

## THE SOCIO-MUSICAL BRAIN: STUDY OF A MUSIC EDUCATION EXPERIENCE

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### Abstract

Musical practice has positive effects on human development in general, involving cognitive, emotional, motivational and social aspects, which imply changes in brain processing. The number of Music Education Program (MEP) focusing on young populations in social vulnerability has grown in Brazil and in the world. The aim of the present study was to investigate the impacts of a MEP on psychological aspects of its students, more specifically self-esteem, social skills and executive functioning. Data collection was carried out in a MEP in the city of Ribeirão Preto - Brazil and in regular schools. The participants were 69 children and adolescents aged between 10 and 17 years, divided into the Beginner Group (BG), students with up to 12 months of enrollment in the MEP; Experienced Group (EG), students enrolled in the MEP for more than 24 months; and Control Group (CG), students without any involvement with music learning. The participants answered the psychological tests Rosenberg Self-Esteem Scale (EAR), Matson Evaluation of Social Skills with Youngsters (MESSY) and Stroop Test. Semi-structured interviews were also carried out with all students from the BG and EG groups, with ten newly enrolled MEP students, with six legal guardians of these students and twelve MEP professionals. Statistical analysis of the psychological tests showed that the participants in BG and EG did not differ among themselves for any of the study variables. The CG had lower scores than BG and EG for Self-Esteem and higher scores for Loneliness and Social Anxiety, indicating that involvement with MEP can lead to gains in these skills. Analysis of the interviews indicated that participation in the MEP is related to positive impacts on participants' self-esteem, social skills and executive functioning. The results were discussed seeking to inter-relate them in order to integrate the data collected through the psychological tests and through the interviews. It is concluded that participation in MEPs with a focus on the social rescue of vulnerable populations has an influence on the development of children and adolescents, indicating that the use of music education characterizes an important social intervention strategy.

**Keywords:** *Music education, social vulnerability, young, self-esteem, social skills, executive functioning.*

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### 1. Introduction

Musical activity involves cognitive, emotional, motivational and social aspects, supporting the activation of neurobiological processes (Bueno, 2012; Immordino-Yang & Damasio, 2007). Due to these characteristics, music appreciation seems to be the product of a specific cerebral organization, which gives support for the existence of a musician-specific neural network (Peretz & Zatorre, 2005). The notion of the socio-musical brain (Bueno, 2012) refers to the interrelation of the various aspects that make up the musical experience and points to the need to understand the music education experience as something that generates human development, implying and integrating psychological, biological and social aspects (Bueno, 1997). The functioning of the socio-musical brain is evident in social intervention actions that use music education methodologies.

The use of music in the school curriculum is common in Western societies, however, frequently, methodologies are based on what common sense or the media suggest as educational (Bueno, 2012). It is necessary that curricula be designed based on methodologies that respond to social and educational demands. Music can be combined with education, child development and social transformation, but it is necessary to use structured programs designed from the needs identified in community environments, in order to respond to the difficulties of these places, using their potential. In this way, this perspective points to a notion of music education that cannot do without taking into account the multiple components of the musical experience.

In children, there is ample evidence that the benefits of musical training are not limited to musical performance, but are also transferred to cognitive domains (Hallam, 2010; Moreno et al., 2011; Trehub, 2003). Studies on the effects of musical training on brain plasticity highlight the potential of using music as an aid in the developmental process of children and adolescents. For Allan (2010) and Majno (2012), art has the potential to challenge exclusion practices and, in this logic, Music Education Programs (MEP) can bring diverse gains to those involved, since they use music as a way of social rescue of children and adolescents in situations of social vulnerability. There is, therefore, a need for studies that address the interrelationship between the development of psychosocial and biological aspects in MEPs.

The MEP “El Sistema”, created in 1975 by the maestro and economist José Antônio Abreu, is a Program of social rescue and profound cultural transformation designed for the entire Venezuelan society without any distinctions, but with emphasis on the most vulnerable and threatened social groups (Abreu, 2009). Success in fulfilling the objective of social rescue is based on an intervention that operates in three spheres: personal/social, family and community, in the same sense as proposed by Freire (2003). Until 2015, they already existed in Venezuela more than 400,000 students enrolled in “El Sistema” (<http://fundamusical.org.ve>, retrieved on December 20, 2015). Many countries in the world have programs related to Venezuelan (Booth; 2013; Cline, 2012; Poloni, 2012; Uy, 2012). In an extensive review of studies and MEPs based on the “El Sistema” model around the world, Creech et al. (2013) found several effects of these MEPs on students' abilities. Hikiji (2006), in a study on Projeto Guri MEP of the State of São Paulo-Brazil, which also focuses on the social rescue of children and adolescents in situations of social vulnerability (<http://www.projetoguri.com.br/>, recovered in 20, December, 2015), discusses the impacts of performance on students. Programs such as Projeto Guri and “El Sistema” promote student presentations from the first months of participation in classes. For the author, the performance gives visibility to the students and the institution, in addition to providing the “performers” with the possibility of experiencing new social places. The immersion and joint practice of orchestral music promoted by “El Sistema” generate results that permeate the three spheres of intervention, culminating in the musical excellence of the Program's musicians (Abreu, 2009). For the founders, the main consequences that can be observed in students are, in particular, the development of self-esteem, social skills and cognitive skills. It is noteworthy that the students' families and the communities surrounding the MEP are also affected by it, since the participation of these instances in the Program's daily life is considered a basic prerequisite.

The literature points to the existence of positive correlations between self-esteem and social skills (Rubin et al., 2004) and also indicates the development of cognitive gains from involvement with music education (Schellenberg, 2005). It is necessary to carry out scientific studies that aim to verify the impacts of the interventions proposed by the MEP on the target populations. The Master Dissertation of Moisés (2016) investigated the impacts of a MEP on the psychological aspects of its students, more specifically self-esteem, social skills and executive functioning. For this, two experimental groups were formed with children and adolescents enrolled in the selected MEP and a control group with young people of the same age, without musical practice and coming from the same regular schools. Psychological tests were used to measure the aspects mentioned in the objective of the study. In addition to the tests, semi-structured interviews were carried out with MEP students, their legal guardians and MEP professionals in order to obtain reports of their experiences and opinions about the impacts of MEP on their lives.

## 2. Method

The project was approved by the Research Ethics Committee of the Faculty of Philosophy, Sciences and Letters of Ribeirão Preto, Universidade de São Paulo (CAAE No. 31434914.6.0000.5407). Data collection was carried out in a MEP in the city of Ribeirão Preto – Brazil and in two regular schools, one private and the other public. Prior consent was obtained from the institutions' management, and acceptance from the participants and parents of minors. The study included 69 children and adolescents aged between 10 and 17 years, divided into three groups (n= 23): Beginner Group (BG), composed of students with up to 12 months of enrollment in the MEP; Experienced Group (EG), composed of students with more than 24 months of enrollment in the MEP; and Control Group (CG), consisting of participants without any involvement with music learning.

Participants in the three groups individually responded to the following psychological tests: Rosenberg Self-Esteem Scale (EAR), Matson Evaluation of Social Skills with Youngsters (MESSY) and Stroop Test. Then, semi-structured interviews were carried out with all the students from the BG and EG groups, ten MEP students who did not make up any group because they did not have the required enrollment time prerequisite. Semi-structured interviews were also carried out with 16 other participants, including professionals from Projeto Guri and legal guardians of minors.

### 3. Results

Psychological test scores were compared among groups of participants by analysis of variance ANOVA and Tukey's test, or Kruskal 's test Wallys when at least one group did not follow the normal distribution. There are differences between the scores of the CG and the BG and EG groups. The mean EAR scores of the BG and EG groups are higher than those of the CG. On the other hand, the average scores of factor 4 (Loneliness/Social Anxiety) of the MESSY scale of the BG and EG groups are lower than those of the CG. No differences were obtained among the scores of the groups with the Stroop Test and MESSY factors 1 (Aggressiveness/Antisocial Behavior), 2 (Social Skills/Assertiveness) and 3 (Vanity/Arrogance).

The analysis of interviews allowed the peer interviews construction of three coding categories: "Interpersonal relationship", "Development of intrapersonal skills", with reflections by students about the perceived changes in their behaviors related to involvement with Projeto Guri, and the category "Engagement with music and human development", with considerations from students' professionals and legal guardians. The students reported impacts on interpersonal relationships resulting from participating in Projeto Guri, addressing sociability, interpersonal exchanges and the exercise of living with other people. The students highlighted that their involvement in the classes and in the daily activities of the MEP helped them to learn to live together in a group, exercising tolerance and negotiation and providing relational gains, such as an increase in the number of friends and the consequent development of a social support network. The activities at the MEP led to the appreciation of teamwork, the ability to assess one's own performance and the feeling of confidence in the face of a mastered task. The development of intrapersonal skills was described by the students interviewed in terms of how they perceive their own bodies, the ability to concentrate, studying discipline, exercising critical and aesthetic sense, and training to build Life Projects. Professionals and legal guardians pointed out, as effects on the development of students, that involvement with music entails "*lifelong*" consequences, such as motor coordination and emotional experience, provides benefits to students' health, improves self-esteem and gains in the context of interpersonal relationships, and promotes the creation of Life Projects linked, or not, to music. Professionals also reported that the institutional development of the MEP affected the relationship between the community and professionals, producing personal transformations that generated new ways of acting and thinking in personal and professional life.

### 4. Discussion

According to the results of the psychological tests, it was verified that the students of Projeto Guri have higher levels of self-esteem and lower levels of loneliness and social anxiety (MESSY factor 4), corroborating the findings of the interviews. It is inferred that the MEP environment, because it is organized in a welcoming way based on pro-social contacts and with a focus on teamwork and quality musical teaching (Abreu, 2009; Creech et al., 2013), triggers a series of personal transformations in students, which can also impact the environment outside the MEP. The interviews carried out indicated a series of transformations that occurred due to the involvement with Projeto Guri, such as changes in the body, in the way of relating with people and with the environment and, also, in the perspectives for the future, involving the construction of Projects of Life. In this way, the interviews supported the differences found through the analyzes of the psychological tests, leaving them with more solid contours.

Still in the same sense, the effects indicated by the EAR and by the MESSY factor 4 (Loneliness/Social Anxiety) at the personal-relational level, have parallels with neural substrates that were identified in the interviews and find support in the scientific literature (Butman & Allegri, 2001; Frewen et al., 2013; Jurado & Rosselli, 2007; Northoff et al., 2006). Stroop Test and factors 1 (Aggressiveness/Antisocial Behavior), 2 (Social Skills/Assertiveness) and 3 (Vanity/Arrogance) of MESSY did not show statistically significant differences between the groups of participants, which may suggest a certain homogeneity among populations. With regard to the fact that the Beginner Group does not differ from the Experienced Group, it can be assumed that this is due to the criteria used to form the experimental groups.

This research contributed to studies in the area, by use adapted and standardized psychological tests for the studied population, aiming to measure the factors indicated by Abreu (2009) as influenced by involvement with "El Sistema". The use of MESSY, specifically, was original since no study with these characteristics was found in the surveys carried out for the elaboration of this research. According to Bueno (2012), psychology plays an important role in the development of tools to help develop indicators of the effects that EMPs generate in communities and individuals.

Interviews with professionals and legal guardians of minors showed that Projeto Guri is a MEP that is constantly changing to adapt to the fulfillment of its human development mission. Educational investment made since 2015 in the Social Development Board, one of the bodies responsible for the Projeto Guri, could mean a greater approximation with the method proposed by “El Sistema”, which is based on the individual-family-community tripod. The studied MEP has developed its own intervention methodologies, adapted to the realities in which its activities take place, which configures a big step when it aims to train people and intervene in the community. It should be noted that several studies with experiences of adaptation of “El Sistema” around the world already point to this need (Booth, 2013).

The changes pointed out by the tests and interviews related to individual aspects of the participants, such as body perception and specific skills, seem to be related to broader aspects of the social environment in which the MEP is inserted, such as schools, homes and communities. New configurations of the organization of the Nervous System can still be inferred, referring to behavioral changes presented by the students. In this way, the functioning of the socio-musical brain proposed by Bueno (2012) was evidenced by the results of the present study insofar as the integrated development between psychological, biological and social aspects of children and adolescents involved in a Music Education Program was identified with a focus on rescuing socially vulnerable populations.

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