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# Child Abuse & Neglect

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## Associations between motor proficiency in children with history of maltreatment and living in social economically vulnerability



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### ABSTRACT

Maltreatment and living in poor socioeconomic conditions during childhood may implicate in deficits on motor proficiency, nevertheless, the literature on this issue is still scarce. The goal of the study was to investigate the possible associations among manual dexterity, aiming and catching tasks, and balance tasks for children who suffers maltreatment and lived in social vulnerability. Eighty-two (82) children (08-09 years old) participated in the study. Forty-one (41) belong to the (SEV-M Group) children living in social economic vulnerability and were previously maltreated (lived in foster homes as results of parental neglect and domestic violence), and 41 belong to the (SEV Group) children living in social economical vulnerability with no history of childhood maltreatment. Children were assessed using the Movement Assessment Battery for Children –2nd Edition. Structural Equation Modeling was used to analyze the data. The results suggest the existence of a variety of motor difficulties in the group of children who suffered from neglect and domestic violence. The statistics model showed a negative effect for children in at-risk environments (regression coefficient =  $-0.30$ ) and only showed a significant effect ( $p = 0.04$ ) for balance abilities. Traumatic experiences may have a negative effect on children's balance proficiency.

### 1. Introduction

Extremely poor conditions or social vulnerability may lead children to show some deficits related to development. By facing adverse physical or psychosocial situations, the individual is forced to adapt in order to get through life (Grassi-Oliveira, Ashy, & Stein, 2008). An appropriate environment is essential to provide opportunities for development, especially in childhood years. On the other hand, extremely poor conditions or social vulnerability may lead children to show some deficits related to development (Font & Berger, 2015). Child maltreatment such an emotional or physical neglect as well as sexual, physical and/or emotional abuse have been related with cognitive and social-emotional wellbeing (Liu, Hoffmann, & Hamilton, 2015), and with behavioral and cognitive developmental outcomes (Grassi-Oliveira et al., 2008).

Using functional magnetic resonance imaging techniques, maltreatment was associated with decreased activity in the central

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regions of the brain involved in emotional regulation and attention capacity (Teicher, Anderson, Ohashi, & Polcari, 2014). Children exposed to stressful life events during their childhood have a higher risk of having internalized disorders (Johnson, Rhee, Whisman, Corley, & Hewitt, 2013) and disruptions in multiple brain regions and neural circuits (Font and Berger, 2015; Font & Berger, 2015). Furthermore, if in addition to the maltreatment, a child living in vulnerability condition or environmental hazards means the potential for loss in development. Since losses vary geographically, over time, and among different social groups, vulnerability also varies over time and space (Cutter, Boruff, & Shirley, 2003). Those children with history of abuse and maltreatment may also show impairment in neurodevelopment, such as smaller sized brain regions, like the hippocampus, the amygdala and the left neocortex (Teicher et al., 2014).

Structural consequences of childhood maltreatment include disruptive development of the corpus callosum, and reduced functional activity of the cerebellar vermis (Grassi-Oliveira et al., 2008), factors associated with poor posture and balance (Geuze, 2005). The cerebellum is important not only to aspects related to movement but also to cognitive function (Picazio and Koch, 2015; Picazio & Koch, 2015) (Mariën, Van Dun, & Verhoeven, 2015; Stoodley, 2012; Steinlin, 2007), such as executive functions and visuospatial skills (Molinari & Leggio, 2007). The cerebellum also plays a key role in many motor, cognitive, and emotional processes (Phillips, Hewedi, Eissa, & Moustafa, 2015).

Further investigation is needed to understand whether maltreatment during childhood implicates in deficits on motor proficiency. Most of the literature in this area shows behavioral and cognitive changes for children under maltreatment in their childhood, but little is discussed about the impact of those conditions on the motor proficiency of children. Previous researchers reported motor delays in locomotor skills for American children living in economical disadvantages (Goodway et al., 2010; Goodway, Robinson, & Crowe, 2010) (Pope, Liu, & Getchell, 2011). A recent research with preschool children enrolled in the American Head Start program suggested that these children in comparison to their typically developing peers performed significantly poorly on balance skills (Liu, Hamilton, & Smith, 2015). Similar tendencies were reported in Brazil in a study that investigated motor proficiency of those children (Valentini, Clark, & Whittall, 2014). Combining these results, it is suggested that young children living in poverty have their fundamental motor skills at-risk of delays. Regarding age and gender, the prevalence of motor problems for socially disadvantaged subgroups in Brazil, over the age range of 4–10 years, was higher than that found in any other country and was also higher in girls and in the 9–10-year age band (Valentini et al., 2012).

This study attempts to further understand the role of maltreatment in children living in socio economic vulnerability on motor proficiency. The goal of the study was to investigate the associations among manual dexterity, aiming and catching, and balance tasks for children who suffers maltreatment and living in social and economical vulnerability.

## 2. Methods

### 2.1. Participants

Eighty-two (82) children participated in the study in a city in southern Brazil. All children lived in socio economical vulnerability specifically, under the condition of poverty living in unsafe neighborhoods that lack basic sanitation in small hazards houses and attending to schools with poor facilities. All children come from the same neighborhood located in a major city in the South of Brazil. This neighborhood has 28,738 inhabitants, representing 2.04% of the population of the city. With an area of 2.02 km<sup>2</sup>, it represents 0.42% of the municipal area, and its demographic high population density was 14,226.73 inhabitants per/km<sup>2</sup>, at the period of the research. The illiteracy rate was 5.06% and the household average income was 2.71 minimum wages among the investigated families; Brazilian minimum wage was R\$ 880,00 per month (IBGE, 2010). The schools were poorly equipped and had insufficient facilities and outdoor spaces. Informed consent was obtained from all participants and were provided by the parents, legal guardians and/or foster's parents. Children participating in the study did not show any diagnosis of cognitive or physical disabilities, or any other condition that prevented participation.

Half of the children (N = 41; 08-09 years old; Age M = 8.6, SD = 0.7) were exposed to maltreatment; those composed the SEV-M Group (children living in social economic vulnerability and were previously maltreated). The SEV-M Group were protected by the government and lived in foster homes as result of parental neglect and domestic violence (physical or sexual); 30 children have been in the foster homes for over 1 year, 10 children for over 2 years e 1 child over 3 years. All families, legal guardians and foster parents of the SEV-M Group were assisted by a University social project and Social Workers were provided for children and families or foster families. Before the admission to the program, the social workers assessed and interviewed the children; their histories were kept in their individual profiles and databases. The history of maltreatment (sexual, physical, or emotional abuse, and emotional or physical neglect) were part of the information obtained from each child's profile. The Social Workers provided all the children's information for the primary researcher in the present study. For those 41 children, the opportunity to participate in the social Project, as compensatory program linked to the University was provided and the families received social care. The Social Workers monitored children participation in the social project.

The comparison group (N = 41) (08-09 years old; Age M = 8.4, SD = 0.6) was composed of children who lived also in a situation of social economical vulnerability with no history of childhood maltreatment (SEV Group) and were selected intentionally from the same neighborhood, with similar geographic location, socioeconomic status and school facilities. The children were enrolled at third and fourth grades from several elementary public school located in this large community. The groups (SEV-M and SEV) also were matched concerning socioeconomic status, grade, gender, age and schools provenience. No significant differences were found concerning the above stratification variables between groups ( $p > 0.05$ ).

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