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The characteristics and effects of motivational music in exercise settings: The possible influence of gender, age, frequency of attendance, and time of attendance

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Abstract

Background. The purpose of the present study was to investigate the characteristics and effects of motivational music in British gymnasia. The secondary purpose was to determine whether the characteristics and effects of motivational music were invariant in relation to gender, age, frequency of gymnasium attendance, and the time of day at which exercise participants attended gymnasia. *Methods.* Participants (n=532) from 29 David-Lloyd exercise facilities across Britain responded to a questionnaire that was designed to assess music preferences during exercise via two open-ended questions and one scaled-response item. *Results.* A content analysis of the questionnaire data yielded 45 analytic properties that were grouped into the following categories: Specific music factors, general music factors, music programme factors, delivery factors, televisual factors, personal factors, contextual factors, and psychophysical response factors. The relative incidence of these analytic properties across gender groups (male/female), age groups (16-26 yrs., 27-34 yrs., 35-45 yrs., 46+ yrs.), frequency of attendance groups (low, medium, high), and time of attendance groups (morning, afternoon, evening) was tested by use of χ^2 analyses. Of the personal variables tested, age exerted the greatest influence on musical preference during exercise; older participants expressed a preference for quieter, slower, and generally less overtly stimulative music. *Conclusions:* Music programmes that are prescribed to accompany exercise should be varied in terms of musical idiom and date of release. Such programmes will account for the preferences of different groups of exercise participants that attend gymnasia at different times of the day. Further, the music chosen should be characterised by a strong rhythmical component.

Key terms: preference; rhythm; tempo; volume

Introduction

The scope of music psychology has broadened in the past decade to include research into the effects of music in a wide variety of social contexts.[1] Leisure facilities provide one such social context and the potential effects of music on the performance and experience of exercise may influence patterns of exercise adoption and adherence.[2-3] Research into the psychophysical effects of music in a physical activity context has been characterised by methodological weaknesses and the lack of study rationales firmly grounded in theory. [4] Consequently, research findings have been largely equivocal.

Four factors are believed to contribute to the motivational qualities of a piece of music: rhythm response, musicality, cultural impact, and association. [2] Rhythm response relates to musical rhythm whereas musicality is the response to pitch-related elements such as harmony and melody. Cultural impact refers to the pervasiveness of the music within society, and association to the extra-musical associations that a piece of music may carry. The factors exhibit a hierarchical structure, *i.e.*, rhythm response is the most important, and association the least important in determining the overall motivational qualities of a musical piece. The factors were divided into 2 groups: music factors and personal factors. The former denotes structural elements of the music (rhythm and musicality) whereas the latter comprises aspects of musical perception, namely cultural impact and association.

The term *rhythm response*[2] refers to the innate predisposition of the organism to synchronise physical movement with the rhythmical elements of music. "The regular and insistent rhythm of popular music stimulates the [cerebral] ergotropic centre, thus increasing the work capability of the individual".[5] Motivational music has been shown to increase endurance in a cycle ergometer task,[6] reduce perceptions of exertion and improve affect in a treadmill task, [7] and promote the experience of flow state.[8,9] In addition to possessing

motivational qualities, music that accompanies exercise should be functional, *i.e.*, well coordinated with the task.[10]

Research into the psychophysical effects of music in exercise and sport contexts has been dominated by laboratory-based work.[11] Hence, the rationale underlying the present study was to strengthen the theoretical base for future research using qualitative methods deployed in a naturalistic setting. Further, the impact of personal variables such as gender and age on music preference in exercise settings has not been comprehensively investigated. Moreover, the methods used in the present study yielded novel findings that may prime future experimental investigation.

There is a precedent for qualitative investigation of the effects of music in sport and exercise contexts. Gfeller utilised a questionnaire to assess the music preferences of young adults participating in exercise-to-music classes.[12] The music characteristics that the participants identified as the most salient include musical style (*e.g.*, rap, jazz, techno, etc.), rhythm, and extra-musical associations. General music preferences become less contingent on prominent rhythm as people age; however, this does not apply in the context of exercise. [12] The preference for different musical idioms is associated with age. For example, classical music preference has been reported to peak in the 55-64 year old group.[13] Further, certain music forms play a key symbolic function in establishing the identity of young people within society.[14]

Gfeller found that the music preferences of males and females in the context of exercise were highly correlated.[12] However, experimental and psychometric researchers have reported gender differences in music preference.[2,15,16] Female exercise participants reported a greater response than male exercise participants to the rhythmical elements of music.[2] Conversely, males exhibited a greater preference than females for music with an exaggerated bass.[15]

Moreover, females selected lower volume levels than males when listening to 4 different types of music.[16] Hence, it is possible that males are more responsive to the stimulative qualities of music.

It is probable that Gfeller's findings were influenced by the structure of the questionnaire that she used; this may have prompted the responses of the participants.[12] For example, questions such as, "do you think the music takes your mind off any part of the physical activity?" (p. 33) resulted in a 91% positive response (*i.e.*, yes it does). Similarly high percentages were found in response to the other questions. Six college athletes were interviewed to investigate the use of music as part of a pre-competition routine.[17] It was concluded that the phenomenon of musical response within sport represents a complex reaction that includes musical and personal variables. In addition, the relationship a person has to music in the sport setting was reported to be highly individual and possibly unique.

The primary purpose of the present study was to investigate the effects and characteristics of motivational music in exercise settings using a qualitative mode of inquiry. The secondary purpose was to investigate the association of personal variables with music preferences in gymnasia. A questionnaire was designed to assess the music preferences of a large sample of members from 29 health clubs. The data were content-analysed to assess preference themes. Subsequently, non-parametric statistical analyses were used to test the association of age, gender, frequency of gymnasium attendance, and time of attendance (i.e., morning, evening) with the frequency counts that emerged from the content analysis of music preference in the exercise setting.

Materials and Methods

Participants

The sample comprised 532 volunteers who were members of 29 David-Lloyd Leisure health clubs in England and Scotland. There were 307 females (57.9%) and 223 males (42.1%); 2 of the participants did not indicate their gender. The age of the participants ranged from 12 to 79 yrs (M = 34.9, SD = 12.3 yrs); 7 of the participants did not report their age. The participants all engaged in gymnasium-based exercise programmes, which comprised of a combination of cardio-vascular and resistance training.

Instrumentation

A questionnaire was prepared by the authors in consultation with senior managers of David-Lloyd Leisure and sport and exercise psychology researchers at Brunel University. Participants were asked to report which David-Lloyd Leisure health club they attended and their age and gender. In addition, the participants reported their frequency and time of attendance to the facility. These questions were open-ended with no response set provided. With reference to music, participants were asked to assess the importance of music to them while they exercised in the gymnasium. This response was rendered on a 7-point Likert-type scale anchored by 1 (not at all important) and 7 (extremely important). Two open-ended questions were used to assess the participants' music preferences in the gymnasium setting. First, participants were prompted to comment on the current music programme being delivered at their facility. Second, participants were asked to suggest how the selection of music could be improved. The questionnaire was purposefully brief so as to render it unobtrusive during administration.

Procedures

Confederates of the researchers, who were recruited from among health club staff and thoroughly briefed, administered the questionnaire. Participants were approached while they were in the gymnasium area. However, the research confederates were under instructions to approach the participants at a time when the completion of the questionnaire would not intrude upon their exercise routine. Having obtained informed consent, the research confederates explained to participants that the questionnaire would be used to accumulate feedback, which would be used in formulating a new music policy for the health club. The participants were given an opportunity to question the research confederates. In order to preserve the participants' anonymity, their names were not recorded. Subsequently, the research confederate withdrew and the participants completed the questionnaire at their convenience before returning it to the gymnasium reception desk.

Data Analyses

Content Analysis

First, the data from the questionnaires were entered onto a Microsoft Excel 2000 spreadsheet to facilitate analysis. The responses to the open-ended questions were broken down into meaning units, *i.e.*, bracketed statements that are indivisible and contain sufficient information to be interpreted on their own.[18] Following this, the meaning units were grouped into properties according to common features. For example, meaning units referring to the rhythmical elements of music were grouped into a 'rhythm' property. Finally, properties were further grouped to form categories at a higher level of abstraction. For example, the 'rhythm' and 'melody' properties constituted part of the 'specific music factors' category. The framework for the analysis of the qualitative data was drawn from a review of relevant texts.[19,20]

In order to further the trustworthiness of the qualitative data analysis[21] a reliability check, also known as an external audit,[22] was undertaken. The 2nd author analysed a subsection of the data containing 300 meaning units (approximately one quarter of the data). The 2nd author classified 94.62% of the property codes in agreement with the analysis conducted by the 1st author. The discrepant codes were then highlighted and discussed individually in order to resolve any residual incongruence between the coding of the 2 authors. At this point, it was deemed unnecessary to re-code the data as the 1st author had justified his decisions in undertaking the original analysis.

STATISTICAL ANALYSES

The association of personal variables with the frequencies of the properties that resulted from the content analysis was examined using a series of χ^2 tests. The gender variable had 2 levels (male and female). The age variable was split into 4 levels (16-26 yrs, 27-34 yrs, 35-45 yrs, & over 45 yrs). The frequency of attendance variable was split into 3 levels (1-2 times per week, 2-4 times per week, > 4 times per week).

χ^2tests were only undertaken when the total frequencies numbered at least 20.[23] χ^2 analyses were also performed in order to ascertain whether the frequency of attendance and time of day variables were associated with age or gender. Thus, when the pattern of results suggested that the influence of either time or frequency of attendance was attributable to age or gender, double classification χ^2 tests were carried out. To ensure adequate cases in each cell for the double classification tests[23] the age variable was condensed into young (16-34 yrs) and old (35+ yrs) participants. Although the data resulting from the participants' ratings of the perceived importance of music during exercise were at interval level, a parametric analysis was not possible given that the data exhibited a leptokurtic distribution (kurt. = 2.24). Further, the variances between the different levels of each independent variable were unequal.[23] Hence, further χ^2 analyses were undertaken to investigate the extent to which the independent

variables were associated with the perceived importance of music during exercise. The perceived importance variable was split into levels according to the seven points on the Likert-type scale used to assess this response. However, the first three points on the scale (1 - 3) were collapsed into one level owing to the low number of responses.

Results

Content Analysis

Insert Table I about here

The results of the content analysis are presented in Table I. The specific music factors relate to structural components of music such as rhythm, which was referred to by 7.89% of the sample. A clear preference was demonstrated for up-beat music; for example, a 26-year-old female exerciser stated that, "music tempo has a significant impact on how hard I push myself. Up-beat music is best". There was a general trend for the preference for louder volume (9.77%) as opposed to quieter volume (4.70%). A 23-year-old female explained that, "the louder it is the more motivated you are to do more." With reference to musical idioms, various types of dance music were touted as especially motivational forms of music (9.77%).

Subjective assessments of the overall character of music were resolved around two poles: Aversion to music that was considered to be bland or boring (3.76%) and preference for music that was considered to be 'lively' or 'energetic' (2.82%). A 20-year-old female wrote, "I find it improves my motivation to carry on with my workout when the music is lively." In terms of the overall music programme, by far the most important concern among the participants was variety (27.44%). In concordance with the marked preference for variety was an aversion to repetitive music selections (18.80%). It was suggested that variety could be

manifested by either utilising music of different eras or different styles. Further, many of the negative references to the repetition of music suggested that gymnasia provide literally the same musical selections over a long period of time.

In terms of the delivery of music programmes, 14 individuals proposed the provision of choice for members of gymnasium facilities. More specifically, positive judgments were passed regarding Cardio-Theatre™, a system that enables users to choose from a variety of channels that are delivered through personal headphone units. Thirty-five individuals felt that music television was motivational: "I would rather have MTV than just music as you have something to watch and keep you interested".

Concerning the personal variable of age, it was felt that the currently available music selection catered for young gymnasium users but not their older counterparts. Contextual factors also influenced the type of music that was preferred. The participants stated that they preferred different music depending on which activity they were partaking of (4.14%). The motivational effects of music were considered particularly relevant during cardio-vascular as opposed to resistance exercise. This trend was illustrated by a 40-year-old male "a good rhythm helps to maintain pace on cardio equipment". Indeed, references were made on 23 occasions to the conscious synchronisation of movement with music.

Twenty-six of the participants (4.89%) wrote that music should be altered in accordance with the time of day. The reason for this proposed alteration was to account for the different clientele that were thought to attend the gymnasium at different times. The general trend of responses suggested that stimulating music (described variously as dance music, loud music, fast music, or rhythmical music) should be played during the evening, busy, or peak times and that music delivered during the daytime should comprise a less stimulative (but not sedative) selection.

Ninety-one participants referred to feeling more motivated in response to the music. Seventeen of these respondents used related terms such ‘inspiring’, ‘incentivising’, or ‘encouraging’ to describe the music in question. Music can also have a negative impact on motivation, “music is one of the prime motivators when actually using the gym, music can make you keep going or give up”. Indeed, in responding to the question regarding the current provision of music, five participants stated that the selection was “not motivating”, whereas four others described the music as “de-motivating”. A 26-year-old female reported that de-motivational music had negatively impacted upon her exercise adherence.

Statistical analyses

Gender was associated with the time of attendance ($\chi^2 = 8.97$, $p < 0.05$) in that males attended gymnasia more than females in the evening when compared to the morning or afternoon. Further, age was also associated with time of attendance ($\chi^2 = 18.50$, $p < 0.05$) in that younger participants attended less in the morning and more in the evening relative to older participants (35+ yrs). Gender was associated with frequency of attendance ($\chi^2 = 6.61$, $p < 0.05$); more males than females attended the gym at a high frequency (5 or more sessions per week) as opposed to a moderate frequency (3-4 sessions per week). Age had no association with the frequency of attendance ($\chi^2 = 1.06$, $p > 0.05$).

Insert Table II about here

The results of the χ^2 analyses on the associations between personal variables and the rated importance of music during exercise are presented in Table II. Females rated the importance of music more highly than the males ($\chi^2 = 22.50$, $p < 0.05$). Younger participants rated the importance of the music more highly than older participants ($\chi^2 = 88.96$, $p < 0.05$).

This difference was particularly marked between the oldest (46 yrs +) and youngest (17-26 yrs) age groups.

The frequency of attendance was not related to the rated importance of music (χ^2 = 12.52, $p > 0.05$). However, a non-significant trend revealed increased ratings of importance for those attending the gymnasium facility more than twice per week. Because more males than females attended the gymnasia at a high level of frequency (5 times per week or more), a separate analysis of the association of frequency of attendance and rated importance of music was undertaken for each gender. The frequency of attendance did not appear to affect the rated importance of music during exercise for females ($\chi^2 = 4.63$, $p > 0.05$). However, males who attended frequently rated the importance of the music more highly than males who attended infrequently ($\chi^2 = 22.44$, $p < 0.05$). The later in the day participants exercised, the more highly they rated the importance of music during their exercise ($\chi^2 = 25.20$, $p < 0.05$). However, this relationship was explained by the fact that younger participants attended the facility more in the evenings than older participants.

Insert Table III about here

The association of gender and age with the incidence of properties from the content analysis is presented in Table III. Gender was not associated with preference for current music ($\chi^2 = 3.15$, $p > 0.05$), preference for non-current music ($\chi^2 = 0.83$, $p > 0.05$), preference for dance music ($\chi^2 = 0.77$, $p > 0.05$), preference for rhythm ($\chi^2 = 1.31$, $p > 0.05$), preference for faster music ($\chi^2 = 1.69$, $p > 0.05$), preference for a varied musical selection ($\chi^2 = 0.07$, $p > 0.05$), preference for quieter music, ($\chi^2 = 0.65$, $p > 0.05$), or preference for louder music ($\chi^2 = 1.19$, $p > 0.05$). However, females relayed a greater propensity to feel motivated in response to

music ($\chi^2 = 4.77$, $p < 0.05$).

Preferences for current music decreased with age ($\chi^2 = 20.67$, $p < 0.05$), as did preferences for dance music ($\chi^2 = 23.74$, $p < 0.05$). Preferences for non-current music were greater amongst older participants than younger participants and peaked markedly in the 35-45-year-old age group ($\chi^2 = 9.04$, $p < 0.05$). Additionally, older participants exhibited a marked preference for quieter music ($\chi^2 = 50.16$, $p < 0.05$), whereas younger participants exhibit a marked preference for louder music ($\chi^2 = 11.60$, $p < 0.05$). Younger participants preferred upbeat music ($\chi^2 = 11.31$, $p < 0.05$). However, a preference for the rhythmical elements of music was expressed regardless of age ($\chi^2 = 0.99$, $p > 0.05$). Younger participants reported a higher incidence of feeling motivated by music ($\chi^2 = 8.80$, $p < 0.05$). The preference for a varied music selection was reported irrespective of age ($\chi^2 = 2.75$, $p > 0.05$).

Frequent attendees were more likely to report an aversion to repetitive music selections ($\chi^2 = 7.88$, $p < 0.05$) and a preference for upbeat music ($\chi^2 = 15.31$, $p < 0.05$). However, frequency of attendance was not significantly associated with the incidence of any other properties. When both genders and age groups were tested separately, the time of attendance was not associated with preference for dance music; this result held for males ($\chi^2 = 1.70$, $p > 0.05$), females ($\chi^2 = 0.73$, $p > 0.05$), older participants ($\chi^2 = 1.29$, $p > .05$), and younger participants ($\chi^2 = 3.059$, $p > 0.05$). The motivation response to music was reported to increase throughout the course of the day ($\chi^2 = 8.62$, $p < 0.05$). However, this result appeared to be moderated by age; neither younger ($\chi^2 = 1.51$, $p > 0.05$) nor older ($\chi^2 = 0.71$, $p > 0.05$) participants reported greater motivation in the evening than expected.

Those who attended the gymnasium in the evening reported a greater preference for the rhythmical elements of music ($\chi^2 = 22.47$, $p < 0.05$). Further, those who attended the gymnasium in the afternoon were particularly averse to the repetition of the music programme

($\chi^2 = 10.65$, $p < 0.05$). The time of attendance bore no significant relationship with the preference for upbeat music ($\chi^2 = 2.45$, $p > 0.05$), preference for a varied music selection ($\chi^2 = 1.23$, $p > 0.05$), preference for louder volume ($\chi^2 = 0.51$, $p > 0.05$), or preference for quieter volume ($\chi^2 = 1.65$, $p > 0.05$).

Discussion

The primary purpose of the present study was to investigate the effects and characteristics of motivational music in exercise settings. The secondary purpose was to investigate the possible influence of personal variables on music preferences in such settings. The mean rating for the importance of music during exercise was 5.84 on a 7-point scale. Hence, it appears that the ubiquitous presence of music in exercise facilities is, to some extent, justified. However, it is plausible that this ubiquitous presence of music has conditioned individuals to regard the music as an important characteristic of the exercise environment.

Motivational characteristics of music

The importance that the participants attributed to the rhythmical elements of music underlines the theoretical importance of rhythm response.[2] However, the present findings indicate that the rhythmical elements of music elicit an arousal response in addition to a synchronisation effect. The participants did not refer to the pitch-related musical qualities of harmony and melody that may also contribute to the motivational qualities of music.[2] The absence of any reference to such musical factors may have been due to the fact that the response format did not encourage the participants to provide verbose or subtle descriptions of their preferences. Further, the sample may have consisted of participants who were naïve to musical terminology.

The present findings indicate that the motivational qualities of music are heightened when the music is delivered at a high volume. The definition of motivational music draws its

lineage from the terms used to describe stimulative music.[2] Hence, if increased volume results in increased stimulation, then this, in turn, should enhance motivation. The issue of volume is key to the provision of music within gymnasia; practitioners must achieve a balance between allowing the music to become obscured by environmental noise[10] and causing short-term hearing loss.[24]

Idiomatic descriptions of music provide an excellent framework for the selection of a balanced programmes of music that are grounded in the symbolic categories, which lay people (non-musicians / non-musically trained) use to categorise music. However, musical pieces should be selected on an individual basis rather than purely because they are thought to be representative of a desirable idiom.[25] By far the strongest finding in terms of frequency of response was the preference for a varied music programme. This result suggests that people are sensitive to the effects of a musical programme as a whole. An ecumenical approach should be taken to the selection of music in physical activity environments; one that has, as yet, not been countenanced within the literature. For example, five of the participants made the suggestion that music should be selected according to thematic principles, *e.g.*, a "disco night".

Contextual factors

The finding that gymnasium members advocated the provision of musical choice can be interpreted in the context of self-determination theory[26, 27]. Specifically, the provision of choice may enhance the sense of autonomy,[28] which is one of the needs underlying intrinsic motivation. Music appears to serve a particular function in relation to specific activities. Typically, the participants reported that the rhythmical elements of music facilitated their performance on cardio-vascular ergometers such as the treadmill or cycle; exercise participants may require additional motivation to endure the unpleasant physical sensations they associate with certain pieces of equipment. At equivalent exercise intensity, ratings of

perceived exertion were higher for certain pieces of cardio-vascular equipment than others.[29]

Gender differences

Females rated the importance of music more highly than the males, so it appears that music is a more integral aspect of their workout experience. This result permits various interpretations. For instance, females may require a greater degree of extrinsic motivation to exercise, or they may be more responsive than males to music in the exercise environment. Music may function in a 'comfort' role for women in the same way that it does in a working environment.[30] However, females reported a far higher incidence of being motivated by music than males, thus implying that music may exert a more potent effect on female exercise participants.

The higher incidence of motivation in response to music may be due to gender differences in the affective response to music. Although there were an insufficient number of responses to test the association of gender with affective response, the prevailing trend indicated that females were more likely to experience enhanced (more positive) affective states as a result of listening to music during exercise. It has been suggested that females are more aware of and affected by their mood states.[31] Gender did not affect preference for music volume, a result that may be related to the exercise context, as other researchers have reported a general sensitivity of females to louder volume music[32] or a male preference for loud volumes.[16] In contrast to the previous findings,[2] gender was not associated with preference for the rhythmical component of music.

Age Differences

The results of the present study indicate that preferences for musical idioms during exercise display a similar pattern to those reported in the general music preference literature. Fourteen of those 17 participants who reported a preference for classical music fell into the 46

yrs old and over group; a result which is analogous to findings in the mainstream music preference literature.[13] Further, the youngest age group (16-26 yrs) preferred current music and dance music predominantly, whereas those in the 36-45 year-old group expressed the greatest preference for non-current music. The introduction of unconventional musical idioms such as classical music into the gymnasium environment would be problematic due to acoustic factors. There is a possibility that the dynamic range and diversity of timbre in classical recordings would be obscured by the gymnasium noise pollution.

The present findings concur with those of Gfeller[12] in that preference for the rhythmical elements of music endured with age. Older participants displayed a clear preference for quieter and slower music. The preference of younger participants for music with a fast tempo may relate to the intensity of the exercise that they undertake; those who exercise at higher intensities may prefer music of a faster tempo.[33,11] The number of participants reporting a motivation response to the music receded with age. This may have been because the music provided in the chosen gymnasia was selected primarily for younger exercise participants. Hence, music that is selected specifically for older age groups may promote increased motivation. An alternative explanation is that older individuals do not seek to be motivated by the music to the same degree as younger individuals. In addition to reporting that they were less likely than younger participants to be motivated by music, the older participants felt that music was less important during exercise.

Time and frequency of attendance

The findings relating to frequency and time of attendance also have implications for the proprietors of exercise facilities. Higher frequency attendees reported a greater preference for music with faster tempi. It is probable that those who attend exercise facilities on a frequent basis exercise at higher intensity levels and thus prefer music with a fast tempo that matches their exercise heart rate.[33, 11]There were some instances in which the time of attendance was

related to responses independently of age or gender. For example, the rhythmical elements of music were preferred by those using gymnasia in the evening (as opposed to the morning or the afternoon). Such diurnal differences may reflect larger changes in fatigue and energy levels during the course of the day.[34, 35]

Conclusions

Health club operators may have underestimated the importance of music to those exercising in gymnasia. Indeed, the tenor of the participants' responses invites the conclusion that present music content in gymnasia is deficient in numerous aspects and requires more careful selection. The results of the present study are characterised by opposing preferences, underlining the problems facing those who select music in gymnasia. In addressing these problems the authors recommend 2 solutions. First, the music programme should demonstrate great variety. This aim can most easily be achieved by systematically varying the age (date of release) and musical idiom of the selections to cater for different tastes. However, the volume, tempo, and rhythmical components of the music should not be varied to the same extent as they influence the perceived motivational qualities of musical pieces in a more exacting way. Second, an effort should be made to carefully account for the preferences of the exercise participants that attend facilities at different times of the day. The most important personal variable in any such consideration should be age. For example, slower, quieter, musical selections that coincide with the idiomatic preferences of older gymnasium attendees may be appropriate during the morning.

The gender of exercise participants may also have a bearing on their music preferences during exercise. Females appear to find music more important during exercise in addition to exhibiting a heightened response to its motivational qualities. However, the question of whether females are more responsive to the rhythmical elements of music appears to warrant

further investigation. The present findings suggest that volume is an important feature of the musical stimulus and a tentative conclusion would be that a louder volume is likely to enhance motivation to exercise. Further, the nature of tasks being undertaken should receive careful attention when music is prescribed for exercise; the motivational effects of music appear to be particularly evident in the case of cardio-vascular exercise.

Future research utilising idiographic and qualitative paradigms may better assuage the semantic difficulties, which impede researchers from accounting for the effects of musical variables that are not understood by lay individuals. Several avenues for future research follow from the present findings. Researchers may wish to examine whether the rhythmical components of music lead to increased arousal, using an experimental manipulation of the rhythmic properties of a musical selection. The motivational effects of music volume have received scant attention in the exercise-related music literature. The possible effects of volume level on the motivational responses to music during exercise may also be tested experimentally. However, any such design should include age and possibly gender as independent variables. In addition, the effects of motivational music when used to accompany different exercise modalities (*i*.e., resistance training, cardio-vascular work) are ripe for investigation.

Externally valid and quasi-experimental designs may be used by researchers wishing to evaluate the impact of systematic variation on the motivational effects of a music programme as a whole. Finally, one of the most promising directions for new research in this field is the motivational effects of music-television; a stimulus that has received very limited attention from researchers. The research literature should reflect the prevalence of music television in gymnasia so that the efficacy of this medium may be assessed. The present study has highlighted the importance of personal variables in determining the motivational response to music, possibly providing a rationale for including personal variables in future conceptual

frameworks. The evidence presented herein supports the conclusion that the current state of music provision in gymnasia requires considerable attention.

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Table I. *Content analysis of qualitative data*

Category	**Property**	**Frequency and % of sample**
General music factors	Preference for dance music	52 (9.77%)
	Aversion to dance music	9 (1.69%)
	Preference for popular / chart music	28 (5.26%)
	Aversion to popular / chart music	18 (3.38%)
	Preference for classical music	18 (3.38%)
	Preference for rock music	15 (2.82%)
	Preference for rap music	6 (1.13%)
	Aversion to rap music	5 (0.94%)
	Preference for jazz music	9 (1.69%)
	Preference for easy listening music	5 (0.94%)
	Preference for energetic (or similar term) music	15 (2.82%)
	Aversion to dull or bland (or similar terms) music	20 (3.76%)
	Preference for type of music used in classes	12 (2.26%)
	Aversion to type of music used in classes	3 (0.56%)
Specific music factors	Preference for upbeat music	76 (14.29%)
	Preference for downbeat music	4 (0.75%)
	Preference for current music	56 (10.53%)
	Preference for non-current music	32 (6.02%)

(table continues)

Table I. (continued)

Category	Property	Frequency and % of sample
Specific music factors	Preference for rhythmical elements of music	42 (7.89%)
	Preference for prominent beat	4 (0.75%)
	Preference for less prominent beat	7 (1.32%)
	Preference for loud volume	52 (9.77%)
	Preference for quiet volume	25 (4.70%)
Music programme factors		
	Preference for varied music selection	146 (27.44%)
	Aversion to repetitive music selection	100 (18.80%)
	Preference for radio programming	11 (2.07%)
	Aversion to radio programming	20 (3.76%)
	Aversion to talking (i.e., news broadcasts, advertisements)	8 (1.50%)
Delivery factors	Preference for the provision of cardio-theatre ™	23 (4.32%)
	Request of provision of choice in music selection	14 (2.63%)
	Inadequate acoustics (poor sound quality) in gymnasium facility	8 (1.50%)
Tele-visual factors	Preference for provision of television in general	7 (1.32%)
	Preference for music television	35 (6.58%)

(table continues)

Table I. (continued)

Category	**Property**	**Frequency and % of sample**
Tele-visual factors	Aversion to music television	7 (1.32%)
	Preference for televised sport	3 (.56%)
Personal factors	Influence of age on music preference	26 (4.89%)
Contextual factors	Interaction between music and type of exercise activity being undertaken	22 (4.14%)
	Synchronisation of movement with music tempo or rhythm	23 (4.32%)
	Differing music preferences depending on the time of day	26 (4.89%)
Psychophysical response factors		
	Increased motivation	91 (17.11%)
	Stimulative effects of music	13 (2.44%)
	Sedative effects of music	5 (0.94%)
	Enhanced mood	19 (3.57%)
	Distraction from physical sensations	11 (2.07%)

Table II. *Chi-square analysis of the association of sex, age, frequency of attendance and time of attendance with the rated importance of music during exercise*

Variable	**Level**	**M**	**Frequency**	**1-3**	**4**	**5**	**6**	**7**	χ^2_{df}
Sex	Female	6.07	Expected	18.54	31.28	41.71	75.89	139.60	22.50_4*
			Observed	10	23	36	79	158	
	Male	5.53	Expected	13.46	22.72	30.29	55.19	101.40	
			Observed	22	31	36	52	83	
Age	17-26	6.25	Expected	8.56	14.65	19.90	35.10	65.50	88.96_{12}*
			Observed	2	8	19	35	80	
	27-35	6.19	Expected	8.21	14.04	19.07	33.64	62.78	
			Observed	3	8	16	36	74	
	36-45	5.94	Expected	8.33	14.24	19.35	34.12	63.68	

* $p < .05$

(table continues)

Table II. (continued)

Variable	**Level**	**M**	**Frequency**	**1-3**	**4**	**5**	**6**	**7**	χ^2_{df}
Age	36-45	5.94	Observed	7	12	21	35	65	
	46+	4.67	Expected	5.89	10.07	13.68	24.13	45.03	
			Observed	19	25	16	21	18	
Frequency	Low	5.59	Expected	6.09	10.65	13.69	24.73	45.84	12.52_{12}
			Observed	11	10	17	25	38	
	Medium	5.88	Expected	17.90	31.32	40.27	72.71	134.80	
			Observed	15	29	44	75	134	
	High	5.92	Expected	8.02	14.03	18.03	32.56	60.36	
			Observed	6	17	11	30	69	
Time	Morning	5.52	Expected	7.94	13.43	17.70	30.22	53.41	25.20_{12}*

* $p < .05$

(table continues)

Table II. (continued)

Variable	**Level**	**M**	**Frequency**	**1-3**	**4**	**5**	**6**	**7**	χ^2_{df}
Time	Morning	5.52	Observed	11	23	12	23	53	
	Afternoon	5.74	Expected	3.68	6.22	8.20	14.00	24.75	
			Observed	4	4	12	13	24	
	Evening	5.93	Expected	17.71	30.99	39.84	54.78	96.84	
			Observed	11	17	34	63	98	

Table III. *Analysis of the association of sex and age with the incidence of properties from the content analysis*

Property	**Frequency**	**Sex**		χ^2_{df}	**Age Group**				χ^2_{df}
		Female	**Male**		**17-26**	**27-35**	**36-45**	**46+**	
Preference for current music	Expected	32.44	23.56	3.15_1	14.93	14.30	14.51	10.26	20.67_3*
	Observed	39	17		28	16	7	3	
Preference for non-current	Expected	18.54	13.46	0.83_1	8.84	8.48	8.60	6.08	9.04_3*
music	Observed	16	16		7	6	16	3	
Preference for dance music	Expected	30.12	21.88	0.77_1	13.82	13.25	13.44	9.50	23.74_3*
	Observed	27	25		28	12	9	1	
Preference for rhythm	Expected	24.33	17.67	1.31_1	11.61	11.13	11.29	7.98	0.99_3*
	Observed	28	14		12	11	9	10	

* $p < .05$

(table continues)

Table III. (continued)

Property	Frequency	Sex		χ^2_{df}	Age Group				χ^2_{df}
		Female	Male		17-26	27-35	36-45	46+	
Preference for upbeat music	Expected	43.44	31.56	1.69_1	20.73	19.87	20.15	14.25	11.31_3*
	Observed	49	26		27	27	16	5	
Preference for varied	Expected	83.41	60.59	0.07_1	39.53	37.89	38.42	27.17	2.75_3*
musical selection	Observed	85	59		47	33	40	23	
Preference for loud volume	Expected	30.12	21.88	1.19_1	14.37	13.77	13.97	9.88	11.60_3*
	Observed	43	18		21	19	9	3	
Preference for quiet volume	Expected	13.90	10.10	0.65_1	6.63	6.36	6.45	4.56	50.16_3*
	Observed	15	9		0	2	4	18	

* $p < .05$

(table continues)

Table III. (continued)

Property	**Frequency**	**Sex**		χ^2_{df}	**Age Group**				χ^2_{df}
		Female	**Male**		**17-26**	**27-35**	**36-45**	**46+**	
Increased motivation	Expected	52.71	38.29	4.77_1*	24.60	23.58	23.91	16.91	8.80_3*
	Observed	63	28		33	29	16	11	

* $p < .05$