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ORIGINAL ARTICLE

MUSIC AND EXERCISE:
DOES CREATING AN EXPECTANCY OF ENJOYMENT INCREASE REPORTED ENJOYMENT?

Abstract

Many exercisers listen to their favorite music during their workouts, and this has been shown to increase exercise enjoyment and decrease perceptions of exercise exertion. This study investigated whether suggestion of increased enjoyment from using music would create an expectancy effect that would, in turn, influence actual reported enjoyment of an exercise session. Participants (*N*=69) intending to voluntarily exercise at a college wellness center while listening to self-chosen music were invited to participate in the study. All participants were asked to volunteer to fill in an exercise enjoyment scale after their session, but using a simple randomized experimental design in a field setting, expectancy of exercise enjoyment was manipulated by telling half of them that their choice of music was already known to improve exercise enjoyment before they began their workouts. There was a significant effect ($p < 0.05$) on reported exercise enjoyment with the experimental group scoring higher ($ES = 0.48$) on the modified PACES scale. This preliminary study indicates creating expectancy can influence the effect of music on reported exercise enjoyment. This effect might have measurement implications for future research and possible practical implications for the promotion of physical activity for health and wellness reasons.

Key Words: : Exercise, enjoyment, music, PACES, expectancy effect

INTRODUCTION

Research in the areas of sport and exercise psychology, exercise physiology, and psychology of music has focused on applications of music during exercise (for reviews, see Karageorghis and Terry, 1997; Terry and Karageorghis, 2006). Data from such research has been used to promote the marketing of certain songs, playlists, and personal music players (mp3 players) to individuals and businesses such as athletic clubs and wellness centers. Enjoyment of exercise has been shown to predict physical activity participation (Rhodes, et al. 2009), and listening to music during workouts may help sustain an individual's workout regimen by increasing enjoyment, arousal control, and decreasing perceived exertion (Boutcher and Trenske, 1990; Dyrlund and Wininger, 2008; Elliot, Carr, and Savage, 2004; Karageorghis, Terry, and Lane, 1999; Potteiger, Schroeder, and Goff, 2000; Wininger and Pargman, 2003). Some literature also suggests that this enjoyment may decrease the likelihood of abandoning a personal exercise regimen, resulting in greater physical health (Annesi, 2001). This is of obvious importance to public health since the attrition rates from exercise have been known for some time—for example, Dishman (1991) reported that 40-65% of individuals who start a workout regimen drop out within six months, often due to variables associated with a lack of enjoyment of the exercise.

While music may be a variable that generally increases exercise enjoyment (Berger and Motl, 2001; Dishman, 1991; Karageorghis and Terry, 1997; Schwartz, Fernhall, and Plowman, 1990), as a construct, it is somewhat complex. Musicologists and sport psychologists agree on most aspects that define music, such as discernible tempi, classification by genre, and varied instrumentation. While responses to music may vary according to individual perceptions and preferences, and as a result of influences such as cultural background, recent advances in neuroimaging have shown that music listening provides a unique stimulus to many different areas of the brain (Patel, 2008).

In terms of the psychophysiological responses to asynchronous music listening, Karageorghis, Terry, and Lane (1999) proposed three categories: arousal control, reduced ratings of perceived exertion, and improved mood. Similarly, Karageorghis and Terry (2001) conceptualized a framework in a sports context that posited the main benefits of music to an exerciser would include positive mood, relaxation or arousal when desired, dissociation from pain, reduced ratings of perceived exertion, and perhaps a better likelihood of achieving a state of "flow." Music also has particular qualities that resonate with the listener in different, unpredictable ways, and exercisers who choose music tend to do so without a complete understanding of the possibilities in terms of motivation and stimulation (Lind, Welch, and Ekkekakis, 2009; Priest, Karageorghis, and Sharp, 2004).

The mechanisms by which music listening may facilitate a state of enjoyment during a stressful task such as exercise are not entirely understood. Rejeski (1985) used the parallel-processing model of pain by Leventhal and Everhart (1979) as a basis but extrapolated it to perceived exertion. While emotional and sensory information "loads" are processed in parallel, conscious processing focuses on a limited amount of information at any given time. If the first "load" is internal focus on breathing and heart rate, as an example, and the second (parallel) load to be processed is an external stimulus (music, in the present study), then salience of each load may be the deciding factor. If exercise intensity-related discomfort becomes too high due to workload, music processing is reduced as a cognitive load and has less effect. If music is salient in terms of volume and preference to the individual, the model predicts a lesser effect from the autonomic responses to the workload. Similarly, Lind, Welch, and Ekkekakis (2009) discuss music as a potential for conceptualizing attentional focus in terms of attending to music as a salient stimulus rather than other associative means, such as self-talk or video.

However, although much is now known about the relationships between exercise intensity and affective variables such as perceived enjoyment, and about how music may facilitate such enjoyment, for most volitional exercisers, the practical reality may be much simpler. Indeed, as a leading exercise promoter (Pollock, 1978) pointed out more than three decades ago, people participate if they find an activity enjoyable, and lower intensity exercise is more enjoyable for most people. Since then, it has also become evident that most exercisers have a preferred level of exertion that is enjoyable (Dishman, 1994), and for aerobic exercise, that preferred level is generally close to the ventilatory threshold (Lind, Ekkekakis, and Vazou, 2008).

Moreover, the addition of music to the exercise environment has become ubiquitous—

either via through facility-wide sound systems in many exercise environments, or from portable music devices carried by individual exercisers. In the last decade, portable music devices (for use during aerobic exercise) have become digitized, which has improved clarity and portability of sound, and allowed more personal choice of music, and those devices have been heavily promoted by manufacturers and exercise leaders alike. Thus, in many fitness facilities, it is not uncommon for the majority of exercisers to be using personal music devices—and it is likely that most users would endorse the idea that the music either enhances their exercise enjoyment, or alternatively, reduces their perceptions of the discomfort associated with exercise intensity.

Because exercise is accepted as beneficial for health at the correct "dose," and especially since it is often recommended as "medicine," it would seem logical to ask questions with regard to the possibility that a music "treatment" intended to help users feel better and reduce perceptions of discomfort might be analogous to a pharmaceutical treatment—such as an analgesic—intended to produce similar results. If so, then perhaps it is surprising that, unlike much medical research, the issue of actual versus placebo effects does not appear to have been addressed (at least, our literature searches did not reveal any experimental studies on the topic). Could it be that the well-documented effects of music on affect during exercise are, at least to some extent, a placebo effect rather than just a direct effect? If so, there may be measurement-related implications for future research on the topic, as well as effectiveness-related implications for those trying to promote exercise adherence for public health reasons.

The study of placebo effects has been extensive in medicine, and while it has sometimes been confused and controversial, there is consensus that the two main theories explaining a placebo effect are *unconscious* (Pavlovian) *conditioning* and *conscious expectation* (Ernst, 2007). In medical research, the effects of expectancy in studies of analgesia are well-documented, especially, as Ernst (2007) notes from the extant literature, expectancy is enhanced by verbal instructions informing patients that their medicine is powerful. Could this also be the case for the effects of music on exercise enjoyment—and if so—to what extent are the effects a result of expectancy versus actual direct benefits?

Thus, the purpose of this study was to better understand the roles of music listening and expectancy effect related to exercise enjoyment. Using a simple experimental design, and in line with extant medical research on topics such as analgesia, it was hypothesized that reported enjoyment of exercise would be increased if an expectancy could be induced by informing participants that their music choices were well-known to be enjoyment-enhancing.

METHOD

Subjects

This study was conducted at a wellness center of a university in the upper Midwestern United States. People entering the aerobic workout area of the wellness center and observed to have a personal music player (i.e. mp3 player) were asked by a research assistant to take time just prior to and immediately after their workout to complete pre- and post- data collection instruments. Sixty-nine exercisers agreed to take part in this study (for details see Table 1). The procedures were approved by the university Institutional Review Board, and all participants provided written informed consent.

Participants were asked to complete two questionnaires—one pre-exercise, and the other post-exercise. The pre-exercise questionnaire asked for the participant's gender, age, workout type and duration, as well as a list of all musical selections he or she would likely listen to during the workout period. Both groups were asked for this information to ensure parity of information gathering between the experimental and control groups, and to enable the expectancy-producing deception to be applied to the experimental group before they exercised.

Table 1. Exercise demographics

Group	*N*	Gender		Mean	Age	Minutes
		M	F	Age	Range	Exercised
Control	33	9	24	20.48	18-26	60.47
Experimental	36	12	24	21.17	18-30	62.64
Total	69	21	48	20.84	18-30	61.62

Data collection instruments

A modified version of the Physical Activity Enjoyment Scale (PACES: Kendzierski and DeCarlo, 1991) was used as a measure of post-exercise enjoyment. There are no subscales in the instrument, so the mean score of all items provides the physical activity enjoyment score. The original PACES has 18 items and utilizes a 7-point bipolar scale. Motl, et al. (2001) reduced the scale to 16 items (omitting two as redundant content) and utilized a 5-point Likert-type scale that ranges from 1 ("Disagree a lot") to 5 ("Agree a lot"). For this study, the scale was also modified to the past tense so as to tap post-exercise perceptions of enjoyment. This modification was used by Whitehead, et al. (2008), and satisfactory internal reliability was reported (scale alphas 0.91 to 0.94)

Procedures

A trained research assistant was stationed at a table at the entrance to the wellness center aerobic workout area. Exercisers (on treadmill, stationary bicycle, stairclimbers, elliptical machine) who were carrying their own music listening device were asked to take part in the study. Random order of assignment to the experimental or control groups (balanced by sex) was determined ahead of time. If they agreed to take part, participants filled out the pre-exercise demographic form (which was covertly coded to the control or experimental group), and at the conclusion of the exercise period, all participants were asked to complete the modified PACES. Three exercisers refused the initial consent and demographics collection, so they did not take part in the study.

The musical list was used to establish the deception. Participants in the treatment group were told that their selections were "evidence-based" to increase exercise enjoyment. This was the script for recitation no matter what music samples the participant noted. Potential answers to participant questions were scripted prior to the study. For example, one such anticipated question was "Are any of these songs not good for exercise enjoyment?" The scripted answer was "No – looking at your playlist, all of these songs are evidence-based to increase your enjoyment." Inherent in all parts of the deception was the notion of certainty—phrases were included such as "*will* increase your enjoyment" and "songs *are evidence-based.*"

The intent was to allow participants to exercise at their own preferred exercise intensity, duration, and modality (treadmill, etc.), with the only variable potentially manipulated being the expectancy of enjoyment from the music selections created by deception for the participants who were randomly assigned to the treatment group.

RESULTS

The internal reliability of the modified PACES was determined using Cronbach's alpha. Scale alpha was a satisfactory 0.84, and in no case would removal of an individual item have increased the scale alpha coefficient. An independent *t*-test indicated that there was no significant difference between groups on exercise duration ($p = 0.68$). Self-chosen aerobic exercise modalities appeared similar between groups (see Figure 1). There was a significant difference between males and females on exercise enjoyment ($t\ (67) = -2.57$, $p < 0.05$) with females reporting higher enjoyment ($M = 4.46$, $SD = 0.37$) than males ($M = 4.21$, $SD = 0.37$). There was no significant interaction between sex and experimental group ($p = 0.44$).

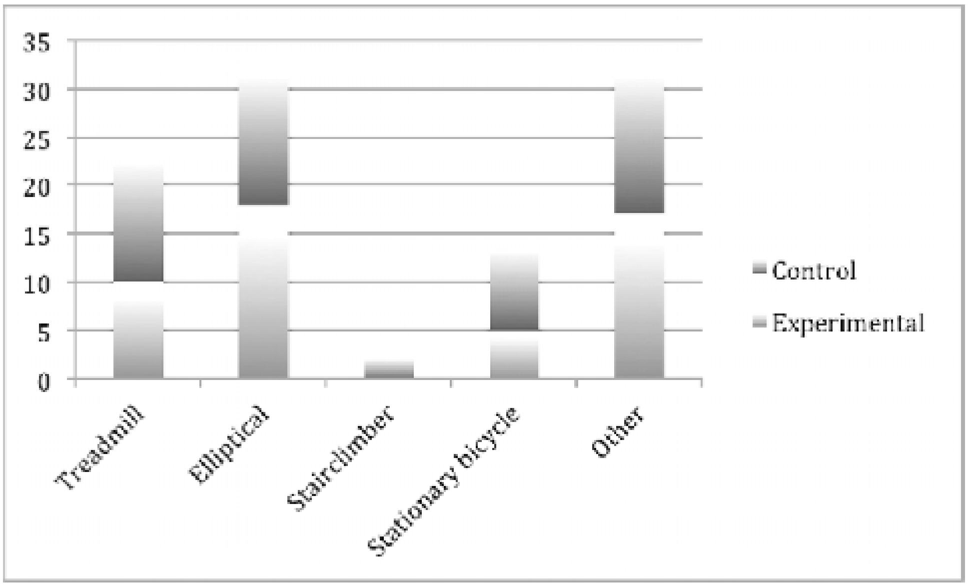

Figure 1. Exercise modality

*Some participants indicated more than one mode of exercise.

In the main analysis—a test of the effect of the experimental intervention—an independent *t*-test revealed a significant difference between the PACES scores of the control and experimental groups (t (67) = 2.01, $p < 0.05$), with the experimental group reporting higher exercise enjoyment (M = 4.47, SD = 0.36) than the control group (M = 4.29, SD = 0.39). The effect size was moderate (ES = 0.48). The data are graphically represented in Figure 2.

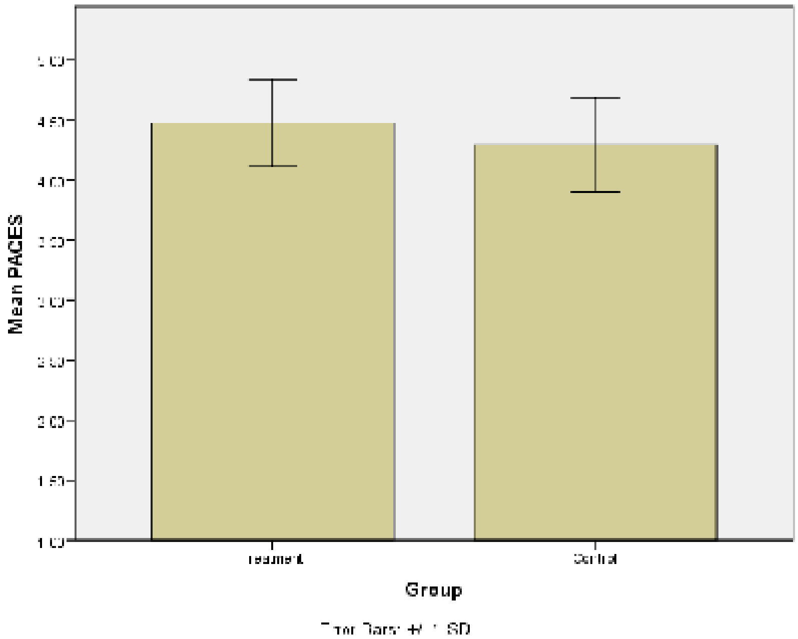

Figure 2. Mean Scores on PACES

DISCUSSION

This study was designed to test the hypothesis that creating the expectancy that music would increase reported exercise enjoyment would actually lead to higher levels of reported enjoyment—and the hypothesis was supported. It was a simple randomized field experiment—which gave it the strength of ecological validity, but also reduced control over other variables such as environmental conditions and exercise intensity. However, since other experimental studies of enjoyment expectancy effects were not uncovered by our literature reviews, there is arguably some heuristic value to these results, as well as some practical implications for physical activity promoters and exercise leaders.

A key issue is the question of whether the *reported* increase in enjoyment represented an increase in *actual* enjoyment. While an unequivocally answer to that question cannot be given, some speculation is appropriate, and will be attempted below. However, before that attempt is made, the “so what” question of the significance of the results should be addressed.

In the field of medicine the need to consider placebo-type effects is driven by multiple factors such as avoiding spurious treatment findings, improving patient care, and minimizing patient harm (Ernst, 2007). Using this analogy, the first main answer regarding this study, is arguably that the results have measurement implications for future studies on the topic. Given that our participants had already chosen to listen to music while exercising—presumably to enhance their perceptions of the experience, the finding of a moderate effect for a created expectancy should serve as a caution for future experimenters to control for it, or at the very least, to consider that it may have been a factor in their results. Future researchers on exercise and music might consider how medical researchers can "blind" both participants and researchers to avoid such bias, and try to employ similar research design strategies themselves.

In the field of medicine the ethical issues related to placebo-type effects are a subject of concern. On one hand, deceptive placebo use can be seen as a clear violation of patient autonomy, but on the other hand, it can be construed as compatible with informed consent (Barnhill, 2011). While the nuances of that debate may be beyond the scope of this discussion, perhaps of more direct relevance is the evidence for a "healthy adherer" effect, where adherence to placebo and/or beneficial therapy reduces mortality, but adherence to harmful therapy increases mortality (Simpson, et al., 2006). Thus, if exercise is an appropriate health behavior, improving adherence by creating an (albeit false) expectancy of enjoyment from music use may be seen as both ethical and beneficial. Of course, if exercise was contraindicated for particular individuals, the opposite may be true. If the former can be ensured by appropriate pre-exercise screening (e.g., use of the PAR-Q), then the use of placebo-type exercise enjoyment enhancers by physical activity promoters and exercise leaders would seem to have justification given the evidence that exercise has important health benefits for most people.

The question of whether a reported increase in enjoyment represented an actual increase in enjoyment cannot be unequivocally answered by this study, but speculation about some possible influences or explanations is merited since awareness of them could help future research design. For example, since all participants knew they were being studied, and because all were asked for details of their music selections before they exercised and subsequently completed the PACES, it is possible that results were influenced by a simple

Hawthorne effect (Bramel and Friend, 1981). Thus, scores in general on the dependent variable may have been elevated (McCarney, et al., 2007). In the current study, each participant was aware that he or she was going to be asked about enjoyment of exercise after the workout. Future experiments could test this possibility by approaching potential participants after their exercise sessions were completed, but still randomly using the expectancy-producing deception before the PACES was completed.

Similarly, while it is clear from the data of this study that creating an expectancy did increase reported enjoyment, there is no way of knowing if that increase was simply some sort of obedience-to-authority effect, or if it was a genuine effect. If the latter, then we would speculate that the simple deception used was enough to "focus" the exerciser on music more than he or she typically attended to it—thus increasing a dissociation effect from exercise intensity, which enhanced enjoyment. Lind, Welch, and Ekkekakis (2009) discuss music as an "environmental stimulus" used for dissociation during exercise. A possibility for future studies could be the use of deceptions designed to produce the expectancy of less enjoyment from music, or to decrease dissociation by increasing the focus on bodily perceptual and physiological responses to the exercise itself. The recommendations of Lind, Welch, and Ekkekakis (2009) also encouraged researchers to investigate where dissociative effects are most pronounced in terms of exercise exertion, but this would likely require a more laboratory-based study. Inevitably, such research design alternatives involve trade-offs between internal and external validity, but both approaches may be needed to pinpoint the relative effects of the different variables.

Of course, there are several other limitations to this study (e.g., sample size, participant diversity, and exercise modality), which need to be addressed in future studies. Also, in designing the study, it was decided to utilize a simple experimental (post-test only) design because it was felt that using the PACES in a pre-test could possibly cause reactive pre-test sensitization. Thus, future studies could use a pre-test to explore that issue as a possible confound. Similarly, because our focus was primarily on the effects of the experimental manipulation, and because there was no interaction effect, we have not discussed the higher enjoyment scores reported by the female subjects--although such differences have been noted by others (e.g., Priest, Karageorghis, and Sharp, 2004), and it is possible that different experimental designs with larger samples could reveal some type of sex-by-treatment interaction effects. However, while recognizing its limitations, a strength of this study is the ecological validity consequent to its focus on individuals exercising at their preferred intensities and modalities. Moreover, since there appears to be a dearth of studies on expectancy-type influences on the physiological and perceptual responses to healthful exercise, its results have both heuristic value (e.g., measurement issues in research design) and practical value (e.g., potential to improve exercise adherence). Given that most of the population does not obtain sufficient exercise to get the well-known health benefits, the continued study of enjoyment of exercise, including the role of music in enhancing it, would seem to be merited.

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