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## **Finding focus : using external focus of attention for practicing and performing music**

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## 2

## Attentional Focus for Learning and Performance

### Introduction: What do Musicians Focus on?

When asked, “What should you focus on during performance?” musicians often answer “On the music”. Most will report that when they focus on themselves – on avoiding errors, steering their body’s movements, thinking about the consequences of their performance, or when they have distracted thoughts – their performance suffers.

Two studies done at the Conservatoire of Amsterdam show some insight into musicians’ attentional focus during performance. The first study by Buma, Bakker & Oudejans (2014) addressed the focus of elite performers and found that one of the main foci of attention was “music-related focus”. A similar study on attentional focus of music students found that there was more focus on worries and disturbing thoughts than for the elite performers in the first study, and concluded that training in attentional focus can and should be offered at conservatoire level (Oudejans, Spitse, Kralt & Bakker, 2016). In an ethnographic study in 1987, William Trusheim interviewed 26 elite brass players – all members of leading American symphony orchestras – and found that they focussed on musical imagery in a multi-modal way (using auditory, as well as kinaesthetic senses) both during practice and in performance. He refers to their type of focus as “audiation” (Trusheim, 1991). Both audiation and Trusheim’s study are discussed in detail in Chapter 3. Peter Keller (2012) also emphasises the importance of imagining the music by using anticipatory auditory imagery in music performance.

Clearly, thinking about “the music” is helpful for performance, as well as for learning, but what do we mean when we say “the music”? This chapter examines attentional focus in the context of learning and performing motor skills, explains the significance of external focus of attention and outlines the main research findings on external focus. The conclusion of the chapter connects the concept of external focus with focussing on “music”.

### What is Attentional Focus?

*"Everyone knows what attention is. It is the taking possession by the mind in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought [...]. It implies withdrawal from some things in order to deal effectively with others, and is a condition which has a real opposite in the confused, dazed, scatterbrained state"* (William James, 1890).

Attentional focus (or concentration) is one of the most important aspects that influence the achievement of musical excellence (Connoly & Williamon, 2004; Chaffin, 2004; Keller, 2012) and excellence in motor skills in general (Wulf, 2007). Focus can involve the senses

e.g. sight, hearing, touch, smell or taste, or a combination thereof. Musicians typically rely on their visual, auditory and kinaesthetic senses when they focus – or on an emotion. Attention can be on what is in the past or present, or on an imagination of something in the future. It can be either narrow or broad, related to the task at hand or to something else, be based on the intended outcome or on the outcome that one fears. Focussing attention involves choosing what to focus on as well as what not to focus on. The different types and aspects of attentional focus are described in the following section.

### **Types of Focus**

Focus can be categorised in several ways. Below is a hypothetical categorisation and model (formulated by the author) that describes five dimensions of attentional focus.

#### **Dimension 1 involves task relevance – associative focus versus dissociative focus.**

Associative focus refers to focussing on the task itself and can include monitoring of bodily sensations (e.g. “my finger movements are relaxed/cramped”; “my breathing is deep/shallow”; “I can feel the keys with my fingertips”), or thoughts that include internal commands or instructions (e.g. “relax my shoulder”; “make a crescendo here”; “keep the rhythm steady”). Other types of focus relevant to a musician’s task are noticing the sound of the music and/or how it feels or using imagery – to imagine how a phrase could sound or feel, or what it is expressing. Dissociative focus involves thinking about things that are unrelated to the task at hand and could include noticing things in the environment that are irrelevant to the task, or reflection on past events and planning for future events. Focus on the self (e.g. judging oneself or thinking about the judgement of others) or on the consequences of a performance, are also forms of dissociative focus and have been found to be detrimental to performance (Kenny, 2011). Focussing outside of the immediate task brings one out of the task, making it difficult to adapt or react to any changes in the environment. Optimal or ‘peak’ performance is often accompanied by a “flow state” of consciousness where performance is “an almost automatic, effortless, yet highly focussed state of consciousness” where the performer’s concerns about success and even sense of time is absent (Csikszentmihalyi, 1996, p. 110).

**Dimension 2 refers to the direction of the focus – internal versus external focus.** Internal focus is giving attention to the body’s movements (e.g. my arm, fingers, breathing) and external focus is on the result or effect of the movements (e.g. the sound, the phrase, the music) (Wulf, 2007; Wulf, 2013). Both internal and external focus can refer to what is actually happening or it can be on the intention or anticipation – imagining what is about to happen. External focus is explained in detail in the next section.

**Dimension 3 is whether the focus is positive or negative.** A further dimension of attentional focus that is connected to anticipating a result is whether the player is focussing on something

positive (e.g. the sound or effect he wants to make) or something negative (e.g. the mistake he wants to avoid). This relates to focus on self or on consequences (see above). The “flow state”, mentioned earlier, is accompanied by positive emotions. Focussing on what you *don't* want makes it more likely that the (unwanted) result will happen – this has been called the ironic effect (Wegner, 1994). Many a musician has experienced bad results when focussing on not making mistakes.

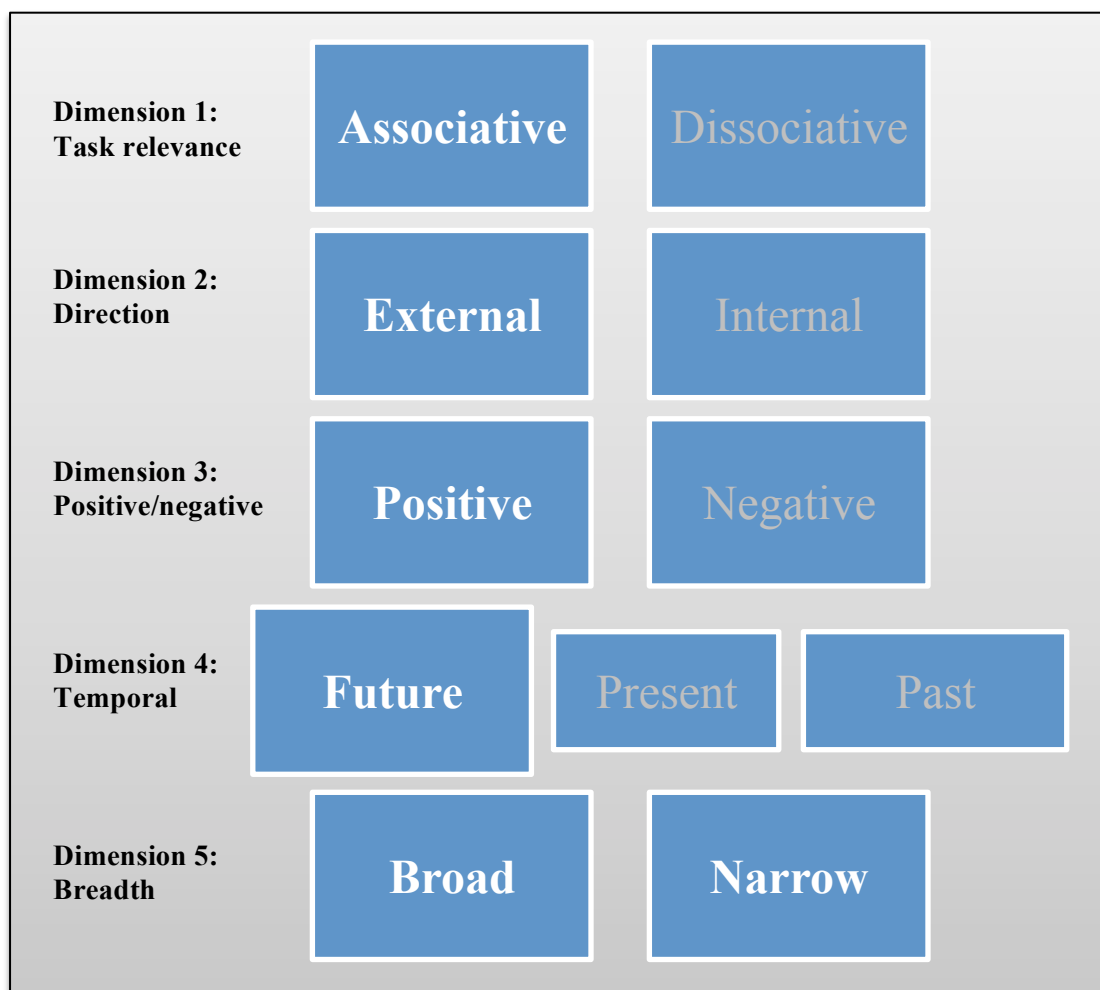
**Dimension 4 refers to the temporal dimension of focus.** The temporal dimension of focus – whether focus is on something occurring in the present moment, on something that occurred in the past, or on something that the player is intending, or anticipating – is of crucial importance to this research. A player could be focussing on something that is occurring in present time (e.g. the sound or phrase he is making, or the movements of his body, or the sound of the ensemble), or in the past (e.g. what just happened or happened in a previous performance) or in the future (e.g. the sound or phrase he is about to make). Masters pointed out that focussing on what has already happened leads to hypothesis testing and analysis. Focussing on what is about to happen is anticipating a result, and is a crucial aspect of external focus (Keller, 2012; Wulf, 2007).

**Dimension 5 refers to the breadth of the focus:** Focus can also be broad (e.g. paying attention to a wide range of sensations, thoughts, feelings and sounds associated with the performance; listening to the ensemble) or narrow (e.g. listening to your own sound; noticing a particular sensation) (Connolly & Williamon, 2004; Nideffer, 1976; Schmidt & Wrisberg, 2008).

Table 2.1 illustrates dimensions of focus in a hierarchical way and highlights the most effective focus for motor learning. Based on the literature cited above, for optimal results, focus needs first to be related to the task (be associative) and on the intended goal – meaning it is external, positive and anticipatory. Both broad and narrow focus are recommended.

External focus falls into all of the recommended categories listed in Table 2.1 – i.e. it is associative, positive, anticipatory, and can be broad or narrow (see the following section on external focus).

**Table 2.1 Five Dimensions of Attentional Focus**  
(recommended focus shown in white letters)



### Limitations of Attentional Focus

#### Attentional Capacity, Attentional Span and Level of Arousal

An important aspect of attention to consider is that it is a limited resource – limited both by how much information we can process at any given time or how many things we can pay attention to at once (attentional capacity), and by how long we can sustain our attention (attention span) (Schmidt & Lee, 2005). Our ability to focus attention is also affected by our level of arousal and our ability to manage arousal and anxiety (Schmidt & Wrisberg, 2008). Attentional capacity and span differ from individual to individual (and from day to day) and are subject to many factors including age, the subject of the attention (how “interesting” it is), tiredness, and the individual’s ability to regulate attention (e.g. being able to ignore things that are irrelevant to the task) (Hattie & Yates, 2014). Attentional capacity, span and the effects of arousal on attention are dealt with in more detail in the following sections.

### ***Attentional Capacity***

Attention can be defined as, or measured by, the degree of interference between two tasks (Schmidt & Lee, 2005). For this reason, much of the experimental research done on attention and motor learning involves testing someone's ability to do a task whilst performing a second task simultaneously. The ability to perform a task whilst doing a secondary task indicates how automatic (learned) the first task is. In the case of Masters' research on implicit motor learning, a secondary task was often used in order to take the person's mind off consciously thinking about the skill that was being learned.

One of the reasons we try to simplify a task is to reduce the cognitive load – the amount of mental effort involved. If the working memory is trying to process too much at once, learning and performance is hampered (Sweller et al., 1998; Van Gog et al., 2005; van Ketel, 2017). The difficulties of processing too much complex material or thinking about too many things at the same time are addressed by cognitive load theory. It seems that not only the type of focus but also the amount of information and how it is presented has an influence on learning and on performance. John Sweller developed the cognitive load theory in the 1980s and explained that the load on someone's cognition can be intrinsic (i.e. it is a difficult task requiring much effort), extraneous (referring to how the information is presented), as well as germane (referring to how much effort it takes to make sense of the information and store it in the brain for later retrieval) (Sweller et al., 1988).

As was implied in the section explaining the stages of learning, managing cognitive load (also referred to as memory load by Hattie & Yates, 2014) is particularly important during early ("cognitive" and "associative") stages of learning. When a task is well learned (autonomous stage of learning), presumably there is 'space' left over in the mind – either for more task-related focus, or for distraction or interfering thoughts.

### ***Attentional Span***

Attentional span refers to how long one can focus attention for before being distracted. Attention wanes over time – the amount of time most likely depends on the individual, the demands of the task and on how interesting or important it is and "what the individual brings to the situation" (Briggs, 2017). Studies on attention indicate that intensive mental focus drops off after only 10 minutes (Hattie & Yates, 2014). There are two major theories that try to explain this. The first – the *ego depletion theory* – describes a depletion of energy (Baumeister et al, 1998). This theory posits that the ability to focus intensively is subjected to biological exhaustion. The second theory – called *cascading inattention* – describes the process of too much information causing confusion and overload (Risko et. al, 2012; Hattie & Yates, 2014).

Because we all have limited attention span (a limited amount of time that we can focus intensively in a day) most sports trainers (as well as instrumental music teachers) recommend distributed practice – practicing for short periods of time several times a day rather than one or two long sessions (Schmidt & Wrisberg, 2008). The best scenario would be that players themselves notice when attention begins to wane and act accordingly (e.g. by finding a way to make the task more engaging or taking a break).

### **The Effects of Arousal and Anxiety on Attention**

As many musicians have experienced on stage, the ability to focus attention can be affected by arousal<sup>17</sup> and anxiety. One of the most popular topics amongst musicians is how to manage performance anxiety. A certain amount of arousal can be beneficial to performance, but when it is too high it can result in anxiety and fine motor control (needed to play or sing music) can be impaired as a result. Research suggests that when someone knows (or imagines) they are being judged or evaluated during a performance they usually experience anxiety (Wrisberg, 1994). Both in the early stages of learning and even during performance, anxiety and arousal can cause someone to shift their focus inwards – from external to internal focus (Wulf, 2007; Schmidt & Wrisberg, 2008). Managing arousal and stress is therefore of paramount importance for all performers and can be facilitated by focussing on the task rather than on the outcome (thus also avoiding self-focus) and by using an external focus of attention (Schmidt & Wrisberg, 2008; Kenny, 2011).

### **Optimal Focus for Learning and Performance**

The current study is about what we should do with our conscious minds during practice and performance. The conclusions we can draw from the above information about the nature of attentional focus are that verbal instructions should be limited during learning and that during learning and performing a person should fill their mind with task related external focus – a type of focus that has less cognitive load than verbal instructions and internal focus. The following section explains external focus in detail.

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<sup>17</sup> Arousal is the level of activation of the central nervous system (Schmidt & Wrisberg, p. 224).



## External Focus of Attention<sup>18</sup>

External focus is being mentioned more and more by sports coaches and motor learning experts as the most effective type of focus for learning and performance. “Research examining the optimal attentional focus for skill learning suggests that people who are instructed to focus on the intended environmental effects of their actions (i.e. an external focus) perform and retain (i.e. learn) target skills more effectively than those who are told to focus on the movement itself (i.e. an internal focus)” (Schmidt & Wrisberg, 2008, pp. 224-225). External focus refers to the person’s concentration and not their visual focus (Wulf, 2013).

The definition of external focus for the current thesis is: *Focussing on the intended effect of one’s movements*. The following section describes the main findings relevant to the current study from research on external focus, theories on how external focus works and the implications for musicians.

### Research on External Focus

Most of the experiments investigating external focus compare it with internal focus and/or with control conditions (where no focus is stipulated), and findings are overwhelmingly in favour of using external focus both for learning – even in early stages – and for performing various types of complex motor skills. Where there is some nuance is how distal the focus needs to be for a particular skill level. A comprehensive overview of research on external focus can be found in Gabriele Wulf’s *Attentional focus and motor learning: a review of 15 years* (2013).

The first reports on the benefits of external focus were made in 1998 as a result of studies made by Wulf, Höß and Prinz using a ski-simulator task. Subjects were asked to focus on either their feet (internal focus), or on the pressure exerted on the wheels of the platform on which they were standing (external focus). A second study made by the same researchers was similar, but involved using a stabilometer, which the subjects tried to balance on, again using either internal or external focus (Wulf, 2013).

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<sup>18</sup> *Contradictory terminology*

In the last 15 years, research on attentional focus has increased and broadened. The literature now contains much, sometimes contradictory, terminology that can lead to some confusion and communication problems. ‘There are two largely separate branches of research studying attention in human performance that are (a) using identical language to describe different constructs and (b) do not integrate research from the other branch into their operational definitions, hypothesis or theories’ (Lohse & Sherwood, 2011, p. 2). Lohse & Sherwood describe in detail the problem of definition and classification of types of attentional focus amongst researchers and the need for more coherence. The result of the discrepancies is that the terms associative and dissociative are sometimes interchangeable with external and internal, and may or may not include task relevance. External focus is understood by some (e.g. Nideffer, 1976) to mean focussing on environmental cues and by others (e.g. Wulf) to mean a focus on the intended effect of an action. The current study is based on Wulf’s definition of external focus.

Many experiments followed from Wulf and colleagues as well as others, involving balance tasks and movements from sport disciplines such as golf, volleyball, soccer, basketball, tennis, throwing, juggling, gymnastics, athletic sports, muscle training, and swimming, as well as from music, e.g. piano playing. Thus a variety of simple and complex movements were tested. Studies were carried out on novices as well as experts. Different distances of external focus were tested. Positive effects of external focus have been found for both effectiveness and efficiency of movement, on both self-efficacy and the speed of learning, for beginners as well as experienced players, and for simple as well as complex movements.

External focus has been found to benefit both performance and learning. Experiments on external focus repeatedly found that there was not much difference between internal focus and control conditions (Wulf, 2013). The main findings from the results of experiments on external focus are listed, described and discussed below, all of which have relevance to musicians and to this study.<sup>19</sup>

### ***A Summary of the Main Findings on External Focus***

#### External focus is better than internal focus for effectiveness and efficiency of both simple and complex movements.

Most studies on external focus have measured its effects on effectiveness or efficiency, and a few have measured both. Movement effectiveness refers to aspects such as balance and accuracy. Many of the trials carried out by Wulf and others have shown that external focus enhances these aspects. Similarly, movement efficiency (achieving an effective movement with less expended energy) benefits from external focus. Aspects such as force production, speed and endurance and movement kinematics (whole body coordination) are included in this category (Wulf, 2013; Wulf, 2007; Wulf & Lewthwaite, 2016).

#### Both learning and performance are affected positively by external focus.

Improvement in performance refers to an immediate effect, shown by an improvement during a practice phase, whereas learning refers to a more permanent change in a person's skill level. Learning can be measured by retention tests (after a period of time has elapsed) or by transfer tests (to see if a skill transfers to similar ones, or is still there without instruction). An example is a study by Wulf & McNevin (2003) where participants practiced a complex balancing task (holding a tube horizontally with a tennis ball in it, whilst balancing on a stabilometer) over 14 trials. The internal focus group was asked to focus on their hands, and the external focus group on the tube. Results showed that the amount of errors made was lower for the external focus group throughout the trial period, over four retention tests as well as three transfer tests. An

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<sup>19</sup> A discussion of the data and details of each study is beyond the scope of this dissertation. For a full review see Wulf, 2013.

implication of high success rates for transfer tests is that external focus creates a mechanism that enables adaptability – something that is very valuable in field situations.

External focus is beneficial for beginners as well as more experienced players and for children as well as adults and also for people with motor impairments.

These findings support Masters' claim that even at the early stages of learning, thinking about how you are producing a movement is not beneficial. Contrary to many expectations, empirical research has found that both novices and experts benefit from external focus. Many teachers and coaches as well as scientists believe that beginners need to go through a cognitive stage (see Table 1.1: Stages of Learning) where they pay attention to how a movement is achieved. Later, when the movement is more automatic, the attention can shift outwards. Several studies on external focus convincingly contend the idea that early stages of learning should be dominated by declarative learning (Wulf, 2013; Wulf & Mornell, 2008). An example is a study with both novice and experienced players practicing a volleyball serve, where both groups performed better with external as opposed to internal focus instructions. The instructions themselves were worded only slightly differently (e.g. "Shift your weight toward the target" versus "Shift your weight from the back leg to the front leg"), and yet produced clear difference in result (Wulf, McConnel, Gärtner & Schwarz, 2002).

The more distal the external focus, the better it works – especially for experts.

An important question when deciding on the "right" focus to use is "how far out should the focus be?" Several studies (first demonstrated by McNevin et al., 2003) found that the more expert the performer is, the further out the focus should be (Wulf, 2013). For this reason it could be important for an individual to find the appropriate "optimal" distance of focus for a particular task. Focussing too close or too far out from the optimal focus can degrade performance and learning. "Thus the optimal attentional focus depends on the level of expertise" (Wulf, 2007, p. 150). In her book *Attention and Motor Skill Learning*, Wulf describes different levels of control: during an early stage of learning, performers tend to monitor their actions by choosing a "lower level of control" – for instance by monitoring muscle control. In later stages – when the player has gained enough experience – the goals and focus represent a "higher level of control", e.g. a strategic aspect of winning the game – leaving the body's co-ordination free to function implicitly. Interestingly, when under pressure, performers can tend to "choose a lower than necessary level of control", which can result in a drop in performance level (Wulf, 2007, p. 150). An understandable reaction to an important or demanding performing situation is that performers try to control their movements consciously and not trust the automaticity of the skill.

External focus promotes higher self-efficacy.

Self-efficacy (a person's belief in their ability to learn) is known to have an effect on motor performance (Moritz, Feltz, Fahrback & Mack, 2000). The finding that focussing externally can have a positive effect on self-efficacy was shown in a study where participants' ratings of

their confidence were measured (Pascua, Wulf & Lewthwaite, 2015). Self-efficacy in turn promotes better learning. The relationship between motivation, external focus and enhanced learning and performance is described in Wulf and Lewthwaite's OPTIMAL Theory (see Chapter 1).

#### External focus is effective regardless of being preferred.

Wulf also points out that regardless of whether a performer's preference is for another type of focus, external focus brought better results (Wulf, 2013). Many sportspeople and musicians enjoy using internal focus – possibly because it gives them a sense of being in control.

#### External focus can help to avoid performance anxiety.

Focus on the self is a strong contributor to performance anxiety (Kenny, 2011). “[...] focus on the self can be induced through instructions, feedback, or an individual's conceptions of his or her ability – tends to have detrimental effects on performance.” (Wulf & Lewthwaite, 2009, p. 110). External focus is task focus, and reduces focus on the self. A lot of research suggests that self-focus hampers both motor performance and learning, and that internal focus is connected with focus on the self (Wulf et al., 2009).

#### Experiments on external focus.

Most of the experiments carried out on external focus cited above included several trials over one or a few days, and most involved novices (beginners) – presumably because the results can be compared more easily if everyone starts off at the same level. Carefully worded instructions were generally used to differentiate internal and external focus (e.g. “to strike the ball, the swing of the leg should be as long as possible” (internal focus) versus “To strike the ball, create a pendulum-like motion with as long a duration as possible” (external focus). See Wulf, 2007, pp. 62-65; 99 for more examples. Most experiments included a retention test (at least one day after the last trial) in order to see whether learning had occurred, and some also included transfer tests in order to see if the skill learned transferred to other variations of the skill. A recent study made by Mornell & Wulf (2019) on expert musicians is explained in detail the section “Research on External Focus and the Performing Arts” below.

More longitudinal studies would shed further light on how best to use external focus and adapt it to different fields, movements and individuals. The literature leaves little doubt that external focus is a better way of learning than either internal focus or avoiding thinking about the task altogether. Further research could test the effects of external focus over longer periods of time, address how to choose a suitable distance of focus for a particular situation or individual, and apply and test the concept of external focus in (complex) field situations. More detailed experiments on experts would add to how we understand the effects of external focus. Most of the skills tested in the research on external focus were discrete skills. More research is needed to see how external focus affects serial skills, e.g. gymnastic routines or

music-making. The fact that there is very little research on the effects of external focus in the performing arts is discussed later in this chapter.

There are some studies that claim that external focus is not more effective than internal focus (e.g. Poolton, Maxwell, Masters & Raab, 2006), or that novices benefit more from internal focus (e.g. Perkins-Ceccato, Passmore & Lee, 2003). However, these claims are challenged convincingly in Wulf's review, where she points out methodological weaknesses (for instance unclear instructions given to the participants) (Wulf, 2013, pp. 91-95). To the author's knowledge, there is as yet no robust empirical evidence to show that internal focus can be more beneficial than external focus for motor learning and performance.

### **Explanations for and Mechanisms behind External Focus**

External focus allows a more overall whole-body co-ordination (movement kinematics), and seems to create more freedom of connection between the various body segments resulting in a more elegant, optimal overall movement, and less muscular effort (Wulf, 2013, p. 89).

The reason for the kind of efficient mechanisms described by Wulf is that implicit learning is going on whilst the mind is engaged by focussing on the intended movement result. It seems that focussing on the intended result frees the motor control systems to function implicitly, thus enhancing the process of learning, and triggering a quicker and more accurate response during performance. Directing attention away from the body's movement also results in directing focus away from the self. According to Wulf's theories as well as those of Diana Kenny, focus on the self is a disturbance to motor performance (Kenny, 2011).

Wulf's constrained action hypothesis is an attempt to explain the mechanisms behind external focus. Below is an excerpt from Wulf (2007), p. 114.

#### **Constrained Action Hypothesis**

- Focussing on one's movements (i.e., adopting an *internal focus*) constitutes a conscious intervention into control processes that would "normally" regulate movements effectively and efficiently. That is, trying to actively control those movements disrupts automatic control processes.
- Focussing on the movement effect (i.e., adopting an *external focus*) promotes a more automatic type of control. It takes advantage of unconscious and reflexive processes and allows them to control our movements to a greater extent. As a result, performance and learning are enhanced.

Wulf does state that the exact underlying mechanisms behind attentional focus need more investigation that could include looking at how brain activity changes when shifting from one focus to another (Wulf, 2013).

### **Research on External Focus and the Performing Arts**

As yet there is very little research on the effects of external focus on performing artists. There are several reasons for this. One is that judging an artistic performance is subjective. Errors are often too subtle to perceive or measure, and opinions vary between judges about what is a good performance. Making music and dancing are activities that are difficult to regulate to laboratory conditions as they involve an extremely complex series of tasks and movements. Most of the experiments carried out by Wulf and colleagues involved novice learners – people attempting tasks they have not done before, making the interpretation of the data straightforward. One of the crucial issues for scientists researching in the performing arts is: “What are we measuring?” (Schmidt & Lee, 2012). The following section is a brief review on the few studies that research attentional focus for musicians: Duke, Cash & Allen, 2011; Atkins & Duke, 2013; Atkins, 2017; Mornell & Wulf, 2019.

An example of the type of experiment conducted by Wulf being replicated for musicians, was one undertaken by Duke, Cash & Allen (2011), where a study was carried out on musicians using a piano keyboard task. The subjects were instructed to focus either on their fingers (internal focus), the keys (external focus), the piano hammers (more distal external focus), or the sound produced (even more distal external focus). The researchers concluded that not only was external focus more effective than internal focus (i.e. the speed at which a participant could play a 13-note sequence of two alternating notes), but also that “the more distal the focus of attention, the more accurate the motor control” (Duke, et al., 2011, p. 4). Most of the previous research on external focus relied on visual or kinaesthetic feedback (e.g. focus on your feet; focus on the target). In this study, the feedback for the external focus instruction was auditory focus (focus on the sound), indicating the potential benefits of external focus for musicians. The study, however, tested a simple two-finger movement (and not a piece of music), and used subjects who were musicians, but most of whom were not keyboard players. Most of the subjects were therefore novices on the keyboard. It is significant that there were only two keyboard players in the study and neither of them showed any improvement in speed or accuracy. The likely reason for this is that the level of difficulty was too low to show any differences. Wulf (2012) emphasises the importance of testing motor tasks that are sufficiently challenging for improvements in speed and accuracy to be discerned. In addition, the task was not a musical one, but merely a finger movement exercise. Sound was produced and auditory feedback was involved, but sound production on its own is not music, so music-making was not tested in this study. Two other studies (Atkins & Duke, 2013; Atkins, 2017) tested the effects of and external focus instructions with singers. Atkins & Duke (2013) gave a group of novice singers internal (focussing on vibrations in their throat) and external (directing sound to their fingers on their nose or the microphone or a point on the wall) foci whilst singing a three-note sequence on one vowel. Expert ratings showed that the tone quality was better with external focus. Atkins (2017) asked expert singers to focus on their soft palate (internal focus)

and on various distances (external foci). Results of this study also found that tone quality was better with external focus and that distal external focus was more effective than proximal external focus.

Anemone Van Zijl carried out research that investigated what kind of focus facilitates an expressive performance (Van Zijl, 2014; Van Zijl & Luck, 2013). Instrumentalists were asked to play a segment of music by first using technical focus, then expressive focus<sup>20</sup>, and then focusing on feeling the emotion represented in the music. The research was carried out using a multi method approach that measured the performers' movement, an analysis of audio data as well as the perception of the audience. Findings showed that focus on expression gave a higher impression of skill and a more extroverted performance than focus on technique. Van Zijl's findings suggest that focusing on musical intention can improve a performer's technical ability during performance compared to focusing on technique.

In a very recent study by Adina Mornell & Gabriele Wulf (2019), skilled musicians were asked to perform a prepared piece by using internal focus (focusing on their fingers, or in the case of singers – their lip movements, and on correct notes), and external focus (on playing for the audience and focussing on the expressive sound of the music) as well as a control trial, where they were not given any instruction. Expert raters were asked to judge the technical quality as well as the musical quality of each performance.

In their first experiment, the statistical results showed that external focus lead to better musicality but not necessarily to greater precision. Their second experiment was an improved design that involved better counterbalancing within the trials, had three rather than two expert raters with more specific criteria for rating and performers were given a 'warm up' before the first trial. It was also simpler in that all the participants did not involve singers (or brass players) so they could all be asked to focus on their fingers in the internal focus trial. Results confirmed those of the first experiment – that external focus led to better musical expression and in addition showed positive statistical results for external focus benefitting technical precision.

Mornell & Wulfs' experiments went a step further than the previous studies in that all of the participants were skilled musicians and there was a variety of instruments represented (piano, violin, clarinet, percussion, cello, tuba, horn, voice) and it involved playing complex music and not only a short sequence of notes. Musical expression and not only technical precision was tested.

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<sup>20</sup> It is interesting to note that Van Zijl considers feeling emotion to be internal focus. This author would categorise it as external focus as it is to do with the intended effect of the performer's movements and not the movements themselves. This is another example of the ambiguity of the terms internal and external focus.

In all of the aforementioned studies the effects of attentional focus were tested primarily on musical performance and not on the learning process; all were designed to test internal versus external foci and on one fragment or piece of music. Participants were given specific instructions on what to focus on. In all four studies, external focus was found to be more effective on performance than both internal focus and control conditions, and distal external focus was found to be more effective than proximal external focus. The interpretation of internal and external focus is possibly problematic in all four studies. Being instructed to focus only on throat vibrations, soft palate or on fingers is not necessarily what musicians would normally do or be instructed to do and would be difficult for a musician – especially when performing – to be able to do. Similarly some of the interpretations of external focus (for example ‘on correct notes’ or ‘playing for the audience’) could be contentious or misconstrued (for instance focussing on correct notes could be seen as external focus – focussing on playing for the audience could be interpreted as pleasing the audience and lead to self-focus).

One of the questions, therefore, for scientists who want to study the effects of external focus on performing artists is: “How do we translate the concept of external focus to the domain of music?”

A clue to answering this question is suggested by a study about external focus and ballet dancers (Guss-West & Wulf, 2016), where it was suggested that performers could focus on images, analogies, or metaphors in order to induce a distal external focus (p. 24). This type of focus makes sense also for musicians as it provides a rich representation of the effect they want to make – not only the resulting sound but also what it represents or feelings it could evoke.

### **External Focus for Music-making**

This thesis is an inquiry into the possible benefits of using external focus for musicians during learning and performance. The research carried out by Gabriele Wulf described above has shown how external focus can be used in the fields of sports and rehabilitation. Research in the performing arts suggests that external focus can improve finger movement (Duke et al., 2011), dance (Guss-West et al., 2016), (vocal) sound quality (Atkins & Duke, 2013; Atkins, 2017) and technical proficiency as well as musical expression (Mornell & Wulf, 2019). The scarcity of empirical studies on external focus for the performing arts was one of the main motivations for the current study. Deeper investigations into the possible benefits and the manner in which we can interpret external focus for musicians are required.

In order to find out what are the effects and possible benefits of external focus for musicians’ learning and performance it is necessary to ascertain what external focus is for musicians. For a golfer for instance, focussing on the movement of the golf club is a form of external focus; he is focussing on the effect of his body’s movement. Focussing on the desired trajectory of the ball would be a more distal form of external focus. For a musician, focussing on the



movement of the keys or objects (e.g. the bow) is one way of using external focus and has been suggested by Wulf and by Duke et al. Wulf also suggested focussing on the desired sound or mood of the music (Wulf, 2007, pp. 62-65). The suggestions from the research of Guss-West and Wulf suggest that using metaphor and analogy is a form of external focus (for a musician this could apply to, for example, the keys or to the sound) (Guss-West et al., 2016). Kenny (2011) suggests that for musicians, external focus would be on the sound produced.

Table 2.2 lists some examples of internal focus, external focus, distal external focus and very distal external focus as applied to musicians.

**Table 2.2 Internal and External Focus for Musicians**

<b>Internal focus</b>	<b>External focus</b>	<b>Distal external focus</b>	<b>Very distal external focus</b>
Movement of the fingers	Movement of the keys	Imagining the desired sound/reverberation	Imagining the meaning of the music
Movement or position of the arm	Movement of the valves		Imagining a picture, analogy or metaphor connected with the music
Force produced by the arm	Movement of the bow		Imagining the mood or emotion behind the music
Embouchure muscles, lip pressure	Movement of the hammers		Imagining the rhetorical expression of the music
Breathing mechanism, force or speed of air	Movement of the stick/s		Imagining a narrative or story connected with the music
Posture			
Position of larynx, soft palette, tongue			

Table 2.2 illustrates ways of focussing internally and externally whilst playing or singing music – including examples relevant for a stringed instrument a keyboard instrument, a wind instrument, a percussion instrument, or for a singer.

Information about and research on external focus is dominated by the work of Gabriele Wulf and has only relatively recently (in the last 10 years) generated a great deal of interest in the domain of sport. Wulf's research is convincing for the reason that it has been rigorously carried out in a variety of scenarios. The claims made by researchers who advocate using external focus rather than internal focus resonate with what many high-level performing artists intuitively believe or have noticed – that focussing on the desired effect or result helps to be “in the music” and does not disrupt the process by thinking about it whilst playing: “Has it ever frightened you to play, and watch your fingers moving, and not know who it is that is making them move?” (Vladimir Ashkenazy talking to Richard Masters: Masters, 2014).

Although learning through declarative processes involving analysis and internal focus has become mainstream practice in music lessons, many musicians prefer to rely on their intuition and on unconscious processes. The books *The Inner Game of Tennis* (Gallwey, 1974) and its musical version *The Inner Game of Music* (Green & Gallwey, 1987) advocate building awareness and avoiding critical analysis and judgement, and have been an inspiration to many

musicians. Research since that time – for instance on external focus – has provided a clearer understanding of how and why we can focus more effectively.