

The Psychophysiological Effects of Music on Exercise Performance and Adherence

by Vivian Navarro and Graduate Student Mentor, Eric Leslie

Introduction

Adherence and efficacy are the result of a well-designed exercise program. These two key components are largely dependent on physiological and psychological responses to the exercise. Over the last decade, behavioral science researchers have become interested in determining how exercise may be structured to improve the experience and thus increase the likelihood of adherence (1) and, consequently, effectiveness of exercise for desired adaptations. Therefore, external influences on exercise outcomes such as music have been considered. Listening to music during exercise can enhance exercise performance, improve motivation and enjoyment, and reduce perceived exertion (1,2). These benefits demonstrate how the addition of music is connected to both the physiological and the psychological aspects of exercise with the latter not recognized in the traditional FITT (frequency, intensity, type, and time) principle for designing exercise programs. Therefore, this article serves to 1) explain the physiological and psychological effects of music during exercise, and 2) suggest practical applications of music in exercise program design.

The Psychological Benefits of Music that Promote Exercise Adherence

Reduced Perceived Exertion

Studies that examine the effects of music during exercise, compared to those without music, frequently assess the outcome measure of rating of perceived exertion (RPE). The effects of music on RPE are crucial because it is a measure commonly used to assess and prescribe exercise intensity. The literature reports mixed results on how music affects RPE, including no significant changes in RPE (1,3,7,8), increased RPE (9), and reduction of RPE (4, 10). Emphasis is often placed on the reduction of perceived exertion, but higher RPE measures have been observed along with greater levels of enjoyment, particularly in high-intensity stationary cycling (9). It is an important distinction to make because music may potentially be the connection to simultaneously increasing effort and enjoyment.

However, a meta-analysis revealed that listening to music during physical activity significantly reduced RPE for over 3,000 participants (10). This finding advocates a widespread use of music for decreasing RPE during exercise in most people. This can benefit sedentary populations

looking to overcome initial exercise barriers (e.g., discomfort) (10) and athletes who strive for more intense training. Therefore, a judicious use of music may entail playing the clients favorite tunes to help prolong exercise time and increase enjoyment despite increased intensity.

Emotions and Adherence

It is sensible to encourage the use of music in physical activity with the primary aim of promoting enjoyment (10). It is crucial health professionals consider this suggestion because a displeasing experience of exercise may hinder adherence to a program. This idea is supported by the hedonic principle, “maximize pleasure and minimize pain” (10). Lack of enjoyment is often a barrier to regular exercise (10), which is particularly common among sedentary populations. Moreover, music can reduce monotony for regular exercisers and athletes who follow stringent training programs (6).

Positive emotional responses are the primary psychological components responsible for creating an enjoyable experience of exercise. A part of this include the motivational qualities of music driven by the psychological effects of improved mood and increases in arousal (1). Terry et al. (10) explained that the music-affective valence link (i.e., the emotional response induced by music) will likely increase participant enjoyment during physical activity and lead to adherence. Health professionals seeking to enhance their clients experience should suggest listening to their favorite music. Apart from the client naturally choosing the music they enjoy; self-selected genres have previously demonstrated to provide the most exercise performance benefits.

Physiological Responses to Music during Exercise

Heart Rate and Oxygen Consumption

Bodily pulses such as heart rate and respiration rate are known to synchronize with the rhythmical qualities of music (10). The exact influence of music on heart rate during exercise remains equivocal but generally there is a response when music rouses the nervous system. One study reported that both stimulating and relaxing music can mentally prepare someone for exercise (5). Similarly, athletes may use these types of music to generate a pre-competition mindset similar to a pregame stimulant (10). Although the role of music regarding heart rate appears largely psychological, heart rate is also commonly used for exercise program design and evaluation for measures of intensity and physical performance. Therefore, it is best for health professionals to individualize music suggestions because clients may respond better to one type of music in comparison to another.

Music has also demonstrated significant effects on oxygen consumption, which is another principal measure used for prescription and evaluation of exercise. One study revealed synchronous music significantly reduced oxygen consumption during cycle ergometry when compared to no music conditions (7). This finding is further supported by a meta-analysis that reported the synchronization of body movement to music possesses an ergogenic effect (10). The same meta-analysis including over 100 studies found that more efficient oxygen use is observed when listening to music during physical activity (10). The assumption is that the body exchanges gases (oxygen and carbon dioxide) more efficiently in the lungs and delivers oxygenated blood to the muscles, which in turn increases exercise performance. Professionals are recommended to appropriately match music type and exercise to promote the desired outcome (increased heart rate, decreased oxygen consumption, etc.).

The Effects of Music on Exercise Performance

Work and Power Output

Work and power output have shown to significantly improve during exercise while listening to music in comparison to without music. Listening to self-selected motivational music during exercise has well established ergogenic benefits (3). For example, listening to motivational music increased total work done during a 15-minute stationary cycling session (3). Motivational music also increased peak power output for sedentary adults during sprint cycling interval training (1). Given exercise trends have focused on shorter and more intense workouts due to busy lifestyles (1), music can serve a key role to optimize benefits in shorter exercise. This research suggests music motivates the client to push through to the end of an intense workout and ultimately achieve a more effective exercise session.

Strength and Endurance

Strength is indicative of general health status and is a fundamental component of any exercise program. Regular resistance training increases strength, reduces body fat, and improves bone density as well as glycemic control (11). Moreover, incorporating music into exercise training has shown to enhance these long-term adaptations.

The ergogenic effect of music serving as a dissociative cognitive strategy (4) can especially be used for strength and endurance exercise. In this case, the psychological strategy aims to shift the focus from the discomfort of exercise to the pleasurable stimuli of music for a person exercising

(4). As a result, discomfort may be tolerated for a longer period that allows for prolonged exercise performance and increased efficacy of a workout.

The effect of music on strength has been observed in people of all ages through measurements of hand dynamometry, which is a valid measure of peripheral muscle strength (5) and reflects the ability to perform activities of daily living. A study evaluating the effects of young men listening to preferred music during hand dynamometry found that maximum handgrip strength increased by 9.06% (4). Similarly, older adults significantly increased handgrip strength while listening to their favorite music (5). The increase in strength was comparable to the difference of being able to stand up or not (5). Therefore, simply listening to music during physical activity may have a fundamental effect on quality of life.

The strength benefits of music extend into measures of strength endurance, which is determined by the maximum number of repetitions performed, as Santos Silva et al. (4) demonstrated, listening to a preferred music genre increased maximum repetitions of lat pull-downs.

Additionally, the benefits of a self-selected song during a strength endurance test in bench press has shown as high as a 42% increase in total repetitions (6). Another study that used electromyograph technology during leg extensor ergometry revealed how specifically fast tempo music delayed the neuromuscular fatigue threshold (7). This reveals how music, a relatively practical tool, can delay the fatigue threshold and enhance the benefits derived from resistance training.

Conclusion

Creating a positive experience during exercise is critical to increase the chances of exercise program adherence and thus, longevity. Listening to music during physical activity optimizes the entire experience by increasing enjoyment and enhancing the effectiveness of each workout to improve physical performance. This presents strong evidence for the regular application of music into exercise regimes. However, the support of exercise professionals is essential for the regular use of music in exercise. Without it, the psychophysiological benefits of music on exercise performance may be wasted. The benefits at stake include increased strength, prolonged endurance, reduction of RPE, and positive emotional responses. Motivational and self-selected genres of music should be integrated into exercise because they appear to impact exercise performance the most significantly. Modern day technology has allowed music playing devices

and free music streaming to be extremely accessible and so, the benefits music brings to exercise are also more accessible than ever before.

4 Elements

Apply It

- The ergogenic effects of listening to music during various types of physical activity have been observed through increased physical performance outcomes, such as, strength, power, endurance, and work output.
- Simple and practical applications of music are suggested to optimize the benefits of exercise. For example, the health professional will find the addition of self-selected music to endurance type exercise may be used to prolong the neuromuscular fatigue threshold.
- The importance of psychological responses induced by music during exercise are highlighted. Specifically, it is a key finding that music can create positive emotions and associate them with the experience of exercise.

Bridging the Gap

Listening to music provides unique and beneficial psychophysiological responses that enhance exercise performance. Music influences important psychological attributes, like emotional responses, to exercise that traditional modifications (i.e., FITT principal) simply do not. The research shows the addition of music can increase strength, endurance, total work, lower ratings of perceived exertion and overall improve the experience of exercise. These effects result in overall elevated exercise performance and adherence to training.

Summary Statement

The addition of music to exercise provides psychophysiological benefits that are unaccomplished by traditional exercise program modification alone. Music is an accessible tool that amplifies physical performance and the enjoyment of regular exercise.

Pulled Text

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Bio:

Vivian V. Navarro is currently an undergraduate student at the University of New Mexico in Albuquerque. After earning her Bachelor’s Degree in Exercise Science, she plans to extend her academic career in health science and pursue a degree in physical therapy.

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