Anxiety Disorders and Trumpet Performance

by

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Abstract

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Thesis directed by Doctor Ryan Gardner

Anxiety is a normal sensation that accompanies the hardships of life. However, some individuals are more disposed to intense feelings of anxiety and dread than others. Anxiety disorders are not uncommon, as approximately one out of five individuals globally are diagnosed with an anxiety disorder at some point in their lifetime. Such disorders can impair social engagement, routine tasks, and occupational function. This is especially relevant to musicians, whose occupation involves regular refinement of fine motor skills, social hierarchies, and exposure in performance settings. There has been a wide body of research on music performance anxiety, but for those with anxiety disorders, anxiety is not confined to moments of performance but saturates multiple facets of their career and personal life. This study seeks to take a holistic approach to anxiety disorders and how they impact musicians, with trumpet playing serving as a frame of reference. This paper will discuss music performance anxiety in relation to other anxiety disorders as well as explore the effects of generalized anxiety disorder, trauma disorders, and obsessive-compulsive disorder on trumpet players. It will also offer treatment solutions and discuss music therapy as a remedy for anxiety disorders.

DEDICATION

This project is dedicated to my sister, a fellow musician with extreme anxiety, or as she refers to it, an “anxious bean.” She is vocal about how her anxiety has both hindered and aided her musical journey, defying the stigma that struggles with mental health should be kept silent. Watching her succeed in her musical endeavors, overcoming the obstacles of heightened anxiety, I am regularly inspired to persevere.

ANXIETY DISORDERS AND TRUMPET PERFORMANCE

INTRODUCTION

Anxiety disorders are disproportionately common among musicians. As stated by Winter and Hunnicutt, musicians are "more prone to obsessive-compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoia, and psychoticism."[1] A study led by Dianna Kenny found that the symptoms of affective disorders were more prevalent in an Australian orchestra than in the general population, including disorders such as social phobias (33%), post-traumatic stress disorder (22%), and depression (32%).[2] Another study of Brazilian musicians reported rates of 13% for moderate to severe general anxiety symptoms, 19% for social anxiety symptoms, and 20% for symptoms of depression.[3] Another large-scale study of Norwegian professional musicians found prevalence rates of 20.1% for symptoms of depression and 14.7% for symptoms of anxiety, which are relatively low rates in relation to global prevalence but were found to be higher when compared to other professions in Norway.[4] These rates of prevalence within the music profession are significant, as a study found that prevalence of common mental disorders globally was estimated at 29.2%.[5]

The semantics of anxiety have long been debated, but the commonly accepted definition of anxiety is encompassed in the following quote from psychologist David Barlow:

"Anxiety is a unique and coherent cognitive-affective structure within our defensive motivational system. At the heart of this structure is a sense of uncontrollability focused on future threats, danger, or other potentially negative

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[1] Heather Winter Hunnicutt and A. Scott Winter, *Notes for a lecture on Taming musical performance anxiety*, Retrieved from ssl.texmed.org/virtual/cme/PDF/12P_05.pdf, quoted in Inette Swart, "Overcoming adversity: Trauma in the lives of music performers and composers," *Psychology of Music* 42, No. 3 (2014): 388.

[2] Dianna Kenny, Tim Driscoll, and Bronwen Ackermann, "Psychological well-being in professional orchestral musicians in Australia: A descriptive population study," *Psychology of Music* 42, no. 2 (2014): 210-232, https://doi.org/10.1177/0305735612463950.

[3] Ana Elisa Medeiros Barbar, José Alexandre de Souza Crippa, and Flávia de Lima Osorio, "Performance Anxiety in Brazilian musicians: Prevalence and association with psychopathology indicators," *Journal of Affective Disorders,* 2014*:* 152-154, 381-386, https://doi.org/10.1016/j.jad.2013.09.041.

[4] Jonas Vaag, Johan Håkon Bjørngaard, and Ottar Bjerkeset, "Symptoms of anxiety and depression among Norwegian musicians compared to the general workforce," *Psychology of Music* 44, No. 2 (2016): 234–248, https://doi.org/10.1177/0305735614564910.

[5] Zachary Steel, Claire Marnane, Changiz Iranpour, Tien Chey, John W. Jackson, Vikram Patel, & Derrick Silove, "The Global Prevalence of Common Mental Disorders: a systematic review and meta-analysis 1980-2013," *International Journal of Epidemiology* 43, no. 2 (2014): 476-493.

events […] Accompanying this negative affective state is a strong physiological or somatic component that may reflect activation of distinct brain circuits..."[6]

Charles Darwin studied the nature of human anxiety in *On the Origin of Species by Means of Natural Selection*[7] and *The Expressions of the Emotions in Man and Animals*,[8] and his observations yielded what would be later coined the "fight-flight-fright (freeze)" response, now referred to by its shorter name, the fight or flight response.[9] This reaction stems from a predatory relationship between animals. Therefore, its presentation varies across species. However, the human social fear that we experience as anxiety comes from a system of submission to a dominant force.[10] The human nervous system can be separated into two parts: the central nervous system, consisting of the brain, spinal cord, and its branches, and the autonomic nervous system, consisting of the sympathetic nervous system and two branches of the parasympathetic system, the dorsal vagal system and the ventral vagal system. The sympathetic nervous system is responsible for triggering the fight or flight response, the dorsal vagal system triggers the fright (freeze) response, and the ventral vagal system regulates subconscious social behavior. Historically, neuroscientists and behavioral scientists have considered the three parts of the autonomic nervous system to balance each other in their control of vital survival functions. However, a recent theory referred to as the polyvagal theory suggests that the three systems are not in a state of equilibrium but form a hierarchy in which each system has its own behavior of taking over autonomic responses to stimuli.[11] Rather than three captains steering the same ship together as thought previously, they are instead fighting to take turns. The state of flight or fight happens when the sympathetic nervous system overrides the vagal complexes of the parasympathetic nervous system.

Anxiety is not a simple emotion but a combination of two distinct cognitive processes: anxious apprehension and anxiety sensitivity.[12] Anxious apprehension is the uneasiness at the notion of the uncontrollable outcome that the stimulus may have on the subject's personal values (i.e., the fear that a poor performance will lead to limited professional opportunities). Anxiety sensitivity, derived from expectancy

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[6] David Barlow, "Unravelling the mysteries of anxiety and its disorders from the perspective of emotion theory," *American Psychologist* 55*,* no. 11 (2000): 1249, https://psycnet.apa.org/doi/10.1037/0003-066X.55.11.1247.
[7] Charles Darwin, *On the Origin of Species by Means of Natural Selection* (London: John Murray, 1859).
[8] Charles Darwin, *The Expression of the Emotions in Man and Animals* (London: John Murray, 1872).
[9] Dianna Kenny, *The Psychology of Music Performance Anxiety* (Oxford: Oxford University Press, 2011), 37.
[10] Ibid.
[11] Ibid.
[12] Ibid., 23.

theory, is the fear of the anxiety symptoms themselves and how they may impact social scrutiny, injury, or loss of control (i.e., the fear that the symptoms of anxiety are indicators of a poor performance). The variations in how musicians display signs of anxiety may be related to how prone they are to each cognitive process.

Charles Spielberger posited the State-Trait Anxiety Theory, which differentiates between two different levels of anxiety, state anxiety and trait anxiety.[13] Spielberger describes state anxiety as a "transitory" state of anxiety, in which arousal varies in intensity and fluctuates in response to an event, circumstance, or threat. Trait anxiety is described as the baseline anxiety prevalent in the cognitive and behavioral disposition of the subject despite the absence of events, circumstances, or threats that can be identified as triggers of the autonomic nervous system. For example, if a musician suffers from performance anxiety, they will experience state anxiety triggered by a performance setting. If a musician has generalized anxiety, they will experience a heightened trait anxiety without a stimulus to prompt such anxious feelings.

The symptoms of anxiety can be broken into four categories. The first is physiological: this set of symptoms includes an increased heart rate, shallow breathing, increased sweating, etc. The effect these symptoms have on trumpet players is obvious. For effective music making, the player must have control of their physical faculties. Control of breathing is especially vital, and the shallow breathing that accompanies anxiety can be detrimental to the sound quality of the performer.

The second is cognitive: this set of symptoms pertains to the intrusive thoughts or ruminations that run through the sufferer's head such as "I'm not good enough," or "If I blow this, my career is over." Many trumpet pedagogues and performers preach the importance of a positive mindset to facilitate a successful and rewarding musical creative process. The cognitive symptoms of anxiety may impede the positive outlook often needed to create beautiful music.

The third is behavioral, referring to how the individual manages these thoughts or avoids high-stress performance situations. This can include the musician going out of their way to avoid performance or gig opportunities. These symptoms can also lead to avoidant or excessive behavior when practicing.

Finally, the fourth form of symptoms is psychological, or how the individual's perceptions of a threat affect their response to that situation.[14] As the pressure of a situation increases, attention narrows and the ability to integrate or analyze new

[13] Charles Spielberger, "Anxiety as an emotional state," *Anxiety: Current Trends in Theory and Research* (New York: Academic Press, 1972): 23-49.
[14] Kenny, *The Psychology*.

information and think ahead becomes limited, making it difficult to adapt in ensemble settings or integrate new ideas in the practice room.[15]

The physiological symptoms of anxiety can be measured upon two axes, those of somatic anxiety and physiological arousal. Somatic anxiety, or somatization, describes bodily sensations that accompany anxiousness, such as dizziness, fatigue, abdominal pain, or chest pain. Physiological arousal refers to the intensity of behavior, spanning a "continuum from deep sleep to intense excitement or fear."[16] Arousal occurs in a cycle that progresses in four steps. During the first phase of the cycle, the subject feels threatened or challenged. The next phase includes the onset of feelings of fear or arousal. Next, arousal peaks as the challenge or threat are met. Finally, arousal begins to decline as the challenge has been met. This cycle of arousal is especially important in how musicians respond to music performance anxiety, but it is also relevant to all forms of anxiety disorders.

There are multiple ways in which anxiety disorders can influence trumpet players. The most heavily focused of these is music performance anxiety, a common occurrence among all performers. Music performance anxiety has often been linked to social anxiety disorders, panic disorders, and in some cases, generalized anxiety disorders. However, anxiety disorders are not exclusive to discreet moments of performance. Anxiety disorders such as generalized anxiety disorder, post-traumatic stress disorder, and obsessive-compulsive disorder can affect the ways in which trumpet players approach the instrument, both in performance and practice. This paper aims to explore the ways in which anxiety disorders affect all facets of the musical occupation, with trumpet playing serving as the example of focus.

MUSIC PERFORMANCE ANXIETY

The feeling of sweaty palms, an upset stomach, or shaky hands are not foreign or even uncommon sensations for musicians. For performers of highly coordinated tasks under extreme pressure, performance anxiety becomes another constant in the musical occupation. A study at the University of Iowa School of Music found that 40% of students and faculty suffered from moderate performance anxiety, 21% from serious performance anxiety, and 16.1% reported that it had negatively affected their careers.[17] In many cases, this uncomfortable sensation is manageable, kept in the margins of performance. But for some, performance anxiety

[15] Robert Nideffer and Nancy Hessler, "Controlling Performance Anxiety," *College Music Symposium* 18, no. 1 (1978): 146–153, http://www.jstor.org/stable/40373929.
[16] Kenny, *The Psychology*, 27.
[17] Robert Wesner, Russell Noyes Jr., and Thomas Davis, "The Occurrence of Performance Anxiety Among Musicians," *Journal of Affective Disorders* 18, no. 3 (March 1990): 177-185, https://doi.org/10.1016/0165-0327(90)90034-6.

becomes a second performer onstage, hellbent on playing every wrong note, miscounting every rest, and undoing all the performer's demanding work. While performance anxiety can seem like a scary boogeyman, it is a normal response to stress, and it is one with treatments and solutions.

Music performance anxiety (MPA) is a natural response, and the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) states that such anxiety should not be diagnosed as an affective disorder unless it "leads to clinically significant impairment or marked distress."[18] However, many psychologists have noted that music performance anxiety can be more severe than the one-dimensional descriptor provided by the DSM-IV and therefore relate it to other disorders. Because performance anxiety is caused by a specific situation or event with potential for social scrutiny, many psychologists have categorized it as a social phobia. It is the belief of the subconscious that a performance under scrutiny may result in embarrassment or indignity, and therefore triggers the fight or flight response.[19] A 2015 study found that MPA could be predicted by the performer's disposition to social anxiety.[20] However, some psychologists debate this classification of MPA as a social phobia. Kenny argues that MPA could be classified as a focal condition, in which the symptoms of anxiety are specific to performance (in some cases, only specific performance settings) but are not present in any other facet of the musician's life, suggesting that they are otherwise healthy.[21] Kenny also suggests that extreme MPA could be a symptom of a panic disorder, in which not only does performance increase anxiety, but it also distorts the logical processing of the performer, leading them to believe that performance is an extreme source of danger.[22] However, another study suggests that MPA is more closely related to generalized anxiety disorder.[23] The wide range of connections between MPA and other disorders suggests that MPA is a complex condition that, while it is naturally experienced in the performing arts, can become severe when accompanied by other affective disorders.

Psychologist Sandra Harris notes that there are four stages that a musician goes through in the context of a performance: preparation, confrontation, during,

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[18] American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders: DSM-IV,* (Washington, DC: American Psychiatric Association, 1994).
[19] Mark Ely, "Stop Performance Anxiety!," *Music Educators Journal* 78, no. 2 (October 1991): 35–39, https://doi.org/10.2307/3398258.
[20] D. Riley Nicholson, Meghan W. Cody, and J. Gayle Beck, "Anxiety in musicians: On and off stage," *Psychology of Music* 43, no. 3 (2015): 438-449, https://psycnet.apa.org/doi/10.1177/0305735614540018.
[21] Kenny, *The Psychology*, 57.
[22] Ibid., 63,
[23] Anna Wiedemann, Daniel Vogel, Catharina Voss, & Jana Hoyer, "How does music performance anxiety relate to other anxiety disorders?," *Psychology of Music* 50, no. 1 (2022): 204-217.

and after the performance.[24] Proper execution of each of these stages can increase the chances of keeping performance anxiety from crippling the work of the musician. During the preparation period, the performer devotes most of their time to skill training and practice, but more important is the time of rest and recovery in between practice sessions as well as practicing positive cognitive strategies. Such cognitive strategies will be discussed later in this paper. The confrontation stage is the period immediately before the performance. This is the most nerve-racking stage. Cortisol levels peak 20-40 minutes before performance and arousal peaks approximately thirty seconds before beginning to perform. It is crucial that the performer acknowledge and accept these feelings before walking on stage or starting the performance. During performance, anxiety will often drop after two minutes but could escalate with an increased frequency of performance errors. After the performance, anxiety returns to normal and cortisol levels drop. It is important for the performer to strengthen the healthy cognitive strategies they used during the performance by recognizing the accomplishment.

All public performances have the potential to be sources of anxiety, but certain factors can heighten anxiety in performance. Such factors include how critical or personally relevant the audience is. A musician is more likely to experience heightened anxiety in front of their professor than a random listener on the street. Another is the impact of the performance on the musician's life, such as a high-stakes audition or a collegiate jury. Another is the amount of importance the performer places on their musical identity.[25]

Every musician has experienced some manifestation of performance anxiety. But as I mentioned before, it ails performers to different degrees. Different individuals have different tolerances and different responses to pressure.[26] While some performers might feel only a slight tremor in their hands because of their anxiety, others will breakdown under the weight of the anxiety. But breaking down under pressure should not be seen as a personal failure; it is only a physiological response to a threat that some perceive as greater than others do.

Robert Nideffer and Nancy Hessler of the Eastman School of Music noticed the varying responses to high pressure performances among students at the school and sought to evaluate whether those variations could be identified preemptively.[27] They administered what is called a Test of Attentional and Interpersonal Style, a twenty-minute test that quantifies how attentional processes are affected by anxiety. Such a test can predict which students will perform better under pressure,

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[24] Sandra Harris, "A Psychologist Views Musical Performance Anxiety," *American Music Teacher* 35, no. 3 (1986): 24–40, http://www.jstor.org/stable/43541063.
[25] Nideffer & Hessler, "Controlling Performance Anxiety."
[26] Ibid.
[27] Ibid.

which students are prone to suboptimal performance under pressure, and what kind of mistakes they are prone to making. Nideffer and Hessler identified three reactions to anxiety inducing situations. The first is withdrawal, avoidance, and refusal, the second is marked by disorganized and impulsive behavior, and the third is an attempt at controlling anxiety, leading to a narrow train of focus, rigidity, and the inability to adapt. Students who react to high pressure situations by withdrawal, avoidance, or refusal are at elevated risk of dropping out or changing their careers. They may perform adequately but can never reach their full potential. These students are often too anxious to seek feedback to help them reach the next level of performance or take too long to formulate concerns. Teachers may incorrectly view the student's silence as a confidence in abilities and will give the student less time and energy as a result, leading to continued frustration and miscommunication. The other two reactions to performance anxiety are more obvious. Students who experience performance anxiety accompanied by disorganization or impulsiveness are more likely to make discernable mental errors and may require guidance by the teacher in mental grounding. Students who try to apply control to their anxiety will likely build up tension, resulting in flawed technique and prompting a poor performance, or worse, injury.

It is unclear whether performance anxiety is an innate or learned behavior. The unashamed behavior of small children suggests that it is learned at some point in the development process of adolescents. Mark Ely argues that performance anxiety is learned through childhood experiences of being judged, ridiculed, or laughed at.[28] The classical theory of fear acquisition states that anxiety is learned in three ways, "classical conditioning, operant conditioning, and observational learning."[29] During classical conditioning, a neutral stimulus becomes conditioned and connected to a response. During operant conditioning, the response to a behavior will vary to alter the behavior. During observational learning, a response of fear to a certain stimulus will be acquired by observing another individual's fear of the same stimulus.

The role of learning and prior experience in the development of performance anxiety has been investigated in studies of young children. Performance anxiety has been found in elementary school aged children as early as the third grade, but Helene Boucher and Charlen Ryan set out to answer whether any semblance of performance anxiety exists in younger children.[30] They designed an experiment in which 66 three- to four-year-olds took part in a ten-week music program consisting

[28] Ely, "Stop Performance Anxiety!"
[29] Kenny, *The Psychology*.
[30] Hélène Boucher and Charlene Ryan, "Performance Stress and the Very Young Musician," *Journal of Research in Music Education* 58, no. 4 (January 2011): 329–345, http://www.jstor.org/stable/40961658.

of lessons and rehearsals and concluding with two concerts in short succession. One of each child's music lessons and both concerts were videotaped and analyzed for behavioral indicators of anxiety. Saliva samples were taken to analyze cortisol secretion. The parents answered questionnaires on the child's prior performance history, and the children completed a pictorial self-report of their anticipatory anxiety. The results of this experiment indicated that children do experience stress in performance situations as there was an increase of cortisol and anxious behaviors leading to the performances. Children who had previously performed publicly had lower anticipatory stress scores than those who had not but had higher cortisol levels, suggesting a heightened physiological response to performance situations. These results seem to suggest that some individuals may be prone to performance anxiety while it may also be learned or aggravated by critical performance experiences. Those who are prone to performance anxiety may exhibit other formal anxiety disorders or anxious traits such as perfectionism or the need for complete personal control. Perfectionism imposed by social structures such as friend groups, schools, or jobs has a stronger association with heightened performance anxiety than self-imposed perfectionism.[31]

While I have discussed many of the negatives of performance anxiety, a degree of arousal can benefit the practice and performance of a musician. Wilson and Roland commented that the quality of performance is connected to arousal with an inverted-U curve, referred to as the Yerkes-Dodson Law.[32] This law also states that the peak of the curve comes earlier for more complex tasks than simpler ones. There are three other factors that Wilson and Roland tie into this model: trait anxiety (personality traits that might make someone prone to stress), situational stress (the nature of the environmental pressures), and task mastery (how well the performer has learned the material). Whether arousal is helpful or hurtful depends on the interactions of these three factors.

However, as mentioned earlier, anxiety is not exclusive to public performance. A 2015 study placed 130 professional musicians in different performance settings, solo performances, ensemble performances, and solitary practice. The researchers then evaluated indicators of anxiety across those three settings. The study found that anxiety in solo performance setting was the highest of the three settings that were examined, and anxiety in solitary practice was the lowest of the performance settings. However, some level of anxiety was reported by professional musicians in the practice setting.[33] The authors of the study contend

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[31] Glen Wilson and David Roland, "Performance Anxiety," In *The Science & Psychology of Music Performance: Creative Strategies for Teaching and Learning,* ed. Richard Parncutt and Gary McPherson (Oxford: Oxford University Press, 2002), 47-61, https://doi.org/10.1093/acprof:oso/9780195138108.001.0001.

[32] Ibid.

[33] Nicholson, Cody, and Beck, "Anxiety in musicians," 445.

that the report of anxiety in solitary practice indicates a form of anxiety described by Kenny as a "disorder of the self," in which the audience the musician is performing for is their own self-identity and ego.[34] Such vulnerability of self-identity or the absence of self-concept clarity is theorized to be closely related to generalized anxiety disorders[35] or trauma disorders.[36] For this reason, it is important to discuss these disorders in the context of practice habits.

GENERALIZED ANXIETY DISORDER

Generalized anxiety disorder (GAD) is a somewhat loosely defined condition. It was included in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R), published in 1980, a relatively recent addition to the taxonomy of anxiety disorders. The disorder includes all presentations of anxiety that do not meet the specific criteria of other anxiety disorders.[37] Sufferers of GAD experience chronic worrying and anxiety that cannot be attributed to a specific cause. Symptoms include restlessness, fatigue, difficulty concentrating, irritability, muscle tension, and sleep disturbance. For a GAD diagnosis, the individual must experience symptoms for over six months with episodes of worrying or anxiety occurring more days than not.

As mentioned previously, music performance anxiety can be tied to generalized anxiety disorders. However, generalized anxiety disorders can affect the way a musician learns in the practice room. We can discuss how generalized anxiety can affect musical learning and practice through the concepts of Hullian learning theory and drive theory. Hullian learning theory states that the excitability (anxiety) of a subject is a multiplicative function of the subject's drive and habit strength. In other words, the physiological or psychological needs of a subject facilitate the drive to learn a task by providing a reward upon successful learning. Drive theory, an extension of Hullian learning theory, states that drive will increase as the physiological or psychological need is not met and will return to homeostasis once the need is met, relying on an internal feedback control system. In an analysis of Hullian learning theory and its relationship with drive theory, psychologists Spielberger and Heinrich reported the relationship between the difficulty of the

[34] Kenny, *The Psychology*, 260.
[35] Andrea Kusec, Kathleen Tallon, and Naomi Koerner, "Intolerance of uncertainty, causal uncertainty, causal importance, self-concept clarity and their relations to generalized anxiety disorder," *Cognitive Behaviour Therapy* 45, no. 4 (2016): 307-323, https://doi.org/10.1080/16506073.2016.1171391.
[36] Kenny, *The Psychology*, 235.
[37] Ibid., 36.

task being learned and the trait anxiety of the learner.[38] This relationship can be summarized through the following three assumptions:

1. For simple learning tasks, in which desirable habits are dominant and undesirable habits are minimal, high-anxiety subjects will learn to perform the task more efficiently than low-anxiety subjects.
2. For complex learning tasks, in which undesirable habits are stronger than desirable habits, the task learning of high-anxiety subjects will be inferior to that of low-anxiety subjects.
3. For intermediate learning tasks, the stage of learning dictates habit enforcement. Heightened anxiety is detrimental in the early learning phases but constructive in the later learning phases.

Spielberger later extended these relationships, including the factor of the intelligence of the subject. This extension yielded the following three predictions:

1. For subjects with heightened intelligence, high anxiety facilitates proper performance of most learning tasks, especially in the later learning phases.
2. For subjects with average intelligence, high anxiety is more effective in learning simple tasks and, later in learning, intermediate tasks. On very difficult tasks, high anxiety is detrimental to the learning of the task.
3. For subjects with low intelligence, high anxiety facilitates performance on simple tasks that have already been mastered, but high-anxiety individuals struggle to learn difficult tasks.

Teachers and performers can utilize these theories to facilitate the implementation of new habits. In students who display higher than average anxiety, it would be beneficial for the teacher to work with the student on simple learning tasks earlier in their studies, such as breathing habits, hand position, or posture. The teacher can advance the student to intermediate learning tasks as they see progress in the student but should be warry of advancing them to complex learning tasks, as the student's anxiety could hinder such an accelerated rate of learning. While it may be unfair of the teacher to make assumptions about the student's intelligence, Spielberger's extension could be applied in a similar fashion.

Generalized anxiety can result in the physiological, cognitive, behavioral, and psychological responses present in music performance anxiety as well as other forms of anxiety such as panic disorders or social phobias. However, as opposed to these other conditions, GAD is not triggered by a specific stimulus. Therefore, trumpet players and other musicians cannot take action to prevent such responses

[38] Donald L. Hamann, "The Assessment of Trait-State Anxiety and Musical Performance" in *Advances in Personality Assessment*, Vol. 5, ed. C.D. Spielberger and J.N. Butcher, (Hillsdale, NJ: Lawrence Erlbaum Associates, Inc., 1985): 135-136.

in the practice room. As a result, these symptoms associated with performance anxiety can creep into practice habits. When practicing, trumpet players suffering from GAD may experience dry mouth, shaking and tremors, or shallow breathing, all of which can contribute to inefficient or ineffective practice habits. The increased arousal that results from GAD can cause muscle tension and fatigue, inhibiting the physical mechanics of performance.[39] Some players may display avoidant behavior by refusing to practice specific material or even practice at all. The hyperawareness or arousal attributable to anxiety may also lead a trumpet player to overanalyze the physical actions necessary to play the instrument, leading to a paralysis-by-analysis scenario.

While generalized anxiety can cause impediments to the episodic practice habits of trumpet players, it can also lead to long-lasting effects. Neurological disorders have been tied to generalized anxiety. A 2004 study found that musicians suffering from chronic pain or task-specific focal dystonia often display psychological patterns indicative of generalized anxiety disorders.[40] Not only that, but the study concluded that such psychological patterns were present before the onset of the playing conditions. The dystonic subjects of the study were also found to demonstrate severe perfectionist tendencies. However, the study does not distinguish between musicians who were being treated for their anxiety and those who were not. Empirical study on the treatment of anxiety disorders to prevent such playing conditions is needed.

As mentioned, generalized anxiety can impede nearly every facet of life. For those with high-stress jobs that require optimal performance such as musicians, generalized anxiety can be detrimental to their careers. It is important for trumpet players as well as all other musicians to prioritize treatment for generalized anxiety so as to avoid occupational setbacks.

TRAUMA DISORDERS

Traumatic experiences are indiscriminatory; they can happen to anyone regardless of occupation, social class, or other demographic markers. Inette Swart defines emotional trauma as a "toxic condition, a mixture of intense anxiety, absolute helplessness, and a loss of control."[41] An event can be considered traumatic if its impact remains unresolved. Trauma physically alters the victim's brain, changing the function of synapses, neurons, and neurochemicals, "consequently

[39] Inette Swart, "Overcoming adversity: Trauma in the lives of music performers and composers," *Psychology of Music* 42, no. 3 (2014): 391.
[40] Hans-Christian Jabusch, Sandra V. Muller, and Eckart Altenmuller, "Anxiety in Musicians with Focal Dystonia and Those with Chronic Pain," *Movement Disorders* 19, no. 10 (2004): 1169-1238.
[41] Inette Swart, "Overcoming adversity," 387.

changing the perceptual experience that constitutes the mind."[42] The brain loses its ability to distinguish the present from the past traumatic event, resulting in an inability to adapt to the future. Reactions to a traumatic event can include denial, dissociation, constriction, hyperarousal, and emotions of helplessness. Of those who experience traumatic experiences, it is estimated that 70% recover, 20% suffer from PTSD, and 10% show Post-Traumatic Growth.[43]

Trauma can lead to two disorders, acute stress disorder and post-traumatic stress disorder. It is important to note the difference between these two conditions. Acute stress disorder (ASD) occurs when a victim of trauma experiences symptoms for more than two days but resolves such symptoms within four weeks. The symptoms include characteristic anxiety or dissociative behavior. Characteristic anxiety is defined by the impairment of regular daily function, hyperarousal, re-experiencing of traumatic events, and avoidance of any triggers. Dissociative behavior includes a sense of detachment, emotional disinterest, numbing, depersonalization, or dissociative memory loss. The traumatic events that lead to post-traumatic stress disorder (PTSD) are specified by the DSM-IV as events that threatened death or serious injury or threatened the "physical integrity of the self or others."[44] Symptoms of PTSD include those also experienced from ASD, but such symptoms in the case of PTSD last for more than one month and cause impairment of occupational or social activity. The severity of response to trauma is influenced by the nature, duration, and severity of the traumatic experiences. Such factors can be objectively quantified but exclude the subjective past experiences of the victim. As Swart states, "past experiences shape people's subjective perception of the extent of the threat and their capacity to respond adequately and defend themselves."[45] While both ASD and PTSD include stress in their name, the two conditions are more closely related to trauma than stress. Stress and trauma share many similarities, but stress is accompanied by the fight or flight response triggered by the sympathetic nervous system while trauma results in a freeze response triggered by the parasympathetic nervous system.[46]

Trauma can have a complex effect on the practice and performance of music. Performers use their craft to interpret the musical intentions as well as the emotions of the composer. Therefore, musicians are exposed to and experience a complex range of emotions. For some performers who suffer from trauma disorders, this can be therapeutic, while for others, it can be overwhelming. Trauma victims have a distrust of the arousal cycle, associating any arousal with danger. They also

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[42] Ibid., 387.
[43] Ibid.
[44] Ibid., 388.
[45] Ibid.
[46] Robert Scaer, *The Trauma Spectrum: Hidden Wounds and Human Resiliency* (London: WW. Norton, 2005).

may have difficulty differentiating excitement from anxiety. When experiencing the heightened emotional weight of music, the musician potentially becomes exposed to a similar state of arousal felt during the traumatic experience, triggering changes in memory perception and unconscious behavior.[47] For some victims, some traumatic memories may only be recalled when they are placed in that state of increased awareness and hyperarousal associated with creating music. Therefore, a victim of trauma is likely to display avoidant and anxious behavior in respects to the physiological state that results from music performance or practice. Victims are likely to prevent the completion of the arousal cycle and remain in a state of fear. The dissociative behavior symptomatic of trauma disorders can negatively impact how present the performer is during performance and practice. Many victims may be unaware of these unconscious tendencies and cannot identify further action to place them in a state of relaxation. Healing from the unconscious behavior associated with trauma disorders involves "an awareness of physical and mental signs of arousal; acknowledging the signs; and letting the symptoms peak and thereafter diminish and resolve."[48]

There are several other symptoms of trauma disorders that can inhibit the occupational life of trumpet players. Orofacial pain is the most obvious example. Chronic orofacial pain is a frequently reported symptom in victims of emotional trauma. This is due to the number of common neuroimmunological fibers shared between the trigeminal nerve responsible for facial sensation and the pathophysiological processing system active in victims of PTSD.[49] For obvious reasons, this pain could interfere with the pressure of the instrument against the embouchure and potentially cause unbearable pain when playing the instrument.

PTSD can also interfere with the tolerance of practice or performance space. Claustrophobia, the fear of what might happen in an enclosed space, is a common comorbidity of PTSD.[50] A musician suffering from PTSD may experience a fear of the confined space of a practice room. As the trumpet is naturally a louder instrument, a trumpet player suffering from PTSD-related claustrophobia may feel suffocated by the already small room in tandem with the large body of sound they are producing. On the opposite end of the spectrum, some victims of traumatic events experience agoraphobia, a condition in which the sufferer experiences a fear of large public spaces where immediate escape is difficult.[51] Those suffering from

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[47] Swart, "Overcoming Adversity," 391.
[48] Ibid., 397.
[49] Davor Vagic, Natalija Prica, and Drazen Shejbal, "Posttraumatic Stress Disorder and Orofacial Pain," *Acta Stomatologica Craotica* 49, no. 1 (March 2015): 54-59.
[50] Brenda Wiederhold and Mark Wiederhold, "Claustrophobia," in *Virtual reality therapy for anxiety disorders: Advances in evaluation and treatment* (Washington, DC: American Psychological Association, 2005): 165-171, https://doi.org/10.1037/10858-015.
[51] Ibid.

agoraphobia may experience panic or anxiety in large concert halls, especially when performing in a large ensemble, where exit from the stage in the case of an emergency can be more arduous.

Sensitivity to sound volume is another obvious hindrance to trumpet players suffering from PTSD. Hyperacusis, the intolerance of sounds at a volume that would not be considered loud by the standards of healthy individuals, is a condition often linked to trauma disorders. Trumpet players suffering from PTSD may have an intolerance to louder dynamic levels and therefore avoid playing above a certain threshold.

Swart claims that trauma can lead to positive outcomes. She argues that certain artists "matured through experiences beyond the ordinary, […] and this enabled them to compose or interpret music at a level exceeding that of their peers and predecessors."[52] This ability to transform the aftermath of trauma into superior artistry is part of a process referred to as post-traumatic growth.

OBSESSIVE-COMPULSIVE DISORDER

Many musicians, especially trumpet players and other brass instruments, naturally experience compulsions by nature. Brass players regularly follow a specific warm-up or a daily routine. By following this routine, they are reinforcing it as a habit. When, for some reason, the musician cannot follow that routine, it can lead to some cognitive distress. However, some musicians are predisposed to a heightened sense of compulsion. Musicians who suffer from obsessive-compulsive disorder (OCD) might find it intolerable to break their routine in any way, leading to an inability to adapt or obsessions with a particular aspect of their playing.

The Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-V-TR) describes obsessive-compulsive disorder as a condition in which an individual experiences "recurrent and persistent thoughts, urges, or impulses that are experienced […] as intrusive and unwanted, and that in most individuals cause marked anxiety or distress." Individuals suffering from OCD attempt to silence these intrusive thoughts by carrying out compulsions, defined as "repetitive behaviors" or "mental acts" that are "aimed at preventing or reducing anxiety or distress, or preventing some dreaded event or situation."[53] The categorization of OCD as an anxiety disorder is unclear. In the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), the disorder was categorized as an anxiety disorder, but in the fifth edition (DSM-V), it is considered to belong to a

[52] Swart, "Overcoming Adversity," 394.
[53] American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders*, 5th ed., Text Revision (Washington, DC: American Psychiatric Association, 2022).

class of its own. Nonetheless, the symptoms of OCD are anxiety inducing, and interfere in the lives of musicians as any anxiety disorder would.

OCD is often associated with extreme tidiness or germaphobia. However, it is a condition that can present itself in many different capacities. New mothers who suffer from OCD often experience intrusive thoughts of harming their child and will seek to silence those thoughts through compulsive rituals such as removing all sharp objects from their home or padding any blunt surfaces. Due to the stereotype that all individuals with OCD are extremely tidy or germophobic, many that display other symptoms of OCD may not realize to seek a diagnosis or treatment.

In musicians, OCD can present itself as compulsive practicing behaviors. Compulsive practicing refers to the act of practicing with only the goal of silencing the obsession, neglecting musical goals or strategic approaches to implement new habits. Compulsive practicing may mean only practicing one exercise for an extended period or feeling unable to conclude the practice session. Musicians may also obsess over instrument maintenance, unable to focus on their practice or performance unless their instrument is oiled, greased, and polished to perfection. Checking is also a recurrent compulsion prevalent in OCD, and trumpet players may feel a compulsion to check certain parts of their instrument, such as the compulsion to check that the valves are aligned or that the valve caps are all present even though there is nothing to suggest otherwise. Those with OCD often demonstrate resistance to change. This can provide conflict to the trumpet player, as music requires adaptability, and improving on the instrument demands some degree of adjustment. Even if the obsessive-compulsive behavior is not in relation to playing the instrument, intrusive thoughts can distract the musician, leading to less effective practice or performance.

There are two motivational factors identifiable within sufferers of OCD: "harm avoidance" and "completeness."[54] Harm avoidance is prevalent in most anxiety disorders, characterized by anxious apprehension, threat sensitivity, and avoidance of perceived threats. Incompleteness, described by Summerfeldt et. al. as "the drive to quell profound feelings of imperfection – 'not just right[ness]," is unique to OCD.[55] The compulsion to correct incompleteness can lead those with OCD to display pathological perfectionism.

These two motivators are applicable to trumpet performance. Harm avoidance can be considered as the intense desire to avoid a poor performance at all

[54] Laura J. Summerfeldt, Patricia H. Kloosterman, Martin M. Antony, and Richard P. Swinson, "Examining an Obsessive-Compulsive Core Dimensions Model: Structural Validity of Harm Avoidance and Incompleteness," *Journal of Obsessive-Compulsive and Related Disorders* 4, no. 2 (April 2014): 84.
[55] Ibid.

costs. Consider a trumpet player who has an upcoming recital. If that trumpet player experiences a less than satisfactory practice session, they are likely to experience intense anxiety that it could be an indicator that their upcoming recital will be disastrous. While a perfectly healthy trumpet player might experience some frustration from a disappointing practice session, they are more likely to put the instrument away and return to it later with a fresh perspective. However, with a trumpet player suffering from OCD, they are more likely to obsess over the idea that their upcoming recital may be disappointing and will attempt to silence this obsession through compulsive practicing other ritualistic behavior. The motivation of completeness is not dependent on an upcoming performance but can cause panic at any time. Consider a trumpet player who is working on an etude. A healthy trumpet player may be able to acknowledge that perfection is unobtainable and will work on the etude with only the goal of improving their craft. However, a trumpet player who suffers from OCD may struggle to look past any small flaws when working on the etude, leading to obsession and compulsive practicing.

Compulsive practicing can be detrimental, as it can lead to injury or difficulty focusing on anything outside of the musician's obsession. However, the heightened perfectionism of those with OCD can also be constructive. A 2015 study found that there is a correlation between obsessive-compulsive traits and the amount of time spent practicing. The study also found that there is a correlation of obsessive-compulsive traits and musical skill, as 88.89% of the participants who were diagnosed with OCD had received music scholarship, while only 63.31% of the participants not diagnosed with OCD received scholarship.[56]

OCD is accompanied by cognitive inflexibility, the inability to focus on multiple streams of cognitive function.[57] This can be problematic, as musicians are required to process aural input (such as other musicians in an ensemble setting), respond to visual stimuli (reading music or watching the conductor), and execute higher motor function (play the instrument) simultaneously. Musicians suffering from OCD may struggle to focus on more than one of these facets at once.

There are two unusual musical phenomena related to OCD. The first is that of musical obsession. While earworms are common, musical obsession is a condition in which the sufferer experiences excessive musical pseudo-hallucinations which cause extreme anxiety. In one case study, a thirty-year-old composer and songwriter began to hear intrusive occurrences of his own melodies. He began obsessing over the melodies that ran through his head, imagining various settings for the melody without satisfaction, and his obsession began interfering with his occupational and

[56] Jared O'Leary, "An Exploratory Correlational Study among Music Scholarships, Average Amount of Hours Practiced, and Obsessive-Compulsive Traits" Arizona State University, 2015: 15.
[57] Sarah Ting, "Effects of Music on the Psychopathology of Obsessive Compulsive Disorder (OCD)," (M.S. diss., Columbia University, 2018): 20.

personal life. This composer also developed obsessive patterns of "repeated checking, correcting, and maintenance of symmetry compulsions," suggesting that musical obsession correlates with other obsessive-compulsive traits.[58] The onset of musical obsession often occurs after the victim has spent a lot of time exposed to music. Those suffering from musical obsession will often demonstrate behaviors of avoidance. For example, a patient who suffered from an obsession of ring tones avoided ring tones at great lengths, wearing ear plugs, keeping his phone on silent, pleading that others do the same, and avoiding places where he might hear ring tones.[59] Other patients might attempt to distract themselves from their musical obsession by performing cognitive rituals. It should be noted that musical obsession is extremely rare, but there are some reported cases of professional musicians developing the ailment, in which cases their careers were impacted by the disorder.[60] There are no readily available case studies of trumpet players who have developed this disorder, but it is likely that such an occurrence is possible.

The second phenomenon is that of music perception and the intense need for harmony and alignment in individuals with OCD. One study found that individuals with obsessive-compulsive traits displayed heightened distress and a faster reaction to harmonic dissonance.[61] A subsequent study found patients with a formal OCD diagnosis experienced less activation in sections of the brain during chord sequences that violate harmonic expectancy, suggesting that OCD patients are "excessively engaged in processing the implicit structure embedded in music stimuli."[62] These findings may suggest that musicians who suffer from OCD may have difficulty working on music that does not strictly follow the tonal schema of western harmony. Trumpet players suffering from OCD may limit themselves to repertoire that suits their need for harmonic expectancy.

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[58] Amitabh Saha, "Musical obsessions," *Industrial Psychiatry Journal* 21, no. 1 (June 2012): 64.
[59] Steven Taylor, Dean McKay, Euripedes C. Miguel, Maria Alice De Mathis, Chittaranjan Andrade, Niraj Ahuja, Debbie Sookman, Jun Soo Kwon, Min Jung Huh, Bradley C. Riemann, Jean Cottraux, Kieron O'Connor, Lisa R. Hale, Jonathan S. Abramowitz, Leonardo F. Fontenelle, and Eric A. Storch, "Musical obsessions: A comprehensive review of neglected clinical phenomena," *Journal of Anxiety Disorders* 28, no. 6, (August 2014): 584, https://doi.org/10.1016/j.janxdis.2014.06.003.
[60] Thanh Phuong Anh Truong, Briana Applewhite, Annie Heiderscheit, and Hubertus Himmerich, "A systematic review of scientific studies and case reports on music and obsessive-compulsive disorder," *International Journal of Environmental Research and Public Health* 18, no. 22 (2021): 60, https://doi.org/10.3390/ijerph182211799.
[61] Judith Buse, Denise Dörfel, Hannah Lange, Stefan Ehrlich, Alexander Münchau, and Veit Roessner, "Harmonic expectancy violations elicit not-just-right-experiences: A paradigm for investigating obsessive-compulsive characteristics?," *Cognitive Neuroscience* 6, no. 1 (2015): 8–15, https://doi.org/10.1080/17588928.2014.954991.
[62] Judith Buse and Veit Roessner, "Neural correlates of processing harmonic expectancy violations in children and adolescents with OCD," *NeuroImage Clinical* 10 (2016): 267–273, https://doi.org/10.1016/j.nicl.2015.12.006.

Obsessive-compulsive disorder may seem like an unlikely suspect as a hindrance to musicians. However, as this section of the paper has discussed, OCD is not as simple as being tidy or organized. Its symptoms can present themselves in many ways, some of which can be severely debilitating to the musical lives of trumpet players and other instrumentalists.

TREATMENT OPTIONS AND PREVENTION

Musicians and their mentors have adopted a variety of methods to manage the symptoms of anxiety, both in performance and in practice, some more effective than others. Many performers and educators have attempted to use quick fixes to cure performance anxiety. For example, many performers have been instructed to imagine the audience in their underwear, to eat bananas before walking onstage, or to practice even harder. However, these rules of thumb and folk remedies fail to acknowledge that every musician's anxiety is different, and the treatment should not be the same across the board.

There are medical treatments that the musician can seek outside of the classroom or concert hall. Psychoanalysis is the lengthiest treatment, where the treating psychologist might assume that anxiety is a response to some internal dissonance requiring lengthy treatment. Therefore, to overcome anxiety, the psychologist will walk the patient through the process of understanding the inner workings of their mind. While psychoanalysts might try to remove the anxiety altogether, behaviorists are more oriented toward modifying the response the subject has to performance exposure. Behaviorists believe that the uncontrollable, unpredictable nature of events is anxiety inducing, producing negative cognitive monologue and the physical symptoms of the fight or flight response. These physiological and cognitive responses feed off each other and result in a continuous downward spiral.

Baritone Richard Davis lists several treatments that a behaviorist might suggest for patients.[63] At the start of systematic desensitization, the patient will rank a series of images from least to most anxiety inducing. Once the subject is relaxed, the therapist will start presenting the images in the order that they were ranked. The goal of the patient is to remain completely relaxed and show no signs of panic throughout the succession of images. Another treatment, referred to as implosion, consists of the patient visualizing an extreme scenario repeatedly in vivid detail. For example, a patient might imagine being swarmed by an angry mob after a botched performance or entering a practice room, only to discover that they

[63] Richard Davis, "Performance Anxiety," *American Music Teacher* 44, no. 1 (1994): 24–27, http://www.jstor.org/stable/43542724.

had completely forgotten how to play their instrument. Through familiarity with this visualization, the patient will be able to recognize that it is not based on reality. In attentional training, the patient will be coached through turning a negative thought into a positive one. During cognitive therapy, the patient alters the perception of an imaginary threat such as performance by comparing it to a real threat, and autogenic therapy evokes deep relaxation through the repetition of calming phrases while focusing attention on a specific body part. During humanistic therapies, the therapist focuses on the patient's willingness to grow and realize their full potential through the stressful events in question. There are also physiological strategies, such as meditation, aerobic exercise, and biofeedback that induce a sense of well-being in opposition with the fight or flight response.

Most students will benefit from the constant exposure to performance experiences, but for some severe cases, the situation can be exacerbated with repeated exposure. For example, if the musician is repeatedly becoming tense when performing due to MPA, their body is being conditioned to tense up when placed in a position of exposure and the habit will be more difficult to break. While repeated exposure to performance experiences may exacerbate the condition of some more extreme cases of performance anxiety, repeated exposure to low-intensity variants of the anticipated stressor may work for some more manageable cases. Donald Meichenbaum devised a process called stress inoculation that rests on this principle.[64] For example, an individual attempting to conquer their fear of heights might start by standing on top of a van until that feels comfortable and move up to something higher until they are eventually able to board a plane. In the context of music, this could mean starting out performing in front of smaller audiences or performing works with less technical demands before performing harder repertoire for larger audiences.

Many performers have turned to medications to mitigate the symptoms of anxiety. Beta blockers (ß-blockers) are a common solution to remedy the symptoms of MPA. Beta blockers work by blocking the adrenergic beta receptors which receive the neurotransmitters norepinephrine and adrenaline, both responsible for the fight or flight response. While beta blockers are successful in diminishing the physiological responses to MPA, it is important to note that this medication does not alter the cognitive, behavioral, or psychological symptoms.

There is a cost-benefit tradeoff involved when a musician chooses to take beta blockers. Many musicians have posited that using beta blockers may cause them to become emotionally detached from the music they are performing. However, a study by Jacqueline Nubé found that no such symptoms of beta blockers could be

[64] Ibid.

confirmed conclusively.[65] For musicians with asthma, beta blockers have been reported to have worsened respiratory function.[66] Obviously, this is problematic for trumpet players and other brass and wind instruments. Trumpet players with asthma should be aware of this risk and discontinue use of beta blockers if they notice asthmatic symptoms worsening. Dry mouth, medically named xerostomia, has also been reported as a side effect of beta blockers.[67] Dry mouth can inhibit trumpet playing by making tongue function more laborious than usual. Some players also depend on wetting their lips before placing the mouthpiece which becomes more difficult when suffering from dry mouth.

Inette Swart argues that beta blockers should not be used indiscriminately for severe cases of MPA as a result of trauma, stating that the medication can "interfere with the natural resolution of the arousal cycle induced by the fight, flight, or freeze response, and hamper complete recovery."[68] Swart suggests that the only solution to interference of PTSD on a musician's occupation is psychotherapy with the aim of resolving the trauma and the "integration of experience, emotion, and cognition."[69]

GAD is generally treated with the previously mentioned psychotherapies or behavioral therapies in combination with antidepressant medications such as selective serotonin reuptake inhibitors (SSRI) or serotonin and norepinephrine reuptake inhibitors (SNRI). SSRIs increase the amount of serotonin, the chemical responsible for mood regulation, in the patient's brain by preventing the nerve cells from reabsorbing used serotonin. SNRIs act the same as SSRIs but also increase the amount of norepinephrine, the neurochemical responsible for stress reactions, in the same manner. Another commonly prescribed medication for generalized anxiety is an anxiolytic called buspirone, a medication that balances the saturation of neurotransmitters. Doctors will also prescribe sedatives called benzodiazepines, but they are generally only effective for acute sporadic anxiety such as that found in panic disorders. Medications such as barbiturates and vasodilators are typically the last medical resort.

Some musicians also find relief of anxiety through rituals, superstitions, fate, or religion. Most performers and athletes have some sort of pre-performance ritual that they rely on to calm their nerves, such as wearing a certain pair of socks or drinking a certain brand of soda. However, for musicians with obsessive-compulsive

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[65] Jacqueline Nubé, "Beta-Blockers: Effects on Performing Musicians," *Medical Problems of Performing Artists* 6, no. 2 (1991): 61–68, http://www.jstor.org/stable/45440335.
[66] Robert Sataloff, Deborah Rosen, and Steven Levy, "Performance Anxiety: What Singing Teachers Should Know," *Journal of Singing* 56 (2000): 30-33.
[67] Murthykumar Karthikeyan, "Antihypertensive Drugs Induced Xerostomia: A Short Review," *Research Journal of Phramacy and Technology* 9, no. 5 (2016): 591-592.
[68] Swart, "Overcoming Adversity," 397.
[69] Ibid.

traits, these rituals have the potential to become compulsive, only temporarily silencing the intrusive ruminations. SSRIs are a common treatment option for OCD in combination with cognitive behavioral therapy.

Others perform what is called imagineering, the process of imagining the optimal upcoming performance in vivid detail. For others, it helps to lower expectations and relieve themselves from the pressure of performing at 100%. Another strategy is learning material to the point where its performance has become a reflex. While this method is theoretically beneficial, the amount of focus and preparation required to reach this level of performance is excessive and unhealthy with the potential to lead to injury or burnout.

While this discussion of anxiety has focused on the individual, it is important to mention anxiety as shared among groups such as ensembles or collegiate studios. Eilam and Izhara examined how group anxiety levels differ from individual anxiety levels.[70] The experiment found that, when presented with the same threat, individuals displayed varying levels of anxiety. However, when a group was exposed to a common threat together, their anxiety levels were quantitatively closer to each other. While there is scant literature relating this group anxiety to orchestral musicians, there is a stigma that if one musician expresses their anxiety or displays anxious behavior to another musician in the group, the anxiety will spread throughout the group.

If anxiety is shared by a group, it would stand that a collegiate studio could be affected by anxious behaviors. Therefore, it is an educator's responsibility to avoid perpetuating an environment that fosters anxiety. As I mentioned earlier, there is a learned aspect of performance anxiety. While collegiate music schools attempt to offer education in the complexities of careers in the real world, warts and all, it is important to not let those complexities instill anxieties within young students who are still learning to perform and developing attitudes toward their career. The late pedagogue Richard Millar stated that "no matter what the technical orientation or level of skill, a pessimistic singer is not a successful singer; mental attitude can make or break a career."[71]

A teacher who is truly invested in advancing the technical, musical, and intrapersonal abilities of their student will aim to teach in a way to preemptively correct negative thoughts or behaviors. Therefore, students need to feel free to discuss difficulties or concerns openly and without judgement. The easiest course of

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[70] Rony Izhar and David Eilam, "Together they stand: A life-threatening event reduces individual behavioral availability in groups of voles," *Behavioural Brain Research* 208, no. 1 (March 2010): 282-285, https://doi.org/10.1016/j.bbr.2009.11.045.

[71] Jessica Riley, "Reducing Anxiety: Studio Strategies for Performing Salvation," *Music Educators Journal* 98, no. 3 (March 2012): 65–70, http://www.jstor.org/stable/41433282.

action is to be a positive model as a teacher. Through observing optimal performance characteristics from their teacher, the student can model and rehearse the same positive characteristics.[72] This reinforcement of positive attitudes and behaviors is not confined to performance setting but also applies to confidence in and a positive outlook on self-identity. Shirley Emmons and Alma Thomas wrote that "some students may be negative not only about […] technique but also about their self, which attitude can be far more damaging."[73]

Some studio teachers have found journal writing to be beneficial for their students. Through tracking their thoughts over the course of a week at a time, the students can identify troublesome thoughts that are detrimental to their musical growth.[74] This way, students can confront deeply personal thoughts without their teacher being intrusive.

Another method that can be used in the lesson setting is a technique called thought stopping. This includes having an external force like a therapist or teacher say something to call attention to or shut down negative thoughts when they enter the conversation.[75] In a lesson or classroom setting, the teacher could hold up a visual stimulus such as a stop sign every time a student says something negative.

An emphasis on general health and well-being as a priority may seem insignificant in the context of managing anxiety, but its benefits cannot be overlooked. Especially in the collegiate setting, students must be reminded that sleep, hydration, exercise, and a healthy diet are some of the most important contributors to academic and musical success. This reminder will be most impactful if it comes from their teacher, someone who only wants the best for their students.

MUSIC THERAPY AND ANXIETY

Any discussion of mental disorders and music would be incomplete without mention of music therapy as a form of treatment. While the bulk of this paper has been about the effect anxiety disorders have on music, music can also have a positive effect on anxiety disorders.

One 2011 study divided fifty-seven college students into four groups. Each group participated in thirty-minute sessions, one group assigned to piano playing, another to calligraphy, and another to clay molding, with the final group remaining silent as a control group. The group assigned to piano playing demonstrated the greatest decrease in stress levels measured in cortisol levels and an administered

[72] Davis, "Performance Anxiety."
[73] Riley, "Reducing Anxiety."
[74] Ibid.
[75] Davis, "Performance Anxiety."

state-trait anxiety inventory (STAI).[76] There have been several studies on the effects of listening to music and generalized anxiety disorder, yielding the consensus that music therapy is an appropriate treatment for generalized anxiety.[77] However, there are few available studies on the effect of active music creation and GAD.

Music therapist and psychoanalyst Louise Montello believes that performers can use music to address traumatic experiences rather than avoid them.[78] Swart agrees that music therapy can be an appropriate treatment for trauma related disorders, as trauma disrupts the connection between the brain and bodily sensation, and music can be a "means of experiencing oneself in time."[79] There have been several accounts of music therapy as a successful method for trauma resolution. For example, music has been used to facilitate psychological healing in physically and sexually abused children and adults.[80] Music therapy has also been used to treat symptoms of trauma in South African children.[81] Music therapy has also been effective in treating refugees seeking asylum who have experienced trauma because of political violence.[82] That being said, trauma is an individualized experience, and therefore treatment through music therapy should be tailored to suit the needs of the patient.

Music therapy has been recorded as a successful treatment for obsessive-compulsive disorder. One 2019 study found that listening to calming sleep music or meditation music daily could aid in the treatment for OCD symptoms.[83] Another study found that music therapy both reduced obsessive-compulsive behaviors, but also mitigated depressive and anxiety symptoms that can result from obsessive

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[76] Kumiko Toyoshima, Hajime Fukui, and Kiyoto Kuda, "Piano playing reduces stress more than other creative art activities," *International Journal of Music Education* 29, no. 3 (August 2011): 257–263, https://doi.org/10.1177/0255761411408505.
[77] Enrique Octavio Flores Gutiérrez and Víctor Andrés Terán Camarena, "Music Therapy in Generalized Anxiety Disorder," *The Arts in Psychotherapy* 44 (July 2015): 19-24, https://doi.org/10.1016/j.aip.2015.02.003.
[78] Louise Montello, "The Performance Wellness Seminar: An Integrative Music Therapy Approach to Preventing Performance-Related Disorders in College-Age Musicians," *Music and Medicine* 2, no. 2 (2010): 109-116, https://psycnet.apa.org/doi/10.1177/1943862110364231.
[79] Swart, "Overcoming Adversity," 389.
[80] Suzanne B. Hanser, "Using music therapy in treating psychological problems in older adults," In *Handbook of Counseling and Psychotherapy with Older Adults*, ed. Michael Duffy, (New York: John Wiley & Sons, 1999): 197-213.
[81] Mercedes Pavlicevic, "Between Chaos and Creativity: Music Therapy with 'Traumatised' Children in South Africa," *British Journal of Music Therapy* 8, no. 2 (December 1994): 197-213, https://doi.org/10.1177/135945759400800202.
[82] Matthew Dixon, "Music and Human Rights," In *Music, Music Therapy and Trauma: International Perspectives,* ed. Julie Sutton, (Philadelphia: Jessica Kingsley Publishers, 2002), 119-132.
[83] Deldar Morad Abdulah, Salim Saadi Miho Alhakem, and Rasoul Sabri Piro, "Effects of music as an adjunctive therapy on severity of symptoms in patients with obsessive-compulsive disorder: Randomized controlled trial," *Nordic Journal of Music Therapy* 28, no. 1 (2019): 28, https://doi.org/10.1080/08098131.2018.1546222.

rumination.[84] Not only does listening to music reduce OCD symptoms, but neuroscientist Sarah Ting argues that playing a musical instrument can aid in OCD treatment.[85] As discussed previously, the cognitive inflexibility that results from OCD can be detrimental to the performance of musicians. However, the demand of musicians to manage multiple streams of cognitive functions at once can also exercise the individual's cognitive flexibility. Ting suggests that music composition, improvisation, and sightreading are effective methods of training the patient's cognitive flexibility.[86]

CONCLUSION

Anxiety is a complex cognitive process increased in severity by a range of disorders. This paper has looked at these disorders in the context of music performance and practice in relation to trumpet performance. As discussed, music performance anxiety has a complex and uncertain relationship with a spectrum of other disorders. It has been considered a focal anxiety, but it has also been tied to generalized anxiety disorder, panic disorder, and social anxiety disorder. Generalized anxiety can affect the function of trumpet players regardless of performance conditions. In this way, it permeates all aspects of the occupation. Trauma disorders such as ASD and PTSD can place musicians in a state of fright in which they are unable to act and adapt to the demands of the profession. Obsessive-compulsive disorder can interfere in the focus and cognitive processing of musicians in several ways, primarily through harm avoidance and completeness. This paper has also discussed treatment and prevention methods, including methods for instructors to cultivate a healthy environment for their students. Finally, this paper discussed music therapy as a treatment for anxiety. It is the hope of the author that this paper will be used in the future by performers and students seeking to understand and address their anxiety and how it may affect their musical careers.

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[84] Shahrzad Shirani Bibabadi and Amirhooshang Mehryar, "Music therapy as an adjunct to standard treatment for obsessive compulsive disorder and co-morbid anxiety and depression: A randomized clinical trial," *Journal of Affective Disorders* 184 (September 2015): 13–17, https://doi.org/10.1016/j.jad.2015.04.011.
[85] Sarah Ting, *Effects of Music.*
[86] Ibid., 22.

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