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Why is he special? The importance of educational diet in children with Hemiplegic Cerebral Palsy: a case study

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This study describes the functionality, cognitive, and neuropsychological performance of a child with Hemiplegic Cerebral Palsy, and the role of the "educational diet" in his performance. Executive dysfunction is expected in Hemiplegic children, and even those with normal cognitive functioning are predisposed to show specific learning difficulties. This particular case displays a profile disparate from what is expected. Results confirmed the high functionality of the child, FA, in all domains. Moreover, a parent interview verified that the educational diet followed may be an important aspect that is contributing to the child's divergent results.

Keywords: Cerebral Palsy, hemiplegic, executive function, educative diet, single case.

¿Por qué este niño es especial? La importancia de una dieta educativa en niños con Parálisis Cerebral hemipléjica: un estudio de caso. Este estudio describe el caso de un niño con Parálisis Cerebral de tipo hemipléjica según su nivel de funcionalidad, cognitivo y rendimiento neuropsicológico y, también, el rol de la "dieta educativa " en su rendimiento escolar. Es esperado que niños hemipléjicos tengan una disfunción ejecutiva, pero incluso aquellos con funcionamiento cognitivo normal, es muy probable que presenten dificultades específicas de aprendizaje. En este caso el perfil presenta resultados distintos a lo que sería esperable. Los resultados confirmaron la alta funcionalidad del niño, FA, en todos los dominios. Además, la entrevista con los padres permitió verificar que la dieta educativa seguida puede ser un importante aspecto que está contribuyendo a los resultados divergentes que este niño presenta.

Palabras clave: Parálisis Cerebral, hemipléjica, función ejecutiva, dieta educativa, estudio de caso.

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Cerebral Palsy (CP) is estimated to occur in 1.5 to 2.5 children per 1000 live births (SCPE, 2002), and is considered the most common physical disability disorder in childhood with a lifelong impact (Novak, Hines, Goldsmith, & Barclay, 2012). CP is a term that embraces a group of permanent non-progressive neuromotor disorders that can result from early brain developmental problems during the prenatal, perinatal, or postnatal periods, with motor and posture consequences (Bax et al., 2005; Krigger, 2006; Rosenbaum et al., 2007). The main causes of CP are related to complications that can emerge from prematurity and low birth-weight, which, nowadays, have better survival rates due to advances in neonatal medical cares (Babcock et al., 2009).

CP can be classified in a number of ways, such as based on the nature of the motor impairment (e.g., dystonia, dyskinesia, ataxia, and mixed), area of the brain injury (pyramidal or extrapyramidal), or part of the body impaired (Gorter, Rosenbaum, & Hanna, 2004). The classification takes in consideration the part of the body compromised, and is divided into unilateral (impairment of one side of the body) and bilateral (impairment of two sides of the body). Unilateral classification is divided into monoplegia (upper or lower limb impaired) and hemiplegia (upper and lower unilateral extremity affected). Bilateral classification comprises diplegia (all limbs affected, with more incidence in the lower limbs), tetraplegia (upper and lower unilateral limbs impaired and a third limb affected in the other side of the body), and quadriplegia (all limbs and trunk impaired) (Bialik & Givon, 2009; Pakula et al., 2009; Rosenbaum et al., 2007). Importantly, the hemiplegic clinical condition (HCP) represents one third of all cases of children with CP (Chinier et al, 2014). Besides the motor impairment, children with CP, and specifically those with HCP, often display cognitive, executive, emotional, behavioral, and social difficulties (Christ et al., 2003; Goodman, 1997).

Repercussions of CP go beyond the motor domain. This developmental disorder typically involves cognitive deficits and a lack of emotional, behavioral, and social competences (Odding, Roebroeck, & Stam, 2006; Parkes, White-Koning, McCullough, & Colver, 2009). These difficulties echo in the learning processes and Activities of Daily Living (ADL) (Mutsaarts, Steenbergen, & Bekkering, 2006). In fact, many of these difficulties may arise before the schooling years, with literature showing that children with motor impairments display lower pre-academic skills (Michel, Roethlisberger, Neuenschwander, & Roebers, 2011). Children with HCP are likely to show normal values on intelligence tests (Goodman, 1997) and usually perform better in verbal measures, which supports the use of verbal IQ score as the most reliable indicator of their cognitive ability. Actually, in this population, overall IQ Performance is typically 10 points lower than Verbal IQ (Goodman, 1997). A possible explanation is that nonverbal tasks (e.g. block design) usually require two-handed skills, language, and/or visuospatial skills, and these skills are likely to be compromised (Goodman & Yude, 1996).

Research shows that even HCP children with a typical cognitive functioning display a risk of developing learning disabilities, such as in reading, spelling, or arithmetic (Muter, 1994) and difficulties in social skills. The prevalence of the difficulties is higher in arithmetic (26%) than in reading (19%) (Rooijen, Verhoeven, & Steenbergen, 2010). Moreover, children with HCP are at risk of experiencing difficulties in specific school contents, such as geometry, due to their visuospatial and visual-perceptual impairments (Goodman & Yude, 1996). These difficulties may also derive from their proneness to display impairments in the Executive Functions (EF) and Working Memory (WM) (Bottcher, Flachs, & Uldall, 2010; Jenks, Moor, & Lieshout, 2009). In fact, research in brain injury during early development suggests that the executive impairment in children is frequently the result of extended injury (Anderson et al., 2010).

The deficits in EF might include compromise of visual attention, auditory attention, planning, response time, inhibition, among others (Carlsson, Hagberg & Olsson, 2003; Pirila et al., 2004). Whittingham and colleagues (2014) have shown that children with HCP have poor EF performance in everyday life. In fact, EF are related to a family of a fundamental top-down processes involved in decision-making, anticipation of consequences, and staying focused on a specific task (Diamond, 2013). Specifically, cognitive functions and EF are involved in emotional responses, behavioral actions, self-regulation, and social skills, which have a large influence in children's ADL (Whittingham et al., 2014).

Self-regulated behavior and EF are closely related, as evidenced by extant literature (e.g., setting and managing goals, planning, inhibiting, problem solving, control of cognitive functions, and managing online information) (Sanz de Acedo & Sanz de Acedo, 2015; Ylvisaker & Feeney, 2002). These processes can be stimulated through three specific non-disjunctive methods: personal experience, instruction, and deliberative practice (Rosário, Núñez, Valle, González-Pienda, & Lourenço, 2013; Valle et al., 2009). The results of this stimulation culminate in the personal development of two key competences, choice and control, which are fundamental promoters of child's autonomy. The stimulation of these SRL processes can be infused in the family's everyday life, conceived also as an educative context (Rosário et al., 2010). How, then, can family promote SRL competences? This can be achieved through the establishment, with the child, of reasonable and achievable goals (both individual and family-oriented), the conception of plans of action to achieve the goals set, the monitoring of the execution of these plans of action, and the ability to switch strategy to achieve the goals when necessary (e.g., set the table for dinner and an extra guest unexpectedly arrives). The knowledge and learning of these strategies are only meaningful when self-awareness is present in the child (Núñez, Rosário, Vallejo, & González-Pienda, 2013). Being self-aware allows the child to actively engage in the activities, and routines, and understand his/her relevance to self-development (Ylvisaker & Feeney, 2002).

The present study describes the functionality, cognitive, and EF assessment of a single case of a child with HCP. When taking into consideration the success of this child in his school trajectory and rehabilitation goals, we became interested in understanding the characteristics of his functioning and the learning strategies being used. Hence, our goal was to understand how a particular "educative diet" can promote SRL strategies and autonomy.

METHOD

Case characteristics

FA is a ten year old boy with right dystonic HCP with dysarthria and motor impairment in the right upper and lower limbs. FA shows considerable levels of muscle spasticity, but no cognitive, auditory, or visual deficits. He was born at 40 weeks gestation (3.420 kg) with a low Apgar index (Apgar 4/7/8), resulting in fetal anoxia, and childbirth occurred with dystocia and vacuum extraction. At birth, he exhibited muscle stiffness and repeated short strokes of the limbs. There was no history of seizures during child development. Magnetic Resonance Imaging (MRI) conducted in 2011 (age 6) revealed lesions associated with asphyxia that occurred within the perinatal period, with ischemic periventricular repercussions. Currently, FA exhibits difficulties in manual dexterity, balance, fine motor skills, swallowing, and speaking. Finally, the scapular waist compromises the stability of his upper limbs.

The child has been attending a tailored therapy program in the rehabilitation center since he was four, with each activity being planned by the rehabilitation team. This program is centered in his motor impairments, expressive language, and functional difficulties (e.g., handwriting). It is conducted on a weekly basis and comprises one hour session per therapy (physiotherapy, occupational therapy, and speech therapy), complemented with one-hour equestrian therapy once every two weeks. Sessions are organized around goals that are to be achieved in a pre-arranged time-frame. Importantly, following a family-based logic aiming to engage the family in the therapeutic process, parents are expected to actively participate in every therapeutic session. Throughout the process, goals are periodically monitored by FA's therapists, his parents, and himself.

FA is in 4th grade and has grades that are higher than the majority of his peers. His highest achievements are in mathematics, although difficulties are more evident when the exercise demands reasoning explanation. Additionally, FA presents slight difficulties in reading (i.e. number of words read per minute and planning of written answers). The school teacher highlights the factor time as an interfering element for FA normal task execution. In academic tasks with a predefined time period for execution, FA's performance decreases (e.g. final exams) due to his motor impairment, suggesting that the motor function compromises the speed in which FA is able to execute the task.

Procedure

To accomplish the aim of this study, a neuropsychological and functional protocol was conducted. Considering that an evaluation exclusively focused on neurocognitive functioning would not be enough to explain variations in this child's performance, a parent interview was performed to integrate indicators from the child's educational context into the neurocognitive results.

Evaluation Protocol

The evaluation protocol included a cognitive and functional evaluation, an interview with the parents, and an EF evaluation. The EF evaluation was based on a three-structure model (Miyake et al., 2000), including tasks to assess Inhibition, Shifting, and Updating functions. Research has suggested that EF operate in a concurrent manner, meaning that several processes may be working simultaneously, which may create obstacles in the assessment of isolated functions (Ven, Kroesbergen, Boom, & Leseman, 2013) like inhibition or shifting. Hence, Miyake et al. (2000) proposed a structure with three distinct EF. This three-structure model includes: the ability to prevent a dominant response to occur in place of another one or absence of a response (Inhibition); the ability to alternate between automatic rules and new ones during the task (Shifting); and the ability to save and update relevant information during the task in WM (Updating) (Miyake et al., 2000; Ven et al., 2013).

Neuropsychological Assessment

Cognitive Assessment

Wechsler Intelligence Scale for Children-3rd Edition (WISC-III). The general cognitive evaluation was measured with an adapted version of WISC-III (Wechsler, 1991) for the Portuguese population (Simões et al., 2003). The WISC-III is an individually administered test for children aged 6 through 16, and comprises five verbal sub-tests and six performance sub-tests measuring specific aspects of the composite intelligence and providing strong evidence of executive functioning.

Executive Functions' Assessment

Inhibition

The inhibition function was assessed through the Color Word Interference Test, a sub-test of the D-KEFS (Delis, Kaplan, & Kramer, 2001), based on the Stroop Task (1935) developed to assess interference effects and inhibition control (Martín, Rodríguez, García, Díaz, & Jiménez, 2015). The four conditions of this sub-test are evaluated by the time the individual takes to complete the task. Thereafter, the results in each individual condition are contrasted with each other, originating the Contrast Scores Completion Time and the Contrast Scores Optional Measures.

Shifting

To identify the presence of impairments in the shifting function we used the sub-test Trail Making Test from the D-KEFS (Delis, Kaplan, & Kramer, 2001). The sub-test includes the two original conditions from the Trail Making Test–number sequencing and number-letter sequencing-and four new conditions that were later introduced by Delis and collaborators (2001) -visual-scanning, motor speed, number-sequencing, and letter-sequencing.

Updating

The presence of impairments in the updating function was evaluated by the sub-test Tower Test from the D-KEFS (Delis, Kaplan & Kramer, 2001). The Tower Test measures several key EFs, such as planning, and research suggests that the Tower Test's results are related to the updating function, particularly regarding goal information and WM (Miyake et al., 2000).

Functional Assessment

Manual Ability Classification System for children with cerebral palsy (MACS)

The MACS is structured in different levels (I, minor difficulties to V, major difficulties) on how children with CP use their hands to manipulate different objects involved in ADL (Eliasson et al., 2006).

Gross Motor Function Classification System (GMFCS)

The GMFCS evaluates in different levels (I, minor difficulties to V, major difficulties) the movement ability: sitting movement, self-initiated movement, transferring, and mobility (Andrada et al., 2010; Palisano et al., 1999).

Communication Functional Classification System (CFCS) to Cerebral Palsy

The CFCS classification system allows for the assessment of the child's activity and participation in ADL in five levels (I, minor difficulties to V, major difficulties), according to the International Classification of Functioning, Disability and Health (ICF) by the World Health Organization (WHO) (Andrada et al., 2011; Hidecker, Geurts, & Steenbergen, 2011).

Eating and Drinking Ability Classification System-Algorithm (EDACS)

The EDACS classifies eating and drinking ability in children with CP in five levels (I, minor difficulties to V, major difficulties), distinguishing the eating and drinking competences of the child (Sellers, Mandy, Pennington, Hankins, & Morris, 2010).

"Educative Diet" Assessment

Data were collected with a semi-structured interview with one of the parents, to explore the routines in the ADL and school activities. This interview included three different parts: (1) Questions directed to explore the routines in ADL, adapted from the Routines-Based Interview created by McWilliam (2003) (e.g., Does he eat autonomously? What can he do by his own?); (2) Questions directed to explore the school routines to understand how the family manages the mainstream school demands (e.g., Does he have a place at home to study?); and (3) Questions directed to explore parental involvement in the school activities and ADL (e.g., At home, do you talk about school? At what time? What topics?).

RESULTS

Neuropsychological Assessment

Cognitive Assessment

FA's general cognitive level was within the average range of intellectual functioning-Full Scale IQ (FSIQ=111) (Table 1). Regarding the Verbal and Performance Scale, FA results were within the average range. However, FA results shows a significant difference between the VIQ (118) and PIQ (101). This difference is congruent with FA's clinical condition. Specifically, the performance in the verbal and nonverbal scales suggests that his ability to think with and without the use of words is heterogeneous. Nevertheless, the motor impairment in the vocal trait and in the lower and upper limbs does not interfere with a normative performance in the two scales.

FA achieves higher in verbal tasks compared to the performance scale. Specifically, verbal reasoning -Verbal Comprehension Index (VCI=116)-, nonverbal reasoning -Perceptual Reasoning Index (PRI=104)-, and speed processing abilities -Processing Speed Index (PSI=112)-, were within the average range.

However, the discrepancy between the results of specific sub-tests -Coding (8) and Symbol Search (16)-, emphasize difficulties in the self-regulation competences and in timed tasks performance, which is also consistent with performance in the Cancellation sub-test (5).

Table 1. Cognitive assessment (WISC-III) results

Cognitive Assessment (WISC-III)	
Sub-test	FA Results (Normative Result)
FSIQ	111 (*M*=100; *SD*=15)
Verbal IQ	118 (*M*=100; *SD*=15)
Performance IQ	101 (*M*=100; *SD*=15)
VCI	116 (*M*=100; *SD*=15)
PRI	104 (*M*=100; *SD*=15)
PSI	112 (*M*=100; SD=15)

Executive Functions Assessment

Inhibition, Shifting, and Updating Evaluation

Table 2 shows the results of the EF Assessment. Particularly, FA's inhibiting ability was measured using the *Color Word Interference Test* through four conditions (C1: Color Naming; C2: Word Reading; C3: Inhibition; C4: Inhibition/switching). The *Word Interference for Completion Time* results were below average for all four conditions.

However, the results in the *Contrast Scores for Completion Time* were within the average range, suggesting a preserved inhibiting ability. Additionally, FA showed results within the normative range in the *Contrast Scores for Optional Measures*. Because Contrast Measures are not influenced by the time the individual takes to perform the task, these measures allows for the isolation of naming and reading performance, with results suggesting preserved competences for the inhibition function. FA's Shifting ability was within normal range in all conditions except for Visual Scanning (C1=2) and Motor Speed (C5=1). These two conditions are control tests of visual and motor speed skills, and the results were congruent with the clinical characteristics of HCP. Results for the Updating evaluation revealed that FA scored in the average range for all test conditions of the Tower Test except for Time-Per-Move Ratio.

Table 2. Neuropsychological Assessment results, assessed with D-KEFS

Neuropsychological Assessment	
Inhibition (Color Word Interference Test)	
Condition	FA Results (Normative results)
Word Interference–Completion Time	
C1: Color Naming	1 (*M*=10; *SD*=3)
C2: Word Reading	1 (*M*=10; *SD*=3)
C3: Inhibition	5 (*M*=10; *SD*=3)
C4:inhibition/switching	5 (*M*=10; *SD*=3)
Combined Naming+Reading	3 (*M*=10; *SD*=3)
Contrast Scores Completion Time	
C3: Inhibition vs. C1: Color Naming	14 (*M*=10; *SD*=3)
C4: Inhibition/switching vs. C5: Combined Naming+Reading	11 (*M*=10; *SD*=3)
C4: Inhibition/switching vs. C3:Inhibition	11 (*M*=10; *SD*=3)
Contrast Scores Optional Measures	
C4: Inhibition/switching vs. C1: Color Naming	13 (*M*=10; *SD*=3)
C4: Inhibition/switching vs. C2: Word Reading	9 (*M*=10; *SD*=3)
Shifting (Trail Making Test)	
Condition	
C1–Visual Scanning	2 (*M*=10; *SD*=3)
C2–Number sequencing	10 (*M*=10; *SD*=3)
C3–Letters Sequencing	7 (*M*=10; *SD*=3)
C4–Number-Letter Switching	7 (*M*=10; *SD*=3)
C5–Motor Speed	1 (*M*=10; *SD*=3)
Updating (Tower Test)	
Condition	
Total Achievement Score	11 (*M*=10; *SD*=3)
Mean first-Move Time	10 (*M*=10; *SD*=3)
Time-Per-Move Ratio	6 (*M*=10; *SD*=3)
Move Accuracy Ratio	11 (*M*=10; *SD*=3)
Total Rule Violations	10 (Cumulative Percentile)
Rule-Violations-Per-Item Ratio	10 (*M*=10; *SD*=3)

Functional Assessment

Table 3 shows the results regarding the functional evaluation conducted on FA.

Table 3. Functional Evaluation results: Manual, Gross Motor, Communication, and Eating abilities

Functional Evaluation of Manual (MACS), Gross Motor (GMFCS), Communication (CFCS), and Eating (EDACS) abilities	
Instrument	FA Classification
MACS	Level I-Handles objects easily and successfully. At most, limitations in the ease of performing manual tasks requiring speed and accuracy. However, any limitations in manual abilities do not restrict independence in daily activities.
GMFCS	Level I-Children walk at home, school, outdoors, and in the community. Children are able to walk up and down curbs without physical assistance and stairs without the use of a railing. Children perform gross motor skills such as running and jumping but speed, balance, and coordination are limited. Children may participate in physical activities and sports depending on personal choices and environmental factors.
CFCS	Level II-Recognizing the use of all effective methods of communication including augmentative and alternative communication.
EDACS	Level I-Eats and drinks safely and efficiently.

"Educative Diet" Assessment

The interview was conducted on FA's father in the Cerebral Palsy Association where he attends therapies, lasted for thirty minutes, and was voice recorded. After transcription and analysis of the speech, three major categories emerged: *FA's involvement in ADL's routines*, *FA's involvement in school routines*, and *Parental involvement in FA's involvement in school activities.* Within each major category, subcategories were identified from the parent's discourse (see table 4).

Table 4. Summary of categories and subcategories that emerged in the parent interview

Categories and Subcategories that emerged in the Interview
Parents promotion of FA's involvement in ADL routines
Promotion of autonomy competences
Established routines/ schedules
Promotion of responsibility in household shores
FA's involvement in school routines
Place to study
Asks for help -Parents/Internet
Organizes place of study
Positive emotions associated with school activities
Accomplishment of pre-defined rules and schedules for studying
Infeasibility of attending extra-curricular activities
Involvement in preparation for exams
Involvement in study organization
Anxiety in moments of evaluation
Parental involvement in FA's involvement in school activities
Parents visit school with regularity
Talk daily about school at home
Diversity of topics of conversation about school -Relationship with peers/School day
Positive parental expectations - College Education

FA's parents are highly conscientious regarding the need of routines and rules in FA's daily life. The existence of rules and routines promotes autonomy and the sense of responsibility, especially regarding school demands. Because of his medical condition, FA's parents expect him to work hard in school and to follow the therapists' recommendations to continue to improve his motor conditions and, hopefully, prevent setbacks. At home, every event is regarded as an opportunity to stimulate FA at a cognitive, motor, and autonomy level (e.g., actively watch TV quiz shows together at dinner time; performance of small household chores).

DISCUSSION

In this study, we observed that FA displays a cognitive performance within normative range and has high academic achievement. Still, it is important to stress his difficulties for timed tasks (e.g., FA struggle during exams and time limited tasks) due to his motor impairments. However, research shows that a relevant number of children with HCP display a normal cognitive level (Goodman & Yude, 1996) with better performance in verbal IQ tests, despite coexisting with executive dysfunction (Aarnoudse-Moens, Smidts, Oosterlaan, Duivenvoorden, & Weisglas-Kuperus, 2009), deficits in visuospatial perception, and other types of neurocognitive deficits. Nonetheless, these children are prone to show learning disabilities in reading, spelling, or arithmetic, and also in domains, such as geometry, that involve visuospatial ability (Jenks, De Moor, & Van Lieshout, 2009; Rooijen, Verhoeven, & Steenbergen, 2010).

From literature inspection, it would be expected for a child with a clinical condition such as FA to display executive dysfunction (Whittingham et al., 2014). However, FA's results suggest a normative EF assessment result. Specifically, FA shows normative performance for the Inhibition, Shifting, and Updating functions. This implies that FA has executive and cognitive control, meaning that he is capable of initiating, executing, and monitoring his behavior in one task and inhibit concurrent behaviors. Despite FA's results being within the normal range for the tasks that demand motor or visuospatial perception competences (*Word Interference–Completion Time, C1 and C5 of Trail Making Test, and Time-Per-Ratio of Tower Test)*, his results are lower than normative performance, as expected for his clinical condition.

Findings are congruent with FA's school achievement profile and his father's perceptions about his school behavior. Consistent with literature, FA shows a good school engagement and displays SRL strategies to cope with his school tasks, following a positive developmental trajectory (Mahatmya, Lohman, Matjasko, & Farb, 2012). Regarding school activities, FA showed good performance in mathematics but difficulties in reading tasks. The latter may be due to motor impairments, which may prevent his communication. Despite this, FA scored higher in the Verbal tasks when compared to the other measures of the cognitive assessment. FA's better performance in mathematics is congruent with, and corroborated by, his results in the cognitive and executive assessment.

Why does this child display a positive progression when a stagnation, or even a downswing, in children with this clinical condition is expected?

Children with CP need specific interventions tailored to their difficulties. In the present case, the rehabilitation plan comprises all areas in need of continuous stimulation (i.e., physiotherapy, occupational therapy, speech therapy, and equestrian therapy). Yet, this therapy program is not enough to explain FA's school success. In fact, children with HCP with a normal cognitive level and similar therapy programs, do not show a pattern of school achievement similar to that of FA. On the contrary, these children are likely to have learning disabilities and poor school achievement. In the current case, the intervention is extended to the family context where the stimulation process continues, intuitively and spontaneously, without technical or professional supervision. Three key education aspects of the educational diet followed with FA were identified: routines, support, and awareness of the clinical picture.

FA's father, speaking on behalf of the couple, stressed that the family follows clear routines such as "First study, then play" or "each one do their tasks". Several examples help to understand how they set routines: "*At home, FA's obligation is to set the table and warm the food in the microwave, and we expect him to do his job as we do ours*". Sometimes, FA tries to skip rules: "*he frequently asks 'only 5m in the playstation, come on…', and I answer. Ok, but 5m are not 6! He has to learn how to manage time and be responsible*".

Parents believe that routines may be important to help FA "find his way"; but, as FA's father explained, support is "very, very important". A clear example of the importance of parental involvement in FA's schoolwork is their help in the organization and management of study. "*FA has to study by himself, but we still help him do summaries. We write on the computer to teach him how to do it. Sometimes we take notes and organize the content to facilitate learning, but he has to learn how to do it to become autonomous. Difficulties will grow, he must be prepared*".

Together with the routines and support, parental awareness about FA's clinical condition and associated needs is another aspect of the "educational diet" that seems to contribute to FA's success. "*Today FA's behavior shows that we can expect much from him, but we know his difficulties, and tomorrow may be not so sunny. Now, our job is to help him reinforce his behavior, be stubborn, more than him. Always expect more, but with our feet on the ground*." FA's father further explained his expectations of cognitive stimulation with the following statement: "*At dinner we watch TV quiz shows. We do it on purpose to create opportunities to play with the family and 'compete' for the answers, but to also foster FA's general knowledge. Sometimes he knows the answer, other times [when he does not know the answer] he asks 'what is the answer?' and then we talk about the questions and the answers*". These three key aspects, routines, support, and awareness, seem to play a major role in FA's educational diet.

The tailored therapy program, the continued stimulation, and the three main aspects of the “educational diet” -routines, support, and awareness of FA’s clinical picture- seem to play an important role in the progression of FA’s clinical picture and school achievement. Acknowledging that HCP children receiving similar clinical protocol do not achieve the same success, it is important to learn the features of FA’s “educational diet” because it is likely to play an important role on his success.

Considering this case, and studies that highlight the impact of family involvement in children development, we suggest that future interventions with children with similar characteristics should include closer tailored work with parents concerning the “educational diet” of their child (Álvarez, Suárez, Tuero, Núñez, Valle, & Regueiro, 2015; Fernández-Zabala, Goñi, Camino, & Zulaika, 2018). Therapists should consider organizing training programs for parents, focusing on relevant educational topics such as motivation, SRL strategies, possible-selves, and parenting styles. These training programs should stress and discuss concrete guidelines and strategies to apply in the family context. Guidelines and strategies should rooted in the family’s daily life. To complement this line of intervention, a good practice in the therapy context would be the family-centered approach. In this approach, relatives or caregivers attend the therapies together with their child with the aim of learning about, and clarifying ideas about, the rehabilitation process and transferring the knowledge to the contexts of daily-life. This kind of approach is expected to promote family engagement, thereby potentiating the contribution of each of the three key aspects of the educational diet.

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