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## Sports participation and physical disabilities

Jaarsma, Eva

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# **Barriers and facilitators of sports in children with physical disabilities: A mixed method study**

*Eva A. Jaarsma, MSc; Pieter U. Dijkstra, PT, PhD; Jan H.B. Geertzen, MD, PhD; Rienk Dekker, MD, PhD.*

## Abstract

Purpose: This study explored barriers and facilitators of sports participation of children with physical disabilities from the perspective of the children, their parents and their health care professionals.

Method: Thirty children and 38 parents completed a questionnaire, and 17 professionals were interviewed in a semi-structured way. Data from the three groups were combined in a mixed method design, after which the results were triangulated.

Results: Mean age (SD) of the children was 14.1 (2.9) years old, 58% were boys. Sixty-seven percent of the children had cerebral palsy and 77% participated in sports after school. Most commonly practiced sports were swimming, cycling and football.

Children specifically experienced dependency on others as a barrier, parents did not have enough information about sports facilities, and professionals observed that the family's attitude had influence on the child's sports participation. Facilitators were health benefits, fun and social contacts.

Conclusion: Sports participation of children with physical disabilities is a complex phenomenon because children, their parents and professionals reported different barriers. Sports participation is more physically challenging for children with severe physical disabilities, as their daily activities already require much energy. However, the psychosocial benefits of sports are applicable to all children with physical disabilities.

## Introduction

In the Netherlands in 2007, approximately 130,000 children (4%) between the ages of 6 and 19 years had a physical disability<sup>[1,2]</sup>. These children often participate less in sports than children without physical disabilities<sup>[3,4]</sup>. The benefits of sports have been documented frequently and generally include an increase in health and physical fitness and a decrease in secondary conditions, such as type 2 diabetes and obesity<sup>[5,6]</sup>. These benefits are also very much applicable to children with physical disabilities<sup>[7]</sup>. Besides health benefits, sports participation also promotes personal autonomy, community integration and life satisfaction of children with physical disability<sup>[8]</sup>.

Most research on sports participation of children with physical disabilities tends to focus either on children, their parents or health professionals working with children with physical disabilities or a combination of two of these groups. Barriers to sports participation mentioned by parents of children with physical disabilities were the physical, social and cognitive demands of sports<sup>[9]</sup>, transport<sup>[9,10]</sup>, lack of information<sup>[9,11]</sup> or lack of equipment<sup>[9]</sup>, lack of time<sup>[9,12]</sup>, and costs<sup>[9]</sup>. Health professionals mentioned the need for adaptive equipment, sufficient information on how to use equipment and instruction on how to successfully conduct sports classes, as requirements for sports participation<sup>[13]</sup>. Facilitators mentioned by parents were fun<sup>[12]</sup>, social contacts<sup>[9,12]</sup> and transport<sup>[9]</sup>. A recent qualitative study on children with cerebral palsy showed that children participated in sports because they enjoyed it, felt capable or could do the activity with someone else<sup>[14]</sup>. Pain and fatigue were barriers to sports participation<sup>[14]</sup>. However, all these studies only focused on describing sports participation from only one perspective, which does not allow distinguishing differences in perspectives on sports participation of children with other physical disabilities.

To our knowledge, no study has combined the experiences of children, their parents and health professionals on the barriers and facilitators of sports in the same study. By combining perspectives from children, their parents and their health professionals into one study (i.e. triangulation), a more comprehensive insight into the complex phenomenon of sports participation can be provided than only one perspective could do<sup>[15]</sup>.

This study therefore aimed to provide comprehensive information about the barriers and facilitators of sports participation of children with physical disabilities by triangulating data from children, their parents and their health professionals.

## Methods

### Ethical approval

The study was approved by the Medical Ethical Committee of the University Medical Center Groningen (METc 2012/033).

### Participants

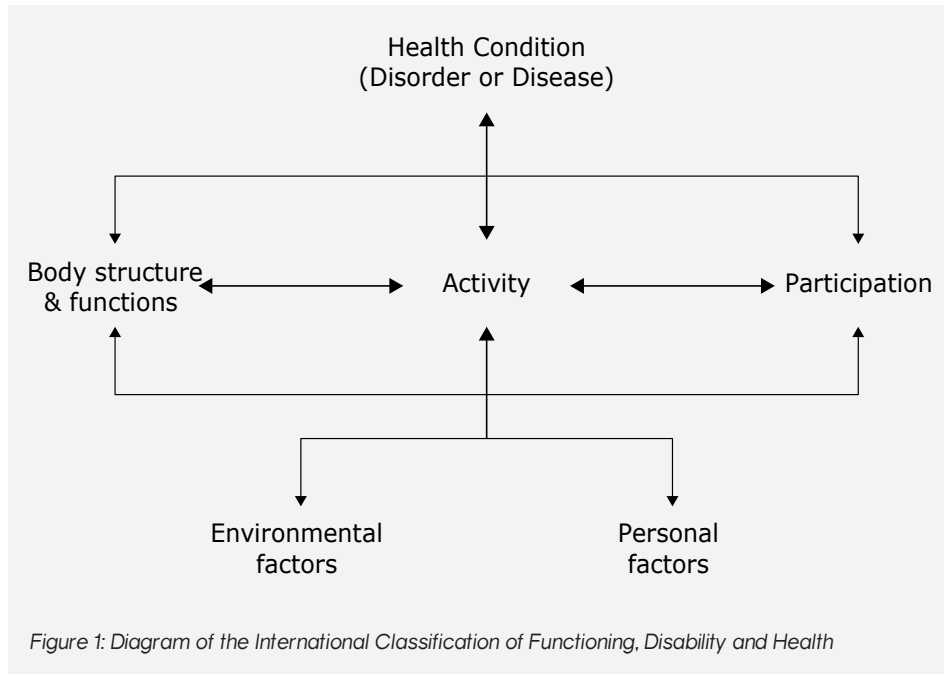
Between June and December 2012, children between 8 and 20 years old were invited to participate in this study. All children were registered at the Prince Johan Friso Mytylschool, Haren, the Netherlands, a special school for children with physical disabilities, some of whom also have mental disabilities. The age of 20 years old was chosen, because this is the maximum age for children to be able to attend this school. All children had diagnoses that are frequently treated at the University Medical Center Groningen. Children attended all levels of education offered at the school. Levels 1 and 2 were primary education with level 1 indicating the level for children with multiple disabilities and an IQ lower than 35, and level 2 being special primary education that sometimes provides extra individual attention to the children. Level 3 until 5 are secondary education. Where level 3 focuses on daytime activities (either work or activity related), level 4 focuses on vocational education and level 5 focuses on finishing a high school degree<sup>[16]</sup>.

During that same period, parents of these children and health professionals (i.e. occupational therapists, physical therapists, speech and language therapists and teachers) were also invited to participate in a questionnaire and an interview, respectively.

### Quantitative section

Children and their parents were invited by mail to participate in the study by completing a children's and parents questionnaire, respectively (Appendix 1). The children's questionnaire consisted of 18 items. The parent questionnaire consisted of 23 items. Both questionnaires were adapted from a self-constructed questionnaire for Paralympic athletes published previously<sup>[17]</sup>, and contained items about sports participation, physical disabilities, and barriers and facilitators of sports participation. The items about barriers and facilitators of sports participation were divided into personal and environmental factors, according to the International Classification of Functioning, Disability and Health (ICF)<sup>[18]</sup>. The ICF model (Figure 1) is a classification that divides health conditions into three parts: body structure and

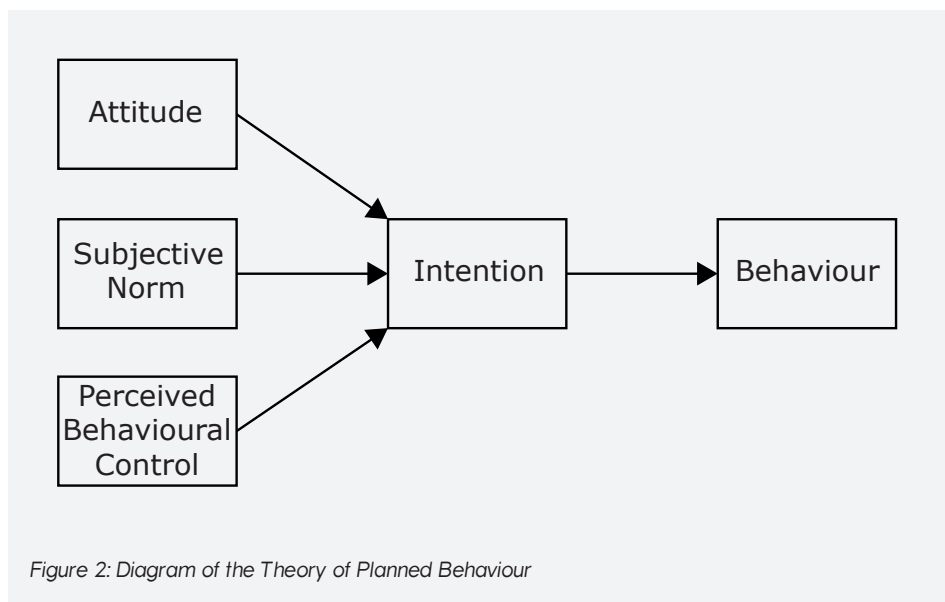
functions, activities and participation. Sports participation falls under the broader term participation. Within participation, the ICF model distinguishes personal and environmental factors.



Items about sports participation and disabilities were grouped according to components of the Theory of Planned Behaviour (TPB)<sup>[19]</sup>. The TPB (Figure 2) combines the components attitude, subjective norm and perceived behavioural control that determine intention (motivation), which in turn leads to behaviour (i.e. sports participation). “Attitude” refers to positive or negative outcome expectancies of a person toward the behaviour. “Subjective norm” is the social pressure regarding the behaviour. “Perceived behavioural control” is the perceived control a person has over their own behaviour in certain situations<sup>[19]</sup>.

In the envelope sent to children and parents, a cover letter was included that explained the purpose and methodology of the study. The cover letter also explained that participation was voluntary and that all data would be processed anonymously. An informed consent was included for the children and parents to sign. Children and parents were invited to either complete the paper questionnaire included in the mail or to use the provided link to complete the questionnaire online. A reminder was sent two months after the initial mailing. Compensation of 10 euro was given as a token of appreciation for their participation after completing and

returning the questionnaire.



## Qualitative section

The qualitative part of this study involved semi-structured interviews with teachers and health professionals about sports participation of children with physical disabilities attending their school. For the interviews, a pre-developed interview plan with open questions was used<sup>[20]</sup>. The topics in the interview plan were based on the questionnaire used for the children and parents (Appendix 1). With this interview plan, the interviewer (EAJ) was able to interact with the participant and still have a relatively tight structure to ensure that all important information was obtained during the interview<sup>[20]</sup>. This type of interviewing also allowed participants to reveal more information about experiences with sports participation, because they had room to shape the interview according to their experiences<sup>[20]</sup>. At first the interviewer asked some general questions about the participant's background, occupation and participation in sports, to make them feel comfortable. During the interview participants were asked to describe their experiences with children's participation in sports both during and after school, observed barriers and facilitators of participation in sports and their role in stimulating the children's participation in sports. All participants were interviewed in a separate, quiet room at school. Prior to the interviews, informed consent was obtained.

## Mixed methods design

This study used a mixed methods design, where qualitative and quantitative data were collected simultaneously. A mixed methods design combines two or more research methods (e.g., qualitative and quantitative methods) into one study, after which results are triangulated<sup>[15]</sup>. Data from questionnaires completed by the children and their parents were combined with data extracted from the interviews with health care professionals. We considered the results from the children and their parents to be dyadic data.

## Data collection and analysis

For the quantitative part of this study, chi-square tests were used to analyse differences in barriers and facilitators between active and inactive children, and a McNemar test was used to analyse differences between the children and their parents. A Mann Whitney U test was used to analyse differences in the number of experienced barriers and facilitators between active and inactive children. The alpha level for statistical significance was set at 0.05 for all tests in this study.

For the qualitative part of this study, all interviews were digitally recorded and were transcribed verbatim by the first author. To ensure anonymity of the participants, all information about the identity of the participant was excluded from the transcribed interviews and all participants were assigned identification numbers. Thematic analysis of the transcribed interviews was used to interpret the qualitative data. Thematic analysis is a flexible research tool for identifying, analyzing and reporting themes in qualitative data. It can organise and describe complex data in rich detail, such as the phenomenon of sports participation of children with physical disabilities<sup>[21]</sup>. Thematic analysis can also be used with any theoretical frameworks, which in our study were the ICF and TPB<sup>[21]</sup>.

Transcribed interviews were read and re-read several times by the first author, to get familiarized with the data. While conducting the interviews, the first author already had noted initial thoughts about the analysis of the data. After the familiarisation with the data, two researchers (EAJ and RD) independently and systematically coded interesting features throughout all interviews, to ensure reliability of the interpretation of the data. The coding from both researchers was compared during a consensus meeting and the final coding resulting from this meeting was then used to combine codes into themes. These themes were codes that were shared by several health professionals or that contained possible explanations for sports participation. Finally, these themes were compared with the quantitative data from the children's and parents' questionnaires, and triangulated



to allow interpretation of both qualitative and quantitative data.

## Results

In total, 127 children and parents were asked to participate in this study, of which 30 children and 38 parents completed the questionnaires. Twenty-six pairs of child and parent data were obtained. The mean age (SD) of the children was 14.1 (2.9) years old, 58% were boys. Sixty-seven percent of the children had cerebral palsy and 55% used assistive devices during activities of daily living (Table 1).

Almost all of the children participated in sports at school (96%,  $n=29$ ), and the majority also participated in sports after school (77%,  $n=20$ ). The most commonly practiced sports were swimming ( $n = 9$ ), cycling ( $n = 4$ ) and football (soccer) ( $n = 4$ ).

Seventeen teachers and health professionals were interviewed about barriers and facilitators of sports participation of children with physical disabilities. Data saturation occurred after 14 interviews, after which an additional three health professionals were interviewed. No new themes occurred.

### International Classification of Functioning, Disability and Health

#### Personal factors

##### **Barriers**

##### *Disability*

Disability was frequently mentioned as a barrier to sports participation by active children ( $n=6$ ) and their parents ( $n=7$ ), as well as by inactive children ( $n=2$ ) and their parents ( $n=3$ ; Table 2). Several teachers and health professionals mentioned the severity and the type of disability as a barrier to sports participation:

*"Some children are so severely disabled that almost everything will be a disappointment, as they can hardly do anything." (Subject 5, teacher)*

##### *Fatigue*

Teachers and health professionals also considered fatigue of the children as a result of long school days as a barrier:

*"[Travelling to and from the school] takes a lot of time for some, there are some [children] who have to leave early in the morning, and come home late in the afternoon. And then they also have to do their homework." (Subject 4, teacher)*

Table 1: Characteristics of the research population

|                                       | Children<br>(n = 30) |                | Paired Children and Parents<br>(n=26) |                |         |                | Parents<br>(n = 38) |                |
|---------------------------------------|----------------------|----------------|---------------------------------------|----------------|---------|----------------|---------------------|----------------|
|                                       | M                    | SD             | Children                              |                | Parents |                | M                   | SD             |
|                                       |                      |                | M                                     | SD             | M       | SD             |                     |                |
| Age child                             | 14.3                 | 2.7            | 14.1                                  | 2.9            | 14.4    | 2.8            | 14.8                | 2.7            |
|                                       | n                    | % <sup>a</sup> | n                                     | % <sup>a</sup> | n       | % <sup>a</sup> | n                   | % <sup>a</sup> |
| Gender (boy)                          | 17                   | 57             | 15                                    | 58             | 14      | 56             | 23                  | 61             |
| <b>Disability child<sup>b</sup></b>   |                      |                |                                       |                |         |                |                     |                |
| Cerebral Palsy                        | 20                   | 67             | 17                                    | 65             | 16      | 62             | 26                  | 68             |
| Spina Bifida                          | 1                    | 3              | 1                                     | 4              | 1       | 4              | 1                   | 3              |
| Other Neurological diagnoses          | 3                    | 10             | 2                                     | 8              | 3       | 12             | 3                   | 8              |
| Visual Impairment                     | 2                    | 7              | 2                                     | 8              | 2       | 8              | 3                   | 8              |
| Mental Impairment*                    | 2                    | 7              | 2                                     | 8              | 8       | 31             | 13                  | 33             |
| Muscle Disease                        | 1                    | 3              | 1                                     | 4              | 1       | 4              | 1                   | 3              |
| Other                                 | 6                    | 20             | 6                                     | 23             | 6       | 23             | 9                   | 23             |
| <b>Level of education<sup>c</sup></b> |                      |                |                                       |                |         |                |                     |                |
| <u>Primary education:</u>             |                      |                |                                       |                |         |                |                     |                |
| Level 1                               | 6                    | 20             | 5                                     | 19             | 5       | 19             | 7                   | 18             |
| Level 2                               | 5                    | 17             | 5                                     | 19             | 5       | 19             | 8                   | 21             |
| <u>Secondary education:</u>           |                      |                |                                       |                |         |                |                     |                |
| Level 3                               | 2                    | 7              | 0                                     | 0              | 0       | 0              | 0                   | 0              |
| Level 4                               | 8                    | 27             | 7                                     | 27             | 8       | 31             | 12                  | 32             |
| Level 5                               | 9                    | 30             | 9                                     | 35             | 8       | 31             | 11                  | 29             |
| <b>Assistive advices</b>              |                      |                |                                       |                |         |                |                     |                |
| Use of assistive devices (Yes)        | 23                   | 55             | 20                                    | 77             | 22      | 85             | 32                  | 84             |
| Wheelchair                            | 13                   | 43             | 12                                    | 46             | 16      | 62             | 26                  | 68             |
| Wheeled walker                        | 8                    | 27             | 4                                     | 15             | 5       | 19             | 8                   | 21             |
| Speech generating devices             | 1                    | 3              | 1                                     | 4              | 2       | 8              | 4                   | 11             |
| Ankle Foot Orthoses                   | 6                    | 20             | 6                                     | 23             | 6       | 23             | 6                   | 16             |
| Orthopedic shoes                      | 10                   | 33             | 10                                    | 39             | 11      | 42             | 15                  | 39             |
| Adapted bicycle                       | 12                   | 40             | 12                                    | 46             | 16      | 62             | 23                  | 61             |
| Other                                 | 2                    | 7              | 2                                     | 8              | 3       | 12             | 6                   | 16             |
| <b>Sports participation child</b>     |                      |                |                                       |                |         |                |                     |                |
| Sports at school (children)           | 29                   | 97             | 25                                    | 96             | 26      | 100            | 36                  | 92             |
| Sports after school (children)        | 24                   | 80             | 20                                    | 77             | 17      | 65             | 26                  | 67             |

<sup>a</sup> Percentages are column percentages<sup>b</sup> Multiple answers were possible<sup>c</sup> Level 1: IQ<35; Level 2: special primary education, sometimes with extra attention; Level 3: focus on daytime activities (work or activity related); Level 4: vocational education; Level 5: high school degree

\* Significant differences between children and parent pairs: p= 0.03

Table 2: Barriers of sports mentioned by paired children and parents

|                                                   | Children (n = 26) |                | Parents n = 26) |                |
|---------------------------------------------------|-------------------|----------------|-----------------|----------------|
|                                                   | n                 | % <sup>a</sup> | n               | % <sup>a</sup> |
| <b>Barriers (of active children)<sup>§</sup></b>  | n=20              |                | n=17            |                |
| Disability                                        | 6                 | 30             | 7               | 41             |
| Lack of acceptance by others                      | 5                 | 25             | 2               | 12             |
| Transportation                                    | 2                 | 10             | 3               | 18             |
| No peers                                          | 2                 | 10             | 1               | 6              |
| Costs                                             | 1                 | 5              | 3               | 18             |
| Dependency                                        | 4                 | 17             | -               | -              |
| Injuries                                          | 2                 | 10             | -               | -              |
| Too busy with other activities                    | 1                 | 5              | -               | -              |
| Lack of information                               | -                 | -              | 2               | 12             |
| No problems                                       | 8                 | 40             | 7               | 41             |
| <b>Barriers (not active children)<sup>b</sup></b> | n=6               |                | n=9             |                |
| Transportation                                    | 3                 | 50             | 5               | 56             |
| Disability                                        | 2                 | 33             | 3               | 33             |
| Costs                                             | 1                 | 17             | 2               | 22             |
| No sports clubs in the neighborhood               | 1                 | 17             | 7               | 78             |
| Lack of sports facilities                         | 2                 | 33             | -               | -              |
| No fitting sport                                  | 2                 | 33             | -               | -              |
| Injuries                                          | 1                 | 17             | -               | -              |
| Child does not like activity                      | -                 | -              | 2               | 22             |
| Takes too much time                               | -                 | -              | 2               | 22             |
| No buddy                                          | -                 | -              | 1               | 11             |

<sup>a</sup> Percentages are column percentages

<sup>b</sup> Multiple answers were possible

*"I think lots of children would like to play football, but they can't"...."It's physically impossible [because of fatigue caused by the disability]." (Subject 8, teacher)*

## Facilitators

### Health

A frequently mentioned facilitator of sports participation by active children (n=12) and their parents (n=11) was improved health (Table 3). Health professionals mentioned change in position of the body for children in wheelchairs as a positive factor of participation in sports:

*"When you're in a wheelchair all day, it is hard, especially with warm weather. So then it's good to be out [of the wheelchair]"...."And being in the same position the entire day is not healthy." (Subject 1, teacher)*

Table 3: Facilitators of sports participation mentioned by active children and their parents

| Facilitators <sup>b</sup> | Children (n = 20) |                | Parents (n = 17) |                |
|---------------------------|-------------------|----------------|------------------|----------------|
|                           | n                 | % <sup>a</sup> | n                | % <sup>a</sup> |
| Health                    | 12                | 60             | 11               | 65             |
| Fun                       | 11                | 55             | 14               | 82             |
| Getting stronger          | 6                 | 30             | 8                | 47             |
| Losing weight             | 5                 | 25             | 3                | 18             |
| Social contacts           | 5                 | 25             | 11               | 65             |
| Support from family       | 5                 | 25             | 11               | 65             |
| Suggested by physician    | 3                 | 15             | 5                | 29             |
| Skills                    | 1                 | 5              | 4                | 24             |
| Winning                   | 1                 | 5              | -                | -              |
| Accepting the disability  | -                 | -              | 4                | 24             |
| Self confidence           | -                 | -              | 9                | 53             |
| Independence              | -                 | -              | 2                | 12             |
| Energy                    | -                 | -              | 1                | 6              |

<sup>a</sup> Percentages are column percentages

<sup>b</sup> Multiple answers were possible

### Fun

Fun was mentioned as a facilitator by both active children (n=11) and their parents (n=14). The majority of the teachers and health professionals also mentioned fun as an important facilitator:

*"Yes, yes, I always think it makes them happy. Those Physical Education classes are very important. Even though the children sometimes cannot do anything, it is still very important to race through a gym class with the wheelchair. Just to experience moving." (Subject 3, teacher)*

### Internal motivation

Many teachers and health professionals mentioned internal motivation of the child as a facilitator:

*"They have to become interested by experiencing [sports] themselves" (Subject 9, Physical Education teacher)*

*"Well, it (i.e., sport participation) is part of internal motivation of the child, why children participate in sport, or not" (Subject 12, physical therapist)*

### Strength

Increasing physical strength was mentioned both by children (n=6) and their

parents (n=8). Health professionals did not mention physical strength as a possible facilitator.

## Environmental factors

### **BARRIERS**

#### *Lack of sports facilities*

A lack of sports facilities was mentioned as a barrier by inactive children (n=2). Teachers and health professionals also mentioned the lack of sports clubs for people with disabilities, particularly clubs with team sports, in the children's neighbourhood. Logistical problems with transportation were also noted as possible barriers:

*"You (i.e. the child) have to travel far to play a match, a tournament. You cannot really play in a competition, because there are not enough teams." (Subject 13, teacher)*

#### *Transportation*

Transportation was mentioned by inactive children (n=3) and their parents (n=5) as a barrier to sports participation. Health professionals also mentioned transportation as one of the organizational issues parents have to address:

*"I also have several children who would love [to participate in sports], but the parents dread it for some reason. And if you ask them, it is usually transport issues." (Subject 16, physical therapist)*

#### *Dependency*

Four active children with disabilities did not like to be dependent on others to be able to participate in sports. Health professionals frequently mentioned the attitude of the family (e.g., parents and siblings) of the child as an important role in the child's participation in sports:

*"It very much depends on how things are arranged within a family...whether it (i.e., participation in sport) is easy to organise." (Subject 15, teacher and former occupational therapist)*

#### *Lack of acceptance*

Active children mentioned not feeling accepted by others (n=5) as an environmental barrier. Two parents of active children also mentioned this barrier. Health professionals did not mention the fact that children did not feel accepted

by others as a possible barrier.

#### *Lack of information*

Lack of information about sports was mentioned as a barrier by two parents of active children. Health professionals also mentioned a lack of information as a barrier:

*"Information, well, they will pay attention to that during the Physical Education classes, obviously. But I do not think that it is clear to everybody what possibilities there are." (Subject 4, teacher)*

*"At my previous job we had a nice overview of all disabled sports clubs in the area. I find it much harder to search in the rural areas, to find what possibilities there are and for which group of children." (Subject 11, physical therapist)*

### **FACILITATORS**

#### *Social contacts*

Active children (n=5) and their parents (n=11) mentioned social contacts as a facilitator of sports participation. Social contacts were also mentioned by health professionals:

*"It is nice that they have the exercise, but it is mainly about atmosphere, the fun and social contacts." (Subject 8, teacher)*

#### *Support from family*

Support from family was a facilitator mentioned by both active children and their parents (n=5; n=11).

Teachers and health professionals also mentioned the positive influence of the child's environment (e.g., influence from parents, teachers and friends) on the child's participation in sports:

*"When you are participating in sports yourselves (i.e., as a parent), then your child will also participate easier. Yes, and then if you possibly have several children, then it's more natural to also start participating in sports." (Subject 14, teacher and former occupational therapist)*

*"It (i.e., participation in sports) was initiated by themselves (i.e., the children), there were a few students...who were very competitive and they encouraged the others as well." (Subject 4, teacher)*

## Information

Several health professionals mentioned information as a facilitator:

*"I think you can find a lot of information on the internet, well certain things. When you type in disabled sports and Province Groningen, for instance, you will find a whole range of different information." (Subject 6, teacher)*

*"In general, they (i.e., parents) have a lot of information and they also exchange information amongst each other. And with the internet nowadays, you just google it and everything will appear." (Subject 10, teacher)*

## Sports activities during school hours

A possible facilitator only mentioned by health professionals was organising sports activities (i.e., activities other than the regular Physical Education classes) during school hours:

*"We try to plan projects, if possible, during the breaks in between classes, as the children are already at school. Because after school it is very difficult to keep them here, because then you immediately have transport issues." (Subject 9, Physical Education teacher)*

Organising sports during school hours could also help parents with their busy schedule:

*"It is easier to arrange things (i.e., sports) during school hours, as children live all through the region. So it (i.e., sports) is something you cannot ask from parents to also take care of that after school." (Subject 15, teacher)*

## Discussion

Factors such as a child's health, information availability and the role of the family were mentioned as both barriers and facilitators of participation in sports. The data collected from children, parents and health professionals showed different perspectives on barriers and facilitators of participation in sports of children with physical disabilities.

## **International Classification of Functioning, Disability and Health**

### **Personal factors**

#### ***Barriers***

Children, parents and health professionals all mentioned the disability and health conditions (e.g. fatigue) of the child as personal barriers, something that has been repeatedly reported in previous research<sup>[22,23]</sup>. The severity or type of disability and fatigue after a long day at school might be reasons for children not to have enough energy left to also participate in sports in addition to their daily activities. Although the school offers many opportunities for its students to become familiar with and participate in sports, these activities are perhaps more applicable to children with less severe disabilities because sports are probably more physically challenging for children with more severe physical disabilities.

#### ***Facilitators***

Health benefits and fun were mentioned as personal facilitators by children, parents and health professionals. Health was mentioned both as a barrier (see above) and a facilitator in terms of increasing health and/or physical fitness as a reason to participate in sports. Increasing physical strength was another health benefit that was mentioned by children and parents, and was also reported in previous research<sup>[14]</sup>. Fun was frequently mentioned as a facilitator by children, their parents, and health professionals, as has been reported previously<sup>[12,14,24]</sup>. Children with severe disabilities also described fun and health as facilitators, highlighting that the psychosocial factors for sports participation are applicable to all children with physical disabilities.

### **Environmental factors**

#### ***Barriers***

Children depend on their parents to be able to participate in sports, in terms of medical care, transportation and sometimes also supervision or guidance during the activity. Health professionals expressed that the attitude of the parents and siblings very much determines whether a child with a disability has an opportunity to participate in sports. Parents could experience their child's sports participation as an additional burden in addition to their daily obligations, such as work and taking care of their family, including a child with disabilities. The suggestion by several health professionals to organise sports activities at the school site could help by easing transportation problems. If sports clubs were situated at the school facilities and offered sports activities directly after school or in between classes, it would spare children from travelling. However, as mentioned above, the school should



carefully consider the physical challenges children with severe physical disabilities might face when sports are added to their daily activities. In addition to the above-mentioned barriers, the children, their parents and the health professionals had group-specific perceptions of barriers to the children's participation in sports. Children exclusively mentioned the dependency on others, whereas parents mention problems with transportation, information about sports possibilities and acceptance of their child with a physical disability, and health professionals observed that the attitude of the family was of large influence on participation in sports by children with physical disabilities.

### ***Facilitators***

In accordance with previous research, the children, their parents and the health professionals also mentioned social contacts and support from family as environmental facilitators<sup>[9,12,14,26,27]</sup>. These facilitators were also mentioned by all of the children, regardless of the severity of their disabilities.

### **Theory of Planned Behaviour**

Variables influencing sports participation found in this study were supported by the TPB. Facilitators such as health and fun positively influenced the attitude of the child. The internal motivation mentioned by health professionals could also positively influence the intention of children with physical disabilities to participate in sports. Children, parents and health professionals also mentioned factors associated with subjective norm to influence sports participation. Support from family, friends and school positively influenced the sports participation of a child with physical disabilities. However, children and parents also reported negative pressure on sports participation, as peers sometimes did not accept children with physical disabilities. Perceived behavioural control did not play a role in sports participation by the children in this study. So when advising and promoting sports participation for children with physical disabilities, the emphasis should be on attitude and subjective norm to ensure intention and eventually actual participation in sports. However, the TPB focuses on the positive components that eventually will lead to participation in sports, whereas not all children with physical disabilities were able to become physically active. This study showed that active and inactive children also experienced barriers to participation in sports and these barriers should also be considered when promoting participation in sports.

## Mixed methods design

We used questionnaires for the children and parents based on a similar questionnaire on barriers and facilitators of sports participation of people with physical disabilities that was published previously<sup>[17]</sup>. Children and parents both received a questionnaire with related questions, to provide dyadic data. Additionally, we wanted to explore how health professionals viewed sports participation by children with physical disabilities. In order to obtain a more complete picture of sports participation of children with physical disabilities, we decided to include different methods in a single study<sup>[15]</sup>. We considered the data resulting from the interviews with the health professionals to be supplementary data that would not be obtained by another questionnaire and triangulated this with the data from the questionnaires<sup>[15]</sup>. It is therefore that we decided that a qualitative approach via semi-structured interviews was the most appropriate research method for collecting data from health professionals. This mixed methods design revealed that children, parents and health professionals not necessarily have the same perspective on sports participation. Children and parents might report gaining physical strength as an important facilitator, whereas professionals consider other facilitators, such as internal motivation, as an important reason for children to be physically active. Children and parents also tend to look at the positive influence of family and friends, whereas health professionals observed that physical inactivity of parents and siblings has negative consequences for the sports participation of the children. This study has therefore indicated that sports participation of children with physical disabilities is indeed a complex phenomenon, and all perspectives should be considered when promoting sports participation.

## Limitations

In this study, only 30 children and 38 parents out of a possible 127 children and parents completed the questionnaire. Most children included in this study were active both during and after school, whereas previous research showed that only 25% of children with physical disabilities in the Netherlands participate in sports after school at least once per week<sup>[22]</sup>. Our findings could therefore be the result of selection bias. The percentages of active children were probably overestimated, as active children were probably more interested in participating in this study than inactive children. If, in the worst case, our sample included all of the active children in the school, only 19% (24/127) of the children of the school participated in sports after school.

Not all of the questionnaires completed by children and parents could be paired,

as both the children and their parents did not always complete questionnaires. Data from children and parents that were not paired could only be partly used in the results section. Future research should therefore thoroughly consider the approach for recruitment of subjects to obtain a greater number of (paired) responses.

Because of the small sample size some barriers and facilitators were only reported by 1 or 2 children and/or parents, which implies that interpretation of these results should be considered very carefully. However, because of the explorative and mixed method nature of this study, these results represent the perspectives of the children, parents and the health professionals on sports participation. Results in this study therefore cannot be generalized for children with physical disabilities, but do provide interesting suggestions that could be considered in future research.

## **Conclusion**

This mixed methods study found that children, their parents and health professionals considered different factors influencing the participation in sports by children with physical disabilities. Perceived barriers seemed to differ by group, suggesting that sports participation is a complex phenomenon. Sports might be more physically challenging for children with severe physical disabilities, as their daily activities already take much energy. However, the psychosocial benefits of sports are applicable to children with all types and severities of physical disabilities and should be emphasized by rehabilitation professionals when advising children with physical disabilities about sports. Advice about sports participation should be considered very carefully and should be tailor made.

## **Declaration of interest**

The authors report no conflicts of interest.



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# Appendix 1

## Sports participation of children of a special school: Questionnaire for students

Some children participate a lot in sports, while other children rather do other things. We know you have Physical Education (PE) classes at school, but we would also like to know that sports you do after school hours. We would like to know whether you participate in sports and why you like it so much. If you do not participate in sports, we would also like to know why you do not like sports. Your answers can help us seeing what you like and dislike the most about sports

There are no right or wrong answers; we just would like to know how you think about sports. We cannot see who gave what answer.

Completing the questionnaire will take about **15 minutes**.

### General questions:

1) You are a:

- ☐ Boy
- ☐ Girl

2) Please write down your date of birth? dd/mm/yyyy

.....

3) You are in:

- ☐ Primary school
- ☐ Secondary school

4) Could you please tell us what kind of disability you have:

- ☐ I am missing a (part of my) arm or leg
- ☐ I have trouble with moving (spasticity)
- ☐ I cannot see that well
- ☐ I do not have that much strength in my arms and/or legs
- ☐ Other, namely .....

5) This disability started:

- ☐ When I was born
- ☐ ..... (year)

6) Do you have assistive devices, which help you every day during school or playing outside?

- ☐ Yes
- ☐ No → Please go to question 8

7) What are those assistive devices that help you every day during school or playing outside?

- ☐ Prosthesis

- ☐ Wheelchair
- ☐ Walker, cane
- ☐ White cane
- ☐ Magnifying screen for the computer
- ☐ Speech generated devices
- ☐ Splint(s)
- ☐ Special shoes
- ☐ Adapted bicycle
- ☐ Other, namely.....

8) How do you (usually) go to school?

- ☐ With special transport
- ☐ By car, brought by parents
- ☐ By bicycle
- ☐ Walking

**We would like to ask you a few questions about sports. With sports we mean playing tennis or football (soccer), but also biking (to school) or walking.**

9) Do you participate in sports at school?

- ☐ Yes
- ☐ No → Please go to question 11

10) What sports do you do at school?

*Multiple answers possible*

- ☐ Fysiojudo
- ☐ Survival
- ☐ Gymnastics
- ☐ Swimming
- ☐ Zumba or similar
- ☐ Fitness
- ☐ Other, namely .....

11) Do you also participate in sports after school?

- ☐ Yes
- ☐ No → Please go to question 18

12) What sports do you do after school?

*Multiple answers possible*

- ☐ Athletics

- ☐ Basketball
- ☐ Zumba or similar
- ☐ Boccia
- ☐ Cycling
- ☐ Fitkids
- ☐ Golf
- ☐ Judo
- ☐ Rowing
- ☐ Wheelchair basketball
- ☐ Wheelchair hockey
- ☐ Table tennis
- ☐ Tennis
- ☐ Soccer
- ☐ Volleyball
- ☐ Walking
- ☐ Sailing
- ☐ Swimming
- ☐ Other, namely .....

13) Are you a member of a sports club?

- ☐ No
- ☐ Yes

14) How long are you playing this/these sport(s)?

..... years

15) Where did you get your information about these sports?

*Multiple answers possible*

- ☐ The doctor
- ☐ Someone from the rehabilitation center told me
- ☐ Someone from school told me
- ☐ Friends
- ☐ Parents of family
- ☐ There was a day at school, where you could try different sports
- ☐ Internet, facebook, other social media
- ☐ Other, namely .....

16) Why did you want to do this sport?

*Multiple answers possible*

- ☐ Because it is good for me

- ☐ Because I like sports
- ☐ Because I want to become stronger
- ☐ Because I can meet other children during sports
- ☐ Because I want to loose weight
- ☐ Because I like winning
- ☐ Because I want to improve my skills with my wheelchair or prosthesis
- ☐ Because my family also plays sports
- ☐ Because my friends also play sports
- ☐ Because the doctor told me it is good for me
- ☐ Other, namely .....

17) What are things you do not like about sports?

*Multiple answers possible*

- ☐ I like everything about sports
- ☐ I have trouble playing sports because of my disability
- ☐ I am (too) busy with other activities
- ☐ I am afraid I will fall and hurt myself
- ☐ I do not like it when other people have to help me with playing sports
- ☐ I have to travel far to get to a sports club
- ☐ There are no children of my age to play sports with
- ☐ Other people think I am strange because of my disability
- ☐ Playing sports is expensive
- ☐ Other, namely .....

**Please go to the end of the questionnaire**

18) Why do you not play sports?

*Multiple answers possible*

- ☐ I do not like sports
- ☐ I have trouble playing sports because of my disability
- ☐ I am afraid I will fall and hurt myself
- ☐ I do not like it when other people have to help me with playing sports
- ☐ I do not know which sports clubs I can go to
- ☐ There are (almost) no sports club close to my home
- ☐ I have to travel far to get to a sports club
- ☐ There are no children of my age to play sports with
- ☐ I cannot find a sport that I like
- ☐ I cannot find a sport I can play with my disability
- ☐ Other people think I an strange because of my disability
- ☐ Playing sports is too expensive
- ☐ Other, namely.....

**Could you please return the completed questionnaire to us in the return envelope?  
Thank you for your answers to our questions!**

