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**The Impact of Music on Task Performance at Work**

**by**

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**An Honors Thesis in partial fulfillment of the requirements for the Bachelor of Science in  
Business Administration in Accounting**

**Sam M. Walton College of Business**

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## **INTRODUCTION**

Music plays a big role in the daily life of an average person. Humans are almost constantly exposed to music in some form whether it is through commercials, movies, telephone music, or a variety of other sources. The centrality of music to life can be observed across cultures because music appeals to people's "emotions and contributes to [an individual's] ability to learn and remember information" (Brown and Brown, 1997, p. 349).

Music's centrality to everyday life has inspired researchers to study the influence and impact that music has on individuals. Research that has been conducted over the past century has resulted in a variety of outcomes that reveal how music affects individuals. Music has many factors that influence the performance of individuals on cognitive tasks. These factors have been heavily studied in the context of educational settings. However, the relationship between music and task performance has not been studied in great depth in the working environment. Given the impact that music has on an individual's brain as mentioned above, the effects of music on cognitive performance should be transferable to other work aspects present in a work environment that require similar cognitive or physical processes. In this paper, I will theorize about the impact that music has on individuals in the workplace. This is important because organizations may be able to utilize particular aspects of music to improve worker performance. I will be looking at the impact that the presence of music has on work performance and how that impact is altered by different moderators (structure of music, task complexity, interdependence of tasks, control over choice of music, preference of type of music, and generation-based preferences).

The research question of how the presence of music impacts work performance is important from the standpoint of contributing to research knowledge and such information can be used by employees and organizations. This paper will provide important insights for employees who want to improve their performance in the workplace. The results discussed by this paper will provide information about situations in which music would be beneficial as well as instances when music would have a negative impact on worker performance. Organizations will benefit from the information in this paper because this paper discusses the ways in which music can be utilized in the workplace environment to improve employee performance.

I will begin this paper by talking about the effect that music has on individuals. These effects have been researched in an academic setting. Next, I will discuss the existing research about the effects that music has on the work environment and present my model describing the relationship between the presence of music and work performance. This model includes both the factors that moderate the effect of music on work performance and a discussion of mediating factors that drive these effects.

## **RESEARCH ON THE EFFECTS OF MUSIC ON INDIVIDUALS**

Over the past decade, the connection between music and the brain has been extensively researched and analyzed. The research conducted on the aforementioned connection has demonstrated that the presence of music does have the ability to influence or improve brain performance in areas such as spatial-temporal reasoning and motor functions. Spatial-temporal reasoning is the "ability to mentally move objects in space and time to solve multi-step

problems” (Nisbet, 2012). For example, spatial-temporal reasoning is used when you are given a piece of paper with a cubed object depicted on the page. In this problem, each side of the cube has a different image and you are asked to select an answer that correctly demonstrates the cubed object flattened out so that all of the sides are visible – it looks like the cube has been “unfolded”. Motor skills are the “ability to perform complex muscle-and-nerve acts that produce movement” (Merriam-Webster, 2018). Motor skills can be small movements like writing and tying a knot or motor skills can be large movements like walking and skipping. When the effect of the beat of music on the brain was analyzed using brain imaging techniques, an individual’s basal ganglia and supplementary motor areas lit up when an individual listened to music that had beat generating rhythms (Grahn, 2009).

Research has suggested that music has the ability to influence a person’s brain emotionally and cognitively because music synchronizes the right and left hemispheres of the brain. The left hemisphere of the brain analyzes the structure of music, while the right hemisphere focuses on the melody (Davies, 2000). The two hemispheres of the brain work together to enhance learning. Learning, in its most basic form, typically provides an individual with the tools and knowledge needed to complete a task. The synchronization between the left and right hemisphere of the brain has been shown to accelerate learning.

Research has suggested that music ultimately affects an individual’s cognitive operations via music’s ability to alter mood, arousal, enjoyment, and attention. I will be discussing these concepts in further detail in the following sections in which I address the moderators that determine the influence of the presence of music.

The influence that different types of music has on an individual listener has been intensely studied in an educational environment. In the educational environment, music has been researched under the broader concept of the ‘Mozart Effect.’ The ‘Mozart Effect’ refers to enhanced spatial-temporal measures after listening to music composed by Mozart compared to control conditions that involve sitting in silence or listening to relaxing instruction (Schellenberg, Nakata, Hunter, and Tamoto, 2007).

The results of the studies conducted in the educational environment can provide insights into the potential impact that music has on individual performance in the workplace. This is because music does not only have cognitive effects, music has a physiological impact on an individual’s body.

### **EFFECTS OF MUSIC IN THE WORK ENVIRONMENT**

I will discuss various studies that have revealed that productivity can be increased through the use of song in the workplace. The combination of music and work goes far back into history. Singing, drumming, and playing instruments were used as stimulators of emotions in dramatic situations in tribal societies (Scott, 1980). Despite the other uses of music in the past, it was not until WWI that the singing of music was studied in the work environment (Scott, 1980). Women working in the Royal Naval cordite factory sang as they worked. When a military authority found out about this, the women were ordered not to sing – this order was only heeded by the

night shift. Subsequently, the night shift saw a 15% decrease in production, suggesting the positive impact of the presence of music on performance (Scott, 1980).

The figure below demonstrates the relationship between the presence of music in the workplace and its impact on individual work performance. The presence of moderators (structure of music, task complexity, interdependence of tasks, control over choice of music, preference of music, and generational preferences) are expected to affect the relationship between the presence of music and work performance.

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Insert Figure 1 about here  
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As I mentioned earlier, the type of mental abilities required to complete cognitive tasks are similar to the tasks that will be done in a workplace such as tasks that involve critical thinking or reasoning. Because of this, it is reasonable to expect the presence of music to have a positive impact on work performance.

I am also considering the physiological effect of music on the body. Husain, Thompson, and Schellenberg (2002) examined the physiological effects that music with different modes and tempos have on the listener's body. Listening to sad-sounding music decreases the listener's heart rate and skin-conductance level, but increases their blood pressure. Listening to frightening music increases pulse transmission time and decreases pulse amplitude. Listening to happy-sounding music decreases the depth of an individual's respiration (Husain, Thompson, and Schellenberg, 2002).

In other words, this physiological effect of music can directly influence brain activity. Performance on cognitive tasks is better following manipulations that induce a positive mood than when manipulations induce a neutral or negative mood. Mood refers to a relatively long-lasting state of affect that may have a strong impact on cognition (Husain, Thompson, and Schellenberg, 2002). Boredom or a negative mood can lead to low or poor performance on cognitive tasks such as problem solving, complex decision making, and heuristics. There has been debate over whether this relationship is a direct one with music directly influencing performance or if mood and arousal act as mediators of the relationship between the presence of music and task performance (Husain et al., 2002).

The role of music in the workplace is analyzed in the context of creativity promotion. This is because creativity influences performance at work. Ultimately, an individual's mood mediates performance through their creativity in a similar way that an individual's mood through the mode of music mediates their cognitive performance. Positive mood is a facilitator of cognitive processing that increases creativity. Positive mood impacts creativity by "altering the cognition and attention of individuals" (Liu, 2016). Attention is a condition of readiness that involves a focusing of consciousness or receptivity (Merriam-Webster, 2018). Attention is a component of arousal. Positive mood alters cognition by encouraging flexible thinking and problem solving for complex and difficult tasks. This expansion will play a greater role in tasks that require more

complex and diverse thinking. Mood, more specifically a positive mood, broadens the focus of attention by increasing an individual's responsiveness to peripheral cues and correlative mental representations on a conceptual level (Liu, 2016). In other words, a positive mood enables individuals to pick up on subtle or nuanced occurrences that allow him or her to generate original ideas. Mood can influence the perceived culture of openness or safety within a working environment. According to the feelings-as-information model, moods have a signaling function (Liu, 2016). For example, a positive mood may signal to an individual that their current environment, their work environment, is safe and such emotion would prompt the individual to take part in more risk-taking activities. The individual will be encouraged to perform tasks in different ways and to think of more creative and daring solutions.

Based on this existing research, it is expected that the presence of music in a working environment has a positive impact on the performance of workers exposed to the music.

*Proposition 1: The presence of music in the workplace positively impacts the performance of workers who are exposed to music.*

## **MODERATORS OF THE IMPACT OF THE PRESENCE OF MUSIC ON INDIVIDUAL WORK PERFORMANCE**

The model demonstrates the relationship between the presence of music in the workplace and its impact on work performance. The presence of other variables (type of music, task complexity, interdependence of tasks, control over choice of music, preference of music, and generational preferences) moderate the relationship between the presence of music and work performance. The model shows that the presence of music alone does not solely determine work performance. The presence of music is challenged or modified by the existence of several variables. In the next sections, I will describe these moderators and their impact.

### **Structure of music**

The structure of music is the tempo, mode, rhythm, and complexity of a piece of music. Music impacts an individual's ability to perform cognitive tasks through each of these components of structure. Each component of music impacts the mood and arousal of the listener. I will discuss each of these elements in detail below.

#### ***Tempo***

Tempo refers to the pace of the music or the number of beats per measure; essentially tempo is the "speed at which a piece of music is played" (Merriam-Webster, 2018). To make the definition of tempo more tangible, think of the tempo of music as the pulse of a song. For example, a slow song has a slower beat that is perceived as being more relaxed and soothing than an upbeat song that has a fast tempo. Tempo affects an individual's performance by affecting arousal. Arousal refers to the degree of psychological activation or to the intensity of an emotional response (Husain et al., 2002).

I will now discuss how changes in tempo or tempo modulations impact individuals. Tempo modulations are the changes in the pace or speed of a piece of music. Tempo affects an

individual's arousal, but not their mood (Husain et al., 2002). Different tempos are associated with expressions of activity, excitement, surprise, and potency (Husain et al., 2002). Fast tempos are linked to emotions such as happiness, fear, anger, and tension. When the emotion is positive like happiness, fast tempos are able to improve work performance. When the emotions are negative ones like fear and anger, fast tempos are not associated with improvements in work performance. However, this association does not guarantee that the individual listening to such tempo will experience those emotions. Tempo is an important variable in this study because organizations can use music with fast tempos to impact their employee's arousal and performance.

*Proposition 2: Fast-tempo music will affect the relationship between the presence of music and work performance, such that fast tempo (vs slow tempo) music will be associated with higher work performance.*

### ***Mode of music***

Mode is the major or minor key that music is played in. A major key sounds very bright and happy like the song "Y.M.C.A." by Village People. On the other hand, a minor key sounds dark and gloomy like the song "Yesterday" by The Beatles. Classical examples of songs in major and minor keys would be Vivaldi's Four Seasons "Spring" and Beethoven's Symphony No. 5 in C minor. In discussing the impact that mode has on individuals, I will look at how mode mediates an individual's mood.

Different modes affect an individual's mood but not their arousal. This means that mode affects an individual's performance through mood by the changes in the sound of the music. As I mentioned earlier the mode of the music – happy, bright notes or dark, foreboding notes – can see their mood reflected in the mood of the listener. Mode manipulations have strong associations with expressions of happiness and sadness (Husain et al., 2002).

*Proposition 3: Music in a major key will affect the relationship between the presence of music and work performance, such that music set in a major key (vs a minor key) will be associated with higher work performance.*

### ***Rhythm of music***

Rhythm is the repetition of a pattern of sounds – a regular and repeated pattern. Rhythm and tempo are often confused with each other – think of tempo as the number of beats in a minute while rhythm is the pattern of sounds in a piece of music. Rhythm can stimulate essential patterns of brain growth (Davies, 2000).

Rhythm has been researched in an educational setting. In the context of musical instruction, the structure of music leads to learning because music is built on fundamental counting systems with numerical subdivisions, overtone structures, and tuning systems (Deere, 2010). These systems teach children to classify sounds, compare patterns, and solve problems. Furthermore, musical training focused on rhythm and math are deeply related to each other because they require a similar set of core qualities in proportions, patterns, ratios, and spatial temporal reasoning (Deere, 2010). Research by O'Herron and Siebenaler has revealed a connection between

musical perception and literacy (Deere, 2010). Musical perception is an individual's understanding and awareness of the rhythm and harmonies in a piece of music (Merriam-Webster, 2018). The components of literacy are positively correlated with music in the areas of processing, articulation, and rhythm through decoding skills. Decoding skills describe the relationship between sounds and symbols. Good communication skills, thinking skills, and vocabulary development are some of the skills obtained through music and literacy (Deere, 2010). Music improves an individual's decoding skills because the aforementioned skills are used in listening to music.

Rhythm in the workplace has been used in a more "hands-on" approach in which people are actively taking part in acting out rhythms with their hands. I will discuss this concept and its impact when I discuss music and the interdependence of tasks.

*Proposition 4: Music with rhythm will affect the relationship between the presence of music and work performance, such that music with an explicit rhythm (vs music with a subtle rhythm) will be associated with higher work performance.*

### ***Complexity of music***

The complexity of music has two components: the music composition and the presence or absence of lyrics in music. Lyrics are the words of a song (Merriam-Webster, 2018).

First, I will discuss the complexity of music in terms of music composition. Complex music has been shown to promote complex thinking (Viadero, 1993). The complexity of music stimulates more complex thinking in that the individual's brain activity is influenced by the various tempos, keys, and note changes in a piece of music. For example, the song "Twinkle Twinkle Little Star" is not a complex song. "Twinkle Twinkle Little Star" has very little variation in tempo and follows the same sequence of notes in a repeated rhyme. On the other hand, Beethoven's "Ode to Joy" is an extremely complex song full of variations in tempos and notes. The complexity of music mediates an individual's arousal when completing tasks. The results of an abstract reasoning exam were better for subjects who listened to 10 minutes of a piece of Mozart music prior to taking the exam, than the result of those who listened to a relaxation tape or meditated before the test (Davies, 2000). Music in general can aid the brain in working more efficiently, depending on the type of music. For example, students who listened to music in the ear opposite of the hand used in a learning task were able to learn the task quicker than other students attempting the task without music (Davies, 2000).

Now I will talk about the presence or absence of lyrics in a piece of music. Lyrical music adds to the complexity of a piece of music which you might think would promote complex thinking in a way similar to that of variations in the composition of a piece of music. However, lyrical music presents the problem of split concentration and distraction. This is because the brain processes lyrics and music independently. Independent processing means that the processing of the words in a sentence or lyrics in a song is separate from the processing of musical elements in a song (Besson, Faita, Peretz, Bonnel, and Requin, 1998). If an individual were to listen to lyrical music while trying to complete a task, efficiency and effectiveness of performance could decrease



depending on the complexity of the assigned task given the increased focus and effort required to process lyrical music.

*Proposition 5: Music with complex composition will affect the relationship between the presence of music and work performance, such that music with complex composition (vs music with simple composition) will be associated with lower work performance.*

*Proposition 6: Music with lyrics will affect the relationship between the presence of music and work performance, such that music with lyrics (vs music with no lyrics) will be associated with lower work performance.*

### **Task complexity**

Task complexity is a subjective variable that will vary from one individual to another. Task complexity can be defined in many different ways; however, I will use the following definition to discuss task complexity in this study. Task complexity is the amount of complicated actions needed to complete a task (Nugent, 2013). The relationship between music and complex tasks is largely dependent on the brain activity required to complete more difficult tasks.

The majority of research studies that have been conducted related to music and cognition have been focused around cognitive development in children, the benefits of learning music or taking up an instrument, or the impact of music on learning (Schellenberg, et al., 2007). Few research studies have addressed the impact of music in terms of task performance or task complexity. Furthermore, the majority of research conducted on the impact that music has on production has been conducted in blue-collar jobs such as manufacturing. The tasks involved in this kind of work are monotonous and routine and the relationship between complex tasks and music has not yet been established in research (Scott, 1980). Task complexity determines the degree of creativity an individual has while performing a task. The more complex a task is, the more meaningful the task is perceived to be. This relationship is explained through Hackman and Oldham's Job Characteristics Model (Hackman and Oldham, 1980). In fact, when workers perceive their task to be meaningful, they have increased levels of satisfaction and improved performance.

Task complexity does not only impact an individual's creativity. "Variations in task complexity have effects on affective, cognitive, physiological, and behavioral responses" of those performing the task (Mayer, 1996, p. 77). Research has shown that individuals perform tasks better when cognitive complexity is matched to the environmental conditions. This means that group cognitive complexity must be developed to meet the specifications of a particular task (Mayer, 1996). In that same vein, music must be adapted to different tasks, different conditions, and different work environments in order to effectively impact task performance in a positive way.

*Proposition 7: Low task complexity will affect the relationship between the presence of music and work performance, such that tasks with little complexity (vs tasks with great complexity) will be associated with higher work performance.*

The complexity of music, more specifically the presence of lyrics in music, presents challenges for more complex tasks. I mentioned the complexity of music earlier, but now I am mentioning the complexity of music in the presence of a more complex task. Earlier it was revealed that the presence of lyrics causes the brain to process the lyrical portion of a piece of music and the instrumental portion of a piece of music separately. Ultimately, this phenomenon creates divided attention. Divided attention is assessed in the context of the level of performance required by a task. The complexity of music is mentioned in task performance as only another factor that would relate the type of music to the complexity of a task and the ultimate impact that this complexity would have on work performance.

I will talk a little bit more about the impact of this factor on attention. Attention is necessary when completing difficult or complex tasks. When an individual is unable to focus on a complex task, the quality of their performance on a task will be negatively affected. Music can impact the attention an individual devotes to a complex task through the type of music that is being played. If music has lyrics, the individual's brain will be focused on processing the lyrical and instrumental components of that piece of music separately (Besson et al., 1998). This divided attention is further divided by the complexity of a task. The individual's brain will already be processing two elements that are independent of a given task. When including a task that is more difficult or that requires more cognitive processing, the individual's attention will be further divided. Not only is the individual trying to focus on the task at hand, but their brain would also be focused on processing the lyrics and the music independently. This would decrease the performance on the given task because an individual will be attempting to focus on multiple diverse elements simultaneously.

*Proposition 8: There will be an interaction between the effect of music complexity and task complexity on the relationship between the presence of music and task performance, such that the lowest task performance will occur when both music and tasks have high complexity.*

### **Interdependence of tasks**

The interdependence of tasks relates to the context of group work or teamwork within an organization. Task interdependence refers to “the extent to which an individual group member needs to rely on the information, materials, and support provided by other group members to complete his or her tasks” (Chen, Tang, and Wang, 2009, p. 626).

The nature of work activities in modern organizations has changed because there is more interdependence between social and departmental networks in the workplace (Chen et al., 2009). Interdependence is an integral part of work projects that refers to the interdependence of goals and tasks (Chen et al., 2009). The interdependence of tasks motivates employees to behave differently when compared to groups that are not in a highly interdependent context. Members in highly interdependent group contexts are encouraged to work closely with one another to complete the group's task and achieve the overall goal of the assigned project (Chen et al., 2009).

This variable is important to this study because of the importance of cooperation in the workplace environment. Cooperation is an important component of performance in tasks that are highly interdependent because individuals need to rely on each other to complete the given task. Furthermore, task interdependence fosters a sense of friendship among group members (Chen et al., 2009). However, there is no research to support the idea that interdependent groups will always perform cohesively and interact positively. Music can be utilized to increase the cooperation and working dynamics of groups with high task interdependence. Such effects on work performance can be achieved through careful selection of music that has certain rhythmic elements.

As mentioned earlier, the rhythm or tempo of music has a physiological effect on the listener's body. This relationship has been studied in the context of a group or team setting. Rhythm-induced synchronized activities are able to influence the relationship between two individuals who partake in the activity together. Studies using rhythm-induced synchronized activities have resulted in the participants feeling trust for their partner, increased cooperation, or increased overall perception and motor skills (Kniffin, Yan, Wansink, and Schulze, 2016). For example, participants in a study who were able to successfully follow a drum rhythm with a partner engaged in significantly more cooperative behavior than partners who did not successfully work together (Kniffin et al., 2016). In another study, participants were given the option to synchronize the tapping of their hands to a tone with their partners or to do their own beat. When the participants chose to tap their hands with their partner, they ended up demonstrating greater trust in their partners when compared with the trust of the non-synchronized tappers (Kniffin et al., 2016). The increased cooperation and trust as a result of the synchronized hand tapping can be applied to music chosen in the workplace. Happy music has been linked to a positive mood in the listener while upbeat, fast-tempo music has the physiological ability to increase the focus and productivity of workers. When the two are joined together, workers could be inspired to work more cooperatively in a productive manner through their increased trust and social bonding.

A study conducted by Korczynski revealed the ability that music has to enact social order in routinized work duties. Music was used "as a dialectic cultural practice that enacted the social order" because singing songs in the factory expressed a sense of resistance to the repetitive patterned, alienating social order present in the factory setting" (Korczynski, 2011, p. 87).

The use of music with a tempo that affects mood positively can be utilized in jobs that have interdependent tasks because of the musical influences on cooperation mentioned earlier. Music will positively affect cooperation in groups because happy music facilitates a positive mood. When individuals are in a good mood they are more likely to approach tasks with an open mind and they tend to participate in social bonding when listening to music with others.

In the same way that individuals were influenced by participating in creating rhythm with a partner, individuals may experience greater levels of trust within groups from listening to rhythmic music. Music with collectivistic themes may also be used to subliminally increase the cooperation needed to successfully complete interdependent tasks. This is because of the emotional effect that music has on individuals and their mood to inspire feelings of cooperation or ease.

*Proposition 9: The degree of task interdependence will affect the relationship between the presence of music and work performance, such that tasks with higher interdependence (vs little or no interdependence) will be associated with higher work performance.*

### **Control over choice of music and preference of music type**

Control over choice of music type and preference of music type are closely related concepts, so they will be analyzed in conjunction with one another. Control over music type is the degree of control an individual has to select the genre of music that is played. The preference of music type is an individual's preference for one genre of music over another genre.

Control over choice of music influences the duration and timing of the music playing. The continual use of music does have the potential of a decreased positive effect on work performance especially in an open office setting. When music is constantly played it becomes counter-productive because it becomes part of the background noise and loses its ability to influence performance (Scott, 1980). Background music can function as ambient noise in the workplace. Ambient noise is typically in the form of the background noise of production, room noise, or atmospheric noise. The continuous playing of music causes the music to become a part of the routine atmospheric noise. The effectiveness of music in an open office space is determined by the tasks performed in a specific industry as well as an individual's sensitivity to music.

This suggests that playing music when employees are fatigued could work to motivate workers to perform better. Different workers can reach a point of fatigue at different times. In knowing when they reach their fatigue points, employees are able to select music to motivate them that will be more impactful than the employees being subjected to music when they are not fatigued. Allowing employees to choose when music will be played will increase their sense of autonomy, which in accordance with the Job Characteristic Model, increases an employee's level of job satisfaction and work performance (Hackman and Oldham, 1980). Allowing employees to choose what kind of music they listen to based on their personal preference will have a similar effect on autonomy and will increase the employee's level of enjoyment. Enjoyment is state of pleasure or satisfaction (Merriam-Webster, 2018). Enjoyment is a component of mood. As mentioned earlier, mood is a mediator through which music is used to increase an employee's level of performance.

Music does provide positive benefits to work performance when music is deployed properly. An individual's control over music is largely determined by the type of office environment, meaning the presence of a closed or open office space. Music in an open office setting will afford the individual little to no opportunity to control what kinds of music they listen to while completing a task. Music in a closed office setting allows for individualized selection of music because individuals are able to control their environment in a cubicle setting. Both of these present different results for the improvement of work performance given the research already summarized in previous sections.

The mediators that affect music such as enjoyment and mood have the potential to vary from individual to individual. An individual's preference for a certain type of music comes into play when looking at music in an open office setting as well as a closed office setting. One individual might be positively affected by a particular song while for another individual this music has the complete opposite effect. The emotional impact that music has on an individual is subjective; therefore, playing music in an open office setting where everyone is subjected to the same style of music could have a significantly different impact on worker productivity. Unpleasant background music has a negative effect on a listener in terms of decreased confidence. When listening to unpleasant background music, employees took fewer risks and received fewer rewards (Kniffin, 2016).

*Proposition 10: The control over choice of music will affect the relationship between the presence of music and work performance, such that greater control over choice of music (vs little or no control over the choice of music) will be associated with higher work performance.*

*Proposition 11: Variations in the preference of type of music across employees in a work environment will affect the relationship between the presence of music and work performance, such that homogeneity of music preference (vs heterogeneity of music preference) will be associated with higher work performance.*

## **Generational preferences**

Generational preferences expand beyond song or music genre preference. Younger generations have grown up with the influence of technology and pervasiveness of music by way of the iPod in ways that previous generations have not. This experience can make the use of music in the workplace more normalized in the eyes of younger workers. On the other hand, older workers may not see the need for music in the workplace assuming that their performance is not motivated by music. For example, one study found that older gym-goers were not motivated to physically work harder by including music in their workout routine (Priest, Karageorghis, and Sharp, 2004).

Mood, arousal, and enjoyment are mediators that facilitate the impact of music on work performance. Enjoyment and mood can be determined by the characteristics of the individual listening to the music being played. An individual's preference for a particular type of music largely depends on the music that they grew up listening to or the music that makes them feel a particular way. Musical preferences can be developed in response to an individual's environment. Generational preferences are also tied into the preference for a particular type of music.

Generational or age differences impact the way that music is perceived in the workplace. Generational preferences moderate the impact of the presence of music through an individual's enjoyment. Generational differences have been analyzed in the context of physical activity, more specifically in an exercise or gym setting. A study was conducted in a gymnasium to assess the personal factors (such as music perception) and music factors (such as the structure of music) that motivate individuals during a workout (Priest et al., 2004). In this particular study, music

preferences across gender lines were relatively consistent and did not vary from one biological gender to another. The difference in motivational music preference was more varied across age groups. In terms of genres of music that were used as a motivational driver in the gym, older participants (age 46 and over) preferred classical music while participants age 36 to 46 preferred to listen to older music that was popular when they were young (Priest et al., 2004). In contrast, younger participants (age 16 to 26) preferred to listen to modern or dance music to energize their bodies (Priest et al., 2004).

These differences lie in the fact that the participants' preference for rhythmical elements differed with age. The older participants, who preferred classical music, were more motivated by quiet, slow-tempo music than they were by fast, up-beat songs. Furthermore, these older participants were less likely to be motivated by the presence of music. The younger participants were motivated by faster tempo music that was matched to a particular type of exercise.

Generational differences and societal norms can explain the underlying differences in these preferences. This study was conducted in 2004 so the younger generation was composed of individuals age 16 to 26 who were born during the years 1978 through 1988. They would have been growing up during the emergence of dance music and new wave music. Artists like Michael Jackson, Prince, Madonna, and Whitney Houston were popular during this time. It is natural that the younger generation would be influenced by the music that they heard growing up. Music styles and genres are always evolving and changing. The music that the younger generation listened to was different from the folk and blues rock music of the 1960s like "Blowin' in the Wind" by Peter, Paul, and Mary or "Wild Thing" by From Nowhere, respectively, that the older generation might have a predisposition for.

Changing workplace demographics present the opportunity for employers to use generational preferences to their advantage when it comes to the use of music in the workplace. The way that the younger generation listens to music and conducts work looks different than the way older generations work. According to a survey, 48% of millennials wear headphones every day at work or at school (PR Newswire, 2014). The ways that millennials listen to music is an important part of the generational preferences variable because millennials' preferences will influence the impact of the presence of music on an employee's performance. Millennials, based on the survey results, listen to music on a regular basis (PR Newswire, 2014). In addition to this, the millennials in the exercise study were more motivated by musical stimulus than the older generation was. The presence of music in the workplace could be more beneficial for a workplace that is made up of millennials versus a multigenerational workplace.

*Proposition 12: The positive effects of music on task performance will be more limited in multigenerational work environments.*

I have discussed, in detail, different moderators of the relationship between the presence of music and task performance at work. I will now present a table that summarizes the moderators and the mediating affect that they have on the aforementioned relationship. I have argued that different variables moderate through four different mediating mechanisms (mood, arousal, enjoyment, and attention). This table provides key insights for employers to determine what kind

of music should be played in their particular work environment to maximize the influence that the presence of music has on individual task performance.

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In the following discussion section, I will discuss the purpose of this study and its importance, review my predictions, and present the implications that the results of my research have for employers in a work environment.

## **DISCUSSION**

The purpose of this study is to research the impact that the presence of music has on task performance in the work environment. The impact of the presence of music is moderated through the structure of music, task complexity, the interdependence of tasks, control over choice of music and preference of type of music, and generational preferences. This study is important because of the role that music plays in an individual's everyday life. At the beginning of this paper in the introduction, I mentioned that music plays a big role in daily life because of the pervasive exposure that an individual has to music. This exposure is not confined to a person's home-life; an individual takes their musical preferences around with them wherever they may go and they take these preferences with them to the workplace. It is important to understand the effects of the moderators of the presence of music because those moderators help employers understand how to manage the use of music in their work environments.

### **Implications for employers**

I will briefly go over the twelve propositions that I have made throughout my research paper and discuss the implications of these propositions for employers.

Ultimately, the benefit of music lies in its effect on mood, arousal, enjoyment, and attention and its ability to create stimuli that elicits a positive effect within an individual. Generally speaking, the presence of music in the workplace can have a positive effect on worker performance under certain conditions. Not all types of music will be beneficial to play in the workplace. Employers can use music in the workplace to elicit positive improvements in performance from workers, but employers need to be aware of the type of music that they are playing. Depending on the type of music played, in the context of the mediators that have been identified and discussed, the positive effect of the presence of music on work performance could be diminished if an employer is playing music that is not compatible with their line of work or tailored to their employees.

Music can vary in terms of its mode. In the context of this study, mode can be used to improve work performance because of mode's ability to influence or mediate an individual's mood. If an employer were to play music that was set in a major mode, employees would feel their moods improve and they would have a happier, more positive attitude which would improve their work performance. However, music does not only impact an individual's mood or arousal, music can

have physiological impacts on individuals. The rhythm or tempo of music has a physiological effect on the listener's body. This relationship has been studied in the context of a group or team setting. Rhythm-induced synchronized activities are able to influence the relationship between two individuals who partake in the activity together. Having workers listening to music with an explicit rhythm while they work will increase the rate at which they work as their bodies respond to the rhythm.

Despite the fact that the structure of music has an impact on performance, the degree of this impact depends on the task. There are two components of complexity to consider: the complexity of the music being played and the complexity of the given task. The more complex a piece of music is the greater the effort exerted by an individual's brain to process the lyrics and the music independently. The resulting divided attention will make it increasingly difficult for the individual to efficiently complete a task. This level of difficulty in completing a task also depends on the complexity of the given task. The more complex a task is, the more work will be required to complete the task. If an individual is working on a highly complex task, they are already focusing on successfully completing the task at hand, and their difficulty in completing the task can be exacerbated by playing complex music because they would be required to exert effort on processing the music in addition to completing their task. The worst combination an employer could have is to play complex music while their employees are completing complex tasks. In a situation like that, the presence of music will have a negative effect on individual work performance.

The use of music in the workplace may be especially impactful if the tasks are interdependent. Cooperation is an important component of performance in tasks that are highly interdependent because individuals need to rely on each other to complete the given task. I have mentioned that rhythm and major mode music can be used to foster positive group communication and improve group morale. It is important for employers to consider the level of task interdependence when considering what kind of music will be played in their work environment. The music selected should improve the group dynamics, and this is mostly done with music, set in a major key, that inspires a happy mood. If employers do not consider the influence that music has on the group dynamics and the impact of music on individuals who are taking part in the group, then any desired positive benefit that can be gained from using music can be lost through the selection of music that does not inspire cooperation.

The presence of music in the workplace is complicated by the factors of the control over the choice of music and preference of type of music as well as the factor of differences in generational preferences. It is important for employers to determine the best uses of music in the office if they are going to use music in the workplace. Research has suggested that in order to maximize the effect of music, music should be "timed out to counteract the peaks of fatigue during the day" (Scott, 1980, p. 599). When considering control over the choice of music, employers must also consider the manner in which employees listen to their music.

An open office setting removes the traditional wall barriers of office cubicles. Music in an open office setting presents further potential challenges. The impact of music in an open office setting is defined in terms of employees having no control over the kinds of music being played because



an employer will select the music played throughout the office. Should workers in an open office be able to listen to their own music through headphones, they would be able to select music that they found enjoyable and thus improve their performance. However, communication in an open office can be further complicated through the use of headphones. While headphones can provide an opportunity for workers to improve their own productivity through selecting the kinds of music that they find enjoyable, headphones can also function as a means to avoid communication. If employers have an open office setting in their place of business, they need to consider these challenges when determining what kinds of music will be played in addition to considering the level of autonomy that employees will have over the music that is played. If a workplace has an open office setting, employers should either play music universally or allow employees to play their own music depending on the composition of the workforce.

However, there is little research to determine how long music should be played during these periods, how often music should be played during the day, and what style of music should be utilized to maximize the positive effects music has on performance. Employers will have to consider this factor in the context of the generational composition of their workforce. A younger generation of workers will have grown up with music heavily integrated into all parts of their lives. The ease of access to music and the prevalence of music in everyday life has been enabled through the use of technology. As I have discussed, the younger generation's musical tastes can be different than that of older generation workers. It is only natural that these generational preferences could carry over into the workplace. In assessing the use of music in the workplace, it is also important to consider the preference for no music that can impact the level of work performance. If music is not preferred by the majority of a workforce, then the music will function as a distractor that will decrease the level of work performance. If the music being played is not enjoyable to the listeners it can also decrease the level of performance in the workplace, because the workers' level of enjoyment will decrease and they will not be motivated to improve the efficiency or quality their performance.

If a workplace has a closed environment, employers should allow employees to listen to their own music. Employees in a closed environment will ultimately benefit from being able to control their own music and select music that is personally motivating.

If a workplace has an open environment with a multigenerational composition of employees, employers should allow workers to independently select their own personal music. The use of music in such an environment should be individualized meaning that workers can listen to their own devices. This is because of the variety of preferences of types of music between generations in a multigenerational workforce.

If a workplace has an open environment with less generational heterogeneity, then employers would benefit from playing the same music for the whole office to increase the performance of their workforce. The workforce would not have large variances in preference for music type and thus the workforce will improve their performance on given tasks.

## **Conclusion**

All of these factors have important implications for employers if employers wish to use music as a means of improving employee performance. Selecting music that is not suited for their employee or their office style and type of work can negate any positive influence that the presence of music can have on task performance.

There is a need for research on the ideal length of time that music should be played as well as research on how often music should be played throughout the workday. Such research will enable employers to maximize the benefit that playing music has on worker productivity because music will be played at optimal times during the day for a duration of time that will not negatively impact the influence that the presence of music has on job performance.

Research in educational settings has provided insights into what should be studied in relation to music and behavior, and my model provides a guide for extending this research into the workplace. The model also provides recommendations for employers to consider in this interim period as research findings are being developed on the impact that the presence of music and its moderators and their mediating effects have on individual work performance.

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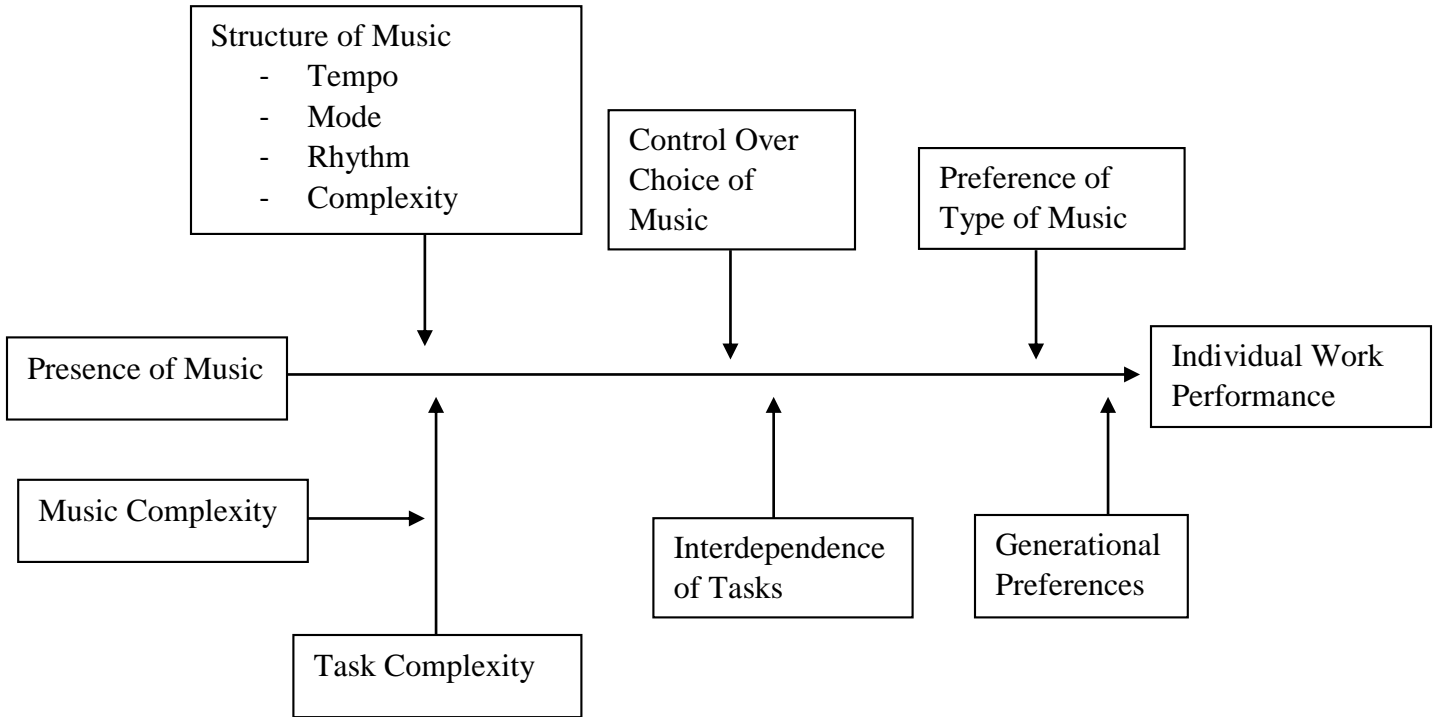
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**FIGURE 1**

**A Model of the Moderators of the Impact of the Presence of Music on Work Performance**



**TABLE 1**

**Moderators and Their Mediating Effects**

<b>Moderators</b>	<b>Mediating Effect</b>
Structure of Music	Arousal Mood
Task Complexity	Arousal Attention
Interdependence of Tasks	Mood Enjoyment
Control Over Choice of Music and Preference of Type of Music	Arousal Enjoyment Autonomy
Generational Preferences	Mood Enjoyment Arousal