again and again, the scientific method gives understanding to the world (Gazzaniga et al., 2013, p. 73).

In psychology, it is difficult to exert the control of the experiment that is needed for a true scientific method, as the participants in the experiments in the vast majority of the cases are people. Also, the executor of the experiment will have their preconceived biases and values, and this is often evident in either the results or the way the experiment is conducted, or both. Much of the debated research methods are especially connected to psychological research reports from racial and gender studies. One example of this could be that the psychologists studying these topics were white, Western, middle class men, who might have their inherent bias towards a Western culture as the norm, and the male mind as the superior. These views and attitudes were then drawn into the research, often unintentionally, colouring the results with the supposedly objective researchers personal views (Tyson et al., 2011, p. 12-15).

6.1 Nature versus nurture

One of the longest running discussions in social psychology is the nature vs. nurture debate. The concerns in this debate are whether our actions and behaviour is predetermined by our genetic inheritance, or nature, or if it is the environment in which we develop, or nurture, that determines this (Tyson et al., 2011, p. 87). As this discussion is central in many aspects of psychology, and certainly very vital in our development as musicians, some time will be spent going deeper into this issue.

This debate has, as mentioned above, run longer than our notion of psychology and is in essence linked to political disagreements about human nature. On the one hand are the people believing that only our genes, or our *genotype*, can decide how we develop into a particular set of traits, scientifically termed the *phenotype*. On the other hand we have the people who believes that our external environment while growing up determines who we develop into. As Tyson et al. puts it: 'The nature-nurture debate can be seen as asking how directly the genotype determines the phenotype' (2011, p. 90). A common form of study to determine this are various twin-studies. In some of these studies, psychologists look at pre-determined similarities between identical twins growing up together and non-identical

twins growing up together. As identical twins have the same genotype as each other, while non-identical twins have no more similarities than any other sibling, supporters of the nature side of the debate would ascribe any increased similarity between the identical twins to genetic factors. However, although the twins were raised together does not necessarily mean that their environment was as identical as their genotype. The environment affects the organism all through its life, from the point of conception when the genotype is fixed and cannot be altered (Tyson et al., 2011, pp. 87-102). In other words, even though the identical twins have the same genotype there have always been differences between them; from how they were positioned in their mother's womb to who were the most affected by e.g. noise later in life.

The modern view to this debate is that genetic inheritance and environment interact in shaping an organism. Nevertheless, the debate is far from over and each side still has strong arguments. For musicians, this debate will always be a large part of life: Is there something as a genetically predisposed ultimate musician, or is it all due to the environment whilst growing up? At this point it would be natural to go on to music education; that, however, will be discussed to some extent in Part II of this thesis. Still, it is important to note that all human beings are born with a certain degree of musical ability. It would be tempting to say that some children show more musical ability than others: While this to some extent might be true, it is more likely due to the child's socio-cultural background and difference in personality traits, like determinism and concentration, than a specifically 'musical' gene (Woody, 2013, pp. 17-21).

6.2 Reflection on psychoanalysis

Although definitely its own psychological tradition, psychoanalysis will be included as a sub-chapter to social psychology in this thesis. This is because of the approach of the thesis: The aim is to provide a practical way of utilising psychology in performance related activities, and though psychoanalysis in its traditional sense is not entirely serviceable in this sense, when viewed from a social psychological and socio-cultural standpoint, it does. Psychoanalysis as we know it today was first conceived by the Austrian physician Sigmund Freud in the late 1890s. In generalised terms, it is a theory of how the human mind works and a therapy for mental distress (Ward & Zarate, 2011, p. 3).

For Freud, psychoanalysis was a therapeutic method for the relief of mental illness, a 'talking cure' to unravel the unconscious and thus get rid of the unwanted psychic contents that had made their way into the patient's mind (Ward & Zarate, 2011, p. 76). In a more direct sense it is about unpicking something that has been tied up. There are several reasons for the overt focus on sexuality; one of them was that Freud believed the human race to be obsessed with sex. From this, he argued that all humans at every stage of their life have a form of sexuality. Because we experience a vast transformation in our sexuality as we go from children to young adults, many of the aspects that were familiar when we were younger suddenly acquire a different meaning and become very confusing (Ward & Zarate, 2011, pp. 44-45). Some people also have further residual problems after a suppressed trauma; this added up could lead to severe mental illness.

Freud had pointed ideas about artists, claiming that they are introvert and prone to neuroses. Although this has been somewhat disregarded over the years, research shows that there are differences in personality traits between musicians and non-musicians, but this has mostly to do with self-confidence and the ability to open up to other people (Woody, 2013, p. 23-24). When linking this to social psychology, what strikes us is that Freud's thoughts of personal development is an interesting thought to draw into research on musical personalities. This will be discussed further in the theoretical discussion to follow.

7. Theoretical discussion

In this section, the different methodologies will be discussed from a musicological point of view. Links between them will also be elucidated, as well as looking at how well, or not well, they are suited for incorporating into studies of music performance. The first to be discussed are the neurosciences.

The biology of the mind is fascinating. As seen in the chapter on neurology, the human brain is a huge success, and to understand only a fraction of how this organ works is mind-blowing. However, many musicians are not overly interested in biology or the other 'scientific' subjects. This is said knowing the danger of generalising, after all I myself am a musician as well as being interested in how our brain functions, and there are many like me. This being taken into account, today's literature on neuroscience and neurology is often very complicated and written for

students or professionals studying neurology, and it might lose its relevance to musicians in its level of details. On the other hand, there are lots of information in this literature that could be important for musicians in their every-day life, and especially if working in fields like music therapy or music education. In for example learning and performing new skills, our brain develops or adapts to behaviours that part of the brain was previously not concerned with. What is needed is a more pragmatic re-writing of some of the existing literature, with specific key points aimed at musicians. This is perhaps particularly evident in auditory neuroscience. Cognitive neuroscience is after all closely linked to cognitive psychology, which again is somewhat easier to grasp than the physics of auditory neuroscience. Again, where it is the cognitive branch of neuroscience that would be the most helpful for e.g. music therapists, knowledge of auditory neuroscience would be immensely helpful for not only music producers and sound engineers, but also for performers interested in knowing more about how the sound affects the audience, and how acoustics can help you in creating the desired atmosphere to the performance.

Habits are a massive part of our daily lives. It was found by a Duke University researcher in 2006 that of all the actions people perform every day, as much as 40% were not actual decisions, but habits (quoted in Duhigg, 2012, p. xvi). This can be anything from which shoe we tie first, what route we drive to work to what the first thing we do when we get in to a practice room. As mentioned in the chapter on habits, understanding how they work can help change almost anything. If you spot the habit loop of your inefficient practice routine, e.g. not following the practice plan because 'I only cheat myself, after all', it is possible to make one small change (leaving the phone in the bag so not to be distracted, have more ensemble rehearsals, or write the plan down so it is possible to check things off when they have been accomplished) which might be what it takes to make the practice session more efficient and constructive. If realising that your student is getting caught up in a bad habit (e.g. posture, technique, how they produce sound on the instrument), it is possible to help them creating good habits to override the bad ones.

Philosophy was another extensive section in this part of the thesis. The reason for including it was as follows: Any form of art is fundamentally subjective, thus being able to give reasons for why certain aspects of the piece is done in a certain way justifies having basic knowledge of some of the most prominent philosophical trends through history. Looking at the history of music through the eyes of a philosopher is

truly intriguing, even though the many different schools and theories will understandably give different results. Though for many musicologists, this is what makes it so interesting! Were the constructionists or the deconstructionists closest to the truth? Or was Foucault right about how power-relations shape society? And how are all of these ideas applicable to music? That is the wonderful thing about philosophy, after reading about the different views, in the end it is up to you to choose the one, or a combination of more, that best suits your understanding of the world. There are several publications on the philosophy of music, many of them draws on diverse forms of philosophy. The problem, however, is that these often go too deeply into the material, making it impenetrable and a feeling of not being relevant for in an every-day musical setting.

Cognitive psychology is in many ways at the core of what musicians do: The cognitive centres in our brain easily adapt to new ways of thinking and develop new kinetic behaviours, and this is after all essentially what expert music making is about. In comparing the brain to a computer, however, much of the unique about creativity disappears, which is one of the key points to musical activity. Many psychologists and theorists have attempted to give a definition to creativity, and give different approaches to working with it. Although most theorists agree that to be creative, you need to find solutions that are original, useful and of high quality, there are disagreements as to how a person can actually be creative (Matlin, 2009, pp. 385-389). There has been done much research on the topic of creativity, and it is generally seen as an extension on problem solving. On the other hand, a musician based in improvisatory music might strongly argue that creativity is not problem solving, it is simply letting go of whatever inhibitions or restraints you might have. In the view of this paper, we will need to be able to see both sides. Personally, I believe that cognitive psychology, as a field of study, should be included to a greater extent in the education of young musicians. There are many topics and debates featured in cognitive psychology that are both relevant and should be considered important to musicians, like the theories on creativity and how we perceive objects around us. Like the neuroscience it is closely linked to, however, it easily gets complicated and too scientific for direct application and it would need literature directly intended for musicians and the study of music performance.

Social psychology is an entirely different matter. Unlike most of the other branches of psychology, it rejects the scientific method as the most suitable way to

investigate phenomena, making it in many ways more accessible to people without any psychological or scientific background (Tyson et al., 2011, p. 12). The idea that society shapes psychology equally to psychology shaping its host society is a relatively easy one to grasp, and can be applied to all aspects of life. The music you perform is influenced by the socio-cultural context, the audience or the specific location of the performance. Equally, you can influence your audience or the society you perform to in choosing unusual repertoire, or give a recital in an unusual place or setting. Examples of this can be a concert with a symphony orchestra on a factory floor, a brass ensemble at a shopping centre or a jazz group transcribing famous classical works, like Duke Ellington did with his 'jazzed up' version of the Peer Gynt-suite.

How you as a performer can affect your audience is of course common knowledge — it is after all what we live for! There are nevertheless many ways in which to do this, and psychological knowledge will in most cases aid your efforts. One example of this is how well your chosen repertoire is received in an audience. We shall now go back to Leonard B. Meyer's theory of musical emotion and meaning, but seen in a social psychological context. In all aspects of life, humans inherently dislike high information stimuli, or in other words surprises. Like Meyer rejected the atonal and arbitrary music appearing during the twentieth Century, the human mind does not like encountering unfamiliar events. From an evolutionary point of view, any animal that could expect what the outcome of any given situation would be, would have a much better chance at surviving. Because of this fundamental need to react (or one could even say overreact) to surprises, musicians, and particularly composers, are able to create musical passages that result in remarkably strong emotional responses in the listeners (Huron, 2011, p. 6). What each individual listener expects or not, beyond the intrinsic need for survival, evidently depends on their previous experiences, as well as where and how they were brought up (Woody, 2013, p. 46). In other words, the psychology of how we as performers and the audience react to a performance is a fine combination of culture, society, neural activities and previous experiences. This is why I believe that psychological knowledge and understanding is essential to make musical performance as emotionally proficient and touching as possible.

This would be a good place to end the theoretical section of this thesis, however, there are some aspects to psychoanalysis that still needs to be addressed. As

mentioned in the section on psychoanalysis, Freud had solid ideas about the mental health situation of artists. Because of the choice to view psychoanalysis through a social psychological lens, I will link this to what has later become known as the 'musicians temperament'. Often, musicians are introvert,[5] but they still have a positive and strong enough self-concept[6] to expose themselves to such a degree as standing up and performing actually is (Woody, 2013, pp. 34-42). As we already saw in chapter 6.2, we can conclude that in its classical term it is unlikely to be of direct use to a musician's performing activities. It is when we challenge the traditional views and apply new opinions to old theories that we can gain a different understanding of how our minds work. Through combining psychoanalysis to social psychology, it can in some cases provide a different way of thinking about some aspects of psychology and why we react to certain situations or activities the way we do.

7.1 Summary of Part I

In this part of the thesis, I have evaluated a number of psychological methodologies for studies in music performance. Not only psychology has been discussed; in addition we have touched on neurology and philosophy. From this, several conclusions can be made. The first is that social psychology is, of the ones mentioned in this paper, perhaps the best suited for making musicians aware of the underlying psychological factors in music making. The second is that cognitive neuroscience and cognitive psychology are both fascinating and to a great extent relevant, but are often too complicated in their focus on details to be of much use without substantial re-writing of the literature. The first is perhaps the most evident, but my personal opinion is that studying neuroscience and cognitive psychology from the viewpoint of social psychology written specifically for musicians would be the best option. Our brain activity, our culture and our biological senses should all be viewed in relation to each other, and as music is such a universal form of art, all of this needs to be considered when proposing a psychological way to study this phenomenon. For art

[5] 'Introverts' are people who are more comfortable in their own company and might find it difficult to talk to other people; '*broadly*: a shy person' (Merriam-Webster, 2015). It is important to note that, although some are, many introverts are not shy, they simply prefer spending time on their own to think or 'recharge'.

[6] The self-concept is our conception and evaluation of ourselves, which contribute to our sense of identity over time. It can be partly conscious, but often it is inhibited from representation though still influencing mood, judgment and behavioral patterns (Woody, 2013, p. 36).

music to maintain its place and role in society, something needs to be done, or it will gradually disappear. I believe that in changing how musicians view their own musicianship is a good place to start, and simple and 'to-the-point' literature will enable them to getting to know these topics. To be able to provide expressive musical experiences to an audience as well teaching in an affective way, studying psychological inter-personal relations and the neurological backdrop of everything we to, I am convinced it will favour our performance.

As David Huron so wisely puts it: 'Our senses are not transparent windows onto the world. Instead, our senses are adaptations that select, distill, augment and (sometimes) deceive.' (Huron, 2011, p. 355). By understanding how our brain — and in extension, our senses — work, I believe that we could all become more proficient and emotionally aware musicians. We will now turn to how this can be put to life in a practical context.

PART II

8. Relevance for musicians

In Part I, we looked at different theoretical methodologies that could be used in a musician's day-to-day working life. We saw, for instance, how theoretical fields such as cognitive psychology, neurology and social psychology can provide a foundation for a more informed expression in performance. Part II aims at being more pragmatic: It will point out the theories that are relevant to musicians, with the approach of it functioning in a teaching situation as well as rehearsal situations for professionals, and at the end provides a three point chekclist for how to work *with* the mind and body. It will draw on several aspects discussed in Part I, from pointing to the science behind the already existing practices in performance and teaching, to give illustrations on how to incorporate it into daily practice. Part II will also be considerably more personal than Part I, as I will use several examples from my own experience as a performer and flute tutor.

As already alluded to in Part I, many of the aspects that will be discussed in this paper are closely linked to many different parts of musicology and the practical musical life. I have chosen to focus on the performing musician and the music educator, partly because delving any further into the different fields of study is beyond the scope of this thesis, and partly because these are the two fields that lie closest to my own heart. The chapter regarding the performing musician will predominantly be based on Woody's writings on social psychology in music (2013). It draws on many aspects discussed earlier in this thesis, and I believe it to be an important text in this field of study. As well as considering the topics and conclusions drawn in Part I, I will focus and evaluate my own experiences in situations where I have attempted to test the earlier results, both in my own practice and rehearsal situations, and educational circumstances.

9. Performance

Music is communication. By deciding to stand up and perform in front of strangers, musicians are putting themselves in a position that is not natural for a human being. From the time the human race developed, exposing yourself in a vulnerable position could lead to being singled out of the group and potentially get killed. This instinct is still very much present in the modern human brain, which is why we often shy away from activities that can put us in a dangerous situation, or attract too much attention from unfamiliar people.

Another point to consider is that people almost constantly try to influence how others perceive them, through clothes, musical preferences, choice of hobby etc. This is especially true for musicians and other performing artists. Performing music requires exposing your musical self-concept (see footnote p. 26), and makes the musician 'continually engaged in "impression management" for "strategic self-presentation"' (Woody, 2013, p. 50). Few people have a strong enough self-concept (musical or otherwise) to not worry about what other people think of them, so for this exposure to be a positive experience the musician needs to have a realistic judgment of what will favourably received and perceived by the audience. If these characteristics have been assessed correctly, there is a smaller chance of negative emotions being produced during the performance. Creating a 'shared identity' with the audience (or any group of strangers that you want to make a positive impression on) is a familiar tool in social psychology, and, if used tactfully, can create a friendly and intimate feeling amongst the listeners (Woody, 2013, p. 52). In the following two sections, we will look at how practising and performing can become more positive and effective experiences. This will be done by pointing to hypothetical problems or examples of real-life situations, and how to deal with them in using the psychology behind.

9.1 When practising

While in a practice room, it can often feel like we can conquer the world. We feel secure in what we do, satisfied with the quality of our playing and enjoy doing it. It can also feel like we are not getting anywhere, that no matter how much we practise that piece we never quite master it and the entire situation turns into something negative. Both of these scenarios can happen within a few days of each other, indeed

within a single hour. No matter how much we focus on the fact that the amount (and quality) of practising varies, it does not make the experience any better when you are struggling to motivate yourself. So how can we make sure the good days outnumber the bad ones?

It is becoming evident through writing this thesis that habits and routines shape every aspect of our lives to a considerably larger degree than I previously ever thought about. Why is it that I need to have a break at 11am for a bite of food every day? Why does it seem impossible to me to focus while practicing at home? And why is my practicing most efficient when I have an exact plan of what I am to do, down to the last minute? By looking at basic human psychology and combining this with knowledge of how the practicing situation works, we can answer all of these questions relatively easily. Finding the reasons almost always makes it easier to alter our responses, and practicing habits are not any different.[7] We will first look at how the habits can present themselves from my own experience and how to deal with them, before giving an example of how to organise a session in the practice room.

As noted in chapter 3, habits arise through a repeated loop of cue-routine-reward. Before the behaviour turns into habits, however, a complex neurological system takes the brain and body through all the stages, until you arrive at the reward. This behaviour is called goal-oriented behaviour, and is the main reason for humans and many other animals to be able to go through life with the feeling of a purpose (Gazzaniga et al, 2013, p. 520). To be able to implement goal-oriented behaviour, a person needs cognitive control. Cognitive control is also in opposition to habits in that it enables us to override automatic behaviours and instead make conscious decisions, like when trying to break a habit or resisting urges. In other words, cognitive control refer to how we plan, control and regulate the flow of information processing (Gazzaniga et al, 2013, pp.510-511). To appreciate this, basic knowledge of the neurological characteristics of the brain discussed in chapter 2 would be essential.

With the issue of needing a break at a specific time every day, one answer might be simply biological: At 11am it is roughly three hours or more since breakfast, and the body needs more energy. Sometimes, however, there is no such need for more energy, but you still need a break at that time. It has somehow worked itself into your behaviour as something automated. Understanding the reason for needing that break

[7] It is necessary to note that just sketching out a habit loop does not automatically change a habit — hard work and dedication is still needed to alter habitual behavior. Nevertheless, in being able to identify the problematic habit, there is a better chance of being able to change.

can be of help in incorporating it into the practice routine. If it is because you are hungry as it is time for lunch, go somewhere else to clear your head and have lunch. If it is not because of this, you might only need a five minute walk in the corridor, or a short chat with someone in the building.

Every person is different, so where we concentrate the best varies a great deal. I still believe that this has got something to do with how easily we are distracted; in other words, how good we have been at creating good habits around practising, and how good we are at sticking to them. There are many musicians who maintain that their best practice sessions are the ones they have in their own home. However, many of us are just as likely to start cleaning the kitchen as we are to manage focusing on our instrument. This example is closely linked to the third problem mentioned earlier; that of the amount of planning needed to achieve a productive practice session. My personal theory is that people who are easily distracted and practise best in a practice room, often also need the most detailed practice schedule — at least, this is the case for me! In having a detailed list of things to do, it is much easier to focus on the tasks at hand as it creates something solid for the brain to work with. Even breaks can be timetabled to reduce the risk of loosing focus.

9.2 When performing

After hours and hours of practice, the goal for most musicians is to get the opportunity to perform in front of people. Whether a solo performance or in an ensemble, this can involve several emotions ranging from exhilaration, joy and satisfaction, to negative emotions like discontentment, exasperation and fear, sometimes all of these at once. So to return to the statement in the introduction to chapter 9, why does some people still decide that they want to stand up and perform?

Just like not two individual people are identical, so are every human brain different. Because of the neurological differences, some people's brains start craving stimulation. Depending on the social network this person has, as well as the neurological system, this can lead to an addiction of experiencing arousal, and because music inherently is a stimulant for arousal it can lead to the feeling of being 'addicted to music'. In musicians, this addiction is mostly a positive thing, and can lead to heightened mental activity and help releasing the needed amount of energy in a concert (Woody, 2013, pp. 29-30).

To create the ideal performance, the typical audience needs a mix of both familiar and new material. Said differently, listeners crave being right in their expectations as much as they crave being surprised. The human brain has evolved over the eons to try its best to predict the future, and holds that it is better to react to numerous false alarms than to overlook one single, truly dangerous situation (Huron, 2006, pp. 5-6). As was briefly discussed in the theoretical discussion of Part I, this inherent pessimistic tendency creates an opportunity for composers and musicians to generate strong emotions from the smallest stimuli. Surprise and tension are two of the strongest devices musicians can use to create emotions in the listeners: They are both capable of generating frisson, awe or laughter. As surprise essentially represents a biological failure, there is always an element of fear or other negative emotions associated with musically surprising turn of events. This initial negative response is normally appropriated by a slower appraising response, as is the case with all surprising events that turned out not to pose a danger (Huron, 2006, pp. 303-304). Tension is created when a highly probable event is approaching — the higher the probability, the higher the tension. The concept of tension and release is a common one among musicians, and relates almost entirely to the strong, positive prediction response when the outcome conforms to the listener's expectation. In delaying the outcome, however, we as musicians can sustain the anticipation for longer periods and thus making it more prominent for the listener (Huron, 2006, p. 328). When performing in front of an audience, the trained musician will do much of this automatically and without thinking about the reason why. By being aware of for example the element of biological fear intrinsic in every surprising cadence, I believe that we can make the experience even more thrilling for our audience. While creating surprise or tension in music is regularly favourable in the endeavour to create stronger emotive reactions in the audience, there is always the danger of the unpredictability becoming predictable. Examples of this can be a slight delay at every cadence point, or stressing the first note in a group in every figure. Although predictability is what the brain prefers, it is also a cue for the brain to stop paying attention: There is a fine line between predictability and boredom.

The semiotic philosophy in chapter 5.1 can also be an interesting approach to consider in relation to how we can make our performance more comprehensive in its expression. Although some would argue that music should be understood entirely on its own terms, experimenting with how the 'musical semiotics' work is an appealing

thought. Unfortunately, this is not something that will be discussed further in this thesis, but the relationship between music and language is a never-ending debate with an abundance of research and literature.

In ensemble playing, that pressing feeling of being exposed is for many replaced with a sense of 'security in numbers'. In addition, there is often a larger sense of doing something purposeful when playing in an ensemble: If working on the assumption that music is communication, it is much more fulfilling to communicate with other ensemble members *and* the audience, rather than only an audience. There are many psychological reasons why we enjoy playing in an ensemble, most of them related to social psychology. The primitive human brain realises that it is advantageous to have a connection with a group, as it gives you ingroup connections and the possibility of advantages outgroup members are denied. This bias towards the familiar and similar to you is the basis for every group affiliation, and the ingroup communication, both musically and non-musically, will create a sense of self-worth and satisfy socio-emotional needs (Woody, 2013, pp. 90-92). Because of this, we can say that ensemble playing is not only beneficial in terms of musicianship, but also when looking at learning social interactions and developing the self-concept.

There are not only positive aspects to being an ensemble musician, however. One example of negative behaviour is what psychologists call *groupthink*. It usually appears as the good intention of a wish for every member of the group to agree with each other. This often results, if it is a case of groupthink, in interruptions in the efficiency, poor moral judgment and reduced reality testing within the ensemble. Any group of people can be likely to resort to groupthink, and especially musical ensembles where the ideas of one subgroup easily can contrast to those of another subgroup (Woody, 2013, pp. 99-101), for example in relation to choice of repertoire. Although groupthink is most certainly not an ideal situation in an ensemble, being aware of its existence can be an advantage. If you are a member of an ensemble and start noticing the signs of groupthink, it is easier to rework the patterns and change the outcome.

10. Music training

It is not the intention of this chapter to discuss different teaching philosophies in great detail, or name a specific theory as the ideal. However, the theories deemed relevant or interesting in relation to the psychological theories discussed in Part I will be given some space. Some of the theories that will be looked into are Vygotsky's theory of sociocultural learning in relation to Piaget's more individual approach to learning, as well as the more recent concept of experiential learning. These learning theories will be viewed from a neurological and psychological perspective, rather than a pedagogical perspective in order to be able to use the conclusions from Part I.[8] Even though there are numerous others who have contributed to educational psychology, I have chosen to focus on Piaget and Vygotsky because they were at the forefront of the 'cognitive revolution' of the 1950s and 1960s, and thus base their theories on many of the concepts that have been discussed earlier in this thesis, for example in chapters 2 and 4.

10.1 Some theoretical learning theories

I am aware that the term 'learning theories' often imply behaviourist theories or similar viewpoints. For the purpose of this thesis, which essentially focuses on the entirely opposite of behaviourist thinking, I choose to use the term in the meaning of *theories related to learning*.

Both Jean Piaget and Lev Vygotsky have been immense influences on learning theory and educational psychology. Although they both made their first contributions in the 1920s, Piaget was not acknowledged in English-speaking countries until the 1960s, and Vygotsky even later, in the 1980s. Their renown marked the shift from behaviourist[9] and psychoanalytic theories being the principal school of thought, to the cognitive approaches promoted by Vygotsky and Piaget (Kozulin, 1998, p. 34). They have often been viewed as oppositions to each other's theories, however they do have some important similarities. One of them is the child-

[8] It should be added that although I have many years' experience from flute tuition, I am by education not a teacher and have therefore chosen not to focus on yet another huge topic.

[9] Said simply, the behaviourists believed that true science could only relate to what can be observed, counted and measured. In other words, thoughts and feelings were not taken into consideration, and physical reactions to stimuli were the main incentive in this theory (Imsen, 1998, pp. 29-30). The most famous experiment in the behaviourist tradition was done by Pavlov, where his dogs started salivating when he rung a bell because they had learned to expect food when they heard the ringing of the bell.

centred psychology. Both Vygotsky and Piaget argued that the child was not a miniature adult, and that a child's mind was not the same as an adult's only on a small scale, but that it was qualitatively different and required to be viewed at its own premises. They also agreed on the importance of the relationship between action and thought. Although slightly in disagreement on how the action should be implemented, they contributed to awareness of the cognitive development inherent in all action-based learning and playing. The third issue they both agreed on was the systemic organisation of the child's thought. The popular view at the time was that the child's mind was simply filled with bits of information and inconspicuous cognitive skills. With the common ground of a search of a systemic explanation of cognitive functions, Piaget and Vygotsky eased on the shift to the developmental view we have today. For Piaget, this meant that a child has several different cognitive levels that appear in 'strict developmental order', where each stage consistently improves the child's cognitive skills. Vygotsky had a slightly different approach: He held that psychological development was a structure of increasingly more complex systems that work together to facilitate one another (Kozulin, 1998, pp. 35-39).

There are many other aspects to both Vygotsky and Piaget; however, I consider these three points to be the most relevant for this thesis. Much of their theories are based on classroom teaching, and although this is relevant for many music teachers, I have decided to focus on one-to-one based tuition. Through performance training, children can learn how to master many other aspects of their lives if they are taught correctly. This is where the child-centred psychology and the organisation of the child's mind fits into place. If a child is being taught at a higher cognitive level than they are currently on (to use Piaget's theory), it could lead to the child either not learning anything, or in the worst scenario get a strong dislike for the topic and quit the activity. Although somewhat far-fetched, using knowledge of cognitive psychology to take into the account to what level the child developed cognitively should be very important for any teacher, no matter how musical the child is or how mature they are for their age.

Experiential learning is in some ways a continuation of Piaget's formula 'from action to thought', in that experiencing something is a linking process between the two. It emphasises how to use experience as a way to analyse and connect dualities into a unity of continuity, process and situation (Beard & Wilson, 2006, p. 18). Experience, it maintains, is the most efficient way of learning that also creates

knowledge. Beard and Wilson define experiential learning 'as the sense-making process of active engagement between the inner world of the person and the outer world of the environment' (2006, p.19). In other words, learning happens in its most fundamental form in the interaction between the person and environment; through experience. This can be related back to the nurture approach in social psychology in chapter 6.1. Although the theory of experiential learning is considered relatively modern, it can be traced as a philosophical line of reasoning all the way back to Plato and the Greeks. All throughout history, people have learned and gained knowledge through experience and action-based activities: E.g. the father teaching the son to plough, or the mother teaching the daughter to churn butter. After the arrival of compulsory formal schooling, learning through current or previous experiences became less prominent. Though ensuring the vast majority of children are now literate and numerate, many have pointed to the shortcomings of this formal classroom approach, like how when learning happens in isolation from a child's experience, it becomes segregated and much harder to retrieve from the memory than if it had been learned through experience (Beard & Wilson, 2006, p. 30). From a neurological point of view, the brain need several repetitions before the knowledge cements itself, preferably through experience.

In relation to music training, it could seem a bit beside the point to discuss the topic of experiential learning to a great extent. After all, the children learning music are all playing an instrument, and thus learning through action! Nevertheless, just consider how much of musical training happens through a curriculum, printed learning material and teacher-oriented demonstration? This is of course very practical for us as teachers, and it is true that there is much theoretical knowledge our students need to learn in order to be able to enjoy the musical activity to its full potential. In spending some time reflecting on this and relating the current way of teaching to the ideas made by Piaget's and Vygotsky's different cognitive theories and experiential learning theory, it might be possible to find a better, more efficient and cognitively sound way of teaching. My own reflection on this will be included in the discussion below, but we will first look at a simple three-point checklist to help musicians and educators include all the aspects debated so far: Social psychology in the form of the self-concept, cognitive psychology in the form of habits, and neurology.

10.2 A schema for music educators

Through writing this thesis, I have come to realise that this research is best utilised in educational settings. As a teacher, the main incentive is to help the student improve their musical ability, and in doing so also make them more confident in themselves and create a positive and strong self-concept. This being said, understanding the links between the psychology of performance, social interactions and the workings of the brain should be of palpable use and interest for any teacher. Based on my own experience as a flute teacher, I have devised this list on how to incorporate the contents of this thesis in every-day teaching.

- Enforce good habits from an early age
- Enhance the self-concept
- Encourage neurological sustainability

As can be seen, these points draw on the conclusions made in Part I, particularly from chapter 3 (habits), chapter 6 (social psychology) and chapter 2 (neurology). They are also highly relevant for students and professionals practising on their own, and I strongly suggest applying them to oneself. This will be discussed further in the evaluation/discussion chapter, so for now I will focus on how to best treat these ideas in an educational/training setting.

This is a three-way diagram where each point is important on its own, but can be even more influential if viewed in relation to each of the other points. For example, to make sure your students create good habits for themselves, it is vital that they work *with* the neurological pathways (consciously or unconsciously) rather than against them. If not, the habits are likely to become dead ends or worse, create a vicious circle of physical pains or unfulfilled musicianship. Similarly, if a student develops good habits, it is likely that a consequence will be a positive self-concept because of improved musical ability or greater enjoyment in playing. We will now look at each point in isolation, before delving further into the links between them.

1) Enforce good habits from an early age.

As noted in chapter 3 on habits in Part I, how we go about our daily lives is defined by our own conscious choices to a much smaller degree than one would often think. This is true for everyone, regardless of age and gender. In a situation involving teaching

music, we as tutors can help our students by pointing them in the right direction when it comes to habits related to practice. Is your student forgetting to practise? Suggest keeping the instrument out of its box and the music open on a music stand throughout the week, this way it is easier to just grab the instrument and play whenever they have time. Or to be instrument specific: If the student is having a bad habit of leaning the head of the flute on their left shoulder, it is possible to counter this by creating a good habit designed to override it. One way I have dealt with this specific problem in my own teaching is to pretend that the shoulder is newly painted – and you do not want to get paint on your flute! In playing pretend, it is possible to teach children new ways of doing things without stressing the fact that it is something they have to do.

Understanding the loop underlying specific habits can be the key to improve the efficiency of practicing for everyone, from beginners to professionals. As Neal, Wood and Drolet noted: When willpower is low, it is not only the bad habits, but also the good habits, that make sure that we go about our lives still able to pursue our goals (2013, p. 972). As a consequence of this, if we all create good music-related habits for ourselves and our students, we can ensure that our music-making does not suffer even if we have one, or several, 'bad days'. Here we can look back to chapter 4 and cognitive psychology. If we understand the underlying loop, we might also understand why and how the habit appeared through the cognitive approach on thought processes and acquisition through use of knowledge. This is another way of confronting bad habits and attempting to change them into better ones.

A different approach that can be connected to the work of habits, is the relationship between inner and outer motivation. In the first half of the twentieth Century, the behaviourists had the prominent approach within the psychology of learning. To relate back to Piaget and Vygotsky, the inner motivation is related to the cognitive approach to learning, emphasising the brain and cognitive knowledge. Learning is an inner process that cannot be directly observed, but rather happens over time as a growth in that person's abilities. Conversely, the outer motivation is grounded in the behaviourist view of observable reactions, heavily relying on reward and penalty in the learning process (Imsen, 1998, pp. 54-55). Combining this train of thought to habits make us see how we can use motivation to induce good routines. For example, it has become relatively common in school wind bands to introduce a competition related to practising. Regardless of the specific system used in each group, the student writes down the amount they have practiced over a given period of

time with either a lottery or some other way of deciding on a winner at the end. This is a very good example of how outer motivation (the possibility of winning a prize) can be used to create good habits (practising every day). Inner motivation is also in operation here, as the student will crave improvement and higher proficiency on their instrument. Exploiting this craving is another ideal way to create a shift from inner or outer motivation to the behaviour becoming a habit.

2) Enhance the self-concept

Through the writings of Woody, we have earlier in this thesis become familiar with the term self-concept, or in this case, *the musical self-concept*. As Woody describes: 'For the musical self-concept, the combination of nature and nurture, talent, motivation, and achievement lead to, produce, and maintain a certain personal characteristics.' (2013, pp. 35-36). This means that in order to uphold a student's positive attitude to music and musical activities, you have to take into account their inherent natural talent, motivation, and support from home when planning lessons. A feeling of achievement is always important in any aspect of a child's development, so as soon as they feel they accomplish something, a positive atmosphere will be connected to the activity. As you might remember, this is an important feature of the experiential learning theory.

As all educators of every kind know, achievement and progress will always vary, both from student to student, and over time. Sometimes, a child has a slow start and can barely manage to produce a sound for the first month, for then to suddenly grasp something and race through the curriculum without there really being a clear reason why. Conversely, another student can seem to have a clear understanding of the material early on in the learning process, for then to have the progress suddenly stop. Understandably, this can be felt as very demotivational for the student, and part of our job as tutors is to inspire the children to keep going through these 'rough patches'. I believe that by working with each individual student's self-concept, it is possible to alter a negative experience into something positive. Following this, I will give one example from my own teaching:

Student A had for several weeks not wanted to practice at home or play during the band rehearsals, the only thing she enjoyed to some extent was her flute lessons with me. I asked her what she thought about this situation, and she replied saying she did not like not being able to play the correct notes, but that it was easier in the lessons because I played with her, and also that she had a lot of homework so she was often

tired. After talking to her parents, who confirmed that school homework was taking up much time, we agreed to try a few things. Firstly, I bought her a book with an accompanying CD of simple melodies and duets. Secondly, she would leave her flute out of its box during the week, in easy reach for playing a few notes when she felt like it throughout the day. Finally, although she did not get any assigned homework,[10] she would play her flute at least three times each week, just playing something she liked. At the start of this period, she remembered to play once or twice during the week, and often ended up simply playing the same melody over and over again. However, in telling her that it did not matter *what* she was playing as long as she *did* play, her parents and I saw her confidence increase, and by that, her enjoyment of playing resurfaced. In other words, by helping her musical self-concept back on a positive track, her musical behaviour took on a new confidence.

Although most people will never become professional musicians, very few people are born without any musical talent or inclination whatsoever. Participating in music making is hardly ever really about it being perfect or becoming a master on your instrument, however, it is about enjoying what you do at that moment in time, and being content with the quality of your performance – for the time being (Woody, 2013, pp. 3-6).

3) Encourage neurological sustainability

This is perhaps the hardest of the three points to grasp. Although I said in the introduction to this section that I would discuss the three themes in isolation before exploring the links that proves impossible for this section, as neurology is the basis of how habits work. Because neurology, as one of the hard sciences, is mostly concerned with measuring and analysing data (as we saw in chapter 2), it is somewhat difficult to apply it to every-day teaching and practicing situations. Despite of this, it is still something I believe every musician, and definitely every educator, should have a basic knowledge of, and is the reason I chose to include it in this list. The neurological aspect will be linked to habits and goal-oriented behaviour, and how we as tutors can guide the students in approaching problems that might arise from a neurologically beneficial point of view.

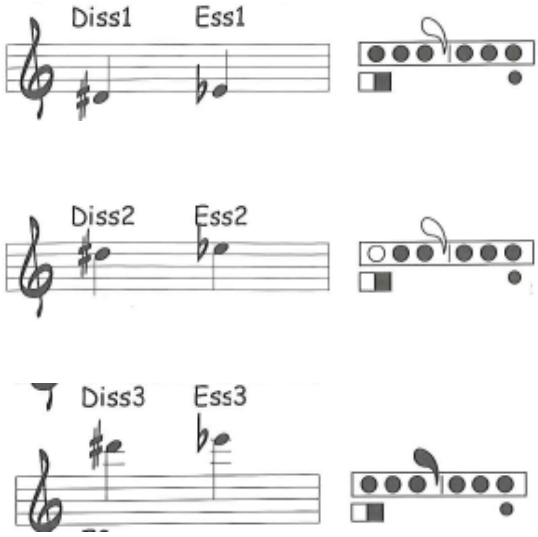
[10] I am always reluctant to term what the students are meant to practice as 'homework'. It is a word with strong, often negative, connotations, but as this is not a discussion for this thesis, I will continue to use 'homework' to name the pieces to be practiced until the next lesson.

In teaching situations, neurological approaches are mostly useful when practicing playing technique. On the flute (and all other wind instruments), where you have to move each finger independently of each other, seeing things as patterns rather than isolated events is helpful in the process of developing the conscious act of moving a finger into habitual behaviour. One example of this is the note E flat or D sharp on the flute. We can play it in three octaves on the instrument, and with very similar fingerings, they are easy to confuse with each other (see fig. 3) (Nordli Krøger et al, 2005, p. 79). The left hand index finger does make quite a difference between the first octave and the second;[11] for a beginner, however, this difference might be rather difficult to hear, and result in them not understanding why the teacher continues to insists on keeping the finger up in the second octave. In playing a B flat major scale, it is easy enough remembering to keep the index finger lifted whilst going up (as it is already up from playing D), but 'harder' to remember it when playing the scale going down (as the index finger needs to be kept down for G and F). This issue does not normally arise because it is problematic to lift the left hand index finger. It is rather a result of a neurological pathway that needs to be focused on and made prominent in order to function properly, as well as initially forcing yourself to override the urge to keep the finger down. In other words, cognitive control needs to be utilised to resist the urge of keeping the index finger down when changing the note from F to E flat.

Another way of implementing neurological sustainability is to be aware of the amount of movement in the fingers. As with all things in life, overdoing it can be dangerous. When students stretch, press or move their fingers too much compared to what is necessary, not only is there a danger of damaging some of the many fine muscles in the hand, but also nerves can get trapped and may result in unnecessary pains. This is not normally a problem with the younger students, as they usually do not practise enough to develop problems. However, in ensuring they do not get used to doing the wrong thing from a young age, later troubles can be avoided.

[11] On the flute, only tones of the first octave are fundamental, anything above B1 is overblown. The different fingerings means that the second and third octaves does not sound like the harmonics they are, as that would not quite match with the modern equal tempered scale.

Figure 3



Selection from a fingering chart for flute, of how to play D sharp or E flat in three octaves. Please note that it is written Diss and Ess instead of D sharp and E flat, as the illustration is from the Norwegian flute book Midt i Blinken 2 by Nordli Krøger, Vannebo and Mortensen (2005).

10.3 Discussion of schema

We will now look more into the interactions possible between the three points above. As the link between neurological sustainability and habits have already been mentioned, this will be continued on briefly, before going into the link between neurology and the self-concept, as well as between the self-concept and habits. Conclusively there will be a section on how to see the three as a whole.

Neurology and habits are, unsurprisingly, inextricably intertwined; after all, habits form from neurological patterns. Any behaviour that is consciously implemented to reach a set goal, has the possibility of turning into automatic, stimulus driven habitual behaviour. It is not a given that this is a negative development as the brain has developed habits to preserve energy, but as with all repetitive actions there is always the danger of strain injury, both physically and mentally. Thus, ensuring that your students develop good habits is just as important neurologically as it is for their musical progress.

Linking neurology to the musical self-concept can seem somewhat more vague than the section above. However, how we define, express and look at ourselves is undoubtedly associated with how our brains are assembled. As mentioned in chapter 2.2, social cognitive neurology has appeared over the last decade. Because the

notion of a self-concept is deeply rooted in social psychology, using social cognitive neuroscience to understand how neural and psychological mechanisms help processing information about the self and other people is an interesting prospect. This is yet another field of study that would need an entire thesis devoted to it; more research needs to be done in this field, and especially relating it to the musical self-concept.

The third link to look at is that of the self-concept and habits. By this point it should be somewhat unnecessary to point out the importance of good habits to how we feel about ourselves, and by extent we can argue that how we feel about ourselves influences our habits. If we are locked in a pattern of destructive habits, the chances are that we do not feel good about ourselves because of this and might even believe that we do not deserve any better, thus creating a vicious circle with ourselves at the centre. It goes without saying that this is not something you wish either for you students of yourself, so establishing a way of life that improves the self-concept is likely to be based on routines that support this.

When connecting all three points to one unity, we can start linking these ideas to those of Vygotsky and Piaget mentioned in chapter 10.1. Their focus on the child's cognitive development and child-centred psychology are notions I have attempted to include in this schema. In taking into account the child's cognitive development and vary the teaching to suit each child individually, you are ensuring that they become more confident in their playing and thus enhances their musical self-concept. Likewise with child-centred psychology: In teaching on the child's premises it is possible to give a better suited and more helpful tuition than if the teaching was provided from an adult point of view. In addition to this, the 'action to thought' principle combined with experiential learning can make room for healthier habits, and thus also neurological sustainability, as well as, on a whole, happier students. There is nothing revolutionary in this application of learning theories to musical education, but this is rather an attempt at viewing tried and tested theories in a new light.

11. Evaluation/Discussion

Throughout Part II we have looked at a more practical way to use the conclusions drawn in Part I. The idea behind doing it this way, was to be able to combine theory and practice to a larger degree than what is often done. Pragmatic use of neurology and psychology in an educational and performance related setting is, to my knowledge, relatively hard to come by, and I started writing this thesis with the aim of slightly lessening this problem. Before concluding, however, it is time for one final discussion, where I will do my best at tying up any loose threads and connecting them all into a (relatively) neat bow.

Firstly, there are a few points made in Part I that I would like to address in relation to the topics discussed in this section. As has already been pointed to, neurology can provide a great basis for an alternative look at music education. Our brain shows extreme plasticity and is able to teach new centres to perform tasks they were previously not concerned with. This can be another way of ensuring neurological sustainability if for example teaching a child with a learning disability to play an instrument. Another topic that was briefly mentioned in both parts of this thesis is the theory of how surprise and expectation shapes our experience of the music. From the point of view of a musician, this can be deemed hardly surprising and something already universally known. As with all acquired skills, however, understanding the underlying reason for why something works augments the effect and makes it easier to apply to more situations that initially thought.

Secondly, there are a few issues that needs to be confronted when it comes to reward-based learning. In the section on enforcing habits from an early age I mentioned the custom of rewarding good practice routines with a winner of some sorts. Although in many ways a brilliant example of utilising outer motivation to create good habits, it does have a downside in that is does not measure the quality of the practising the children do. There is also room for the children (or parents) to be generous with the time they write down: After all, how much does it hurt to say 15 minutes rather than 14? To a certain extent, it is more important that the children actually play their instrument every day without much focus on what they practice, and in some circumstances that can be what it takes to make them enjoy playing again. On the other hand, especially older students need to have some quality to their practising in order to maintain a progression. Using the setting of a contest to inspire the students to practise is in many ways a great initiative and a safe way of ensuring

most of the children to increase the amount of time they spend playing their instrument, but there needs to be secure regulations to how to go through with it.

The main topic in Part II was the three-point schema for use in educational settings. As mentioned before, however, it is not only devised for use in education, but also in our own practising. I was once told by a flute teacher that teaching on a high level and teaching on a low level is more or less identical: I believe this to be precisely to the point, and a good reason why I also believe that teaching *yourself* (i.e. practising) can be done in more or less the same way as teaching your beginner students. When teaching young children to play the flute, I work with moving the fingers fast enough, using the tongue in the right way, having a good embouchure, posture when playing and how to breathe; in other words, exactly the same things I focus on when standing in a practice room on my own. We aim for many things to become automated, like how to move the fingers between D and E, but for not to lose the subjectivity and creative part of music making, we need to be constantly aware of how we phrase, where and how we breathe and so on. In professional practising, we can argue that it is not so much about enforcing the good habits as it is about being aware of the implications behind them. In the expressive part of performing musical art, we can use the example of phrasing. Using the concept of tension to slightly delay a cadence or a climax is an effective technique, but not when it is used at every cadence throughout a piece. As was mentioned in chapter 9.2, predictability is a favoured concept by the human brain, but because the vast majority of music is based around one or several familiar factors, like instrumentation, harmony or meter, we as musicians do not need to make to the performance of it predictable as well (Huron, 2006, p. 267).

Professional musicians are just as prone to develop a negative self-concept as beginners are. There are of course differences between the negative feeling of stagnating development in an eight-year-old who have been playing their instrument for only a number of months and a professional adult, but the underlying emotions are relatively similar. Possibly the major adjustment lies in an adult's ability to point out what is bothering them, and then counter it with different behaviour. As was pointed to in chapter 10.2, the musical self-concept is dependant on the combination of nature and nurture, achievement and motivation to maintain the personal characteristics that best utilises the inherent musicality in a human being. This brings us back to habits and how our routines shape who we become as people.

Another important difference between children and adults is the level of the social norms we live by. I am by no means saying that the interaction between children happen on a lower level than that between adults, but rather that because an adult and a child's mind function in different ways, so the social norms will be different. An adult musician is always expected to present themselves to other musicians in a way that will encourage positive reactions from the others. There is a constant need for impression management because musicianship in a socialised context is characteristically different from practising on your own. Said in other words, you can be a technically fantastic musician, but if your self-presentation does not conform to social norms and expectations, no one will be interested in including you in a group and an important part of music-making will not be satisfied (Woody, 2013, pp. 55-57).

In relation to education, we looked at using neurology as a new starting point for considering familiar learning strategies. As adults, we can apply this to ourselves with the possibility of better results than when aiding our students in the same. It is easier to change your own habits and neurological patterns than it is to do the same in a child. In making only slight changes to for example the hand position, it is possible to reduce pressure and unnecessary pains. I personally have good experience with this. When I was around the age of 19, I started practising a lot more than I had previously done, but without a good foundation to build on. This meant that I quite quickly started experiencing pains in my right hand, particularly in the thumb supporting the weight of the flute. A small device called a thumb-support helped ease the pressure, but some years later another teacher wanted me to be able to play without the aid of the little plastic add-on. In slightly shifting the angle of the thumb from underneath the flute to closer to the side, and marginally bend it she helped relax the tension in the muscle and remove the pressure on any affected nerves. Experimenting with posture and hand- or finger positions is one example of how we can use neurology to aid our performance. If the habitual position is becoming painful, although difficult to change, you can hardly inflict more damage by slightly alter an angle or the position of a joint.

In this discussion, we have looked at conclusions made earlier in both sections of this thesis in a different light. Although not every point made and every line drawn is directly applicable to music performance or education, I have chosen to discuss it because I believe there are transferrable ideas to music from all of the topics

mentioned. Indeed, music is distinctive in its capacity of transferring and aiding learning in almost any subject. With this interdisciplinary train of thought in mind, let us conclude.

12. Final Conclusion

Music is fascinating. It has the ability to convey emotions through seemingly irrelevant pressure-waves in the air. We can feel joy or immense sadness when listening to a group of strangers performing on a stage. It can also help children experience a feeling of success that can help them become confident in other parts of their lives. This thesis has stressed how we need to understand the underlying and core psychological aspects of music to be able to teach, practise and perform to high standard. Conveying emotions relies heavily on psychology and how the brain function, which in turn is best understood through the neurosciences. I have provided a three-point schema by which it is easier to include awareness of this into every-day musical activity, and different examples from my own experience have been offered. My personal belief, which I hope have been made clear through this text, is that the best conveyors of musical emotion are the psychologically aware musicians. In the end, however, music is such a subjective subject that no definitive objective answer can be provided to how to perform music the most expressive way. The best any researcher can do is to provide options for others to consider, and hope that at least a few points makes performing more purposeful to other musicians.

12.1 Comment on sound recorded supplement

As an addition to the written text, this thesis also contains a recording. This is to relate the research project to musical performance. On the recording I play the first and second movements of Otar Taktakishvili's Sonata for flute and piano, written in 1966. As this thesis is not concerned with any piece of music in particular, but rather the underlying psychology of music on a more general basis, the choice of which piece to record was based on how to best apply the theories discussed to great length in this thesis. Taktakishvili's flute sonata is poignant in its playfulness, and quickly moves from one character to another, especially in the first movement. The second movement is more introverted and reclusive, and gives the performer plenty of

opportunities to play with affective elements. We can hear how the composer used both repetition to create a sense of familiarity for the listener, but also included surprising elements, like sudden changes in tonality or rhythmical structure.

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