

Protocol design to assess the attention of children with Autism Spectrum disorder (ASD)

Diseño de protocolo para evaluar la atención de niños con Trastorno de Espectro Autista

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Abstract

A correct assessment of the academic level of students with attention deficits is essential for any teacher and parent who is interested in integrating the student into a conventional education school. Centros de Atención Múltiple (CAM) that care children with Autism Spectrum Disorder (ASD) do not always have the right way to evaluate a student with these characteristics. This work presents the design of a protocol for evaluating students presenting ASD by using simultaneously a mechanical pedaling system as an aid element to focus the student's attention on assigned tasks.

Asperger's Syndrome, Attention Deficit, Autism Spectrum Disorder

Resumen

Una correcta evaluación del nivel académico de los alumnos con déficit de atención es fundamental para cualquier docente y padre de familia que se interesa por integrar al alumno a una escuela de educación convencional. Los Centros de Atención Múltiple (CAM) que atienden a niños con Trastorno de Espectro Autista (TEA) no siempre cuentan con la correcta forma de poder evaluar a un estudiante con estas características. En este trabajo se presenta el diseño de un protocolo para evaluación de estudiantes que presentan TEA mediante el uso simultáneo de un sistema de pedaleo mecánico como elemento de ayuda para concentrar la atención del alumno en las tareas asignadas.

Síndrome de Asperger, Déficit de atención, Trastorno de espectro autista

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Introduction

At the international level, ASD is still being studied by specialist scientists to determine the best teaching-learning methods that are applied to children with this disorder. Since special education schools were created, different methods have been used to teach their students, and many of these centers use specific teaching and evaluation methods according to the individual characteristics of the student's condition. In the Multiple Attention Centers (CAM) throughout the country, children with attention deficit and hyperactivity are treated to integrate them into conventional schools.

However, according to the censuses, the number of children with ASD continues to increase and the number of CAMs is not enough to provide care for all children; so it becomes a problem to consider in Mexico. In Nuevo Laredo Tam. CAM51, seeking more effective teaching methods, proposed the use of a pedaling system coupled with specific work tasks to improve student learning.

The attention deficit in children with ASD has been well documented: they cannot respond to stimuli, they cannot keep their gaze fixed on another person and they cannot orient sounds when speaking. According to CAM experts, the use of a pedaling system helps children achieve better concentration and can focus on performing a task to achieve better performance. That is why in this document it proposes tasks to be carried out simultaneously with a pedaling system to measure the attention of the CAM student.

Because the minimum average time period for the implementation of a therapy is one year, the data collected during the project with a shorter period of time will not be specific enough, however, they will provide an approximate panorama of the expected results. medium and long term. Each infant presents different characteristics and degrees of autism, and in order to provide a personalized record of the effects of the system, the response in children with similar psychological profiles was documented and, in turn, personalized care, evaluation, and comparison thereof. It was recommended to evaluate a minimum number of subjects in order to focus in detail on their profiles and responses.

Materials and methods

The evaluation protocol was designed based on the need to evaluate the performance of the dynamic pedaling system to concentrate the attention of children with autism spectrum disorder, so it was considered for the development of the protocol, children with ADD and attention deficit were considered and the ethical advice of the expert team of the Multiple Service Center.

Initially, it was sought to analyze the student through a series of interactive tests, but later the protocol was adapted so that it was not necessary to intervene between the student's school sessions, thus achieving that the evaluation of the level of attention is directed by anyone outside the school session.

Tests

Due to issues of sanitary isolation during this time of the appearance of the COVID19 disease, we have proposed, since we are not yet allowed face-to-face approach with the children of CAM51, the proposal of tests to evaluate the student's attention. In this protocol, a record is kept of the motor progress reflected in the students through simple tests designed from general objectives, broken down into particular activities.

Task 1 Stroke. In order to develop literacy skills, the first test consisted of a practice device made up of a table with perforated silhouettes in which students can practice their coordination to make lines. For this task, the pedaling system is used at low speed and the student is instructed to make the path guided by the guide device.



Figure 1 Stroke task

Task 2 Name. After the tracing session, the subjects were asked to write their names before and after using the system. Taking into account the aspects of ability to follow instructions and coordination. Similarly, the pedaling system is programmed at low speed. (Figure 2)

Task 3 Puzzles. Final basic test, put together a puzzle of less than 20 pieces analyzing the effect on muscle memory. Similarly, the pedaling system programmed at low speed.



Figure 2 Student performing name task pedaling simultaneously

Participants

The students who were evaluated (face-to-face classes had not been stopped due to the health emergency caused by the Covid 19 virus) at the level of care have the following characteristics: Students from the Multiple Attention Center No. 51, with a age within the range of five to ten years, they may present: Autism Spectrum Disorder (ASD), Asperger's Syndrome (AS), attention deficit and hyperactivity.

Student ID	Gender	AGE (months included)	Diagnostic	School level
1	Male	6 years	ASD	Preschool
2	Female	8 years and 2 months	ASD	1st school
3	Female	5 years and 8 months	AS	Preschool
4	Male	6 years and 1 months	ASD	Preschool
5	Female	8 years and 1 months	AS	1st school
6	Male	6 years and 6 months	ASD	Preschool
7	Male	7 years and 2 months	ASD	1st school
8	Female	5 years and 2 months	AS	Preschool
9	Male	7 years and 8 months	AS	Preschool

Table 1 Characteristics of participants

Results

In on of the views of the CAM51 to test the interaction the students with the pedaling system, some tasks were carried out to see the behavior of the test subject and it was decided to reduce the engine speed so that all the children followed a standard speed at the time of the pedaling on. It should be mentioned that despite being subjects with attention deficit traits, objectivity was not lost on their part to make use of the system, a characteristic that was useful to assess short-term outcomes.

Through the tests it was tried to measure the attention, concentration and permanence of the student while using the dynamic pedaling system. An exam was applied to 9 students of which the first five used the dynamic pedaling system and the remaining four did not, the results are shown in table 2:

Subject Rating Using the system	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
72	1	1	0	1	0	0	1	1	1	1	1	1	0	0	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
77	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1
50	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1	1	1
22	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0
38	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1
27	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0

Table 2 Preliminary results

Key

- A. Attend by hearing your name
- B. Take turns
- C. Attend the instruction
- D. Recognize the numbers
- E. Recognize geometric shapes
- F. Recognizes himself
- G. Recognizes his father
- H. Recognizes his mother
- I. Recognize your sibling
- J. You acknowledge that you belong to a family
- K. Identify the circle
- L. Identify the square
- M. Identify the triangle
- N. Identify the rectangle
- O. Know the concept above
- Q. Know the concept below
- Q. Know the concept ahead
- R. Know the concept behind
- 1. = yes
- 0. = no

Conclusions

The testing protocol presented here in conjunction with the dynamic pedaling system presents an experimental option for schools wishing to innovate their teaching strategies; However, we are faced with a process in which we are obliged to generate formalized information accepted by an ethical council that allows us to implement it safely both for the subjects and for those responsible. This formalization of knowledge also depends on the constant confirmation of results, which, although there are some preliminary advances to the study, may be more specific and precise in terms of objectives carried out in certain periods of time evaluated with statistical tools, providing alternative support to children with ASD.

We consider, according to the preliminary results, aware that a greater number of samples is necessary, which have not been achieved until now due to health issues, that this protocol together with the pedaling system presents a complementary aid that can focus on activities based mainly in the areas of language and communication and mathematical thinking. Said program will be mathematically evaluated for the development of statistics and will be designed in cooperation with educational institutions.

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