Chapter 3

Barriers & Facilitators of sports in Dutch Paralympic Athletes:
An explorative study

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Abstract

*Purpose:* The purpose of this study was to gain insight in barriers and facilitators of sports in Paralympic athletes.

*Methods:* An online questionnaire was distributed through the Netherlands Olympic Committee and National Sports Confederation to determine personal and environmental barriers and facilitators of sports participation. The ICF model and Theory of Planned Behaviour were used to respectively categorise the results in environmental and personal factors, and attitude, subjective norm and perceived behavioural control.

*Results:* Seventy-six Dutch Paralympic athletes completed the questionnaire (51% response rate). Barriers and facilitators experienced by ambulant and wheelchair athletes were compared. Most frequently mentioned personal barrier was dependency of others (22%), while most frequently mentioned environmental barrier was lack of sports facilities (30%). Wheelchair athletes mentioned more barriers (Median=3, interquartile range:0.5–6), than ambulant athletes (Median=1.0,interquartile range:0.0-3.0,p=0.023). One-third of the athletes did not experience any barriers. Most frequently mentioned personal facilitators to initiate sports participation were fun (78%), health (61%) and competition (53%). Most frequently mentioned environmental facilitator was social support (40%).

*Conclusion:* This study indicated that barriers of sport were mostly environmental, while facilitators were usually personal factors. Attitude and subjective norm were considered the most important components for intention to participation in sports. The facilitators outweighed the barriers and kept the athletes being active in sports.
Introduction

The importance of physical activity and sports for health benefits has been frequently documented and has for example shown reduction of chances of cardiovascular disease, obesity and type 2 diabetes mellitus\textsuperscript{[1-4]}. Unfortunately, 36\% of able-bodied adults do not participate in sports. This percentage is even higher for people with a disability; 56\%\textsuperscript{[1]}. During rehabilitation, sports are often part of the treatment, in order to familiarise people with physical disabilities with sports and to improve physical fitness and quality of life\textsuperscript{[5,6]}. However, only few people with physical disabilities stay physically active after they have completed their rehabilitation\textsuperscript{[6]}. Studies regarding barriers and facilitators of sports of able-bodied people showed that lack of time, lack of motivation and difficult access to facilities are among the most frequently mentioned barriers\textsuperscript{[7]}. People with physical disabilities experienced additional barriers to sports such as energy level, transportation, information access, qualification of supervision, and adjustment of facilities\textsuperscript{[7-9]}. Facilitators of sports for able-bodied people and people with physical disabilities seem to be very similar: both groups frequently mention enjoyment, motivation, health benefits and social aspects\textsuperscript{[7,9-12]}. In young adults with a disability personal factors such as motivation and health also appear to be more important facilitators in sports compared to environmental factors\textsuperscript{[13]}. Norwegian Paralympic and Olympic athletes also showed similar motivational factors and coping strategies. However, sport participation of Paralympic athletes was not only dependent on effort but also on external factors such as wheelchairs\textsuperscript{[14]}. Most previous studies focused on patients with spinal cord injuries or amputation\textsuperscript{[9,11,15,16]}. Furthermore, previous studies were not based on a framework or theory, which lead to a lack of coherence in their results. The frameworks used in this study to coherently identify barriers and facilitators in athletes were the International Classification of Functioning, Disability and Health (ICF) of the World Health Organization\textsuperscript{[17]} and the Theory of Planned Behaviour (TPB) by Ajzen\textsuperscript{[18]}.

The ICF model (Figure 1) is a classification of health and health-related domains; body, personal and environmental perspectives. Focusing on the health domain from a personal perspective, the health condition can be divided into three parts: body structure and functions, activity, and participation\textsuperscript{[17]}. For this study we focused on the participation part of the model. Within participation, the ICF model distinguishes personal and environmental factors.

The Theory of Planned Behaviour (Figure 2) is an extension of the theory of reasoned action by Ajzen and Fishbein. The theory combines several components that determine intention or motivation, which in turn will lead to behaviour. These components are attitude, subjective norm and perceived behavioural control.
Insight in barriers and facilitators can help developing strategies to reduce barriers and enhance facilitators in order to increase the number of people with physical disabilities to participate in sport, also at an elite level. A specific group of physical disabilities are Paralympic athletes, who will probably have experienced barriers at the start of participation in sports. Despite these barriers they will also have experienced facilitators, which stimulated them to start and maintain participation.
participation in sports. Therefore we chose Paralympic athletes as our research population. We have included athletes with all physical disabilities classified according to the Paralympic Movement\textsuperscript{[22]}. This broader research population allows for more insight in barriers and facilitators of sport than studies focusing on only one group of disabilities. The aim of this study was to gain insight in the barriers and facilitators of sports participation for Dutch Paralympic athletes with a physical disability.

**Methods**

**Subjects**

Subjects for this study were all Dutch Paralympic athletes who had an official elite athlete status (A or B) provided by the Netherlands Olympic Committee and National Sports Confederation (NOC*NSF) on 1\textsuperscript{st} November 2010.

**Questionnaire**

The questionnaire (44 questions) was partially based on a previously used
The questionnaire used in this study included questions about sports participation, disability, and barriers and facilitators. Questions concerning sports participation (barriers and facilitators) were divided in personal and environmental factors according to the ICF model. Questions about disability and sports were grouped according to attitude, subjective norm and perceived behavioural control, components of TPB. General questions about other characteristics were also included. The headlines and questions about barriers and facilitators of the questionnaire can be found in the appendix.

All 149 Dutch Paralympic athletes were contacted by email by NOC*NSF to fill in the questionnaire. A cover letter explained the purpose and methodology of the study and it ensured that all data would be processed anonymously. Participation was voluntary. Athletes were invited to click the link to proceed to the online questionnaire. Reminders were sent to the athletes two, four, and six weeks after the initial email. The study was approved by the Medical Ethical Committee of the Universal Medical Centre Groningen, the Netherlands (METc 2010.264).

Data collection and analysis

Information about age, gender, disability and sports of all 149 athletes was provided by NOC*NSF. Athletes who completed the questionnaire were divided into two groups: athletes using a wheelchair for activities of daily living and ambulant athletes.

A Mann-Whitney U test was used to analyse differences in the number of barriers and facilitators mentioned by wheelchair and ambulant athletes. To analyse differences between wheelchair and ambulant athletes a Chi-square test was used, and to analyze differences between initiation and maintenance of sports a McNemar test was used. The alpha level for statistical significance was set at 0.05 for all tests in this study.

Results

In total 76 Paralympic athletes completed the questionnaire (response rate: 51%). Mean (SD) age of the participating athletes was 30.5 (9.7) years and 60% were female (Table 1).
### Table 1: Characteristics of the participated athletes and the total Dutch Paralympic population.

<table>
<thead>
<tr>
<th></th>
<th>Participants (n=76)</th>
<th>Total group (n=149)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>m</td>
<td>SD</td>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Gender</strong></td>
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<td></td>
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<tr>
<td>Male</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>Female</td>
<td>60</td>
<td>46</td>
</tr>
<tr>
<td><strong>Disability</strong></td>
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<td></td>
</tr>
<tr>
<td>Amputation</td>
<td>21</td>
<td>16</td>
</tr>
<tr>
<td>Spinal cord injuries</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Other neurological disabilities</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Les Autres</td>
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<td>26</td>
</tr>
<tr>
<td>Visual Impairment</td>
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<td>3</td>
</tr>
<tr>
<td><strong>Sport</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alpine skiing</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Athletics</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>Bench pressing</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Archery</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Equestrian</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Judo</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rowing</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Wheelchair basketball</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Wheelchair tennis</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Table tennis</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Football 7 a side</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Cycling</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Sailing</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Volleyball</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Swimming</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Lower General Secondary Education (practical)</td>
<td>5</td>
<td>4</td>
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<tr>
<td>Lower General Secondary Education (theoretical)</td>
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<td>13</td>
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<td>7</td>
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<tr>
<td>Vocational education</td>
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<td>19</td>
</tr>
<tr>
<td>Applied sciences</td>
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<td>21</td>
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<tr>
<td>University degree</td>
<td>13</td>
<td>10</td>
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<tr>
<td><strong>Living arrangements</strong></td>
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<td></td>
</tr>
<tr>
<td>Independent, alone</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>Independent, with spouse and/or children</td>
<td>45</td>
<td>34</td>
</tr>
<tr>
<td>Independent, with contact persons</td>
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<td>1</td>
</tr>
<tr>
<td>Living at home</td>
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<td>21</td>
</tr>
<tr>
<td>Sheltered housing</td>
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<td>2</td>
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<tr>
<td><strong>Monthly net household income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; € 913</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>€ 913 &lt; € 1304</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>€ 1304 &lt; € 1700</td>
<td>13</td>
<td>10</td>
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<tr>
<td>€ 1700 &lt; € 3000</td>
<td>30</td>
<td>23</td>
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<tr>
<td>€ 3000 &lt; € 3500</td>
<td>3</td>
<td>2</td>
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<tr>
<td>&gt; € 3500</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Rather not say</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

* Percentages are column percentages, sum ≠ 100% because of rounding
# Data unavailable from NOC*NSF
Barriers

Frequencies of variables of barriers to sports of all participants, the wheelchair and the ambulant athletes, are shown in Table 2. The most frequently experienced personal barrier to sports was ‘being dependent of others to be able to exercise’ (22%). Most frequently experienced environmental barrier was ‘too little sports facilities in the neighbourhood’ (30%). Overall wheelchair athletes experienced more barriers (Median = 3, interquartile range: 0.5 – 6), compared to ambulant athletes (Median = 1.0, interquartile range: 0.0 – 3.0; U = 936.5, z = 2.3, p = 0.023).

Significantly more wheelchair athletes mentioned ‘too little sports facilities in the neighbourhood’ (51%), and ‘facilities not (sufficiently) adjusted’ (30%) than ambulant athletes did respectively 10% and 3% (p < 0.01 - Fisher exact).

Personal factor ‘being dependent of others to be able to exercise’ and

Table 2: Barriers to sports experienced by all participants (Participants) wheelchair bound (Wheelchair) and ambulant (Ambulant) Paralympic athletes.

<table>
<thead>
<tr>
<th>Personal factors:</th>
<th>Participants (n=76)</th>
<th>Wheelchair (n=37)</th>
<th>Ambulant (n=39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being dependent of others to be able to exercise</td>
<td>17 22</td>
<td>12 32</td>
<td>5 13</td>
</tr>
<tr>
<td>Not comfortable in the presence of other athletes</td>
<td>10 13</td>
<td>4 11</td>
<td>6 15</td>
</tr>
<tr>
<td>Fear of injuries</td>
<td>7 9</td>
<td>5 14</td>
<td>2 5</td>
</tr>
<tr>
<td>Too busy with other activities</td>
<td>5 7</td>
<td>2 5</td>
<td>3 8</td>
</tr>
<tr>
<td>Not being able to exercise because of physical disability</td>
<td>4 5</td>
<td>2 5</td>
<td>2 5</td>
</tr>
<tr>
<td>Other</td>
<td>9 12</td>
<td>3 8</td>
<td>6 15</td>
</tr>
<tr>
<td>Environmental factors:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too little sport facilities in the neighbourhood</td>
<td>23 30</td>
<td>19 51*</td>
<td>4 10*</td>
</tr>
<tr>
<td>No/not sufficiently qualified supervision</td>
<td>19 25</td>
<td>12 32</td>
<td>7 18</td>
</tr>
<tr>
<td>Transport</td>
<td>17 22</td>
<td>12 32</td>
<td>5 13</td>
</tr>
<tr>
<td>Materials are too expensive</td>
<td>14 18</td>
<td>9 24</td>
<td>5 13</td>
</tr>
<tr>
<td>Disabled athletes are not (fully) accepted</td>
<td>13 17</td>
<td>6 16</td>
<td>7 18</td>
</tr>
<tr>
<td>Facilities not (sufficiently) adjusted</td>
<td>12 16</td>
<td>11 30*</td>
<td>1 3*</td>
</tr>
<tr>
<td>Sports possibilities are unknown</td>
<td>12 16</td>
<td>8 22</td>
<td>4 10</td>
</tr>
<tr>
<td>Not enough fellow disabled athletes</td>
<td>10 13</td>
<td>5 14</td>
<td>5 13</td>
</tr>
<tr>
<td>Not enough materials available</td>
<td>7 9</td>
<td>4 11</td>
<td>3 8</td>
</tr>
<tr>
<td>Practice/Training is not (sufficiently) adapted</td>
<td>7 9</td>
<td>5 14</td>
<td>2 5</td>
</tr>
<tr>
<td>Not enough support from environment</td>
<td>6 8</td>
<td>3 8</td>
<td>3 8</td>
</tr>
<tr>
<td>Materials not (sufficiently) adjusted</td>
<td>5 7</td>
<td>4 11</td>
<td>1 3</td>
</tr>
<tr>
<td>No possibilities to exercise with peers</td>
<td>4 5</td>
<td>2 5</td>
<td>2 5</td>
</tr>
<tr>
<td>Sports activities are too expensive</td>
<td>2 3</td>
<td>1 3</td>
<td>1 3</td>
</tr>
<tr>
<td>Sports are too competitive</td>
<td>1 1</td>
<td>0 0</td>
<td>1 3</td>
</tr>
<tr>
<td>Other</td>
<td>8 11</td>
<td>3 8</td>
<td>5 13</td>
</tr>
<tr>
<td>No barriers</td>
<td>28 37</td>
<td>12 32</td>
<td>16 41</td>
</tr>
</tbody>
</table>

* Significant differences between wheelchair and ambulant athletes (p < 0.01).
environmental factor ‘transport’ were both more frequently experienced by wheelchair bound athletes (32%) compared to ambulant athletes (13%; \(p = 0.055\) for both factors). Thirty-seven percent of the athletes did not experience any barriers to sports (57% ambulant, 43 % wheelchair).

**Facilitators**

Main personal factors for initiating / maintaining sports of Dutch Paralympic athletes were ‘fun and relaxation’ (78% / 82%), ‘health and physical fitness’ (61% / 76%) and ‘competition and winning’ (53% / 72%), as is shown in Table 3.

The personal factor ‘health and physical fitness’ was more frequently mentioned for maintaining sports (76%) than for initiating sports (61%) \( (\chi^2 = 6.050, df 1, p = 0.012)\), as was also the case for ‘competition and winning’ 72% and 53% respectively \( (\chi^2 = 6.759, df 1, p = 0.009)\). Wheelchair athletes mentioned ‘health and fitness’ for maintaining sports most frequently (89%) \( (p = 0.015, \text{Fisher’s exact test})\), compared

<p>| Table 3. Facilitators of initiating and maintaining sports for all Paralympic athletes (total), the wheelchair bound athletes (wheelchair) and the ambulant athletes (ambulant). |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Wheelchair initiate (n=37)</th>
<th>Ambulant initiate (n=39)</th>
<th>Wheelchair maintain (n=37)</th>
<th>Ambulant maintain (n=39)</th>
<th>Total initiate (n=76)</th>
<th>Total maintain (n=76)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal factors:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fun/relaxation</td>
<td>30 (81)</td>
<td>29 (74)</td>
<td>29 (78)</td>
<td>33 (85)</td>
<td>59 (78)</td>
</tr>
<tr>
<td>Health/physical fitness</td>
<td>24 (65)</td>
<td>22 (56)</td>
<td>33 (89)</td>
<td>25 (64)</td>
<td>46 (61)</td>
</tr>
<tr>
<td>Competition/winning</td>
<td>21 (57)</td>
<td>19 (49)</td>
<td>30 (81)</td>
<td>25 (64)</td>
<td>40 (53)</td>
</tr>
<tr>
<td>Social contacts</td>
<td>18 (49)</td>
<td>19 (49)</td>
<td>26 (70)</td>
<td>20 (51)</td>
<td>37 (49)</td>
</tr>
<tr>
<td>Loose energy</td>
<td>18 (49)</td>
<td>18 (46)</td>
<td>17 (46)</td>
<td>17 (44)</td>
<td>36 (47)</td>
</tr>
<tr>
<td>Strength</td>
<td>16 (43)</td>
<td>16 (41)</td>
<td>20 (54)</td>
<td>18 (46)</td>
<td>32 (42)</td>
</tr>
<tr>
<td>Acceptance disability*</td>
<td>6 (16)</td>
<td>9 (23)</td>
<td>20 (45)</td>
<td>15 (20)</td>
<td>30 (39)</td>
</tr>
<tr>
<td>Self confidence</td>
<td>5 (14)</td>
<td>10 (26)</td>
<td>9 (24)</td>
<td>9 (23)</td>
<td>15 (20)</td>
</tr>
<tr>
<td>Learning new skills*</td>
<td>3 (8)</td>
<td>7 (18)</td>
<td>10 (26)</td>
<td>9 (23)</td>
<td>19 (25)</td>
</tr>
<tr>
<td>Weight control</td>
<td>3 (8)</td>
<td>5 (13)</td>
<td>10 (27)</td>
<td>6 (15)</td>
<td>16 (21)</td>
</tr>
<tr>
<td>More independence</td>
<td>3 (8)</td>
<td>3 (8)</td>
<td>5 (14)</td>
<td>1 (3)</td>
<td>6 (8)</td>
</tr>
<tr>
<td>Dealing with disability and aid*</td>
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<td>1 (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3 (8)</td>
<td>5 (13)</td>
<td>3 (8)</td>
<td>5 (13)</td>
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<tr>
<td><strong>Environmental factors:</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Support from family, partner or children</td>
<td>14 (38)</td>
<td>16 (41)</td>
<td>15 (41)</td>
<td>16 (41)</td>
<td>30 (40)</td>
</tr>
<tr>
<td>Support from friends and colleagues</td>
<td>3 (8)</td>
<td>9 (23)</td>
<td>10 (27)</td>
<td>13 (33)</td>
<td>12 (16)</td>
</tr>
<tr>
<td>Medical indication</td>
<td>8 (22)</td>
<td>3 (8)</td>
<td>3 (8)</td>
<td>2 (5)</td>
<td>11 (15)</td>
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<td>Other</td>
<td>30 (81)</td>
<td>29 (74)</td>
<td>1 (3)</td>
<td>2 (5)</td>
<td>5 (7)</td>
</tr>
</tbody>
</table>

* Only factors for initiating exercise.
# Significant differences between initiate and maintain exercising \( (p < 0.05)\)
$ Significant differences between wheelchair and ambulant athletes \( (p < 0.05)\)
to ambulant athletes (64%).

Main environmental factor for initiating / maintaining sports was ‘support from family, partner or children’ (40% / 41%).

Discussion

The aim of this study was to gain insight in the barriers and facilitators of sports in Dutch Paralympic athletes with a physical disability. Most experienced personal barrier was dependency of others, while most mentioned environmental barrier was too little sports facilities in the neighbourhood. The barrier too little sports facilities was significantly more mentioned by wheelchair athletes than by ambulant athletes. Over one-third of the athletes did not experience any barriers.

Main personal facilitators were fun, health and competition. Health and competition were significantly more mentioned for maintaining sports than for initiating sports. Wheelchair athletes mentioned health for maintaining sports significantly more than ambulant athletes. Most mentioned environmental facilitator was support from family.

ICF model

Personal factors

Barriers
The most frequently experienced personal barrier was dependency of others, which was more frequently mentioned by wheelchair athletes than by ambulant athletes. This finding is similar to that of previous research where athletes with spinal cord injuries expressed difficulties with personal assistance in order to access equipment or do the exercises \[9\]. As wheelchair athletes often need help from professionals or family to participate in sports, this could feel as a burden on those people.

Facilitators
First frequently experienced personal facilitator by Paralympic athletes was health. Others also found that health is among the most important facilitators in participation in sports \[7,11-13\]. In this study health was not only important as an initiating factor of sports but also for maintaining sports, especially for wheelchair athletes. In general a good health helps in preventing secondary conditions and in remaining independent \[9,24\].

Fun was also a factor that was experienced as personal facilitator by most of
the Paralympic athletes in this study, which is in accordance with others studies.[7,11,13]

Competition or winning were also factors that were experienced as personal facilitators in this study, which is to be expected of (Paralympic) athletes in general but also of disabled athletes[11,12,14]. This study showed that the athletes found this factor more important for maintaining than for initiating participation in sports. This finding may indicate that once athletes start winning matches, the focus of the sport will be more on competition and winning and becomes a more important reason to continue participating in sports.

Environmental factors

Barriers

Environmental barriers most frequently experienced by Dutch Paralympic athletes were lack of facilities in the neighbourhood, which agrees with previous research[13]. Lack of facilities in the neighbourhood was especially a problem for wheelchair athletes, which may imply that wheelchair athletes have to look for facilities specifically for disabled sports and have difficulty integrating with able-bodied athletes. Sport facilities that also provide wheelchair sports are probably less available than facilities for able-bodied sports, especially in rural areas.

Lack of qualified supervision was another environmental barrier experienced by Paralympic athletes. This result is in contrast with previous research, where supervision was mentioned as a facilitator for sports participation and not as a barrier[25,26]. This contradiction might have occurred because in this study we specifically asked for barriers at the start of participation in sport. Perhaps supervision changes from being a barrier to becoming a facilitator after athletes and supervisors are working more intensively, and performance becomes more important.

Transport was also frequently mentioned as environmental barrier to sports participation. Difficulties with transportation for athletes in this study concern lack of transportation, large expenses for taxi services to and from the sport facilities and difficulties with public transport because of the use of a wheelchair. These difficulties have been found often in research[7,8,27].

An interesting result was that over one-third of the athletes did not experience any barriers of sports participation. This could indicate that though barriers of sports participation are present, these athletes do not perceive them as such. These athletes may focus only on the positive factors of sports. The athletes who did not perceive any barriers were more often men (57%) but no other characteristic were found for this group.
Facilitators
Most frequently experienced environmental facilitator was support from family. This result was also found in disabled swimmers\textsuperscript{[25]}. Support from family or partner can help in providing emotional, functional or economical support\textsuperscript{[25]}. It could be that athletes experience support from family as a positive influence, because their family can help to motivate them to continue participation in sports at difficult times. Family could also help in perceiving the right balance between sport and relaxation. All above mentioned results according to the ICF model can be found in Figure 1.

Theory of Planned Behaviour
The most frequently experienced facilitators are all personal factors, which are associated with their attitude towards sports. Athletes in this study chose to participate because they consider it to be good for their health, they believe it was fun and they have the ambition to win competitions. These factors can all be considered positive outcomes of sports. These positive factors lead to the intention of participating in sports and have also shown to be reasons to remain participating in sports (Figure 2). Subjective norm was also an important facilitator in sports in Dutch Paralympic athletes. The Paralympic athletes considered support from family, spouse and children to be the most important environmental facilitator for participating in sports. This could indicate that the athletes do not see the social pressure of family as a negative for their sports, but consider support from people around them to be a help in performing in their sport. Support from family is equally important at starting and at continuing their sport.

Factors for perceived behavioural control were not experienced by the Paralympic athletes. This could indicate that the athletes do not consider the control over their sports was of any influence in their sports participation. So despite the presence of barriers to sports, these experienced barriers were outweighed by the experienced facilitators and do not change the athletes’ intention to participation in sports.

The study showed a response rate of over 50\% and similar characteristics of the participants of age, gender, disability and sport for participants and the total Dutch Paralympic athletes’ population. Based on these characteristics, generalisation to all Dutch elite level Paralympic athletes may be possible. Other characteristics, possibly limiting generalisation, of the total Dutch Paralympic athletes’ population were not known.

This study was an explorative study, where we used a questionnaire that was
partly based on a previously used questionnaire. The psychometric properties of
the used questionnaire are therefore unknown. Future research could focus on
reliability and (construct) validity of the questionnaire for barriers and facilitators
of sports for people with physical disabilities. Also, this study concentrated solely
on Dutch Paralympic athletes. The Netherlands are a relatively small country with
considerable achievements at previous Paralympic Games, with 22 medals in
Beijing (2008) and 39 medals in London (2012)[28]. The Netherlands also have an
organization of disabled sport being integrated with able-bodied sports, which is
not the case for all Paralympic countries. Consequently the Netherlands cannot
be considered as a representative for all Paralympic countries based on previous
Paralympic results and organisation. Further research at barriers and facilitators in
different Paralympic countries would therefore be recommended, where previous
successes at Paralympic Games and organisation of disabled sports are taken
into consideration. Finally in order to compare these results with people with
disabilities who do not actively participate in sports, future research should also
focus on barriers and facilitators of sports and physical activity in people with
physical disabilities in general.

Conclusion

These results of this study indicate that barriers of sports are mostly environmental,
while facilitators are usually personal factors. Also, attitude and subjective norm are
considered the most important components for intention to participation in sports.
Therefore the facilitators outweigh the barriers and allow athletes to maintain their
intention in sports participation. These findings provide insight in both barriers and
facilitators of sports, because Paralympic athletes from all disability groups were
included. This knowledge can help in providing advices for policy makers in sports
and rehabilitation to reduce barriers and increase facilitators in order to improve
sports participation.
References


Barriers and facilitators of sports in Dutch Paralympic athletes.

Research shows that only few people with a disability regularly participate in sports. We are from the Department of Rehabilitation Medicine, of the University Medical Centre Groningen, and are interested in why people with a disability participate in sports. This research is in collaboration with the Netherlands National Paralympic Committee. Results from the questionnaire can help us give insight in what you consider to be the most important barriers and facilitators. We would also like ask you a few questions about nutrition, mental training and how you combine work or education with elite sport.

There are no correct or incorrect answers to the questions. What counts is your opinion. Every question is asked with a specific reason, even if the question may not seem relevant to you personally.

The answers to the questions will be processed anonymously.

Completion of the questionnaire will take only 10-15 minutes.

Thank you in advance for your cooperation.

**Barriers/facilitators of sports:**

28) Did somebody encourage you to start participating in Paralympic sports?
   - No → Please go to question 32
   - Yes

29) Who encouraged you to start participating in Paralympic sports?
   *Multiple answers possible*
   - Medical specialist (rehabilitation specialist, surgeon, etc)
   - Physiotherapist
   - General Practitioner
   - Sports & Exercise coordinator
   - Cesar therapist
   - Occupational therapist
   - Family
   - Parents/Caretaker
   - Friends
   - Partner
   - Lecturer
   - Other, namely...............................................................................................................

30) How did you discover sports possibilities for people with disabilities?
   *Multiple answers possible*
   - Local newspaper
   - National newspaper
   - Internet, website: ............................................................................................................
   - Information from the county
   - Information from the physiotherapist
   - Information from the medical specialist/ rehabilitation centre
   - (Local) interest groups for people with disabilities
   - Family and friends
   - Education
   - Sports club
31) What were the reasons for *start* participating in sports?

*Multiple answers possible*

**Personal factors:**
- Increasing Health/physical fitness
- Having fun/relaxation
- Increasing Strength
- Increasing Social contacts
- Losing weight
- Increasing Self confidence
- Loosing energy
- Learning new skills
- Competition/winning
- Increasing independence
- Accepting disability
- Learning how to deal with disability/wheelchair/aid
- Other, namely ............................................................................................................

**Environmental factors:**
- Support from family, partner or children
- Support from friends and colleagues
- Medical indication
- Other, namely ............................................................................................................

32) What were the facilitators for *maintaining* sports?

*Multiple answers possible*

**Personal factors:**
- Remaining health/physical fitness
- Remaining fun/relaxation
- Remaining strength
- Remaining social contacts
- Controlling weight
- Remaining self confidence
- Losing energy
- Competition/winning
- Independence of others
- Other, namely ............................................................................................................

**Environmental factors:**
- Support from family, partner or children
- Support from friends and colleagues
- Medical indication
- Other, namely ............................................................................................................

33) What barriers did you experience when you started participating in sports?

*Multiple answers possible*
Personal factors:

- Not being able to exercise because of disability
- Being (too) busy with other activities
- Not being comfortable in the presence of other athletes
- Having fear of injuries
- Being dependent of others to be able to exercise
- Other

Environmental factors:

- Sports possibilities are unknown
- Having little sports possibilities in the neighbourhood
- No/not sufficiently qualified supervision
- Facilities not (sufficiently) adjusted
- Transport
- Materials not (sufficiently) adjusted
- Lack of materials available
- Materials are too expensive
- Practice/Training is not (sufficiently) adapted
- Sports activities are too expensive
- Sports are too competitive
- Lack of possibilities to exercise with peers
- Disabled athletes are not (fully) accepted
- Lack of support from environment
- Lack of fellow disabled athletes
- Other, namely………………………………………………………………………….......

34) On reflection, what do you consider the most important factors for initiating sports?

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35) On reflection, what do you consider the most important factors for maintaining sports?

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36) What aspects of your sports club/federation concerning possibilities for Paralympic athletes are adequate?

Please explain

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37) What aspects of your sports club/federation would you like to see improved, in order to increase sports possibilities for Paralympic athletes?

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38) In general, what aspects of your sports club/federation would you like to see improved, to make it easier for people with disabilities to start and continue participating in sports?

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39) In general, what changes should be made in your environment to reduce barriers to performing sports for people with disabilities?

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40) What improvements could be made in the organisation of Paralympic sports of your country to increase sports participation of people with disabilities?

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41) What do you consider the three largest barriers for initiating sports for people with disabilities?
1) .................................
2) .................................
3) .................................

42) What do you consider the three largest barriers for maintaining sports for people with disabilities?
1) .................................
2) .................................
3) .................................

43) What advice would you give other people with disabilities who would like to initiate sports?
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44) Research is necessary to increase medical care, now and in the future. Would you mind being approached again for participating in a research of the Rehabilitation Department of the University Medical Center of Groningen, the Netherlands?

☐ Yes
☐ No, please indicate name and (email) address below.
  Name:..............................................................................................................................................
  Address:..........................................................................................................................................
  Email address:...............................................................................................................................