

The Effect of One-Session Rhythm Therapy on Mood States in Female and Male Corporate Employees

Efecto de una sesión de terapia de ritmo sobre el estado de ánimo de hombres y mujeres empleados corporativos

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Abstract. Stress management in the worksite has become important because of the existent relationship between stress and different types of illnesses. This study attempted to determine the acute effect of rhythm therapy on improvements in employees' mood states. Fifty-three employees (26 women and 27 men) participated in the study (mean age 30.34 ± 8.76 years), and filled out the Profile of Mood States questionnaire (short A and B version) before and after the one-hour rhythm session intervention. A 2x2 (time x gender) Analysis of Variance (ANOVA) revealed an interaction between time and gender for the Vigor Dimension. Main effects for time were found for all other mood dimensions tested. There was a significant improvement in tension, depression, anger, and fatigue in the participants after participating in the rhythm session. This rhythm protocol is a promising stress management strategy for the worksite.

Key words: Music, rhythm, POMS, stress management, worksite.

Resumen. El manejo del estrés en el lugar de trabajo se ha vuelto importante debido a la relación existente entre el estrés y los diferentes tipos de enfermedades. Este estudio intentó determinar el efecto agudo de la terapia rítmica sobre la mejora en el estado de ánimo de los empleados. En el estudio participaron cincuenta y tres personas (26 mujeres y 27 hombres) con una edad promedio de 30.34 ± 8.76 años quienes completaron el cuestionario Perfil de estados de ánimo (versión corta A y B) antes y después de la hora intervención de la sesión de ritmo. La aplicación de un análisis de varianza de 2x2 (momento x sexo) (ANOVA) reveló una interacción entre el momento y el sexo para la dimensión de vigor. Se encontraron efectos principales para el momento para todas las demás dimensiones del estado de ánimo evaluadas. Hubo una mejora significativa en la tensión, la depresión, la ira y la fatiga en los participantes después de participar en la sesión de ritmo. Este protocolo de ritmo es una estrategia de manejo del estrés efectiva para aplicar en el ámbito laboral.

Palabras clave: Música, ritmo, POMS, manejo del estrés, empleo.

Introduction

Current societal development has provoked changes in people's lifestyles, increasing levels of stress. A clear relationship between stress and illness has been established that shows that stress increases the risk of many diseases. It has been shown that stress can increase the risk of psychiatric disorders, diabetes and cardiovascular disease (Tyssen, Vaglum, Gronvold, & Ekeberg, 2000; Musich, Hook, Baaner, & Edington, 2006). As a result, different therapies have been implemented to address this issue, including stress management strategies at the worksite. Music therapies are one of the methods that have been implemented, but previous research in this area is insufficient and carries many methodological problems. Moreover, few studies have examined music-making protocols instead of music-listening passive strategies to reduce stress.

In the early 1900, a rhythm educational technique by Emile Jaques-Dalcroze was developed to use in children and adolescents' music education. Eurhythmics is a bodily technique of learning, or perhaps, experiencing rhythm, based on the theory that music can be taught through movement (Jaques-Dalcroze, 1976; Boyarsky, 1989). The body is used as the musical instrument with the purpose of understanding and internalizing music as it relates to time, space and energy (Frego, 1995; Boyarsky, 1989). In this technique, enjoyment is essential and learning rhythm movements can prepare a

person not only for musical studies, but for the body and the mind well-being (Jaques-Dalcroze, 1976). Based on this method, a music-making protocol has been developed for this study, using the body as an instrument.

During the past few years, research has been conducted on music-making drumming protocols to enhance mood states and other variables. Fancourt, Perkins, Ascenso, Carvalho, Steptoe, & Williamon (2016), demonstrated significant and positive changes in depression, social resilience, anxiety and mental well-being, after a 10-week group drumming program compared to controls. These results were supported by biological measures of cortisol and cytokines, showing a shift away from a pro-inflammatory towards an anti-inflammatory immune profile. Similarly, positive alterations in neuroendocrine and immunological variables associated with the classic stress response were found in subjects participating of a drumming intervention compared to a control group (Bittman, Berk, Felten, Westengard, Simonton, Pappas, & Ninehouser, 2001). Subsequently, Bittman, Bruhn, Stevens, Westengard, & Umbach (2003) examined the impact of a 6-session Recreational Music-making (RMM) protocol on burnout, mood dimensions and Total Mood Disturbance (TMD) in long-term care workers, finding statistically significant improvements in multiple burnout and mood dimensions, as well as a 46% reduction for TMD. Almost the same protocol was tested in first year associate degree nursing students, obtaining similar results (Bittman, Snyder, Bruhn, Liebfreid, Stevens, Westengard, & Umbach, 2004). The utilization of rhythm therapies and music-making programs for therapeutic purposes has been assessed in other populations as well, such as maltreated school children,

elders, substance-misusers or oncology patients (Teruko, et al., 2017; Varvarigou, Creech, Hallam & McQueen, 2012; Blackett & Payne, 2005; Waldon, 2001), but only one study has been conducted with corporate employees. The study conducted by Wachi, Koyama, Utsuyama, Bittman, Kitagawa & Hirokawa (2007) evaluated a music-making drumming protocol on 40 male corporate employees using a crossover design. The study consisted of two phases with a 6-month interval in between. For the first phase, the group was divided into two control groups and two intervention groups. The same procedure was used in the second phase, with the intervention participants serving as the controls while the previous control groups received the intervention. The authors assessed data from the Profile of Mood States (POMS) questionnaire and blood samples pre-test and post-test intervention. A trained facilitator carried out different activities that included a game, introduction to the basics of drumming, problem solving activities, self-expression of feelings and stress, and breathing and guided imagery while using the drums. The authors found significant positive results concerning mood states improvement. Furthermore, they demonstrate a regulatory response of immune parameters using this therapy. After the intervention, natural killer (NK) cell activity tended to increase in those participants who had low pre-test levels and decrease in those with high pre-test levels, leading NK cell activity levels toward the normal range. Moreover, the increase in NK cell activity adjusted for NK cell percentage was significantly higher in the intervention group compared to control subjects. Furthermore, mRNA levels of stress-induced cytokine Interleukin-10 decreased for most participants in the intervention group and NK cell activity of peripheral blood mononuclear cells and NK cell percentage correlated negatively with Interleukin-10 mRNA levels, and showed a positive correlation with Interferon-gamma mRNA levels, suggesting that a homeostatic modulation of immune functions underlies the reversal of stress associated with the intervention (Wachi et al., 2007).

Each music-making protocol in previous research required musical instruments to perform the multifaceted interventions; therefore, these protocols are difficult to implement in large groups, making it less practical for utilizing in the workplace. Moreover, implementing multifaceted interventions is an issue when trying to determine what exactly is responsible for the improvement in specific variables. To increase the practicality of these therapies, it is important to develop a music-making strategy that will contain fewer components and can use the body as an instrument; as a result, the protocol could be applied to many persons at the same time. Also, even though significant positive results concerning mood states improvement has been found, no comparison of results has been made between women and men.

The purpose of this study was to determine the acute effect of a rhythm therapy on female and male employees' mood states. This was an exploratory study using rhythm therapy that uses the body as an instrument, based on Jacques-Dalcroze Eurhythmics. To our knowledge, this is the first study to apply this technique, typically used for children's and adolescent's music education, with an adult working population for stress management.

Methodology

Subjects

Twenty-six women and 27 men from a company specialized in data processing and preparation in Costa Rica, participated in the study (mean age = 30.34 ± 8.76 years). Before participating in the rhythm therapy intervention, each person signed a written informed consent. Each of these subjects works in a small cubicle in front of the computer and has to fulfill a certain amount of work in a certain period of time.

Procedure

The participants filled out the Profile of Mood States questionnaire (short version in Spanish) before (version A) and after (version B) the one-hour rhythm session. During the intervention, all participants were seated in a room arranged with chairs in five lines of semi-circles. A main facilitator conducted the rhythm session with the help of four facilitator assistants. The session included a 15-minute guided warm-up stretching period (very easy-to-do movements) to facilitate the active participation of the subjects for the following period. After that, all participants learned four different rhythm bases (4/4 time signature), each using his or her body as a musical instrument (including easy movements, breathing, vocalizations, and body sounds). Next, they practiced each rhythm base one more times with the main facilitator. Four groups were then formed and each group was assigned one of the rhythm bases. The facilitator guided the activity by beginning with one group, and added another group performing their base until all four groups were «playing» at the same time. Subsequently, the groups were assigned one of the other rhythm bases and the procedure was repeated. The rhythm bases were changed until all groups tried all bases. During the last combination, changes in volume and speed were implemented. The facilitator added an ending that all participants «played» together.

Instrument

The Profile of Mood States questionnaire (short A and B version in Spanish) was used to assess mood states before and after the rhythm session. This questionnaire is a reduced version of the original self-report instrument developed by McNair, Loo & Droppleman (1971) and it consists of two sets of constructs (versions A and B) that measure five mood dimensions (tension, depression, anger, vigor and fatigue). In each version, participants rate 15 adjectives on a 5-point Likert Scale ranging from 0 (not at all) to 4 (extremely) based on how they feel at that moment. Scores for individual mood dimensions can range from 0 to 12 points.

Statistical analysis

The statistical analysis was carried out using the Statistical Package for the Social Sciences, version 16.0 (SPSS, Inc., Chicago, IL, 2007). An alpha level of .05 was used to indicate statistical significance. Averages and standard deviations of the relevant quantitative variables were calculated, and prior to the hypothesis-test analysis that will be mentioned later, the Kolmogorov-Smirnov normality test

was applied (adequate for more than 50 cases, according to O'Donoghue, 2012) finding that the distribution of the data corresponding to the different moments of measurement of the variables depression and anger differed ($p < .05$) from the normal distribution, which was not the case for the scores of tension, vigor and fatigue. A 2-way mixed variance analysis (measurements and sex) was performed for each dependent variable: tension, depression, anger, vigor and fatigue. A follow-up Analysis of Simple Effects was conducted for the significant interaction effects (Keppel, 1982). According to O'Donoghue 2012, in cases where the assumption of normality of the data is violated in an analysis of variance, if the maximum standard deviation of the different levels to be compared is less than double of the minimum standard deviation, then the test can be considered sufficiently robust to deal with the problem of normality exposed (Shapiro-Wilk test results). This condition was met for depression and anger. Likewise, the sphericity assumptions (Mauchly test, fulfilled by default by having only two measurements in the design) and homogeneity assumptions (Levene test) were met for the scores of depression, anger, vigor and fatigue.

Results

Table 1 shows the descriptive statistics that were recorded before and after the intervention, according to the sex of the participants.

An interaction between time (pre-test and post-test) and gender was found for the Vigor Dimension ($F=4.28, p=.04$). The change in the Vigor Dimension from pre-test to post-test was different between women and men, and was statistically higher for women (Figure 1). It appears that the rhythm therapy had a bigger effect on the vigor dimension in women compared to men. Gender differences in reported mood states have not been very common in previous research conducted with athletes or college students, such that normative data for POMS has been combined for women and men (Terry & Lane, 2000).

No interactions were found for the other four POMS dimensions. However, there were significant main effects for time. There were significant improvements in tension, depression, anger, and fatigue in all participants after participating in the rhythm session (Figure 2). Although tension, depression, anger and fatigue decreased significantly after the intervention, vigor significantly increased. These results provide preliminary positive findings for using rhythm based strategies for stress management.

Discussion

The findings of this study provide preliminary results on the effects of music-making rhythm therapy on mood states as a stress management strategy in the workplace. All mood states dimension significantly improved with the intervention. There was an interaction between time and gender for the vigor dimension, such that the change in vigor was bigger for women than for men.

These results were consistent with previous research conducted for music-making protocols in which positive effects concerning mood states were demonstrated (Bittman

Table 1
Summary of descriptive statistics (mean \pm standard deviation) of the study variables

	Male (n=27)		Female (n=26)		Total (n=53)	
	Pre	Post	Pre	Post	Pre	Post
Tension	4.19 \pm 2.83	2.07 \pm 2.56	4.81 \pm 1.98	2.15 \pm 1.91	4.49 \pm 2.48	2.11 \pm 2.24
Depression	1.59 \pm 2.80	0.63 \pm 1.15	1.38 \pm 1.94	0.08 \pm 0.39	1.49 \pm 2.40	0.36 \pm 0.90
Anger	1.59 \pm 2.91	0.30 \pm 0.82	2.00 \pm 3.05	0.08 \pm 0.27	1.79 \pm 2.96	0.19 \pm 0.62
Vigor	6.74 \pm 2.91	9.00 \pm 2.37	6.12 \pm 3.14	10.04 \pm 2.29	6.43 \pm 3.02	9.51 \pm 2.37
Fatigue	5.04 \pm 3.33	2.70 \pm 2.70	5.96 \pm 3.04	2.15 \pm 2.31	5.49 \pm 3.20	2.43 \pm 2.51

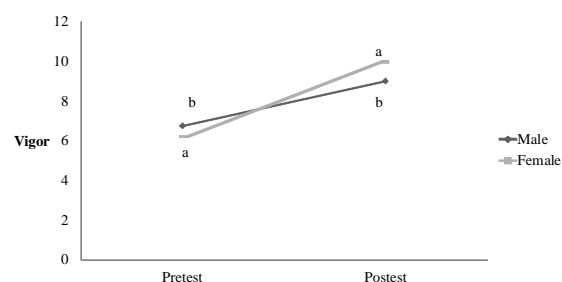


Figure 1. Interaction between Time and Gender for the Vigor Dimension
Note: The letter (a, b) indicate differences between measurements $p < .05$.

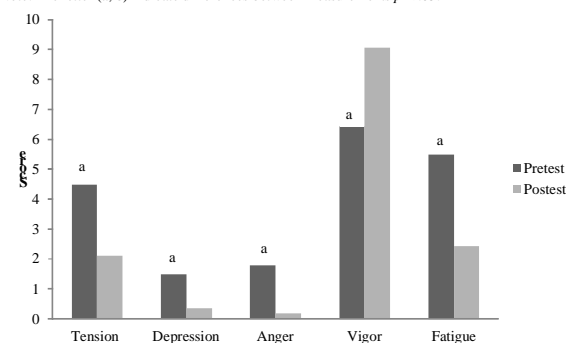


Figure 2. Summary for Pre-Test and Post-Test on POMS Dimensions
Note: The letter (a) indicate differences between measurements $p < .05$.

et al., 2001; Bittman et al., 2003; Bittman et al., 2004; Blackett & Payne, 2005; Waldon, 2001; Wachi et al., 2007). Likewise, it also coincides with De Rueda & López (2013), who demonstrated that a motor intervention program based on musical patterns and dance sequences is capable of improving the emotional state of the participants.

However, it is important to remember that the protocol used in this research was different from those in previous studies. This protocol did not include many components for the rhythm session, and it was low-cost in terms of the equipment usage and could accommodate a large number of individuals in a single session. Moreover, as it consisted of few components, training other facilitators for the development of this therapy could be easier. A company can have their own trained facilitators from the worksite to implement the therapy, with no purchase of equipment.

In the work environment of employees who perform administrative tasks, the present evidence is considered of great importance, since it has been demonstrated that this population can present low levels of physical activity and diversity of perceptions about the benefits that can be received when exercising (Arboleda, Arango, & Feito, 2016; Reynaga-Estrada, Arévalo, Verdesoto, Jiménez, Preciado, & Morales, 2016). By joining a music-making rhythm therapy program, employees can improve their mood and consequently their motivation, with a benefit associated with their life satisfaction (Silva, Jimenez, Leyton, Aspano, & Lobato, 2017), generating a better disposition to perform daily physical activity (Franco, Coterón, Gómez, Brito, & Martínez, 2017).

Contrary to protocols of previous studies, this intervention focused on enjoyment, mastery acquisition of rhythm skills and reinforcement of team work. Mood improvements from the rhythm therapy intervention can be interpreted using self-determination theory, which proposed that competence, autonomy and relatedness are indispensable for social and personal development and the encouragement of these needs will improve self-motivation and mental health (Ryan & Deci, 2000). The rhythm therapy utilized in this study provided an opportunity to meet these three innate psychological needs. Behavior can be intrinsically motivated and rhythm based therapies may allow individuals to experience feelings of competence and self-determination. Intrinsic motivation to know is encouraged when performing a satisfactory and pleasurable activity that is new. Intrinsic motivation toward accomplishments includes the feeling of competence and satisfaction by obtaining mastery and challenge of a difficult training technique. Intrinsic motivation to experience stimulation is present as well, when engaging in a fun and exciting activity and therefore experiencing stimulating sensations (Pelletier, Vallerand, Tuson, Briere, & Blais, 1995). All these intrinsic motivation types can be achieved through rhythm therapy like the one conducted in this study.

The superior ability of women to perform fine tasks of motor coordination (Rodrigues, Ribeiro, Sousa, Lopes, & Barros, 2019) could be presented as a possible explanation to the better response in the variable vigor in women. Better coordination could help to facilitate the actions to be taken during the rhythm therapy session, which could explain the higher satisfaction levels among women.

The experiences of satisfaction of the needs for autonomy, competence and relatedness in the worksite predict performance and well-being at work (Baard, Deci, & Ryan, 2004). Therefore, companies can benefit from stress management interventions in terms of production as well as assure well-being and satisfaction among its employees.

Because this rhythm therapy intervention was successful in terms of the improvements in mood states for a group of 53 participants, then it is a potentially useful stress management strategy to implement in the workplace. Rhythm therapy has the potential to reduce the risk of stress-related diseases and improve quality of life of workers, who may then also benefit the company in terms of improved productivity. It has been shown that as the number of health risks increase, employee productivity decreases (Burton, Conti, Chen, Schultz, & Edington, 1999). According to this study, this rhythm therapy seems to be a promising stress management strategy in the worksite.

The limitations of this study should be taken into account when generalizing these results. Even though the research was conducted with an adequate sample size, no control group was established. These types of companies work against time, and this is a difficulty when asking for a group that is not going to participate in an intervention. A group of employees as a control group for an hour will lead to a decrease in the production that the company is not willing to allow.

Another limitation is the lack of physiological tests and parameters to support the psychological findings. Further

investigation has to be performed adding tests of physiological factors related to emotions and stress like cortisol levels, muscular tension, and immunological markers measured with blood samples. In addition, constructs from the Self-Determination Theory that are hypothesized to be affected by rhythm therapy (autonomy, mastery, relatedness) should be assessed. Furthermore, follow-up measures should be carried out during the rest of the day, to evaluate the changes in mood states during the period following the intervention. Future research should also compare the rhythm session outcomes to those of another stress-related intervention like a relaxation class to evaluate and compare the effect of different stress management strategies.

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