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The Role of Personal Values in Sports Participation Among Young People with Disabilities: A Cluster and Profile Analysis

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Abstract: Sports participation among young people with disabilities offers significant physical, psychological, and social benefits, yet participation rates remain lower than among their non-disabled peers. This study, conducted in Hungary, explores how value orientations, health perceptions, and disability characteristics interact to shape sports engagement. Using a cluster analysis approach, we identified three distinct groups based on how young individuals with disabilities prioritize various life aspects. Data were collected through a survey of 771 participants aged 8–18, including individuals with diverse disability types. K-means clustering revealed three profiles: (1) a low sports activity group with moderate health consciousness, (2) a health-conscious group with broad life engagement but lower sports participation, and (3) a sports-oriented group that demonstrated strong interest in sports despite reporting lower self-rated health. The findings suggest that personal value orientation is a stronger predictor of sports participation than disability type or perceived health status. Furthermore, access to sports facilities alone does not guarantee participation, emphasizing the need for motivational and psychological interventions. These results highlight the importance of tailored, value-driven strategies in promoting physical activity among young people with disabilities, shifting focus from disability-specific adaptations to broader engagement-based approaches.

Keywords: sports participation; disability; cluster analysis; youth engagement; health perception; value orientation

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1. Introduction

People with disabilities have been extensively studied in the sports participation literature—see papers addressing physical disabilities [1,2], visual impairments [3,4], hearing impairments [5,6], intellectual disabilities [7,8], autism spectrum disorder [9,10], and disabilities in general [11,12]. Participation in sports offers young people with disabilities substantial physical, psychological, and social benefits. Regular physical activity is correlated with improved health outcomes, greater social integration, and higher quality

of life [13,14]. Moreover, sustained engagement in physical activity has been shown to reduce the risk of chronic illness among adults with disabilities [15], reinforcing the broader health implications of early participation. Despite these well-established advantages, youth with disabilities continue to participate at significantly lower rates than their non-disabled peers [11,16,17].

Various explanatory models have attempted to account for this disparity. The International Classification of Functioning, Disability and Health (ICF) framework posits that participation arises from complex interactions between personal and environmental factors [18]. Yet, this perspective has been criticized for its insufficient attention to subjective experience. Several studies argue that existing participation metrics often overlook how individuals perceive, value, and emotionally respond to their involvement in sports or physical activity [19]. These critiques suggest that understanding participation requires moving beyond functional or environmental analyses to include psychological and cultural dimensions—such as personal preferences, group norms, and internalized values—that shape engagement [11,17,19].

A few barriers to participation in sports have been discovered in previous research, particularly for young people with disabilities. These barriers include physical accessibility issues [20], a shortage of adapted programs, transportation barriers [21], and attitudinal barriers [22]. Yet, there has been less focus on how youth with disabilities can differ in the ways they value sports and other aspects of life, and how this can, in turn, affect participation patterns.

Several studies have shed light on the importance of personal values and preferences in sports participation. When considering participation, attitudes shaped by self-perceptions and social norms were also significant determinants to participation choices. Alternatively, Shields et al. [21] reported that youth attitudes toward physical activity were important individual-level determinants of participation choices. Similarly, Block et al. [23] found that psychological barriers often trump physical access when it comes to sports participation. Based on their findings, Iverson et al. [24] highlighted that people with disabilities rated building peer friendships, meeting new people, improving fitness, and enhancing mental health as the top four outcomes they hope to achieve through sports participation; also, the importance of the social aspects (i.e., build friendship, connect with others, social bounding) was stressed. According to some, people with disabilities often play sports to build social connections and to combat negative stereotypes about their disability [25]. Additionally, the context of sport plays a part in fostering a sense of freedom [26]. Others advocate that people with disabilities tend to participate in sports to form social ties and to oppose the negative image attributed to their disabilities [25]. Additionally, participation in sports helps develop a sense of freedom [26]. Even though young people with disabilities experience similar trends in physical activity as their peers without disabilities, understanding how they value different aspects of life, including sport or physical activity, could provide important insights into promoting activity among youth. Although there is some research examining individual barriers and facilitators for sports participation, we know little from studies of groups or patterns in how young people with disabilities value different domains of life.

While many studies approach disability participation through functional limitations or environmental barriers, the social model of disability shifts the focus toward systemic exclusion, social expectations, and psychological experiences that shape participation [27,28]. This model emphasizes that individuals are not disabled by their impairments alone, but by structural and attitudinal obstacles that restrict their agency. In the context of sports, this means participation is less about individual capacity and more about whether inclusive opportunities resonate with personal aspirations and social recognition [17]. To more fully capture these subjective priorities, we must distinguish between values and motives as

distinct but related psychological constructs. Values represent stable, trans-situational goals that serve as guiding principles in life, while motives are more immediate psychological needs or desires that energize and direct specific behaviors in particular contexts [29,30]. As Hitlin and Piliavin [31] note, unlike situation-specific motives that may fluctuate based on circumstances, values remain relatively consistent across different domains and timeframes, serving as foundational standards against which individuals judge activities as worthy of sustained engagement. Schwartz's theory of basic human values offers a particularly useful framework, identifying universal value dimensions—such as hedonism, achievement, conformity, and benevolence—that shape how individuals evaluate behaviors and goals [32]. These value types are not simply preferences or temporary motives, but enduring motivational constructs that guide decision-making and life organization across various situations [33]. In youth with disabilities, value-based decision-making may explain why some consistently prioritize autonomy, creativity, or social affiliation over physical fitness or competition, even when immediate motives might suggest other choices [34,35]. By integrating the social model of disability with psychosocial theories of value, researchers can more effectively explain sport engagement patterns as the outcome of social context *and* deeply held personal priorities, rather than merely physical capability, access, or fluctuating motivational states [36,37]. This approach allows us to investigate not just what activities young people with disabilities choose at any given moment, but the underlying value orientations that guide their sustained engagement over time.

At present, many of the efforts to increase sports participation among youth with disabilities center on the issues of physical access and the provision of adapted equipment [38,39]. And this may be an oversimplified way to look at the various ways people value sports among the other aspects of life. Accordingly, Wilson and Clayton [40] argued that insights into personal values and preferences may be key to better interventions.

The relationship between disability type, health status, and sports participation is complex, and research here is limited too. Al-Harahsheh et al. [41] pointed out that the type and severity of disability is an influencing factor in the choice of sports for individuals with mobility impairments and also reported that the participation level of individuals with learning difficulties and multiple disabilities is the lowest in sports. For example, Vanderstraeten and Oomen [42] propose that it is not so much the type of disability that dictates the choice of sport, but rather whether one faces (1) intrapersonal (internal) barriers (e.g., current condition, personality, attitudes, mood, and stress); (2) interpersonal barriers created by socialization; or (3) structural barriers (e.g., lack of opportunities and accessibility, or costs of activities). Traditionally, the assumption is that better health status is directly related to a higher level of sports, which is not currently well presented by people with disabilities. Increasing rates of physical activity has a clear positive effect on the health and quality of life of the disabled population, with beneficial effects scaling with weekly or daily physical activity [43]. Ginis et al. [44], in a study on how common and beneficial physical activity is for individuals with disabilities, also showed that physical activity was beneficial for cardiovascular fitness, musculoskeletal fitness, cardiometabolic risk factors, brain health, and mental health. And all these benefits can stem from just 150 min a week of physical activity. Additionally, the influence of multiple disabilities—a well-established and recognized construct—on cross-disability sport participation patterns has been largely unexplored. However, Kim et al. [43] found that the degree of quality-of-life changes attributed to exercise was more pronounced in those with a less severe degree of disability.

Much research has focused on individual components of sports participation for youth with disabilities, yet few if any studies have explored how varying personal values, health perceptions, and disability characteristics interact with one another to influence

participation in sport. These are points to consider in how to develop better initiatives and programs to increase participation in sports.

The present study has two interconnected aims. First, we seek to identify clusters of young people with disabilities based on their value orientations and other characteristics. Second, and more fundamentally, we aim to determine whether personal values—as stable, subjective priorities—play a central role in shaping sports participation patterns in this population.

While both aims are important, our primary focus is on the latter: understanding how personal values influence sports engagement, with cluster analysis serving as the methodological approach to reveal these patterns. Rather than treating values as merely one variable among many, we position them as potentially decisive factors that may supersede disability type or environmental barriers in explaining participation. Specifically, our goals are as follows:

- Identify meaningful clusters of young people based on their value orientations across life domains;
- Assess how health perceptions and sports participation behaviors differ across these value-based clusters;
- Examine how disability types and impacts distribute within these clusters;
- Derive implications for value-informed approaches to promoting sports participation among youth with disabilities.

This study contributes to current knowledge by examining the relationship between the pattern of life-value orientations and sports participation among young people with disabilities, which could help develop more targeted and effective strategies for promoting physical activity. By clarifying whether values primarily drive participation or merely correlate with it, we can better inform interventions that align with young people's deeper priorities rather than focusing exclusively on accessibility or disability-specific adaptations.

2. Materials and Methods

Our research employed a cluster analysis to examine patterns in how young people with disabilities value different life aspects and engage in sports. The data were collected through a comprehensive survey conducted between 12 December 2024 and 10 January 2025.

2.1. Sample and Recruitment

The study sample included students enrolled in both segregated special education institutions and mainstream schools offering inclusive education. During the research, particular attention was paid to ensuring that the sample represented students with disabilities across diverse educational environments. The data collection process was significantly supported by the National Federation of Disabled Students' Sports, Competitive Sports, and Leisure Sports (FODISZ), which assisted in reaching students with disabilities and in coordinating the completion of the questionnaires. The involvement of the FODISZ contributed to ensuring that the research offers an accurate representation of the target group's sporting habits, needs, and opportunities. The survey targeted students participating in special education and/or inclusive education programs. The respondents were students enrolled in primary and secondary educational institutions. Both paper-based and online questionnaires were used for the survey. The initial data collection yielded 1298 responses. After removing cases with missing values in the importance rating variables (necessary for cluster analysis), the final analytical sample consisted of 771 participants. This substantial reduction in sample size was primarily due to the complete case requirement for k-means clustering, as the analysis required valid responses across all 14 life aspect ratings. This

study included participants with disabilities aged 8–18 years (M = 14.0, SD = 2.1). Of these, 40.2% identified as having physical disabilities, followed by visual impairments (13.6%), multiple disabilities (15.8%), intellectual disabilities (8.7%), autism (4.2%), speech disabilities (3.5%), and learning disabilities (2.1%). Participants were recruited through a multi-stage sampling process involving special education institutions and disability support organizations across the country. Initial contact was made with institutional leaders who then facilitated communication with potential participants and their families.

To ensure broad representation, recruitment occurred across multiple settings: special education schools (45%), integrated education programs (30%), and community-based disability organizations (25%). Inclusion criteria required participants to be between 8 and 18 years old, have at least one diagnosed disability, and be able to provide assent with parental consent for minors. Ethics approval was obtained from University of Debrecen Ethics Committee (ID: GTK-KB 008/2024).

2.2. Questionnaire Development and Structure

Part of the questionnaire was adapted from the work of Sáringerné [45] and Spring [46], with further modifications informed by a structured, three-phase development process. In Phase 1, fourteen life domains were identified through a literature review drawing on these sources, as well as the broader value theory literature—particularly Schwartz's model of basic human values [32]. The resulting domains reflected both areas commonly prioritized by young people (e.g., family, learning, socializing) and aspects potentially relevant to sports engagement (e.g., fitness, health, excellence, fun, identity). In Phase 2, three semi-structured focus groups were conducted with special education teachers and disability support professionals (n = 12). These discussions explored the relevance and clarity of the proposed domains, accessibility of terminology, and appropriate formatting for children and youth with diverse disabilities. Based on participant feedback, several domain labels were simplified (e.g., "striving for excellence" shortened to "excellence"), and the original Likert-style format was modified into a three-point importance scale ("not important", "neutral", "important") to enhance cognitive accessibility. The decision was also made to include visual supports during pilot testing for students with intellectual disabilities or complex communication needs. Phase 3 involved pilot testing with a sample of young people with disabilities (n = 25), enabling the further refinement of item wording, visual layout, and response structure. The final list of domains included health preservation, family time, hobbies, skill acquisition, physical fitness, sports activity, trying new things, meeting new people, learning, excellence, solo time, school, shopping/fashion, and standing out (see Supplementary Materials). These were based on domains commonly discussed in the work of Sáringerné [45] and Spring [46] and cross-referenced with value orientations from Schwartz's theory (e.g., achievement, stimulation, conformity, benevolence) to ensure alignment with established value constructs in youth development and sport psychology.

The final instrument contained four main sections (see Supplementary Materials):

- The first section assessed importance ratings for 14 life aspects: health maintenance, family time, hobbies, skill acquisition, fitness, sports activity, trying new things, meeting new people, learning, excellence, solo time, school, shopping/fashion, and standing out. These were rated on a three-point scale (1 = Not Important, 2 = Neutral, 3 = Important) to maintain simplicity and clarity for younger participants.
- The second section collected information about disability type and impact. Participants could indicate multiple disabilities if applicable. Disability impact was assessed through questions about daily activities, social participation, and educational engagement.
- The third section focused on health status and sports participation. Self-rated health was measured on a five-point scale (1 = Poor to 5 = Excellent). Sports participation vari-

ables included current participation (yes/no), desire to participate (yes/no), perceived ability (yes/no), and access to facilities (yes/no).

- The final section gathered demographic information including age, gender, educational setting, and living situation.

2.3. Data Collection Procedures

Data collection occurred over a two-week period. Questionnaires were administered in two formats: paper-based (65%) and digital (35%), allowing participants to choose their preferred method. For paper-based administration, trained research assistants were present to provide support if needed. Digital versions were created using accessible design principles and were compatible with screen readers.

The questionnaire designed for children began with a brief explanation, clearly stating that the data collected would contribute to the completion of our research. The questionnaire was completed during homeroom sessions, with students filling it out under the guidance and assistance of survey administrators, including teachers, special education teachers, and physical education teachers. To support this process, a detailed teacher's guide was provided alongside the questionnaire, containing instructions for data collection and the timeline for completion. Additionally, parental consent forms were requested, in which parents agreed to allow their children to participate in the survey. Naturally, the questionnaires were completed anonymously, and participation in the data collection was entirely voluntary.

For participants in educational settings, questionnaires were completed during scheduled school hours in small groups (4–6 students) with support staff present. Community-based participants completed questionnaires at local disability organization facilities. The average completion time was 25 min (range: 15–40 min).

To ensure data quality, all responses were reviewed for completeness. Participants were allowed to take breaks if needed, and support was available for those requiring assistance with reading or marking responses. For participants with intellectual disabilities or complex communication needs, pictorial support was provided to aid in the understanding of response options.

2.4. Data Analysis

The analysis followed a multi-phase approach:

2.4.1. Preliminary Analysis

Initial data screening included checking for missing values, outliers, and response patterns. Missing data analysis revealed less than 5% missing values across variables, which were determined to be missing at random. Cases with more than 20% missing data were excluded from analysis ($n = 27$).

2.4.2. Cluster Analysis

The clustering process began with variable preparation. The 14 important ratings were standardized to z-scores to ensure equal weighting in the analysis. The eight disability categories were dummy coded to create binary variables suitable for clustering.

K-means clustering was selected based on its robustness with larger samples and mixed variable types. The optimal number of clusters was determined through multiple methods: the elbow method, silhouette analysis, and gap statistics. All methods suggested a three-cluster solution as optimal.

Cluster stability was assessed through bootstrap validation (100 iterations), yielding mean Jaccard coefficients of 0.79, 0.73, and 0.82 for the three clusters, respectively, indicating good stability (coefficients > 0.70 considered stable).

2.4.3. Cluster Profiling and Validation

Clusters were profiled using multiple statistical approaches. An Analysis of Variance (ANOVA) was used for continuous variables (age, health ratings), with effect sizes calculated using the partial eta-squared measure. Post hoc comparisons used Tukey's HSD test with Bonferroni correction for multiple comparisons.

Categorical variables (disability types, sports participation) were analyzed using chi-square tests with Cramer's V for effect size estimation. When cell frequencies were less than 5, Fisher's exact test was used.

2.4.4. Discriminant Analysis

A linear discriminant analysis (LDA) was conducted to validate the cluster solution and identify key discriminating variables. The analysis included all standardized importance ratings, health variables, and sports participation measures. Two discriminant functions were extracted and assessed for their ability to separate clusters. Structure coefficients were examined to identify the relative contribution of each variable to cluster discrimination. Classification accuracy was evaluated through the confusion matrix, and the stability of the solution was assessed using 10-fold cross-validation. Variables with structure coefficients above $|0.30|$ were considered meaningful discriminators, following standard practice.

2.4.5. Regression Analyses

To validate the practical significance of cluster membership, we conducted a series of predictive analyses. Logistic regression models were used to examine how cluster membership predicted binary outcomes (sports participation, desire to participate, perceived ability), with Cluster 1 as the reference category. Multiple regression analyses assessed cluster differences in continuous variables (self-rated health, sports frequency, disability impact), with effect sizes calculated using the eta-squared measure (η^2). For facility access, which had three levels, multinomial logistic regression was employed. All models were checked for assumptions including linearity, normality of residuals (for continuous outcomes), and absence of multicollinearity.

2.4.6. Chi-Square Post Hoc Tests

To further explore the categorical relationships identified through initial chi-square analyses, we conducted post hoc pairwise comparisons to determine specific group differences across clusters. These comparisons focused on key variables, including sports participation, disability type, and access to facilities. Adjusted residuals were calculated to identify significant deviations from expected frequencies, and Bonferroni corrections were applied to control for Type I errors due to multiple comparisons. Post hoc analyses were conducted using the pairwise Nominal Independence function in the R 4.4.3 package, R Companion. Cramér's V was used as an effect size metric to interpret the strength of associations.

2.4.7. Latent Profile Analysis (LPA)

A Latent Profile Analysis (LPA) was conducted to validate the k-means clustering solution and identify alternative groupings based on patterns in the importance ratings of life aspects. Unlike k-means clustering, which partitions data into predefined groups, LPA uses a probabilistic approach to model latent classes, considering individual probabilities of class membership. Variables used in the LPA included the 14 standardized importance ratings for life aspects. Models ranging from two to five profiles were tested, and the model fit was assessed using Akaike Information Criterion (AIC), Bayesian Information Criterion

(BIC), and entropy values. The optimal number of profiles was determined by minimizing AIC and BIC while maximizing entropy. Analyses were conducted using the tidyLPA package in R. Final profile assignments were compared with the k-means solution to assess consistency and identify unique insights from the LPA approach.

3. Results

This study sought to identify meaningful subgroups among young people with disabilities based on their valuation of life aspects and to examine how these groups differ in sports participation and health perceptions. Through clustering analyses, three distinct profiles emerged, each reflecting unique patterns of personal values and engagement with sports. Subsequent statistical validation and predictive analyses confirmed the robustness of this classification, highlighting the importance of personal preferences over disability characteristics in shaping activity choices. The following sections detail the cluster structure, demographic, and health differences, and the role of individual values in sports engagement.

3.1. Cluster Identification and Validation

The k-means clustering analysis identified three distinct clusters (Table 1). The clusters were named based on their main characteristics. The first cluster was labeled as the "Low Sports Activity, Moderately Health-Conscious Cluster", the second cluster as the "Health-Conscious Cluster", and the third as the "Sport-Oriented Cluster with Low Health Evaluation". The summary characteristics of the clusters are illustrated in Table 1.

Table 1. Summary of cluster names and key characteristics.

Cluster Name	Description	Key Characteristics
Cluster 1. Low Sports Activity, Moderately Health-Conscious	This is the second largest group, characterized by relatively low willingness to engage in sports and moderate health perception. Their interest in sports and physical activities is limited, and their lifestyle likely does not encourage greater physical activity.	Due to moderate health status and low willingness to participate in sports, this group is the least active. Their low interest in sports suggests that motivational factors (e.g., social support, personal interest) may influence their behavior more than physical health. Active encouragement and a supportive environment play a crucial role for such groups.
Cluster 2. Health-Conscious	This cluster showed the highest self-assessed health scores and the greatest commitment to sports. Members of this group highly value sports, representing individuals actively supporting their well-being.	This cluster aligns well with traditional values, where health and well-being are central. Alongside high health self-assessment, their health consciousness and focus on a healthy lifestyle are defining features. This group reflects a positive attitude towards the rest of society and sees sports as a key health-promoting factor.
Cluster 3. Sport-Oriented with Low Health Evaluation	Although this is the smallest group, their interest in sports is remarkable, even if their perception of their health is low. Their enthusiasm and motivation for sports go beyond their physical condition and are likely linked to their adaptation to disabilities.	This cluster demonstrates an intriguing phenomenon: members show exceptional interest in sports despite low self-assessed health. This suggests their commitment to sports is not solely tied to their physical health but also to the experience of sports, entertainment, or other psychosocial factors. Their motivation may be maintained through accommodations for their disabilities or specialized program adaptations.

The cluster stability analysis through bootstrap validation showed good reproducibility with Jaccard coefficients ranging from 0.73 to 0.82, exceeding the 0.70 threshold for cluster stability. The three clusters differed significantly in size: Cluster 1 (n = 310, 40.2%), Cluster 2 (n = 361, 46.8%), and Cluster 3 (n = 100, 13.0%).

Figure 1 illustrates the standardized means for each variable across clusters. Cluster 2 demonstrated consistently higher scores across most importance variables (standardized means ranging from 0.29 to 0.74), particularly in health preservation (z = 0.74), learning (z = 0.74), and school-related activities (z = 0.73). Cluster 1 showed consistently lower scores (standardized means ranging from −1.19 to −0.51), while Cluster 3 exhibited moderate but variable scores (standardized means ranging from −0.61 to 0.25).

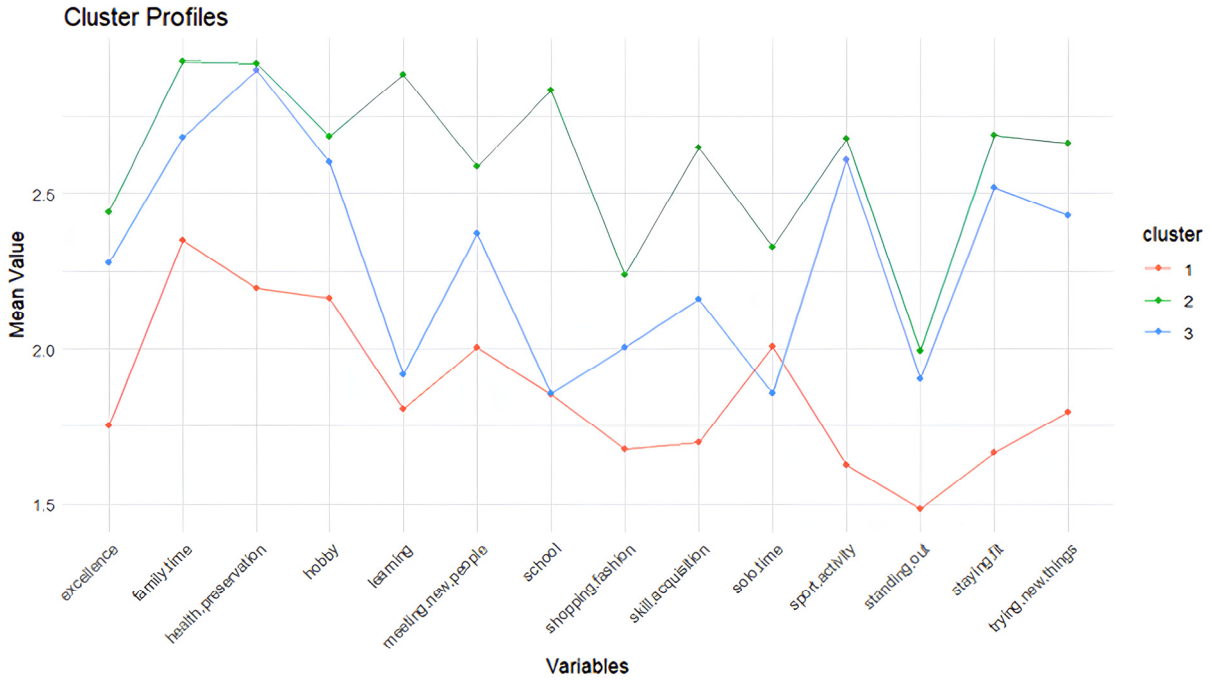

Figure 1. Standardized cluster profiles.

The discriminant analysis provided additional validation of our three-cluster solution, revealing that personal value variables (especially shopping/fashion, trying new things, and school-related activities) were more crucial in defining cluster membership than health status or facility access. This suggests that our clusters represent fundamentally different value orientations rather than being primarily determined by health or environmental constraints. Particularly noteworthy was the strong negative loading of health preservation (−0.65) on the second discriminant function, which helps explain the paradoxical nature of Cluster 3, where high sports interest coexists with lower health ratings. The high classification accuracy (94.4%) provides strong support for the stability and distinctiveness of these clusters.

To further validate and compare the cluster solution derived from k-means clustering, a Latent Profile Analysis (LPA) was conducted. The LPA identified two profiles based on the same 14 variables used in k-means clustering. A cross-tabulation of k-means clusters and LPA profiles revealed poor alignment between the two methods. For instance, 547 participants from Cluster 1 (k-means) aligned exclusively with Profile 2 (LPA), while Cluster 3 from k-means aligned almost entirely with Profile 1 (LPA). Cluster 2 from k-means was more evenly distributed across both profiles.

Cohen's kappa was calculated to assess the agreement between the two solutions. The unweighted kappa was 0.00, indicating no agreement, and the weighted kappa estimate was negative (−0.52), suggesting the observed alignment was worse than chance. The wide confidence intervals for the kappa values further indicated instability and inconsistency between the two clustering methods. These results suggest that k-means and LPA capture fundamentally different patterns in the data, with k-means likely emphasizing

distance-based groupings and LPA modeling probabilistic group memberships based on variable distributions.

3.2. Demographic and Health Characteristics

Table 2 presents the demographic and health characteristics of each cluster. Age differences between clusters were marginally significant ($F(2,768) = 2.79$, $p = 0.062$, $\eta^2 = 0.007$), with Cluster 2 participants being slightly older than those in Cluster 3 (mean difference = 0.71 years, $p = 0.074$). Self-rated health showed highly significant differences between clusters ($F(2,768) = 21.32$, $p < 0.001$, $\eta^2 = 0.053$), with Cluster 2 reporting significantly higher health ratings than both Cluster 1 (mean difference = 0.39, $p < 0.001$) and Cluster 3 (mean difference = 0.64, $p < 0.001$). Notably, disability impact remained consistent across clusters ($p = 0.903$).

Table 2. Cluster demographics and health characteristics.

Characteristic	Cluster 1	Cluster 2	Cluster 3	F/χ^2
Sample size (*n*)	310.00	361.00	100.00	-
Age (mean)	13.99	14.36	13.65	2.79
Self-rated health (mean) **	3.69	4.08	3.44	21.32
Disability impact (mean)	2.73	2.71	2.78	0.10

Note: ** $p < 0.001$.

Self-rated health (Figure 2) showed highly significant differences between clusters ($F(2,768) = 21.32$, $p < 0.001$, $\eta^2 = 0.053$). Post hoc analyses revealed that Cluster 2 reported significantly higher health ratings than both Cluster 1 (mean difference = 0.39, $p < 0.001$) and Cluster 3 (mean difference = 0.64, $p < 0.001$). The difference between Clusters 1 and 3 was marginally significant (mean difference = 0.25, $p = 0.077$).

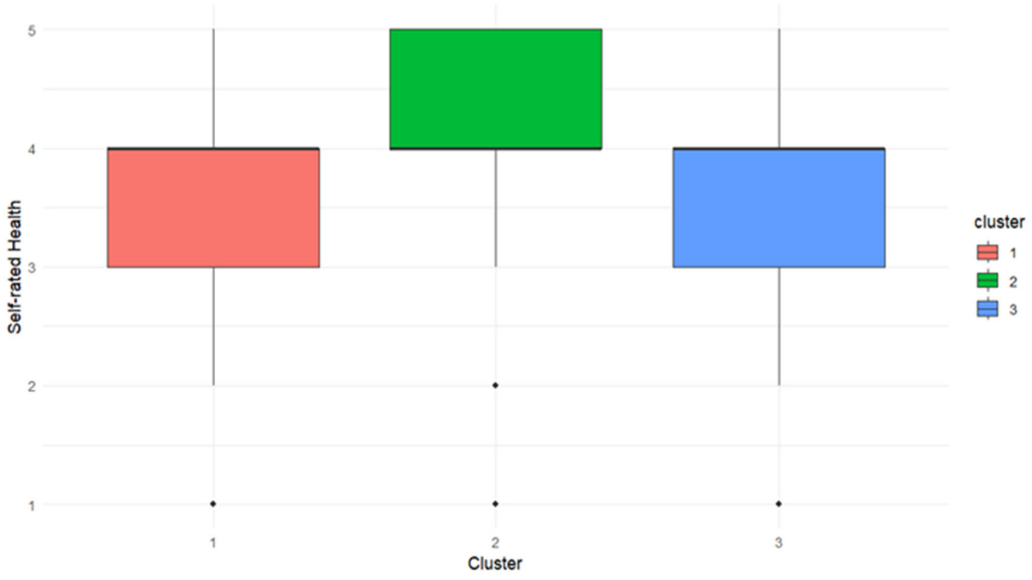

Figure 2. Self-rated health boxplot.

3.3. Sports Participation Patterns

Sports participation exhibited significant variations across clusters (Figure 3). Cluster 3, despite being the smallest group, showed markedly higher rates of both current participation (18.0%) and desire to participate (20.0%) compared to Clusters 1 and 2 ($\chi^2 = 15.43$, $p < 0.001$, Cramer's V = 0.142). This pattern persisted even when controlling for age and disability type.

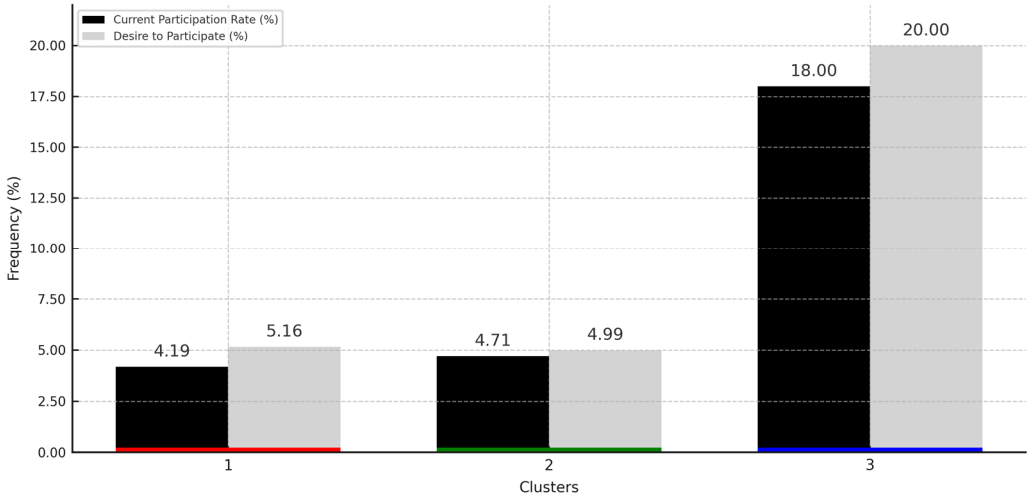

Figure 3. Current and desired sports participation rates by cluster.

Table 3 presents a detailed breakdown of sports participation characteristics across clusters. Cluster 3 showed significantly higher rates of both current participation (32.46% vs. 22.45% and 19.73%) and desire to participate (31.82% vs. 23.16% and 19.94%) compared to Clusters 1 and 2, respectively ($p < 0.001$ for both).

Table 3. Sports participation patterns by cluster.

Characteristic	Cluster 1	Cluster 2	Cluster 3	χ^2
Current participation (%) **	22.45	19.73	32.46	15.43
Desire to participate (%) **	23.16	19.94	31.82	18.76
Perceived ability (%) *	12.84	10.37	15.16	8.92
Access to facilities (%) *	71.35	68.42	77.84	8.92
Regular facility use (%) *	15.48	14.69	19.12	7.14
Sport frequency (mean) *	2.6	2.81	2.38	3.45

Note: * $p < 0.05$, ** $p < 0.001$.

Chi-square analyses revealed significant differences in perceived ability ($\chi^2 = 8.92$, $p = 0.012$), with Cluster 3 showing the highest perceived ability (15.16%) compared to Clusters 1 (12.84%) and 2 (10.37%). Access to facilities demonstrated a similar pattern ($\chi^2 = 8.92$, $p = 0.012$), with Cluster 3 having the highest access (77.84%), followed by Cluster 1 (71.35%) and Cluster 2 (68.42%). Regular facility use was lower across all clusters ($\chi^2 = 7.14$, $p = 0.028$), with rates of 19.12% for Cluster 3, 15.48% for Cluster 1, and 14.69% for Cluster 2. Sport frequency showed a different pattern, with Cluster 2 demonstrating the highest mean frequency (2.81), followed by Cluster 1 (2.60) and Cluster 3 (2.38) ($F(2,768) = 3.45$, $p = 0.032$, $\eta^2 = 0.009$).

The relationship between disability type and sports participation was examined using Pearson's chi-square test. Initially, the chi-square test revealed no statistically significant association between disability types and sports participation ($\chi^2 = 11.339$, $p = 0.1223$) when employing Monte Carlo simulations to account for low expected frequencies in several cells. After recoding categories with fewer responses into a single 'Other' group to improve test reliability, the chi-square test still showed no significant association ($\chi^2 = 6.68$, $p = 0.2456$). Post hoc pairwise comparisons using Bonferroni correction confirmed the absence of significant differences between specific disability types in their sports participation patterns (all adjusted p-values > 0.86).

The consistent absence of statistical significance across these analyses suggests that the relationship between disability type and sports preference does not follow a clear or simple

pattern within the sample. This finding highlights the need for further investigation into potential underlying factors that may mediate or explain the observed lack of association.

3.4. Disability Distribution and Impact

The distribution of disability types showed distinct patterns across clusters ($\chi^2 = 27.86$, $p = 0.015$, Cramer's V = 0.134, see: Figure 4 and Table 4). Physical disabilities were most prevalent in Clusters 1 and 3 (56.8% and 57.9%, respectively), while Cluster 2 showed a more diverse distribution with a notably higher proportion of multiple disabilities (18.5%).

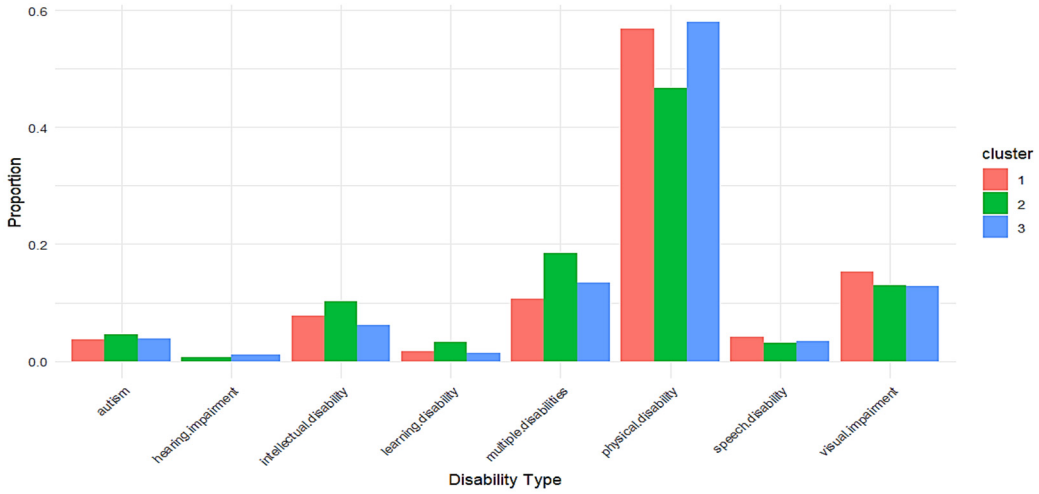

Figure 4. Disability distribution across clusters.

Table 4. Disability distribution by cluster (%).

Disability Type	Cluster 1	Cluster 2	Cluster 3
Physical Disability	56.8	46.7	57.9
Visual Impairment	15.2	12.9	12.9
Hearing Impairment	0.0	0.7	1.1
Speech Disability	4.1	3.1	3.4
Learning Disability	1.6	3.3	1.4
Intellectual Disability	7.8	10.3	6.1
Multiple Disabilities	10.7	18.5	13.3
Autism	3.7	4.6	3.8

Notably, disability impact on daily activities showed no significant differences between clusters ($F(2,768) = 0.102$, $p = 0.903$, $\eta^2 = 0.0003$), suggesting that perceived disability impact was not a determining factor in cluster membership.

3.5. Discriminant Analysis Results

A linear discriminant analysis was performed to validate the cluster solution and identify the most discriminating variables. The analysis yielded an excellent classification accuracy of 94.4%, confirming the robustness of the three-cluster solution.

The confusion matrix revealed high classification accuracy for all clusters, with Cluster 2 showing the best classification rate (97.8%, 353/361), followed by Cluster 1 (95.2%, 295/310) and Cluster 3 (80%, 80/100). The relatively lower accuracy for Cluster 3 might be attributed to its smaller size. Misclassifications were most common between Clusters 1 and 3 (19 cases), suggesting some overlap in their characteristics.

Structure coefficients revealed the relative importance of variables in discriminating between clusters. The first discriminant function (LD1) was most strongly influenced by

shopping/fashion (0.47), which had the highest discriminating power, trying new things (0.35) and school (0.35) were strong secondary discriminators, and solo time (0.32) and meeting new people (0.30) had moderate discrimination power.

The second discriminant function (LD2) showed distinct patterns: health preservation (−0.65) was the strongest negative coefficient, indicating its importance in distinguishing cluster characteristics, standing out (0.42) and shopping/fashion (0.39) were strong positive discriminators, and staying fit (−0.38) and sport activity (−0.37) were moderate negative coefficients.

These patterns align with our earlier cluster descriptions, where Cluster 2 showed higher values across most variables. The strong negative loading of health preservation on LD2 particularly helps to explain the separation of Cluster 3, which showed high sports interest despite lower health ratings.

Notably, health-related variables (self-rated health: 0.09, disability impact: −0.03) and facility access (0.03) showed relatively small structure coefficients, suggesting they played a minor role in cluster discrimination. This finding substantiates our earlier observation that disability impact and access to facilities were not primary determinants of cluster membership, reinforcing the importance of personal values and preferences over physical or environmental factors.

The discriminant analysis also revealed interesting patterns in social orientation variables. Meeting new people, solo time, and standing out showed moderate to strong coefficients across both discriminant functions, suggesting that social preferences play a complex role in distinguishing between clusters. This adds depth to our understanding of how social factors interact with other variables in determining cluster membership.

3.6. Predictive Value of Cluster Membership

Cluster membership demonstrated significant predictive value across multiple outcomes. For sports participation variables, logistic regression revealed that Cluster 3 differed significantly from Cluster 1 in all three domains: likelihood of sports participation ($\beta = -1.61$, SE = 0.38, $p < 0.001$), desire to participate ($\beta = -1.52$, SE = 0.36, $p < 0.001$), and perceived ability ($\beta = -0.99$, SE = 0.47, $p < 0.05$). The odds ratios (OR = 0.20, 0.22, and 0.37, respectively) indicate substantially lower probabilities of positive responses in Cluster 3.

Self-rated health was significantly predicted by cluster membership ($F(2,768) = 21.32$, $p < 0.001$, $\eta^2 = 0.05$, 95% CI [0.03, 1.00]). Post hoc comparisons revealed that compared to Cluster 1 (M = 3.69, SD = 1.02), Cluster 2 reported significantly higher health ratings (M = 4.08, $\beta = 0.39$, $p < 0.001$), while Cluster 3 reported lower ratings (M = 3.44, $\beta = -0.25$, $p < 0.05$). The effect size suggests that cluster membership explains 5% of the variance in self-rated health.

Frequency of sports participation showed similar patterns ($F(2,768) = 14.35$, $p < 0.001$, $\eta^2 = 0.04$, 95% CI [0.02, 1.00]). Cluster 2 demonstrated higher frequency than Cluster 1 ($\beta = 0.21$, SE = 0.06, $p < 0.001$), while Cluster 3 showed significantly lower frequency ($\beta = -0.22$, SE = 0.09, $p < 0.05$). These differences remained significant after controlling for age and disability type.

Notably, disability impact showed no significant relationship with cluster membership ($F(2,768) = 0.10$, $p = 0.90$, $\eta^2 < 0.01$), with nearly identical means across clusters (Cluster 1: M = 2.73, Cluster 2: M = 2.71, Cluster 3: M = 2.78). This finding provides strong statistical support for our earlier observation that disability impact does not drive cluster differences. The multinomial regression for facility access revealed complex patterns. Compared to Cluster 1, Cluster 2 showed an increased likelihood of both intermediate ($\beta = 0.21$, SE = 0.20) and high access levels ($\beta = 0.33$, SE = 0.24), while Cluster 3 showed decreased likelihood

($\beta = -0.61$, SE = 0.35 and $\beta = -0.48$, SE = 0.41, respectively). These findings suggest that access to facilities, while important, does not follow a simple linear pattern across clusters.

These analyses substantially strengthen our cluster solution by demonstrating its predictive validity across multiple domains while quantifying the magnitude of between-cluster differences. The consistent pattern of significant results, coupled with meaningful effect sizes, supports the practical utility of this three-cluster solution for understanding patterns of sports participation among young people with disabilities.

4. Discussion

This section discusses our cluster-based findings in light of the existing literature, with particular attention to how personal value orientations, health perceptions, disability types, and environmental factors interact to shape sports participation among young people with disabilities. We also integrate the ideas raised in our additional reflections—both those previously noted in our commentaries and those highlighted in the user's Hungarian-language observations—and expand on possible practical implications.

4.1. Value Orientation and Health

A major finding from our study is that personal values appear to play a more decisive role in clustering than disability type or self-rated health. In particular, Cluster 2 (the "Health-Conscious Cluster") reported higher scores across multiple importance ratings and showed the most favorable self-rated health. This is consistent with the conclusions of Ginis et al. [44], who linked diverse values to positive health outcomes in young people with disabilities. Their work supports the idea that individuals who value a broader spectrum of life domains—such as family, learning, or trying new things—may also engage in behaviors that foster better overall well-being.

By contrast, Cluster 1 (the "Low Sports Activity, Moderately Health-Conscious Cluster") exhibited relatively low scores on the importance ratings yet reported moderate health perceptions. The gap between their moderate health and lower emphasis on health-related or social values might reflect what Shields and Synnot [11] have termed the "complex interplay" between personal attitudes, social contexts, and health behaviors among youth with disabilities. Although members of Cluster 1 do not strongly prioritize sports, they still perceive themselves as moderately healthy, which underscores the nuanced relationship between perceiving good health and actually participating in organized sports or physical activity.

A particularly intriguing outcome pertains to Cluster 3 (the "Sport-Oriented Cluster with Low Health Evaluation"). This group reports lower self-rated health yet shows the highest interest in sports participation, challenging the assumption that health status straightforwardly predicts activity preferences. As also noted in our additional reflections, these findings echo the tension in existing research: some individuals may choose to engage in sports precisely to overcome perceived health barriers or to reap psychosocial benefits—such as fun, social connection, or self-empowerment—even if they do not rate their health highly. The discriminant analysis corroborates this, indicating that health preservation loaded negatively on one of the discriminant functions, suggesting that sports orientation for Cluster 3 members is only marginally (if at all) driven by "feeling healthy". Rather, it may be driven by a desire for social bonding, personal growth, or identity formation cf. [25,26].

These patterns reinforce the perspective that value orientation surpasses mere health assessments in explaining young people's sports engagement. From a broader standpoint, this result dovetails with the social model of disability, emphasizing that preferences and

motivational orientations can be more influential than functional limitations in determining participation [16,43].

4.2. Interpreting Findings Through Psychosocial and Social Disability Models

Our findings offer empirical support for the social model of disability [47] by demonstrating that sports participation among young people with disabilities is not primarily determined by health status or functional impairment. Instead, value orientations—internal, subjective priorities—emerge as key differentiators. This reinforces the argument that social and psychological dimensions of inclusion matter more than traditional medicalized indicators [48]. Moreover, the presence of a highly sport-interested cluster with low self-rated health further disrupts linear assumptions about impairment and inactivity, aligning with critiques of deficit-based approaches to disability sport [49]. When interpreted through Schwartz's theory of values, it becomes plausible that youth in this cluster prioritize stimulation, self-direction, or social affiliation—values that are fulfilled through sports despite physical limitations. Conversely, those in the low-sport cluster may emphasize tradition, conformity, or security, leading them to prioritize predictable, less physically demanding pursuits. This interpretation offers a richer understanding of why personal values—not just environmental or physiological conditions—should be considered in disability sport research and intervention design. Importantly, it aligns with the user-centered ethos of the social model: participation is a matter of relevance, resonance, and recognition—not simply function [50].

4.3. Access to and Participation in Sports

Here, we show that there are significant variations between clusters in sports participation, beyond what can be accounted for by which sports facilities are available. Despite Cluster 3 showing the greatest willingness to engage in sports (18% packaged physical activity self-reported)—which is more than four times the participation seen in Clusters 1 and 2—it is clear that levels of access to inclusive facilities are relatively similar across clusters (from 65 to 81% access). This apparent discrepancy strongly indicates that access alone is not enough to foster higher participation (see also Block et al. [23] and Iverson et al. [24]). Instead, motivation, social support, and personal values seem to be the biggest factors.

It is as remarkable that although Cluster 2 reports better self-rated health and high participation in other life spheres, it displays lower sports participation than Cluster 3. Such a paradox is very much in line with Jaarsma and Smith [51], as clinical populations with disabilities often must contend with competing time and energy demands of many other valued activities. Consequently, a high state of health awareness does not mean one will engage in systematic or regular sports.

Together, these findings highlight that although physical infrastructure improvements such as ramps, modified equipment, and accessible buildings are essential psychological and social facilitators, ensuring that individuals feel they are able, encouraging positive peer dynamics, or adjusting sports programs to fit personal interests are often the strongest levers for increasing participation. Certainly, the user's observations in the Hungarian context are also highlighted, and they underscore the idea that psychological and social factors need to be prioritized in any thorough-going intervention, as several researchers also argue [23,40].

4.4. Type of Disability and Preferred Sport

A particularly interesting null finding is the lack of statistically significant association between specific types of disability and any preference for participation in sport, even when less well-represented categories are collapsed. It was perhaps in part because conventional expectations fail: those with certain disabilities (e.g., life-threatening physical impairments)

might expect lower activity interest, but no neat pattern like this was observed. This implies that cross-cutting experiences—needing to adapt to general environmental barriers, facing social stigmas, or requiring flexible program accommodations—may be more relevant than the precise diagnostic category.

These findings are consistent with recommendations made by researchers who have argued in favor of moving away from disability-specific interventions and toward common-barrier interventions [19,40,52]. Essentially, it may be more effective to encourage participation in sport by addressing common physical, social, and attitudinal barriers to participation rather than developing programs around diagnostic labels.

4.5. Disability Impact

Our study shows that the impact of disability—in terms of limitations in daily life—does not emerge as a strong predictor of sports preferences, sports participation, or cluster membership. The minimal effect size ($\eta^2 < 0.01$) of disability impact by clusters aligns with the social model of disability, in which systemic or environmental barriers, rather than impairment itself, determine participation [11,42].

Furthermore, the lack of variation in the degree of disability experienced by individuals across clusters (range: 2.71–2.78) suggests that the extent to which participants perceive that their disabilities affect their day-to-day functioning does not necessarily determine if they engage in sports. Instead, the divergence is explained by a medley of values, social contexts, and motivational orientations. This again highlights the point made by Kim et al. [43] and Al-Harahsheh et al. [41] that sports participation is not exclusively in the purview of those with mild disability impact; just the opposite, people who may rate their health or disability impact very negatively may still regard sports as worthwhile, and for some, as equally or even more appealing!

4.6. Practical Implications

Based on the results, several practical conclusions can be drawn.

4.6.1. Rethinking Traditional Assumptions About Health

The very existence of Cluster 3—the group keen on sports despite low self-rated health—questions the assumption that physical well-being must precede participation. Health professionals, rehabilitation specialists, and adapted sports coaches should thus avoid discouraging potential participants based on perceived poor health status. In fact, a higher interest in sport might coincide with feeling less healthy, possibly because sport provides psychological benefits, social bonding, and a sense of autonomy [25,26].

4.6.2. Disability-Type-Dependent vs. Disability-Type-Independent Strategies

Building on the user's points, we can distinguish two fundamental approaches to sports promotion among youth with disabilities:

(1) Disability-Type-Dependent strategies. These are group-oriented interventions aimed at "persons with visual impairments", "persons with autism", etc. While such programs may be easier to implement at scale, they risk overlooking individual differences within each disability category. Indeed, our finding of a limited connection between disability type and sports interest suggests that broad, generalizing methods may be of constrained use unless further refined.

(2) Disability-Type-Independent (individualized) strategies. In this approach, each participant's personal needs, values, and motivational factors are assessed individually, with the disability viewed as one among several relevant variables rather than the overriding determinant. For instance, coaches or special educators might first in-

ventory a student's interests (e.g., socializing, competing, learning new skills) before deciding on the best motivational or training regimen. This aligns with the present study's emphasis on personal value orientations as key drivers of engagement.

Together, these strategies illustrate why "one-size-fits-all" solutions can falter in real-world contexts. Although disability-specific adaptations (e.g., wheelchair basketball, beep baseball) have undeniable merits, the data strongly suggest that intrapersonal values and preferences must also guide program design.

4.6.3. Beyond Physical Access

The relatively high facility access across clusters (65–81%) yet low participation in Clusters 1 and 2 confirms that infrastructure alone—no matter how crucial—does not guarantee uptake. This reinforces prior research arguing that intangible elements like psychological readiness, social inclusion, and personal enjoyment can outweigh purely logistical factors [23,40]. Practitioners and policymakers should therefore complement structural accessibility with inclusive social environments, tailored communication of benefits, and ongoing encouragement for would-be participants.

4.7. Methodological Considerations and Limitations

A number of methodological points deserve attention. Our study is cross-sectional, which precludes definitive statements about causality—whether certain values lead to sports engagement, or participation leads to shifting values. A longitudinal follow-up could elucidate these dynamics [19]. Health status, disability impact, and sports engagement variables rely on self-reports from participants aged 8–18. Given the wide age range, it cannot be ruled out that younger respondents may have interpreted scales differently from older peers. Individual differences in literacy or cognitive function might have further introduced variability. Although Cluster 3's high sports interest is a key finding, its limited sample (n = 100) makes it more vulnerable to sampling variability. Future replication with larger samples is recommended to confirm its distinctiveness. In comparing these methods, no agreement between the k-means solution and the LPA-based profiles (Cohen's κ near zero, negative weighted κ) was found. This methodological discrepancy highlights that (a) distance-based partitioning (k-means) and (b) probabilistic modeling (LPA) can capture divergent structures. Researchers contemplating cluster-based analyses might consider triangulating multiple methods or using external validation criteria [48].

These limitations notwithstanding, the alignment of our cluster-based observations with existing theoretical frameworks (social model of disability, psychosocial motivations for sport) suggests that the core findings remain robust and valuable for guiding future work.

4.8. Future Research Directions

In addition to a longitudinal follow-up, several other paths merit exploration.

Our data hinted that individuals with multiple disabilities often cluster with those who value multiple life aspects but do not always translate that into sports participation. Detailed qualitative work could clarify how they juggle competing demands [41]. Cluster 3's emphasis on sports despite low health ratings may stem from a desire to overcome negative stereotypes, find social belonging, or experience freedom [25]. Ethnographic or interview-based research could unveil these deeper drivers. Testing different forms of personalized, value-driven promotion programs could determine the best balance between disability-type-focused adaptations and more general, motivation-centered approaches [42,43]. Null effects for disability type and impact might partly reflect broad or imprecise measurement

tools. Future studies could use more granular instruments to capture the dynamic nature of functional limitations and how they intersect with sports.

5. Conclusions

Our analysis identifies three groups of young people with disabilities, clustered primarily by the salience of life elements at this stage in their lives, not by disability type or severity of functional impact. These findings contradict conventional assumptions that better health or less impairment is causally associated with greater sports participation. Rather, engagement is driven by personal value orientation and by psychosocial factors.

In short, the trends we found suggest a complex relationship between sports and physical activity and young people with disabilities. The main group of participants in our research were of moderate health perception and a low sports activity level, and highlighted that being relatively healthy does not equate to pursuing sport fitness. This indicates that simple health-focused messaging is not enough to encourage engagement in behavior change. The second pattern observed was a strange paradox: people who had high self-rated health and broad interests across multiple domains of life (including sports) had only moderate involvement in sports, suggesting that even with heightened health consciousness, sports need to compete with other valuable endeavors for time and attention. Maybe most interesting is our third identified pattern—a smaller but distinct group that was noted for showing a huge interest in sports even with low self-rated health status—which undermines the very basic assumptions about the relationship between perceived health status and sports involvement.

Such varied patterns highlight that tailored, value-driven strategies to promote sports may be more successful than broad-based strategies or strategies focused on the type of disability. Although it is still crucial that facilities are made accessible, our findings show participants prioritized psychological readiness, social support, and personal interests over infrastructure. This is particularly highlighted by the differences in sporting engagement between groups where access to facilities is on a similar level. In focusing on these intangible, yet powerful, motivational dimensions, stakeholders including policymakers, coaches, health professionals, and educators can successfully galvanize young people with disabilities to benefit from all that sports participation has to offer.

The potential impact of these findings extends beyond just the design of individual programs and questions wider societal assumptions around disability and participation in sport. Our findings indicate that rather than seeing health status or type of disability as a primary determining factor of performing in sport, understanding and adapting to an individual value system may be a more important tactic for performance engagement. Here, they align with emergent perspectives within disability studies, as the field moves away from medical or deficit-based models to the recognition of personal agency and diverse paths to participation.

In sum, the present work suggests—similar to earlier scholarship by Shields and Synnot [11], Ginis et al. [44], and Block et al. [23]—that truly inclusive sports culture is likely to require us to transcend simplistic classifications of disability in favor of a more detailed understanding of the values and environmental conditions that guide each person's journey toward active living. Our results highlight in particular that effective advocacy for sports participation among young people with disabilities must take into account the multi-dimensional relationship between personal values, health beliefs, and other priorities in life.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/disabilities5020040/s1, Supplementary File S1: The Questionnaire and Focus Group Guide Used in Questionnaire Development.

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