SPECIFIC DEVELOPMENTAL DISORDERS AND SPORTS: AN EXPLORATORY STUDY ON PARTICIPATION AND ENVIRONMENTAL BARRIERS

DISTURBI EVOLUTIVI SPECIFICI E SPORT: UNO STUDIO ESPLORATIVO SULLA PARTECIPAZIONE E LE BARRIERE AMBIENTALI

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ABSTRACT

This study analysed sport participation and parental perceptions of environmental barriers in a sample of 249 parents of Italian children aged 5 to 11 years (115 with specific developmental disorders and 134 without diagnosis). The results highlight that children with Specific Developmental Disorders participate in sports significantly less and encounter more environmental barriers than their peers.

In questo studio sono state analizzate la partecipazione allo sport e la percezione genitoriale delle barriere ambientali in un campione di 249 genitori di bambini italiani di età compresa tra i 5 e gli 11 anni (115 con disturbi evolutivi specifici e 134 senza diagnosi). I risultati evidenziano che i bambini con disturbi evolutivi specifici partecipano allo sport significativamente meno e incontrano più barriere ambientali rispetto ai loro pari.

KEYWORDS
Specific developmental disorders; Special Educational Needs; Sport; Developmental age; Environmental barriers.

Disturbi evolutivi specifici; Bisogni Educativi Speciali; Sport, età evolutiva; Barriere ambientali

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Introduction[1]

The field of Special Pedagogy increasingly emphasizes concepts such as the “network of care”, “educational alliances”, and “community projects”. These are considered indispensable prerequisites for viewing individuals in their entirety and formulating life projects that truly promote well-being, education, participation, and inclusion in all life contexts (Causin, De Pieri, 2006; Franchini, 2007; Ianes, 2009; Mura, 2015; Pavone, 2014).

Within this framework, several authors have paid particular attention to the potential contribution of sport activities as a privileged domain for expanding the scope of inclusive education beyond the school context (Cioni, 2023; de Anna, 2009; Magnanini, 2018; Moliterni, 2013). Due to its well-established prevalence, especially during the developmental stages, the sports sector is now positioned to fulfill the role of the third educational agency, following school and family (Tiano et al., 2023), and it has also gained increasing recognition in institutional documents.

Due to its pervasive influence in society, the Council of Europe asserts that sport serves as a privileged tool in any education policy and related initiatives (2001). Similarly, UNESCO highlights that sports activities can significantly contribute to a broad spectrum of benefits for individuals, families, communities, and society as a whole, spanning areas such as education, health, the economy, and crime reduction (2015). In line with this perspective, the United Nations, in a resolution passed at the General Assembly on September 25, 2015, aimed at the ambitious goal of 'Transforming our world' for sustainable development, emphasizes the need for collaboration across all societal systems, including the sports system. The resolution underscores that sport plays a crucial role in sustainable development, acknowledging its growing impact on goals related to social inclusion, education, and health (2015). Within this context, it is essential to reference the recent draft constitutional law through which the Italian parliament unanimously approved the amendment to Article 33 of the Constitution. The new paragraph declares that "The Republic recognizes the educational, social, and psychophysical well-being value of sporting activity in all its forms," indicating the three guiding principles in which sport provides its essential contribution.

To meet the challenge of education and inclusion for all, it is crucial to ensure that everyone has the right to participate fully on an equal basis with others. This

[1] This paper is the result of the common work of the authors. Particularly, Angela Magnanini is author of Introduction and Conclusions and Lorenzo Cioni of paragraphs 1,2,3 and related subsections.

includes providing an appropriate response to situations arising from "particular health-functioning conditions that may result from an infinite combination of biological, bodily factors, personal skills, and activities [...] mediated by environmental and personal contexts," giving rise to Special Educational Needs (Ianes, 2008, p. 44).

The concept of Special Educational Needs, present in Anglo-Saxon literature since the 1970s (Committee of Enquiry into the Education of Handicapped Children and Young People, 1978; UNESCO, 1994; 2012), originated within the school context and found clearer systematization in Italy through the Ministerial Directive of 27 December 2012. It encompasses all situations, whether transitory or permanent, related to physical, biological, physiological, psychological, and social challenges for which schools must provide an appropriate and individualized response. According to Gaspari, the concept of BES holds no clinical value but rather carries political significance. It aims at "recognizing diversified situations and existential conditions democratically understood, with a view to the necessary acknowledgment of rights, possibilities, resources, enhancing processes of participation, learning, and the culture of common belonging" (Gaspari, 2013, p. 347).

Specifically, in addition to disability, this 'macro-category' also encompasses conditions of socio-economic and cultural disadvantage, along with Specific Developmental Disorders. The latter refers to diagnostic conditions that do not qualify for disability certification under the Framework Law for Assistance, Social Integration, and the Rights of Handicapped Persons (Law no. 104/92), and include specific learning disorders, attention-deficit/hyperactivity disorder, specific language disorders, motor coordination disorder, conduct disorder, and borderline cognitive functioning. Initially brought to the forefront of clinical and scientific research due to challenges emerging in the school context, these conditions have been predominantly analyzed by researchers in relation to difficulties associated with carrying out curricular activities. However, minimal attention has been given to the realm of extracurricular sports activities.

Building on an established line of international research (Carney et al., 2005; Montalva-Valenzuela, 2022; Ziereis, Jansen, 2015), some Italian researchers have delved into the topic by emphasizing potential benefits in terms of health, well-being, and the development of social skills derived from participation in sport activities (Molisso, Masullo, 2018; Termini, Sciurca, 2017). However, as of now, no study has been conducted to examine potential difficulties in participation, despite preliminary international research data indicating that children with Specific Developmental Disorders participate less in extracurricular sport activities

compared to their peers without any diagnostic conditions (Barnett et al., 2013; Beart et al., 2001; Cook et al., 2015; Yazdani, 2013).

According to the biopsychosocial model underlying the ICF (WHO, 2007), participation in any life context relies on the reciprocal interaction between factors in different domains, including health status, bodily structures and functions, activities, and environmental factors that characterize the person's living context. Concerning bodily structures and functions, it is acknowledged that among specific developmental disorders, issues of neurobiological and/or neurophysiological origin related to the control and organization of movement and executive functions are relatively common. These challenges may restrict the ability to perform daily activities (Vio, Lo Presti, 2014). In an environment incapable of offering appropriate and personalized responses, children may be exposed to the risk of restrictions in participation.

Environmental factors encompass all those elements whose presence or absence can either impede or facilitate social participation and overall functioning. Their significance lies in the fact that different environments can exert varying impacts on the same individual, particularly during developmental stages. Given the state of dependency in which children find themselves during development, negative environmental factors often affect children more strongly than adults (WHO, 2007). Some studies have underscored the presence of various physical and social barriers that can impede the participation of children with disabilities in sports activities (Bloemen et al., 2014; Ginis et al., 2016; Jaarsma et al. 2014; McGarty, Melville, 2018; Shields, 2012). Utilizing the ICF as a conceptual framework, Table 1 provides a summary of the primary environmental barriers identified.

Domains	Environmental Barriers	ICF Codes
Products and Technology	Lack of equipment	e140
Natural environment and human-made changes to environment	Adverse weather conditions	e225
	Overcrowded or noisy environments	e250
Support and Relationships	Lack of support from family members	e310
	Lack of support from peers	e325
	Lack of support from the sports educator	e330
Attitudes	Negative attitudes from family members	e410
	Negative attitudes from peers	e425
	Negative attitudes from the sports educator	e430
Services, systems and policies	Lack of offerings in the local area	e555
	Excessive costs	e565
	Lack of information on available activities	e535
	Lack of specific training for sports educators	e585
	Shortage of public transportation services	e540
	Lack of architectural accessibility	e515
	Lack of security	e545

Table 1 – Environmental barriers that can hinder children with disabilities in participating in sports activities and their corresponding ICF codes (WHO, 2007). Source: Cioni, Magnanini (2022).

It's important to note that some of these barriers may also apply to children without any diagnosed condition. For example, according to the review study conducted by Biddle et al., (2010), the availability of local offers, parental attitudes, and support are significant factors associated with levels of sports activity among children without disability. Meanwhile, Somerset and Derek (2018), in reference to the same population, parents' lack of time, the availability of public and private transportation, costs, local offer availability, as well as peer attitudes, all represent potential barriers that can hinder participation in sports activities. While a thorough identification of these factors is crucial for all stakeholders involved in various capacities in the organization of sports activities, there is a shortage of studies specifically focusing on children with Specific Developmental Disorders.

1. Objectives

Building on the considerations mentioned above, the current study aims to explore potential environmental barriers that might impede the involvement of children aged between 5 and 11 with Specific Developmental Disorders in sports activities. This exploration involves a comparison with their counterparts who do not have any diagnostic condition. Specifically, the study aims to:

1) Investigate whether children with Specific Developmental Disorders engage in fewer sports activities compared to their peers without a diagnosis
2) Identify the most significant environmental barriers faced by children with Specific Developmental Disorders
3) Examine whether children with Specific Developmental Disorders encounter a higher number of environmental barriers than their counterparts without a diagnosis
4) Identify the environmental barriers that exhibit the most notable differences between the two groups.

2. Methods

2.1. Preliminary Considerations

By definition, environmental factors are external to individuals but cannot be evaluated independently of the individuals themselves. What can be assessed is the valence, whether positive or negative, that any environmental factor holds for a given person. It is crucial to recognize that the same factor may carry different valences for different individuals. A classic example, as outlined in the International Classification of Functioning, Disability, and Health (ICF), is the access ramp. While it serves as a facilitator for a person in a wheelchair, it may pose a barrier for a blind person, hindering the perception of the difference between the pavement and the road. To others, it might be an irrelevant factor, signifying neither a barrier nor a facilitator.

The impact of environmental factors on individuals' lives can, therefore, be intricate and diverse (WHO, 2007). The ICF emphasizes that, in all cases, environmental factors should be coded from the perspective of the person whose situation is being described. It suggests the direct involvement of the person whenever possible or contacting those familiar with the person and their environment. Taking into account these considerations, alongside the methodological challenges associated with directly involving children (Fargas-Malet et al., 2010), this study opted to engage parents. Given their responsibility for daily mediation between the child and their environment, parents possess a unique and intimate understanding of both, making them particularly well-placed to provide essential information for conducting this study.

2.2. Instrument

For the purpose of this research study, the *Sport Participation and Environment Measure* (SPEM)[2] (Cioni, 2023) was utilized. This self-report questionnaire, adapted from the Participation and Environment Measure for Children and Youth (PEMCY) (Coster et al., 2014), is designed for completion by Italian parents of children with and without a diagnosis. The SPEM aims to assess participation in extracurricular sportive activities and parental perceptions of environmental barriers that may impede such participation.

Evaluation of participation in sports activities includes an assessment of weekly frequency (rated from 0 to 7) and the level of involvement. Parents are asked to rate, on a scale from 1 (little involved) to 5 (very involved), the child's level of "attention, concentration, emotional involvement, or satisfaction" during participation. Additionally, an item is included to identify with whom the child engages in sports.

The environmental factors scale, exhibiting good psychometric properties, comprises 16 distinct factors recognized as relevant for participation in sports activities (Biddle et al., 2010; Bloemen et al., 2014; Ginis et al., 2016; Jaarsma et al. 2014; McGarty, Melville, 2018; Shields, 2012; Somerset, Derek, 2018). Parents are asked to indicate whether each of the 16 environmental factors represents a barrier, sometimes a barrier, or a facilitator for their child's participation. Alongside the SPEM items, the questionnaire employed in this study encompasses an introductory section focusing on socio-demographic variables pertaining to both the child and the parent.

2.3. Sample and procedure

The sample involved in this study is part of a broader research project, where parents of children with disabilities also participated (Cioni, 2023). It was selected using a two-stage cluster strategy, commencing from state primary schools in the province of Rome during the 2019/2020 school year (Cicchitelli et al., 1997). The entire theoretical sample was drawn from seven comprehensive institutes situated in the suburban areas of the province of Rome, encompassing 348 parents. These parents were provided with the paper version of the questionnaire, along with an informed consent form.

Out of the theoretical sample, 249 parents, constituting 71.5%, gave their consent and returned the questionnaire, which was considered valid for analysis. This group

[2] The Italian and English versions of the Sport Participation and Environment Measure (SPEM), along with details on score coding, are available at [https://sites.google.com/view/spem-questionnaire/home-page].

included 115 parents of children with Specific Developmental Disorders and 134 parents of children without a diagnosis. The identification of students with specific developmental disorders within the school was conducted by teachers. Additionally, the administered questionnaire inquired whether the child has a diagnostic certification and, if so, the type of disorder.

2.4. Research design and data analysis methods

The research design employed is cross-sectional, involving a comparison between parents of children with and without Specific Developmental Disorders. The data collected through the questionnaire underwent quantitative descriptive analyses, including frequencies, calculation of percentages, averages, and standard deviation. Additionally, Inferential analyses were conducted using SPSS-22 software. Specifically, the Chi-square test was applied for categorical variables, and the independent samples t-test was used for quantitative variables to identify statistically significant differences between the two groups. Significance was established at $p<0.05$. Furthermore, Cramer's V-index was utilized to assess the effect size. According to Cohen's guidelines (1988), effect sizes were categorized as negligible for values below 0.10, small for V values between 0.10 and 0.3, medium for V values between 0.30 and 0.50, and large for V values exceeding 0.5.

3. Analysis

The children are aged between 6 and 12 years (M=8.7; SD=1.5), with 50.1% being male. Specific Developmental Disorders were categorized into four main types: specific learning disorders (N=48; 41.7%), specific language disorders (N=30; 26%), attention-deficit/hyperactivity disorder (N=17; 14.8%), and other (N=20; 17.5%)[3].
The parents, aged between 27 and 68 years (M=41.8; SD=5.5), predominantly include mothers as respondents (N=189; 75.9%). The reported annual household income ranges from 0 to 80,000€ (M=32,535; SD=1,871) and aligns with that of the reference population, which is €32,297 (ISTAT, 2017a). Parents of children with Specific Developmental Disorders report a significantly lower income than parents of children without any diagnosis (€28,122 vs €37,872; t=3.707; $p<0.01$).

[3] The 'other' category encompasses motor coordination disorders, cases of comorbidity, and instances where the parent has not specified any particular type of disorder.

Currently, 176 children, equivalent to 70.7% of the sample, are engaged in extracurricular sport activities. This percentage is approximately 6 percentage points higher than that reported by ISTAT (2017) for the population in the same age group. Consistent with preliminary findings from other studies (Barnett et al., 2013; Beart et al., 2001; Cook et al., 2015; Yazdani, 2013), the proportion of children with Specific Developmental Disorders currently participating in sports is significantly lower than that of children without a diagnosis (55.7% vs 83.6%; χ^2=23.287; $p<0.01$).

Furthermore, all children with Specific Developmental Disorders participate in the same sports contexts as their peers, and when they do, they exhibit a similar average weekly frequency (2.28 vs 2.38; t=0.829; $p>0.05$), but they seem less involved than their peers (4.22 vs 4.50; t=2.070; $p<0.05$).

Analyzing Table 2, it is evident that among the factors most frequently perceived as potential obstacles to participation by parents of children with Specific Developmental Disorders, we find factors 10, "information on available activities," 11, "availability of sports activities suitable for the child," and 12, "public transportation services."

	Environmental Factor		B	BF	F	X^2	V
1	Weather conditions	SDD	3,5%	23%	73,5%	1,127	0,046
		W	3%	22,4%	74,6%		
2	Physical Accessibility	SDD	1,7%	16,5%	81,8%	4,674	0,137
		W	0,7%	8,3%	91%		
3	Sensory-perceptual characteristics	SDD	4,3%	27,8%	67,9%	0,387	0,039
		W	3%	26,9%	70,1%		
4	Safety of places	SDD	11,3%	16,5%	72,2%	5,286	0,144
		W	4,5%	9,7%	85,8%		
5	Attitudes of other children	SDD	2,6%	40%	57,4	7,393*	0,172
		W	0%	29,1%	70,9%		
6	Attitudes of the sports coach	SDD	1,8%	21,7%	76,5	4,031	0,127
		W	0,0%	15,7%	84,3%		
7	Required physical abilities	SDD	1,8%	33,9%	64,3%	7,433*	0,173
		W	0%	21,6%	78,4%		
8	Required cognitive abilities	SDD	0%	42,6%	57,4%	25,197**	0,318
		W	0%	14,2%	85,8%		
9	Required social abilities	SDD	5,3%	30,4%	64,3%	23,177**	0,305
		W	0%	11,2%	88,8%		
10	Information about available activities	SDD	42,6%	34,8%	22,6%	3,208	0,113
		W	37,3%	29,9%	32,8%		
11	Availability of activities suitable for the child	SDD	44,3%	23,5%	32,2%	12,936**	0,228
		W	24,6%	23,1%	52,2%		
12	Public transportation services	SDD	42,6%	22,6%	34,8%	2,210	0,094
		W	39,6%	17,2%	43,3%		
13	Private transportation	SDD	11,3%	15,7%	73%	18,815**	0,275
		W	3%	3,7%	93,3%		
14	Available time	SDD	7%	53%	40%	8,910*	0,189
		W	3%	38,8%	58,2%		
15	Financial resources	SDD	14,8%	39,1%	46,1%	27,460**	0,332
		W	2,2%	21,6%	76,2%		
16	Availability of equipments	SDD	8,2%	41,7%	50,1%	30,726**	0,268
		W	1,4%	14,3%	84,3%		

N=249; SDD=with Specific Developmental Disorders (N=115); W=without Specific Developmental Disorders (N=134). B= factor perceived as a barrier; BF= factor occasionally perceived as a barrier; F= factor perceived as a facilitator. *p<0.05; **p<0.01. df=2

Table 2 - Parental Perception of Environmental Barriers to Sports Participation in Children with and without Specific Developmental Disorders

Specifically, by summing the percentages of those who perceive these factors as barriers or sometimes as barriers, it can be affirmed that overall, 77.4%, 66.8%, and

65.2% of parents of children with Specific Developmental Disorders perceive the lack of information on available activities, the lack of suitable offerings for the child, and the inefficiency of public transportation services, respectively, as possible obstacles to participation in sports activities.

It's interesting to note that all these factors, related to the ICF domain of Services, System, and Policies, are perceived as possible barriers by a considerable percentage of parents of children without a diagnosis as well—specifically, 67.2%, 47.7%, and 56.8%, respectively. For these factors, there are statistically significant differences between groups for the availability of activities suitable for the child (X^2=12.936; V=0.228), but not for information on available activities (X^2=3.208; V=0.113) and public transportation services (X^2=2.210; V=0.094). This leads us to believe that the lack of services represents a cross-cutting issue that transcends the diagnostic condition of the child. Moreover, it's interesting to note that these results align with findings from a similar study comparing children with and without disabilities (Cioni, Magnanini, 2022).

Next, the factors most perceived as possible barriers by parents of children with Specific Developmental Disorders all fall within the realm of resources available to the family to support the child's participation. Among these, particularly noteworthy are factors 14, "available time," 15, "financial resources," and 16, "availability of equipment" useful for the child's participation. These factors are perceived as barriers or possible barriers by 60%, 53.9%, and 49.9% of parents of children with Specific Developmental Disorders, and by a substantially lower percentage of parents of children without a diagnosis (41.8%, 23.8%, and 18.4%, respectively). Indeed, the differences between the groups are statistically significant in this case for available time (X^2=8.919; V=0.189), financial resources (X^2=27.460; V=0.332), and availability of equipment (X^2=30.726; V=0.268). Note that these results align with sociodemographic data, as parents of children with Specific Developmental Disorders report a significantly lower annual income than parents of children without a diagnosis (€28.122 vs €37.872; t=3.707; $p<0.01$).

Finally, other noteworthy factors include factors 5, "attitudes of other children," 8, "required cognitive abilities," and 9, "required social abilities," perceived as possible obstacles by 42.6%, 42.5%, and 35.7% of parents, respectively. In this case as well, differences with parents of children without a diagnosis are quite pronounced. In fact, the percentages of those perceiving these factors as possible obstacles in this group are 29.1%, 14.2%, and 11.2%, respectively. Statistical differences are of medium size for "required cognitive abilities" (X^2=25.197; V=0.319) and "required social abilities" (X^2=23.177; V=0.305), while they appear to be of small magnitude for attitudes (X^2=7.393; V=0.173).

Therefore, the issue requires a holistic approach based on an educational alliance among various stakeholders involved in organizing sports activities. Given this, the emerging data also lead us to hypothesize that most of the environmental factors relevant to children with Specific Developmental Disorders may also be relevant to their peers without a diagnosis, but to a significantly greater extent. Therefore, it can be concluded that, according to parental perception, children with Specific Developmental Disorders do indeed experience more environmental barriers than their peers. In particular, the environmental factors where the greatest differences between groups emerge are the difficulty of proposed activities in terms of cognitive and social skills required for participation and the lack of family resources to support the child's participation.

Conclusions

Sport is widely recognized today for its potential educational, inclusive, and health-promoting contributions, especially for children and adolescents. It is increasingly becoming a third educational agency after school and family. However, for the sports system to meet the challenge of inclusive education for all, it is essential to ensure the right of each individual to fully participate on an equal basis with others, providing an adequate response to children with Specific Developmental Disorders. In an attempt to address a gap in the scientific literature, this study aimed to assess the levels of participation in sports activities and the potential environmental barriers that may hinder participation in a group of children with Specific Developmental Disorders, comparing them with their peers. For methodological reasons, we turned to parents for data collection, as they are in a privileged position, knowing the child and the environment in which they live better than anyone else.

The data from this study confirm that children with Specific Developmental Disorders indeed engage less in sports activities. Furthermore, even when they do, they appear less involved and experience more environmental barriers than their peers. Since the potential environmental barriers to participation are multiple and diverse, the issue can only be addressed through educational synergies among various stakeholders in the sports system, primarily parents, sports educators, and policymakers.

In particular, the emerging data indicate that the most significant barriers lie in three different domains. The first is the resources available to the family to support the child's participation: parents of children with Specific Developmental Disorders

perceive having fewer resources and indeed report a lower family income than other parents. The issue of the lack of family resources is a well-known theme in the literature (Federico et al., 2009; ISTAT, 2022), and initiatives to address it have been undertaken by the Sports and Health state society for a couple of years, aiming to grant free access to sports, concretely implementing the principle of the right to sports for all by removing economic barriers.

Undoubtedly, these initiatives are commendable but do not guarantee full inclusion in sports activities. Consistent with results from similar research (Cioni, Magnanini, 2022), the data from this study indicate that sports activities proposed in the area, historically influenced by the culture of ableism, are partially inaccessible in terms of cognitive and social skills required for participation.

On a speculative level, data on attitudes can also be interpreted in this direction. The perception of motor ability is consciously or unconsciously used as a criterion for social acceptance. In other words, children with higher levels of motor skills would tend to be more accepted by their peers, while those with lower levels would tend to be more rejected (Weiss & Duncan, 1992; Weiss & Stuntz, 2004). The link between motor ability and social dynamics can provide an interpretative background for approaching the motor difficulties of students with Specific Developmental Disorders, widely recognized in the literature (Winnick & Porretta, 2016), with their lower social acceptance compared to their peers (Gatto & Elia, 2007; Kuhne & Wiener, 2000; Nepi et al., 2015).

However, it is clear that the level of ability emerges based on the type of activity they are asked to perform and that "if games [...] are structured according to the ableist paradigm that tends to highlight the lack of motor skills of students [with motor difficulties], it can become a place of social exclusion where negative attitudes are consolidated (Ferraro, Magnanini, Cioni, in press).

On the contrary, motor difficulties could be partially neutralized if sports educators were able to design sports activities by modifying the universals of games (rules, spaces, materials, roles, etc.) (Parlebas, 1997) based on authentic educational and inclusive intentions, taking into account the actual abilities of each individual.

In this regard, for sport to meet the challenge of education and inclusion for all, massive investment in the training of educators is necessary. They are the ones on the front lines working in contexts that, much like school settings, appear today to be rich in diversity and require the deployment of diverse knowledge and skills. This makes the ability to design individualized approaches in integrated contexts more necessary than ever (Cioni, 2023; Cioni, Magnanini, 2022; Magnanini, 2018).

On the technical side, models based on the transformation of the universals of games (Parlebas, 1997), useful for enriching the baggage of sports educators in an

inclusive key, are widely available today. For example, one can draw on the well-established heritage in the field of Adapted Physical Activities (Steadward et al., 2003), use specific models such as the STEP model and the TREE model (Kiuppis, 2018), or the 5-phase pedagogical model (Magnanini, 2018), or resort to already established integrated sports disciplines such as Baskin and Integrated Football.

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