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# Investigation of Variables that Determine Levels of Self-Esteem in Central American Schoolchildren: A Binary Logistic Regression Model

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## Investigation of Variables that Determine Levels of Self-Esteem in Central American Schoolchildren: A Binary Logistic Regression Model

Investigación de las variables que determinan los niveles de autoestima en los escolares centroamericanos: Un modelo de regresión logística binaria

Investigação das variáveis que determinam os níveis de autoestima em escolares da América Central: Um modelo de regressão logística binária

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### ABSTRACT:

This research aimed to examine the relationships between the levels of self-esteem of Central American schoolchildren and their physical activity habits, ages, and countries of origin. This was a correlational study of random cluster probabilistic samples, which evaluated 5,291 students enrolled in fourth, fifth, and sixth grades, 52.3% of whom were girls and 47.7% boys, from 74 schools in Guatemala, Honduras, El Salvador, Costa Rica, Nicaragua, and Panama, with an average age of  $10.90 \pm 1.13$  years. Lawrence's Self-Esteem Questionnaire (LAWSEQ) was used to measure levels of self-esteem, and the physical activity questionnaire for boys and girls (PAQ-C) was applied in all the countries. A binary logistic regression analysis was conducted to estimate the statistical probability that the independent variables (age, level of activity, and country of origin) could predict the level of self-esteem. The results of this investigation showed that 47% of the children under study perceive themselves to have a low level of physical activity and that children from 9 to 10 years had lower percentages of self-esteem with 51.6% and 47.7%, respectively. In terms of country of origin, children from Costa Rica and Guatemala have a better level of self-esteem than those living in El Salvador, Nicaragua, Honduras, and Panama. In addition, it was determined that age, level of physical activity, and country of origin predicted 58% of the level of self-esteem of Central American children. This situation shows the importance of promoting physical activity in childhood to contribute to the development of self-esteem.

**KEYWORDS:** physical activity, self-esteem, psychological factors, prediction, region.

## RESUMEN:

El propósito de esta investigación fue examinar el enlace entre los hábitos de actividad física de los niños centroamericanos, su nivel de autoestima, edad y país de origen. Este fue un estudio correlacional de muestras probabilísticas aleatorias por conglomerados, que evaluó 5291 estudiantes matriculados en cuarto, quinto y sexto grado, de los cuales el 52.3 % corresponde a niñas y el 47.7 % a niños, pertenecientes a 74 escuelas en Guatemala, Honduras, El Salvador, Costa Rica, Nicaragua y Panamá, con una edad media de  $10.90 \pm 1.13$ . En todas las naciones, se utilizó el cuestionario LAWSEQ para medir el nivel de autoestima y se aplicó el de actividad física para la niñez (PAQ-C). Un análisis de regresión logística binaria fue ejecutado para estimar si las variables independientes podrían predecir el nivel de autoestima de los infantes. Los resultados mostraron que el 47 % de los estudiantes se percibió con un bajo nivel de actividad física y, con respecto a la autoestima, quienes poseen de 9 a 10 años tuvieron porcentajes más bajos, con 51.6 % y 47.7 %, respectivamente. En cuanto al país de origen, los niños de Costa Rica y Guatemala tienen un mejor nivel de autoestima que aquellos habitantes de El Salvador, Nicaragua, Honduras y Panamá. Además, se determinó que la edad, el nivel de actividad física y el país de origen predecían el 58 % del nivel de autoestima infantil centroamericana. Esto demuestra la importancia de promover la actividad física en dicho sector poblacional, para contribuir al desarrollo de su autoestima.

**PALABRAS CLAVE:** actividad física, autoestima, factores psicológicos, predicción, región.

## RESUMO:

O objetivo desta pesquisa foi examinar a ligação entre os hábitos de atividade física de crianças da América Central, seu nível de autoestima, idade e país de origem. Este foi um estudo correlacional de amostras probabilísticas aleatórias por conglomerados, que avaliou 5.291 estudantes matriculados na quarta, quinta e sexta séries do ensino fundamental, dos quais 52,3% correspondem a meninas e 47,7% a meninos, pertencentes a 74 escolas na Guatemala, Honduras, El Salvador, Costa Rica, Nicarágua e Panamá, com média de idade de  $10,90 \pm 1,13$ . Nesses países, o questionário LAWSEQ foi utilizado para medir o nível de autoestima e o questionário de atividade física para a infância (PAQ-C) foi aplicado. Uma análise de regressão logística binária foi realizada para estimar se as variáveis independentes poderiam prever o nível de autoestima das crianças. Os resultados mostraram que 47% dos estudantes se perceberam com baixo nível de atividade física e, no que se refere à autoestima, aqueles com 9 a 10 anos apresentaram percentuais menores, com 51,6% e 47,7%, respectivamente. Quanto ao país de origem, as crianças da Costa Rica e da Guatemala apresentam um nível de autoestima superior as de El Salvador, Nicarágua, Honduras e Panamá. Além disso, determinou-se que a idade, o nível de atividade física e o país de origem previam os 58% do nível de autoestima da criança centro-americana. Isso mostra a importância da promoção da atividade física nesse setor populacional, de forma a contribuir para o desenvolvimento de sua autoestima.

**PALAVRAS-CHAVE:** s: atividade física, autoestima, fatores psicológicos, previsão, região.

## INTRODUCTION

Low self-esteem, understood as the loss of respect for oneself as a person, is increasingly recognized as a risk factor that threatens children's health, together with factors such as overweight, obesity, and sedentary lifestyles (Batista et al., 2016; Molina and Raimundi, 2011). Recent data from the World Health Organization (2019) indicate that approximately 20% of children and adolescents worldwide suffer mental health problems or disorders, and countries with low- and middle-income are the most affected.

Recent scientific evidence shows that low self-esteem can be a risk factor for numerous physical and psychological problems (Couoh et al., 2015). On the one hand, it is associated with a greater predisposition to problems such as depression, anxiety, and social maladjustment, and, in addition, it predicts aggressive, antisocial, and delinquent behaviors in children (Liu et al., 2015). Likewise, it has been found that children with low self-esteem are characterized by poor physical health (Maitta, Párraga, and Escobar, 2018).

Zurita-Ortega et al. (2017) found a direct relationship between low self-esteem and a sedentary lifestyle in children. Since such children do not have adequate self-efficacy (an aspect related to self-esteem), their participation in different physical activities is reduced due to the fact that they do not consider themselves competent to carry out such activities and fear being harassed. Meanwhile, González et al. (2017) state that a high level of self-esteem is associated with greater resilience, providing children with well-being and a better attitude towards school (Ros et al., 2017), and increases the level of participation in different physical activities (Liu et al., 2015; Zamani et al., 2016).

Self-esteem is constructed during the process of socialization and interaction with families and other people; teachers and peers play a very important role in its healthy development during childhood, together with the influence of the media and other institutions (Oñederra, 2008). Therefore, it depends on the construct of perceived self-efficacy, the ability of young children to achieve personal goals, and their assessment of their surroundings, which are factors particularly relevant at this stage of life.

As Harter (1999) pointed out, starting at age 8, children begin to make global judgments about their value as a person. Younger children (between 8 and 10 years old) tend to have a more positive perception of themselves than older children (between 11 and 13 years old) because self-perception changes over time, and physical appearance, together with social abilities, starts to play a more important role in the development of global self-esteem (Molina and Raimundi, 2011; Cabrera et al., 2016).

In the specific case of the Central American region, low self-esteem has not been frequently studied in schoolchildren, despite its importance. Therefore, in most countries, interventions are not prioritized to address this latent problem in the general population, much less in children (González, 2011). In addition, it is usually not known that engaging in physical activity can play a leading role in the prevention of mental health problems in this population (Franco et al., 2017).

Recent studies conducted in Central American countries yielded alarming findings of low self-esteem in children between 9 and 13 years of age in 44.4% of 5,291 students, with children from El Salvador (52.9%), Honduras (50%), and Nicaragua (51%) having the lowest percentages of self-esteem in the region (Evert and Álvarez, 2020; Lacayo et al., 2018; Reyes et al., 2018; Vásquez-Bonilla et al., 2019), followed by Panama (44%), Guatemala (32%) (Ambulo et al., 2020; Dubón and Aguilar, 2018) and Costa Rica (27%) (Herrera-Monge et al., 2019), which had the highest levels of self-esteem among the countries evaluated.

Considering these findings, it is clearly necessary to make efforts to alleviate this mental health problem through coordinated actions between public institutions, the academia, and the private sector of each country in the region. To do so, it is essential to have information about the role played by various factors in the self-esteem of young children in this region. Among the different variables considered for the purposes of this study, the relationship between physical activity of Central American children and their levels of self-esteem will be examined, as well as the relationships between age and country with self-esteem in this population.

## METHODOLOGY

### Participants

This study included 5,291 basic education students from 74 Central American educational centers near the circuit, zone, district, or department adjacent to the university headquarters that conducted the evaluations in each country. The study population consisted of schoolchildren from fourth to sixth grade who were selected using random cluster sampling (Segura-Corea and Honhold, 2000). The minimum sample of schools required was determined, and a group of children was selected from each grade (fourth to sixth) to create representative samples of specific areas in Guatemala, Honduras, El Salvador, Costa Rica, Nicaragua, and Panama. Girls constituted 52.3% ( $n = 2,767$ ) of the sample, while 47.7% ( $n = 2,524$ ) were boys; 33% ( $n = 1,744$ ) were enrolled in fourth grade, 34.2% ( $n = 1,811$ ) in fifth grade and 32.8% ( $n = 1,736$ ) in sixth grade, with an average age of  $10.90 \pm 1.13$  years. All students participated voluntarily in this study and signed consent forms prior to data collection. This study was also approved by the respective university committees on safety and ethics.

In addition, to select the participating schools, it was required that at least 100 students were enrolled in the school year in each of the grades under study, that participants were between 9 and 13 years old, and

permission was obtained from parents or legal guardians to apply the questionnaires. Cases in which any of the criteria for inclusion were not met were excluded.

## Instruments

*Self-esteem* The Lawrence Self-Esteem Questionnaire (LAWSEQ), adapted to Spanish by Marcó and de García (2000), assesses the level of self-esteem in children based on the sum of physical and cognitive characteristics of oneself. It has a total of 16 questions that directly assess self-perception. The internal reliability of the scale is reported as  $\alpha = 0.76$  (Lawrence, 1981) and has an acceptable external validity ( $r = 0.73$ ) with respect to the Coopersmith Self-Esteem Inventory.

*Physical Activity Levels* Physical activity levels were measured using the Physical Activity Questionnaire for Older Children or PAQ-C (Crocker et al., 1997), validated in the Spanish language by Martínez-Gómez et al. (2009). This instrument is designed for boys and girls aged 8 to 14 years and provides a general score for physical activity during the last seven days, in different situations and different times of the day. It has nine close-ended multiple-choice questions with different types of Likert scales scored from one to five, where five indicates that the person is active. The PAQ-C shows adequate test-retest reliability ( $r = 0.75$  to  $0.82$ ) and acceptable validity ( $r = 0.45$  to  $0.53$ ) (Crocker et al., 1997; Janz et al., 2008).

## Procedure

First, education district directors from the Ministry of Education of each country were contacted to obtain their authorization to carry out measurements in educational centers. Then, the objective of the investigation was explained to school directors to obtain their approval. Once the approval was obtained, fifth- and sixth-grade teachers were contacted to explain the importance of the study. Subsequently, once informed consents were obtained from the children's legal guardians and all participating children, data about age, level of self-esteem, and physical activity were collected using questionnaires and following a schedule of visits to obtain the information established in each country. The questionnaires were applied individually, according to established protocols, on daily basis and with the presence of the class teacher. This research was conducted under strict compliance with the bioethical principles established by the different entities and legislation of each country.

## Data Analysis

The data were tabulated and analyzed using the statistical package SPSS version 24.0 for Windows. The assumptions of normality of the data were checked. An analysis of absolute frequencies and percentages was conducted for values of low self-esteem (LSE), average, and high self-esteem (AHSE) by age, level of physical activity, and country of origin. A binary logistic regression analysis was also carried out to estimate the statistical probability that the independent variables (age, level of activity, and country of origin) could predict the level of self-esteem. The dependent self-esteem variable was included in the model coded with values of 0 = average and high self-esteem (AHSE) and 1 = low self-esteem (LSE). Independent variables were physical activity, coded as 0 = moderate-high physical activity (MHPA) and 1 = Low physical activity (LPA), age, a continuous variable with values between 9 and 13 years of age, and country of origin, to which an adjustment was applied to convert each country into an independent variable for each State – they were coded with values 0 = other reference countries and 1 = each country, as an independent variable of contrast. Hypotheses were tested at the  $p < .05$  significance level.

## RESULTS

The results obtained for the self-esteem of Central American schoolchildren showed that 47% of them perceived themselves as having a low level of physical activity. The results also showed that 42.9% of children with moderate-high levels of physical activity had a low level of self-esteem. With respect to age, children aged 9 to 10 years showed lower percentages of self-esteem (51.6% and 47.7%, respectively). Regarding the country of origin, Costa Rican and Guatemalan schoolchildren had higher levels of self-esteem (26.7% and 31.7%, respectively) than those living in El Salvador, Nicaragua, Honduras, and Panama, where approximately 50% of students evaluated were found to have low self-esteem levels (see Table 1).

TABLE 1  
*General self-esteem levels by age, physical activity level, and country of origin among Central American schoolchildren.*

Variables		LSE	AHSE
Age (years)	9	293 (51.6%)	275 (48.4%)
	10	722 (47.7%)	792 (52.3%)
	11	633 (41.0%)	911 (59.0%)
	12	481 (40.0%)	720 (60.0%)
	13	216 (46.7%)	247 (53.3%)
Level of physical activity (PAQ-C)	LPA	874 (47.0%)	984 (53.0%)
	MHPA	1471 (42.9%)	1960 (57.1%)
Country of origin	Costa Rica	118 (26.7%)	324 (73.3%)
	Honduras	816 (49.7%)	827 (50.3%)
	El Salvador	401 (52.9%)	357 (47.1%)
	Guatemala	306 (31.7%)	658 (68.3%)
	Nicaragua	373 (51.0%)	358 (49.0%)
	Panama	331 (44.0%)	421 (56.0%)

Notes: LSE: low self-esteem; AHSE: average and high self-esteem;  
LPA: low physical activity; MHPA: moderate-high physical activity.

Based on these results, a binary logistic regression analysis was carried out (see Table 2), which showed that age, physical activity level, and country of origin predict the level of self-esteem of Central American schoolchildren. The result of the model's Omnibus test was ( $\chi^2_{(7)} = 204.86, p = 0.0001$ ) which shows a statistically significant predictive model: Nagelkerke's  $R^2$  ( $r^2 = 7,059.26; p = 0.051$ ). In addition, the model satisfied the assumption of the Hosmer-Lemeshow test ( $\chi^2_{(7)} = 5.09, p = 0.65$ ).



TABLE 2  
*Results of a binary logistic regression analysis for the prediction of self-esteem*

Variables	B	Standard error	Wald	gl	p	Exp (B)	95% C.I.	
							Lower	Upper
Age (years)	-0.12	0.03	21.25	1	<0.001	0.89	0.85	0.93
Level of physical activity (PAQ-C)	0.16	0.06	7.56	1	0.006	1.18	1.05	1.32
Costa Rica	-0.75	0.13	32.67	1	0.000	0.47	0.37	0.61
Honduras	0.23	0.09	6.79	1	0.009	1.26	1.06	1.50
El Salvador	0.43	0.11	16.75	1	0.000	1.54	1.25	1.89
Guatemala	-0.49	0.10	23.01	1	0.000	0.62	0.50	0.75
Nicaragua	0.33	0.11	10.12	1	0.001	1.40	1.14	1.72
Constant	0.96	0.28	11.42	1	0.001	2.61		

The results indicate that the variables of age, level of physical activity, and country of origin are predictors of levels of self-esteem in the Central American schoolchildren evaluated. In the case of age, for each year completed, children had 0.89 times less chance of having low self-esteem (the lower the age, the higher the probability of low self-esteem). In the case of physical activity, children classified as having low physical activity were 1.18 times more likely to have low self-esteem. The results by country of origin showed that schoolchildren who live in Costa Rica were 0.47 times less likely to classify themselves as having low self-esteem, while the corresponding figure for Guatemalan schoolchildren was 0.62. Schoolchildren from El Salvador (1.54), Nicaragua (1.40), and Honduras (1.26) are more likely to show low self-esteem, while in the case of Panamanian schoolchildren, this prediction was not statistically significant.

## DISCUSSION

This research aimed to determine the relationships between age, level of physical activity, and country of origin and the prediction of self-esteem among Central American schoolchildren. The findings indicate that childhood is one of the most critical stages in the development of adequate perception of oneself; specifically, participants between 9 and 10 years old have lower percentages of self-esteem, unlike those who are 11, 12, and 13 years old. According to the regression model, in general, as students grow older, they have 0.89 times less chance of classifying themselves as having low self-esteem. It is, therefore, at this stage of life that the construction of psychological and emotional well-being must be a priority (Alfaro et al., 2015; Couoh et al., 2015).

These results are not consistent with those of studies that conclude that children approaching puberty have problems with self-esteem (Molina and Raimundi, 2011; Álvarez, 2016). However, González and Gimeno (2013) and Lazarević et al. (2017) state that childhood is the stage where the pillars of children's self-esteem and personality are formed, so that the experiences they have during this time can mark them for the rest of their lives; they also say that adolescence is when many of the dimensions of self-perception are identified, which make self-esteem more important with age.

When self-esteem is related to physical activity, it is found that this is an important predictor of the level of self-esteem in childhood. The findings show that 47% of the young children who perceived themselves as having low levels of physical activity also had low levels of self-esteem. These results are similar to those mentioned by Cofré et al. (2015), Delgado-Floody et al. (2017), and Lazarević et al. (2017), who found that self-esteem and physical activity have a direct positive relationship in children, demonstrating that children with medium and high levels of physical activity scored higher in terms of self-esteem; in contrast, children with low self-esteem showed a decrease in levels of physical activity.

In particular, in addition to self-esteem, physical activity is influenced by other psychological aspects that are directly related to adequate self-perception, such as self-concept, physical competence, and social acceptance, which are essential for balanced mental development (Zamani et al., 2016; Moreno et al., 2011).

According to Estévez et al. (2015), there is a possibility that those children who have a high level of self-esteem engage in and enjoy physical activity more frequently than those with low self-esteem, primarily because the psychological well-being of children is positively affected (Carter, 2018).

Self-esteem is the awareness of a person of his or her own value and is also the result of the relationship between a child's personality and the environment in which he or she grows (Acevedo-Ponce et al., 2010), making it a fundamental part of comprehensive health and a very important issue in health education. Navarro et al. (2006) point out that the relationship of this variable with multiple external and internal factors, such as physical, personal, family, and social environments, self-efficacy, personal identity, and the person's behavior cannot be ignored. Therefore, having low levels of self-esteem can lead to different emotional and psychological disorders that, in turn, affect a child's development in learning, physical activity, and positive social relations (Lope et al., 2015; Naranjo, 2007).

Given that self-esteem plays a determining role in psychological well-being, the results of this research show that highly sedentary lifestyles, such as those reported by the students evaluated, lead to increased emotional problems such as anxiety and depression, and to social problems that generate behavioral and social rejection (Franco, 2006; Lodal and Bond, 2016). It is important to understand that children with low self-esteem are characterized by poorer physical health and, therefore, have a greater risk of having unhealthy habits and a needier attitude (Liu et al., 2015; Zurita-Ortega et al., 2017).

To avoid this health problem, engaging in physical activity is an essential tool when it comes to improving the psychological well-being of Central American children, primarily because of its contribution to consolidating children's self-efficacy and self-concept, which directly affect self-esteem (Delgado-Floody et al., 2017; Kyle et al., 2016). Therefore, in any intervention in a school environment, physical activity must be considered a fundamental tool in constructing positive mental health.

The mental health situation of the Central American population is currently due, in large part, to complex factors including armed conflicts, inter- and intrafamily violence, and the growth of large criminal groups, which have left a mark on the inhabitants of these countries (Jiménez-Barbero et al., 2016; Pérez-Sáinz et al., 2016). As indicated by Jacinto et al. (2007), these events have left deep psychosocial scars in the Central American population, including children.

Psychosocial disorders are influenced by socioeconomic circumstances, which often hinder attempts to overcome these psychopathological cycles in the most vulnerable groups (Couoh et al., 2015; Jacinto et al., 2007; Muñoz and Alonso, 2012). Thus, the place of origin affects levels of self-esteem; children residing in countries like El Salvador, Honduras, Nicaragua, and Guatemala are between 1 and 1.60 times more likely to classify themselves as having low self-esteem, according to the results of this investigation. This finding is reinforced by the results of Román (2015) in their study of sociodemographic factors and their relationship with the level of self-esteem in school-age children, in which they found that the physical and social environment in which a person grows up generate traits and patterns that stimulate or limit self-esteem, and that children are especially affected when they live under poorer cultural, economic, and social conditions.

In addition to these findings, Caso and Hernández (2007), González and Gimeno (2013) and Taberno et al. (2017) point out that poverty is a strong predictor of the presence of development problems because many poor children come from dysfunctional families where efforts to improve the formation of self-esteem are very limited.

A low level of self-esteem in children not only predicts poor health but can be a determining factor in the development of criminal behavior and economic limitations that can accompany children into adulthood if not treated in time (Liu et al., 2015; Serrano et al., 2016; Villasmil, 2010). Moreover, one of the consequences



of family disintegration is that children may seek refuge in criminal groups for protection and care at very early ages, replacing the family environment (Batista et al., 2016; Couoh et al., 2015). At this moment, these psychological difficulties are increasingly common in a society where social pressure continues to be an important factor in determining personal identity (Taberno et al., 2017; Cofré et al., 2015).

In addition, if the relationship between self-esteem and academic success or failure in the school environment is analyzed, low levels of self-esteem can lead to low academic performance (Caso and Hernández, 2010; Navarro et al., 2006). When this is added to the situation of insecurity facing the different Central American countries, it can result in a school environment that not only contributes to membership in criminal groups but also to the development of an unproductive environment with physical and psychological impacts that directly disrupt students' self-esteem (Lojano, 2017; Marín and Villegas-Robertson, 2016).

In short, community and school environments in Central America are niches par excellence for developing actions that promote the development of better self-esteem in children, since they have the human conditions and public policies to contribute to the reduction of psychosocial problems (Carter, 2018; Clerici and García, 2011) through active environments that promote peace, coexistence, communication, and the optimal physical, psychological, and social development of children (Moreno et al., 2011).

## CONCLUSIONS

The findings of this study provide new insights into mental health among Central American schoolchildren by exploring the relationship of self-esteem with factors such as age, level of physical activity, and geographical location. In brief, self-esteem is a basic element in the personal formation of children. When a child acquires self-esteem, he or she feels competent, confident, and valuable. On the contrary, children with low self-esteem feel inferior in front of other people. Therefore, good relationships must be fostered among children in schools, creating harmonious academic environments where they can develop actively and peacefully, empower them to be physically active, and contribute to becoming self-confident from an early age.

The results indicate that the variables of age, level of physical activity, and country of origin are predictors of levels of self-esteem in the Central American schoolchildren evaluated. In the case of age, the lower the age, the higher the probability of low self-esteem. In the case of physical activity, children classified as having low physical activity were more likely to have low self-esteem. The results by country of origin showed that schoolchildren who live in Costa Rica were less likely to classify themselves as having low self-esteem. In contrast, schoolchildren from El Salvador, Nicaragua, and Honduras are more likely to show low self-esteem. The place of origin affects levels of self-esteem; children residing in countries like El Salvador, Honduras, Nicaragua, and Guatemala are more likely to classify themselves as having low self-esteem.

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