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PROCEDURAL FRAMEWORK TO EXAMINE THE POTENTIAL IMPACT OF MALNUTRITION ON COGNITIVE AND EMOTIONAL PERFORMANCE AND ITS IMPLICATIONS ON "BECOMING-SELF" IN SCHOOLCHILDREN IN CARACAS.

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Summary

The human being constitutes a biopsychosocial reality (WHO, 2021), and should not only be understood as what it is, concretely, but also as everything that still has the possibility of being. In this sense, the purpose of this study was to develop a procedural framework to examine, in the future, the possible effects of malnutrition on cognitive and emotional performance, as well as its implications in "becoming-self", in children from the metropolitan area of Caracas, aged between 8 and 12 years. For this purpose, a theoretical review was carried out on the concept of malnutrition and its relationship with the variables mentioned above. In addition, the philosophical positions on the human person proposed by Heidegger, Stein and Zubiri were explored. At the methodological level, the study was framed within the scientific pretensions of a feasible project, which was approached from a mixed perspective, comprising a first phase of quantitative data collection through four tests of the emotional and cognitive domains of the neurobehavioral battery NIH Toolbox, which was followed by a statistical analysis of the results and a qualitative integration of a speculative-hermeneutic nature, related to the constitution and development of the human person in the children evaluated. The sample consisted of children who were beneficiaries of the Centro de Atención Nutricional Infantil de Antímano (CANIA) and, therefore, was non-probabilistic and propositional.

The feasibility analysis was carried out with a pilot sample of 11 subjects in the aforementioned ages, resulting in the conclusion that malnutrition could be an important factor in the cognitive-emotional development of those evaluated. In addition, it was found that the mother's schooling, physiological comorbidities and situations of child abuse could also influence the performance and recovery of children in the aforementioned areas. It was possible to infer that malnutrition,

in fact, could have negative consequences on the becoming-itself of human beings, since the appropriation and realization of their own potentialities would be limited by a neuropsychological development far from optimal conditions. However, it was possible to elucidate that affection and maternal care could catalyze the possibilities of recovery and development of affected children. It is important to emphasize that all the analysis was carried out on the basis of a pilot experience and that, in order to have statistical certainty, it would be necessary to complete the project in a definitive manner.

Key words: childhood malnutrition, positive affect, self-efficacy, processing speed, episodic memory, do-it-yourself, feasible project.

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INTRODUCTION

According to the World Health Organization (WHO, 2023), about 462 million people are currently underweight, with an estimated 149 million children under 5 years of age stunted and 45 million wasted. Moreover, approximately 45% of deaths of children under 5 years of age are related to undernutrition, a percentage that is mostly found in low- and middle-income countries.

The impact of malnutrition on the development of the population and the economic, social and medical consequences are serious and long-lasting, affecting the individual, the family and the community, as well as the national and continental spheres.

The infancy stage represents a vital part of human development. During the first years of life the brain architecture is formed, from the interaction between genetics and the influences of the environment in which the child lives (Martins and De La Ó Ramallo, 2015). Any nutritional deficiency in childhood can be decisive in the anatomical constitution of the cerebral cortex, the functioning of neurons and the proper establishment of synaptic connections that ensure proper cognitive performance (Woodhead and Oates, 2012).

According to Wachs (2000; cited in Benton, 2011), there is no doubt that there is a significant relationship between the quantity and quality of food intake and the constitution of the macro- and microstructures of the central nervous system (CNS) and the neurotransmitters that operate in it. The aforementioned could in some way second Maslow's (1943) most famous theory, when he stated that needs were arranged in a hierarchical and pyramidal manner, with a base composed of physiological demands which, if not met, limit the passage towards more abstract, rational and advanced behaviors and concerns. Given this, it could be argued that food can be both a driver and a constraint in human development, not only in its biological but also in its psychological and social spheres (Dhopeshwarkar, 1983).

In continuity with the above, beyond the neurobiological aspect, Acosta (2016), states that each person is the principle of him/herself - as responsible, free and self-determined - and at the same time, is the result of his/her environment and the external factors that shape him/her. Based on this dual conception, the human being aims to achieve his own development, to project himself outwardly and to put into action the potentialities that are expressed in him, in order to realize himself as an individual and at the same time to integrate with others. This process, called *personalization,* is what allows a human being to constitute himself as a person. About this Zubiri (1998), argues that "when the person executes an act, being subsistent, he executes it in a peculiar way, *executing himself* in the act he performs (...) it is the reactualization

of what in act first was already the person as personeity" (p. 132); that is, we all possess *personeity* innately in our quality of human beings, but *personality* requires activity, individual and even collective efforts, of a constant becoming-itself (Zubiri, 1998).

Now, if the impossibility of satisfying the most basic links of the pyramid of needs limits the correct formation and functioning of the brain structures, on which cognitive and emotional processing depends, would it not also be curtailing or restricting the human being in his defining process of personality, in his personal realization, in his authentic existence -in perhaps more Heideggerian terms-? It is disturbing to think that 462 million people with nutritional deficiencies (WHO, 2023) may find themselves, even without knowing it, with their hands tied in front of their own existential choices, bordered by the frontier that separates living from surviving, by the absence of the necessary nutrients, of the fuel that drives everything else.

Therefore, in order to promote and/or achieve children's health, it is necessary to understand their peculiarities, as well as the environmental, social and affective conditions favorable to their development. Likewise, the integrality of the human being and his biopsychosocial nature must be taken into account, being relevant to study him beyond a purely biological perspective. In addition to considering their cognitive or affective development, other variables should be taken into account, such as the environment in which the child lives, their socioeconomic status, their access to food and other requirements; as well as at a psychic and ontological level, their personal construction, a more integral and complete sphere of their being.

The present research work sought to develop a procedural framework to examine, in the future, in a face-to-face manner, the possible effects of malnutrition on the cognitive-emotional performance and its implications in the "becoming-self" in children from the metropolitan area of Caracas, aged between 8 and 12 years old. Through this framework, it is intended to reach a holistic vision of the human being, by means of a methodological proposal for its evaluation and understanding. This proposal proposes a review of the biopsychosocial development of children, as well as of malnutrition and its consequences, taking into account its effect on affective development -self-efficacy and positive affect- and on cognitive development -episodic memory and processing speed-. Likewise, the philosophical visions concerning the human person of the authors Heidegger, Stein and Zubiri are linked.

METHODOLOGY

Type of research

The present research was conceived as a feasible project, which according to UPEL (1998; cited Dubs, 2002) is a methodology that organizes, plans and develops a viable proposal that solves a problem or need within a specific context.

According to Learmonth and Motl (2013), the steps considered within the approach of a feasible project, broadly speaking, comprise a basic research stage that allows posing an initial research question and frames the problem according to firmly delimited theoretical approaches. Secondly, there is the creative stage of the feasible project, delimiting in a specific and clear way each of the steps to be followed in its future implementation, so that the methodology to be used and the variables to be studied are expressed, which leads to the next and last stage, which is the realization of a pilot test to evaluate the feasibility, effectiveness and efficiency of the proposed project, and therefore, reflect the scope, achievements, limitations and recommendations to guide its implementation. In this sense, Thabane et al. (2010) explain that a pilot test is the way to check whether the methods and procedures could be used in a larger scale study and gives indications about the possible behavior of the variables, their effects and associations.

In this order of ideas, the proposal proposed involved the application of a mixed approach methodology, which combines both quantitative and qualitative methodological aspects and is based on the pragmatic paradigm, which assumes reality from its own duality: not only as objective and measurable, but also as subjective and open to interpretation, thus allowing a more integrated and comprehensive understanding of the phenomenon to be studied (Hernández et al., 2010; Johnson and Onwuegbuzie, 2004; Pereira, 2011). Because both methods or research systems had the same degree of relevance in conducting this study, it is considered a mixed design with equal status (Hernández et al., 2010; Johnson and Onwuegbuzie, 2004).

In turn, according to the classification made by Rocco et al. (2003), the proposed project corresponds to a mixed method design in which an exploratory research was carried out with quantitative data and subsequent qualitative analysis. In this way, data and analysis strengthen and complement each other. In this sense, it followed a sequential explanatory strategy (Hernández et al., 2010). In it, qualitative results were used to "explain quantitative results, the order is quantitative → qualitative, the emphasis is to explain and interpret relationships" (Creswell, 2008; cited in Pereira, 2011, p. 20).

However, at the quantitative level, the project was of the "non-experimental" type, given that only data were extracted from the phenomenon as it occurs in its natural context (Hernández et al., 2010). This design is referred to by Montero and León (2007) as "ex-post-facto" -from the Latin: after the fact-, and implies the analysis of the facts without the possibility of intervening on any variable.

It was also a cross-sectional study, because the information was collected at a specific time and, therefore, "is valid only for the period in which it was collected, since both characteristics and opinions may vary over time" (Arias, 2012, p. 32). In addition, the methodological proposal was located at a correlational level, because it sought to establish, analyze or describe associations between variables, without implying causality (Hernández et al., 2010).

At the qualitative level, the project was framed within a hermeneutic-interpretational design, in order to investigate and deepen the meanings and sense of human behavior (Cárcamo, 2005). Similarly, this project was circumscribed within the analytical induction strategy proposed by Schettini and Cortazzo (2015), which transcends the enumerative-statistical induction and deals with looking for the key links (cords) that exist within the *corpus* of data, in order to build statements and establish relationships from the empirical reality. In this way, this methodological approach intended to study the data obtained through statistical tests in the light of Heidegger's, Stein's and Zubiri's visions of the human person so that the points of encounter and disagreement between them could be evidenced and conclusions could be generated thatcontemplate the phenomenon from its multiple points and dimensions of analysis;that is, from the understanding of man as a unique and indivisible reality, which can be approached through the different paradigms, without implying exclusion among them, but rather complementarity and completeness.

Population, sample and type of sampling

The population studied in the present proposal included eutrophic and malnourished children from the metropolitan area of Caracas. Specifically, children of both sexes, between 8 and 12 years of age, who attended the CANIA semi-boarding school program. Both the children and their representatives attended only five days a week. During this period, the children were evaluated by a multidisciplinary team, both from a pediatric and nutritional point of view, in order to know their current state. In this way, each family received guidance in search of a better quality of life.

The sample was selected through a non-random process and by convenience (Kerlinger and Lee, 2002), because it was subject to the availability and operational variability of the institution where the study was conducted, consequently, the sample was non-probabilistic (Hernández et al., 2010). However, being a purposive sample provided "a careful and controlled choice of cases with certain characteristics previously specified in the problem statement" (Hernández, et al., 2014, p. 190). For this purpose, two groups of children (malnourished and eutrophic) were formed, balanced, as far as possible randomly, in terms of age, schooling and socioeconomic level.

Variables: conceptual and operational definitions

In order to carry out the methodological proposal, the following variables were involved:

Independent variable

Malnutrition: Malnutrition can be a consequence of insufficient nutrient intake, malabsorption of nutrients, an altered metabolism, loss of nutrients or increased nutrient requirements. It goes through several stages, which may vary in speed in each individual. Diagnosis is based on physical examinations, body composition analysis and in certain cases laboratory tests (Morley, 2018).

This variable was not measured by the researchers because the multidisciplinary team of CANIA, made up of pediatricians and nutritionists specialized in malnutrition, provided the required information on the participants. In the same way, we had access to the clinical history of each of the children in the sample, thanks to which we were able to know the nutritional status of the participants and fill out a case report form (see Annex 1).

Dependent variables

Processing speed: It is defined as the amount of time it takes to process a certain amount of information, or conversely, as the amount of information that can be processed in a given amount of time. It is a measure that reflects mental efficiency; therefore, it is essential for the performance of other cognitive functions and can be affected by change or disease (NIH, 2017). Operationally, this variable was measured with the Pattern Comparison Processing Speed Test of the *NIH Toolbox* cognitive battery, in its Spanish version. So far, this test has only been validated in the U.S. population, yielding significant correlations with traditional convergent and divergent tests. In turn, its reliability for ages 3 to 15 years was high (0.84) (Carlozzi et al., 2015).

Episodic memory: Refers to the cognitive processes involved in the acquisition, storage, and retrieval of new information. It involves a conscious recollection of learned information within its context. The term "learning" refers to the acquisition of skills and knowledge, while the term "memory" refers to the persistence of this learning over time and the subsequent ability to recall it. Episodic memory can be verbal, such as remembering a conversation or a grocery list, or nonverbal, such as imagining a place you were or a picture you saw the day before (NIH, 2017). Operationally, this variable was measured with the Spanish version of the NIH Toolbox Picture Sequence Memory Test, whose validation was performed in the U.S. population. According to the psychometric scales used, the results indicated good reliability and construct validity (Dikmen et al., 2014).

Positive affect: refers to feelings that reflect a level of pleasurable engagement with the environment, such as happiness, joy, enthusiasm, and satisfaction (NIH, 2017). Operationally, this variable was measured with the Positive Affect Survey, in Spanish, for 8-12 years, belonging to the set of tests that fall under the construct of "Psychological Well-Being", likewise validated in the United States, with a Cronbach's alpha of 0.73 (Paolillo et al., 2018).

Self-efficacy: It is understood as a person's belief in his/her ability to manage him/herself and to have control over significant events in his/her own life (NIH, 2017). This variable was measured through the Self-Efficacy Survey (NIH Toolbox) in its form adapted to Spanish-speaking populations, which belongs to the Stress and Self-Efficacy subdomain of this neurobehavioral battery. Additionally, when performing the exploratory factor analysis, this test was adjusted to the "Psychological Well-Being" factor, whose reliability is 0.73 (Paolillo et al., 2018).

Descriptive variables

The descriptive variables to be taken into account were the following:

Sex, since CANIA is attended by both male and female children. This qualitative variable was considered nominal and dichotomous.

Age was another variable to be taken into account for the project. Boys and girls between the ages of 8 and 12 years were evaluated. This quantitative variable was considered to be scalar and continuous.

The last of the descriptive variables was the differential diagnosis, since girls and boys with a diagnosis of malnutrition (subclinical) were evaluated, mild or moderate), as well as eutrophic children. This condition corresponds to a qualitative, nominal and polytomous variable.

Data collection techniques and instruments

Affective tests

The methodological proposal proposes the use of two of the tests of the subdomains "Psychological Well-Being" and "Stress and Self-Efficacy" of the emotional battery of the NIH Toolbox.

NIH Positive Affect Survey Toolbox

This test belongs to the "Psychological Well-Being" subdomain and measures both activated (happiness and joy, among others) and inactivated (serenity and peace, among others) aspects of the positive affect construct, for a range of 8 to 12 years of age (NIH and Northwestern University, 2018).

On average, it is administered in approximately one to two minutes, consists of 9 items and is administered via an iPad, which automatically displays instructions on the screen to the participant, asking them to answer questions about their thoughts, emotions and behaviors as well as they can. Each item is rated on a five-point scale ranging from "not at all" to "very much".

The application will automatically return the subject's results upon completion of the test (both their raw score and standardized with T-scores). High scores mean high levels of positive affect and vice versa (NIH and Northwestern University, 2018).

NIH Toolbox Self-Efficacy Survey

This test belongs to the "Stress and Self-Efficacy" subdomain and measures participants' overall sense of self-efficacy; that is, their perception of their own abilities to manage their lives (NIH and Northwestern University, 2018). It was applied in its version for subjects from 8 to 12 years of age.

This is a Computer Adaptive Test (CAT), so the number of items and their content will be redefined according to the characteristics of the subject and his/her responses during the test. Its average duration ranges between one and two minutes. Instructions are presented on the iPad screen automatically and invite the subject to indicate how true each statement is for him or her. Scores use a five-choice scale that ranges from "never" to "very often". Higher scores indicate a higher degree of perceived self-efficacy and vice versa (NIH and Northwestern University, 2018).

Cognitive tests

The project proposes to use two of the tests belonging to the cognitive domain of the NIH Toolbox.

NIH Toolbox Pattern Matching Processing Speed Test

This test measures processing speed by asking participants to discern, as quickly as possible, whether two adjacent images are the same as each other. The stimuli were presented in pairs and the participant has 85 seconds to respond to as many items as possible. The items are simple, since what is of interest is to measure response speed more purely. In general, the test takes approximately three minutes to administer and can be administered between the ages of 7 and 85 (NIH and Northwestern University, 2018).

The subject's raw score is the number of correct answers in a time of 85 seconds (ranging from 0 to 130). A higher number of correct answers will reflect faster processing speed (NIH and Northwestern University, 2018).

NIH Toolbox Image Sequence Memory Memory Test

This test is used for the assessment of episodic memory for ages 3 to 85 years. In this test, participants are asked to recall an increasingly long series of images of certain activities presented in a particular order on the iPad screen, accompanied by a descriptive audio. Participants are asked to recall the sequence of images twice; the length of the sequence varies from 6 to 18 images, depending on age. Hits are counted for each pair of adjacent images that are correctly placed (i.e., if the images at locations 7 and 8 are placed in that order and adjacent to each other at any location, a point is awarded). If the sequence has 18 images, the maximum score in that test is 17 (the number of adjacent pairs of images that exist). The test takes approximately seven minutes to administer. Higher scores will reflect a better level of performance in terms of episodic memory (NIH and Northwestern University, 2018).

Application procedure

Taking advantage of the Cooperation Agreement between CANIA and UNIMET, researchers will be provided with a unique space for the application of psychological tests and access to the required sample.

Once the informed consent form (see Annex 2) has been filled out by the legal representatives, the application of the tests will follow the following sequence: initially, the case report will be filled out with the representatives (which includes the identification data of the child and the representatives, the exploration of possible comorbidities, pathological history, data on the child's development and family context) and the information regarding the child's nutritional status provided by the center's specialists will be appended. Then, the tests belonging to the emotional domain (positive affect and self-efficacy, respectively) will be applied, and finally the tests belonging to the cognitive battery (processing speed and memory, in that order) will be applied. The sequence of application was selected according to the duration: first, the shortest and, finally, the longest, in order to reduce the fatigue effect. The application of the four selected tests takes 30 minutes on average per subject.

Data analysis techniques

As mentioned, four tests were applied in the methodological proposal: two of them belonging to the emotional domain (positive affect and self-efficacy) and the other two to the cognitive domain (processing speed and episodic memory) of the NIH Toolbox battery set, a digital tool that allows participants to take tests of various domains through an iPad, thanks to which the data collection process and its processing were carried out automatically, so that the correction of the tests was provided immediately after the application of these (NIH and Northwestern University, 2018).

The interpretation of results was performed considering the raw score of each subtest, or the standardized scores according to sex and age. Additionally, the NIH Toolbox provided the value of another series of parameters that were useful for establishing more specific comparisons, such as the consideration of the speed of response to each item.

Once the results were obtained, a descriptive analysis was performed using GraphPad Prism v. 8.0.1, which made it possible to identify atypical or extreme data and missing or incomplete data that could affect subsequent analyses.

Ethical considerations

As suggested by the code of ethics of the American Psychological Association (APA, 2010), institutional authorization was obtained to carry out the psychological research, and the proposal and objectives of the study were made known to the institution in question. Likewise, following the guidelines of the Code of Professional Ethics of the Psychologist in Venezuela, the subjects participated voluntarily in the study, having the ability to withdraw from it if they so wished and having sufficient information about the purpose and procedure that was carried out.

The study had an informed consent form that was sent to all participants as a mandatory requirement for the application of the psychological tests, which guaranteed voluntary collaboration and knowledge on the part of the legal representatives. Likewise, it was the researchers' duty to provide all the information about the study that was requested by the participants during any of the stages of the study.

Finally, the study received ethical approval from the Research Advisory Committee, attached to UNIMET's Directorate of Research and Development. The research project is registered in the Research Activities Information and Repository Module (MIRAI) of UNIMET.

RESULTS

Analysis of the Conditions of Applicability of the Tests

For the application of the tests it was relevant to take into account the condition of the space where the tests were conducted, as well as to maintain a structure when carrying them out, seeking not to alter the order, highlighting the importance of language (both nonverbal and verbal), since this could be considered as an intervening variable before the sampling, as well as clothing, tone of voice and prosody, as well as other aspects of communication with the participants.

It was also important to take into account the different family and socio-affective realities of the children, among which it was possible to highlight child violence, abuse, absence of parental figures, among others.

The environment at CANIA allowed for a cooperative relationship to be established in order to gain a deeper understanding of the effects of nutritional deficits in the participating children and to provide a pool of information to guide the development and improvement of the nutritional care programs offered by the organization, so that corrective and preventive measures could be taken that were increasingly targeted and in accordance with the specific needs of the children.

Pilot Test

Characterization of the Study Sample

A total of 11 participants were evaluated. All were assessed cognitively (image sequence and pattern matching tests). However, only 7 of these were assessed both cognitively and affectively (including, in addition to those mentioned above, tests of self-efficacy and positive affect). The specific characteristics of the groups studied are presented below:

Age of Participants

Table 1: Age of the Total Sample

Characterization by age

Age	Frequency
8	3
9	2
10	2
11	3
12	1

Table 1. Characterization by age of the total participants comprising the sample collected in CANIA as part of the pilot study. The frequency of each of the ages recorded is indicated.

Table 2: Ages of Cognitive and Affectively Assessed Participants

Characterization by age

Age	Frequency
8	2
9	1
10	1
11	2
12	1

Table 2. Characterization by age of the participants evaluated both cognitively and affectively, comprising the sample collected in CANIA, as part of the pilot study. The frequency of each of the ages recorded is indicated.

Table 3. Gender of the Total Sample

Gender of Participants

Genre	Quantity
Female	2
Male	9

Table 3. Gender characterization of the total participants comprising the sample collected in CANIA as part of the pilot study. The frequencies recorded are indicated.

Table 4. Gender of Cognitive and Affective Assessment of Participants

Genre	Quantity
Female	2
Male	5

Table 4. Gender characterization of the participants evaluated both cognitively and affectively, comprising the sample collected in CANIA, as part of the pilot study. The frequency of the recorded genders is indicated.

Participant Diagnosis

Table 5. Nutritional Diagnosis of the Total Sample

Diagnosis	Quantity
Malnourished	3
Risk of malnutrition	5
Eutrophic	3

Table 5. Characterization based on the nutritional diagnosis of the total participants comprising the sample collected in CANIA, as part of the pilot study. The frequency of the diagnoses recorded is indicated.

Table 6. Nutritional Diagnosis of Cognitive and Affectively Evaluated Participants

Diagnosis	Quantity
Malnourished	2
Risk of malnutrition	4
Eutrophic	1

Table 6. Characterization based on the nutritional diagnosis of the participants evaluated, both cognitively and affectively, comprising the sample collected in CANIA, as part of the pilot study. The frequency of the diagnoses recorded is indicated.

Statistical Analysis of Data

In order to analyze the data collected through the pilot sampling process, the first step was to identify whether or not extreme data existed, so that an initial debugging could be performed. This was done through the GraphPad Prism program, yielding the following results:

Table 7. Extreme Data Analysis

			Applied Tests	
	Pattern comparison	Image Sequence	Positive affect	Self-efficacy
n	11	11	7	7
Extreme data	0	0	0	0

Absence of extreme data in each of the tests applied.

Since no extreme data were found in any of the tests applied, as shown in Table 7, a descriptive cross analysis was performed between the results of each of the tests, according to the nutritional diagnosis to which the participants correspond. Due to the limited sample size, the tests used responded to non-parametric statistics, obtaining the following:

Table 8. Pattern Comparison Test Results

Diagnosis	Average Gross Score	Standard Error	Coefficient of Variation
Eutrophic (n=3)	37,33	0,8819	4,091584822%
Risk of malnutrition (n=5)	37,40	1,833	10,95930481%
Acute-Moderate Malnutrition (n=3)	33,00	2,082	10,92591212%

Table 8. Mean values, standard error and coefficient of variation obtained when applying the Pattern Comparison Test, according to the nutritional diagnosis of the subjects.

Figure 1. Results of the Pattern Comparison Test.

Raw scores obtained in the Pattern Comparison Test, according to the nutritional diagnosis of the subjects. The columns represent the mean ± the standard error of the sample (eem). Despite the trends observed, no significant differences were found between groups.

With the data presented in Table 8 and Figure 1, it was possible to show that in the Pattern Comparison Test, the means between eutrophic individuals and those at risk of malnutrition were very similar and did not vary much between them. Although no statistically significant differences were found between the groups (according to the Mann-Whitney test), which is probably due to the limited size of the pilot sample, it was observed that individuals with acute-moderate malnutrition scored lower than the other two groups evaluated. This indicates that the performance in terms of Processing Speed, evaluated through this test, could be influenced by the nutritional status, once it is severely compromised. In addition, it was found that each group had a homogeneous Coefficient of Variation, which indicates that the data have little variability among them and, therefore, that the mean is a representative statistic for the comparative analysis.

Table 9. Image Sequence Test

Diagnosis	Average raw score	Standard Error	Coefficient of Variation
Eutrophic (n=3)	6,33	0,8819	24,11881945%
Risk of Malnutrition (n=5)	11,80	2,538	48,0890202%
Acute-Moderate Malnutrition (n=3)	17,33	3,844	38,41343145%

Mean values, standard error and coefficient of variation obtained when applying the Image Sequence Test, according to the nutritional diagnosis of the subjects.

Figure 2. Image Sequence test results.

Raw scores obtained in the Image Sequence Test, according to the nutritional diagnosis of the subjects. The columns represent the mean ± eem. Despite the trends observed, no significant differences were found between groups.

Although the Mann-Whitney test did not show significant differences, due to the limited number of subjects evaluated, both in Table 9 and Figure 2, it was possible to note that the episodic memory performance (paradoxically) turned out to be considerably higher, visually, in the group whose diagnosis was Acute-Moderate Malnutrition, and the lowest results were obtained by the Eutrophic group. However, the data in the Risk of Malnutrition group and in the Acute-Moderate Malnutrition group have high variability between them (given by the value of the Coefficient of Variation), which indicates that it is necessary to make an analysis that considers other intervening variables because the mean of the scores does not seem to be in this case the best comparative statistic between the groups, taking into account that the intra-group scores were distant and discrepant from each other.

Table 10. Positive Affect Test

Diagnosis	Average raw score	Standard Error	Coefficient of Variation
Eutrophic (n=1)	38,00	0	0%
Risk of malnutrition (n=4)	32,00	0,9129	5,705443307%
Acute-Moderate Malnutrition (n=2)	25,00	0	0%

Mean values, standard error and coefficient of variation obtained when applying the Positive Affect Test, according to the nutritional diagnosis of the subjects.

Figure 3. Positive Affect Test Results

Raw scores obtained in the Positive Affect Test, according to the nutritional diagnosis of the subjects. The columns represent the mean ± eem, except in the case of malnourished children in which there was only a single participant. Despite the trends observed it was not possible to perform a statistical comparison between groups due to the small sample size.

In the first place, the intra-group variation was quite homogeneous, which allowed us to say that the performance of each individual within each group was similar to the mean and therefore, the mean as a comparative scale was a reliable statistic. When comparing the mean among the three groups, it was possible to observe that the performance of the Eutrophic was higher than that of those at risk of malnutrition and at the same time, this last group had a higher performance than those in a state of Acute-Moderate Malnutrition. All this allowed inferring, at first sight and with little level of certainty due to the size of the sample, that as the nutritional level was higher there was a more positive perception about one's own life and the elements that make it up, but it is necessary to confirm this with a broader and more exhaustive sampling process.

Table 11. Self-Efficacy Test

Diagnosis	Average raw score	Standard Error	Coefficient of Variation
Eutrophic (n=1)	39,00	0	0%
Risk of malnutrition (n=4)	32,00	1,080	6,750771561%
Acute-Moderate Malnutrition (n=2)	33,50	1,500	6,332299533%

Table 11. Mean values, standard error and coefficient of variation obtained when applying the Self-Efficacy Test, according to the nutritional diagnosis of the subjects.

Figure 4. Self-Efficacy Test Results

Raw scores obtained in the Self-Efficacy Test, according to the nutritional diagnosis of the subjects. The columns represent the mean ± eem, except in the case of malnourished children in which there was only a single participant. Despite the trends observed it was not possible to perform a statistical comparison between groups due to the small sample size.

In the Self-Efficacy test, the coefficients of variation of each group were very small indicating that the variability between the data is minimal and therefore, that the mean is interpretable as a representative statistic of the data. On a comparative level, the means of the At Risk of Malnutrition group and the Acute-Moderate Malnutrition group were very close to each other, and differed from the score of the Eutrophics, which was found to be up to 6 points higher. This could also indicate, without statistical certainty, that the perceived level of self-efficacy was being influenced by nutritional level, being higher in those who had a good nutrient intake and lower in those who were at risk of malnutrition or were already characterized as malnourished. What was interesting to mention in this case was that the behavior was very similar in the latter two groups, which could be explained by other socio-demographic, emotional and family variables of this particular sample group.

DISCUSSION

Relationship between malnutrition and other variables

Firstly, according to the scores yielded by the Positive Affect Test, it was possible to validate the appreciations of Gordillo-León et al. (2017), Flores et al., (2005) and Oros (2009), who stated that as the nutritional status was more impaired, the positive perception of the environment and of one's own life tended to decrease, as well as emotional performance in general. In this sense, the results obtained in the pilot test suggest a greater presence of positive emotions when there is an optimal nutritional condition. This can be linked to that presented by the organization Action Against Hunger (2020), which understands malnutrition from a much broader conception: as a condition that goes beyond the biological and that carries in itself psychosocial consequences of great importance. According to this organization, apathy and loss of interest, as well as difficulty in understanding simple instructions and, therefore, in relating adequately with their environment, are socioemotional symptoms that are frequently present in malnourished children.

On the other hand, as the nutritional condition is more acute, comorbidities in both physical and mental health increase (Gordillo-León et al., 2017), as is the case of the two

participants with Acute-Moderate Malnutrition, who have a history of neonatal seizures, which can aggravate both the cognitive, as well as the emotional level. In addition, due to the stage of neurodevelopment in which these children are - in which the limbic system (in charge of emotional processing) is highly sensitive to changes (Mustard, 2005) -, the Association Doctors Without Borders (2014), states that, in general, children with greater nutritional deficiency tend to be more susceptible to the relationship they have with their representatives or caregivers. In this order of ideas, children with greater support and positive attention from their responsible adults, build over time a better emotional management, perceiving life in a more positive way and, therefore, this is associated with a faster recovery capacity (Sansinenea et al., 2010). In contrast, children subjected to abuse, neglect or inattention are in a state of greater emotional vulnerability and, therefore, lower positive affect (Médecins Sans Frontières, 2014). The latter is present in one of the subjects evaluated with the condition of Acute-Moderate Malnutrition, who was precisely attending the institution as part of the intervention program in the face of a situation of parental maltreatment. This particular situation could influence the results obtained in the analysis presented above.

In relation to the results found in terms of self-efficacy, it is feasible to infer a possible effect of nutritional status on the perception of the subjects about their own abilities to influence significant events in their lives. According to Matar and Ortiz (2019), the individual, from a biopsychosocial perspective, operates integrally, intertwining his physical, emotional and social aspects in a reciprocal relationship. In this sense, self-efficacy, as a socio-emotional construct, affects and can be affected by nutrition and eating behaviors that correspond to the sphere of the biological. This is in accordance with what was previously stated about the bidirectional influence established between environmental and physiological elements and the perception of self-efficacy (Salanova et al., 2009). According to this statement, it is possible to hypothesize that a low nutritional status could be intervening in the weakening of personal judgment about one's own capabilities and achievements.

However, from the data collected in the pilot study, a very small difference can be observed between the score of the subjects with Risk of Malnutrition and Acute-Moderate Malnutrition, which seems to indicate the presence of exogenous variables in the sample in question. When carefully reviewing the case reports, it was possible to find that one of the subjects within the Risk of Malnutrition group had a history of neurofibromatosis type 1, a chronic disease of early onset whose main characteristic is the presence of tumors in the nervous tissue, which includes, among its most frequent consequences: bone deformities, hypertension problems and learning difficulties (Mayo Foundation for Medical Education and Research, 2020). However, as highlighted by De Caso and García (2005), children who present some type of learning difficulty tend to make external attributions of their achievements and internal attributions of their failures, thus fostering a negative self-image and a perception of diminished efficacy with respect to their neurotypical peers. This could explain the small distance between the mean scores of the two groups with nutritional deficiencies, because the small amount of data makes the analysis sensitive to the individual differences of the subjects. However, it was not proven that

this particular subject had, in fact, a cognitive deficiency and it is necessary to note again that the analysis presented here is an approximation based on the data obtained in the pilot study, but that a more exhaustive and prolonged sampling process is needed to perform a rigorous inferential analysis with verifiable statistical significance.

On the other hand, the graphs and tables related to the Pattern Comparison test and the Processing Speed variable show that there is little variability between the first two groups of analysis. However, there is a much greater discrepancy with respect to those with a diagnosis of Acute-Moderate Malnutrition. In this particular subsection, it is pertinent to mention again the subjects evaluated with this diagnosis who presented neonatal convulsions, in addition to persistent headaches (and as noted above, one of these cases is associated with a case of child abuse and neglect). All these factors, as mentioned above, have a significant impact on the emotional and cognitive performance of the children evaluated.

It is also necessary to remember the approach of Woodhead and Oates (2012), when they mention that it is during the neonatal stage and the first years of life that the myelination process occurs in a more characteristic way, which is fundamental for the speed of processing. Neonatal seizures, together with the malnutritional phenomenon, may have generated in these subjects a performance so significantly lower than the others -in this specific area-, which may be the reason why the difference between this group and the others is so noticeable. In addition, it is necessary to bring up the statements of Poch (2001), which supported that the diagnosis of malnutrition was commonly associated with a decrease in myelination in childhood, which could also influence the lower performance of this specific diagnostic category.

Finally, with regard to the Picture Sequence Test and more specifically, to the performance in terms of Episodic Memory, it is possible to evidence results that might seem paradoxical at first sight, considering that those with better performance in this pilot test were the subjects with a more impaired nutritional status. However, it is important to note, in the first instance, that the arithmetic mean does not seem to be, in this case, a sufficiently reliable statistic to perform the measurement and analysis of this variable, because the high variability among the data detracts from its interpretative significance. In any case, this inverse behavior to that expected by Budson and Price (2005) -who proposed that episodic memory performance tended to be lower in the presence of pathological processes such as malnutrition, neurodegenerative diseases, trauma and other related conditions- could be linked to the presence of other variables that, depending on the amount of data, greatly affect the behavior of the data. In these cases, the variable that is particularly striking is the level of schooling of the mother, which tends to be "basic education" in the representatives of the eutrophic subjects; bachelor or TSU in those responsible for children at risk of malnutrition; and university in the case of subjects with acute-moderate malnutrition, which could be interfering with the children's own performance in carrying out the required cognitive tasks.

In view of the results found, both in the emotional and cognitive areas, it is consistent with what was stated by Aristizábal et al. (2018), when evaluating the effect of nutritional deterioration

on neurocognitive performance in children, they deduce that although malnutrition is a variable of great importance to evaluate and predict the performance of mental processes, it does not seem to be sufficient in itself, but that "social situations, context, cognitive stimulation, associated family problems, among others, are factors that together may contribute to the low development of cognitive processes for age and school grade" (p. 47). Thus, the evaluation carried out as a pilot approach seems to yield possible indicators about the incidence of nutritional status on the emotional and cognitive performance of subjects between 8 and 12 years of age. However, it also allows inferring the presence of other variables to be taken into consideration at the time of carrying out the feasible project proposed above.

Philosophical Speculation from Findings

As has already been discussed in previous chapters, the three authors selected for this research coincide in their vision of the person as a constant potentiality of being, that is, there is a distinction "between what I have and what I am. When I say I have, I am referring to all the faculties that constitute human nature. On the other hand, when I say I am, I am referring to the person" (Acosta, 2016, p. 649).

When I say I have, I am referring to the set of all the faculties that constitute human nature. Both Dasein for Heidegger (1971) and Stein (1994), as well as the process of becoming-itself in Zubiri (1998), start from the notion of a possible-being that seeks to become concrete through the continuous efforts to put into action that which constitutes us in a latent form.

Now, for Stein (1994), the theoretical void left by Heidegger is related to the finiteness of that Dasein he mentions, since for the author, Being-there, insofar as it is pure potentiality, is not subject to time and that is why, that Dasein -which is proper to the subject and cannot exist isolated from it-, no longer takes place in a being-for-death but rather, it is endowed with transcendence, a quality that is only possible to find in the dimension of affects, which are the central axis that houses the non-finite.

In other words, despite the fact that the Self will always have an intimate and incommunicable quality (Burgos, 2013), Stein claims the value of the affective as a starting point, motor and guide in the constant process of concretization of the possibilities of a subject's existence, and it is only through this dimension that the individual manages to authentically transit towards his Being, even outside the limits of temporality.

All of the above makes sense when the results found in this project are analyzed in detail, allowing inferences to be made about the implications of malnutrition on the personalization process -in terms of Zubiri (1998)- of the schoolchildren evaluated. The implications of this reality are important, since cognitive capacity is that which allows us to perceive, process, interpret, respond and give meaning to the world and to ourselves as participants and inhabitants of it. Therefore, the deterioration in the cognitive capacity of these children could imply the self-

cancellation of themselves, translated into the loss of critical capacity, of goal setting, of the formation of identity and sense of self and, therefore, of the conscious appropriation of that which inexorably belongs to them: their personal Being.

Children with greater nutritional deterioration tend to experience less positive emotions and this also has a strong impact on their process of becoming-self. In the same vein, it was found that the higher the level of malnutrition, the lower the self-efficacy tended to decrease, which means that the most affected children have a lower perception of agency over significant events in their lives.

For both Heidegger and Zubiri (1998), the capacity and perception of agency in an individual constitute the core of their theories, since, being possessors of the personeity that constitutes them, personality only develops as the person feels that he or she is capable of taking the reins of his or her own existence, giving it meaning and moving from potency to act, in a process of constant activity and construction.

Thus, as malnutrition becomes more severe, these children's perception that they are capable of influencing their own existence and the events that shape it diminishes, and not only that, but also, if there is a correlation with cognitive difficulties, they tend to make external attributions of their successes and internal attributions of their failures, strengthening around them the idea that nothing good that happens to them is their own work, but belongs to exogenous factors, which not only weakens self-esteem, but also, in the long run, may affect the willingness to make decisions, leading to demotivation and even loss of interest in their own development and self-realization.

It should be noted that episodic memory is closely linked to learning capacity, but above all, to crystallized intelligence and schooling processes; this is why it is important to highlight the role of mothers in the scores and performance of the schoolchildren evaluated.

This has two aspects of analysis: the first, the confirmation that the concern for the other (in this case, the mother's concern for her children) allows catalyzing the process of construction of the personality - in the same way, in terms of Zubiri (1998) - of the children; that is to say, of the actualization of their potentialities and the concretion of their personhood. On the other hand, it reaffirms the importance of the affective component referred to by Stein (1994), when he asserts that only through it is possible to achieve the true self-determination of the Self; in this sense, the affective mother-child relationship could be crucial in the expression of all the dimensions of the existence of the children in her care.

We have to remember Zubiri and his approaches about personality (1998), when he affirms that this is an intrinsic quality of human beings, and that it is inexorable, inexhaustible and unattainable. Each of these subjects possesses and will always possess the capacity to affirm his or her personality and develop it according to all his or her potentialities - which is reinforced by Burgos (2013) when he states that "the person is a being with such a strong existential

density that he or she belongs in himself or herself" (p. 27). The example of the mothers and the way in which they manage to soften the damages of malnutrition is a clear demonstration that the potency remains there despite the accidental qualities of the Self and allows giving rise to hope in the recovery and optimal development of the children affected by this condition in the country.

It is imperative to consider the implications for society if measures are not taken to guide individuals towards the appropriation of their potential for Being.

To be consistent in the work of the different institutions for the strengthening, both cognitive and affective, of Venezuelan children would represent, according to the pilot experience and the visions of the proposed philosophers, not only a positive act motivated by altruism, but even more so, a non-prolongable need that demands from us as a society the conjugation of different efforts towards a more promising future, leading to self-realization, critical thinking, integrality, spirituality and, in a more general scope, the achievement of a greater collective welfare as a country.

CONCLUSIONS

In this sense, the proposed procedural framework reaffirms its need to be carried out, since validating these facts is crucial for progress in the country's recovery and development measures.

The data from the pilot sample not only showed that nutritional deficits may be affecting the positive affect of individuals, but could also alter their perception of agency (self-efficacy) in the face of events in their own lives. This leads, according to the proposed theoretical views, to limitations in decision making, motivation, the search for positive relationships with the environment, the assumption of responsibility for one's actions, vital energy, achievement orientation, resilience, perseverance and the capacity to satisfy one's needs and to experience pleasant emotions.

A child in these conditions, according to the approaches of Heidegger (1971), Stein (1994) and Zubiri (1998), can hardly take the reins of his own Being and bring to the concrete the potentialities that are his by constitution.

This is related, then, to the ability to perceive, process and develop in different environments, both school and socio-familial. Of course, it is also linked to difficulties in the storage of information, reception and response to the stimuli to which they are exposed daily and interferes, not only in their academic performance, but also in their constitution as integral beings, with criteria, discernment capacity and the possibility of making judgments that come from themselves, in an effective realization of their own personality.

The affection, care and sense of security provided by the mothers to some of these children were reflected in more favorable results, as well as in the fact that, when the mothers

had reached a higher level of education, the children, in spite of their malnourished condition, excelled in the cognitive tasks proposed to them, compared to the rest. This could reaffirm what was previously pointed out: that the accompaniment of the caregivers and their dedication is probably a catalyst for the development of those they represent and that it is through the affections - as Stein (1994) affirmed - that the quality of the human person and its sense of transcendence beyond temporality is properly achieved. The person is a system that operates integrally and the interpretative union of the spheres that compose it, confers a holistic and multidimensional look to whoever pursues to study the human being from its inexhaustible complexity.

Limitations and Recommendations

Limitations of the study:

- The COVID-19 pandemic limited access to a more representative sample.
- The small sample size makes it susceptible to individual differences and margins of error.
- The global health conditions made it necessary to readapt the study to a procedural framework.
- The CANIA sample could not be accessed due to pandemic conditions.

Recommendations:

- Analyze the results with statistical caution.
- Replicate the study with a larger sample.
- Follow the recommendations in the logbook for the application of the test.
- To deepen the initial assessment of socio-familial conditions and the presence of comorbidities.
- Continue the line of research on the effect of malnutrition on cognitive processing.
- To produce a body of knowledge to broaden the approach methods and favor the integral recovery of vulnerable populations.