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Having Fun and Staying Active! Children with Disabilities and Participation in Physical Activity: A Follow-Up Study

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ABSTRACT

Aim: This study investigated change in the participation profile of physical activity over 15 months after a three-week intensive rehabilitation that used physical activity as the main intervention. *Methods*: The Children's Assessment of Participation and Enjoyment (CAPE) was used in a longitudinal prospective study (pre- and post-design) with three measurements over 15 months. Eighty children with physical disabilities (6–17 years old; mean score 11.1; SD 2.4), some with additional cognitive challenges, completed all three measurements. *Results*: Participation diversity and intensity of all 55 leisure activities declined significantly over the 15-month period. The largest decline was for children aged between 10 and 13 years. Among physical activities, there was a stable level of participation of the total group, and sub-groups. Boys preferred "active physical activities" to a greater extent, while girls preferred "skill-based activities." Both genders expressed a higher level of enjoyment in their preferred activities according to the Preferences for Activities of Children. *Conclusions*: This intervention may have the potential to maintain the level of physical activity among children and youths with disabilities, yet further controlled studies are needed. Gender differences should be taken into consideration to facilitate stable participation in physical activities with a high level of enjoyment.

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Participation; physical activity; enjoyment; children; disabilities; Children's Assessment of Participation and Enjoyment (CAPE)

Participation in leisure activities is essential for children's development. Through participation, children develop both mental and physical health, gain social competence, and form friendships (King et al., 2003; Schreuer et al., 2013). Research has found a positive relationship between participation in leisure activities and improvement in quality of life for children with disabilities (Dahan-Oliel et al., 2012). Children with disabilities are at risk of limited participation in leisure activities compared with their peers without disabilities (King et al., 2009). They face increased barriers for successful participation, and participate in fewer activities with less variation and intensity compared with their non-disabled peers, and quiet recreational activities performed at home with family members or alone are more frequent (Imms, 2008a; Law et al., 2006). The difference in participation between children with

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disabilities and their non-disabled peers increases during adolescence (Brown & Gordon, 1987; Bult et al., 2010; King et al., 2010b).

In spite of an increasing research focus studying change in participation, there is still limited evidence based on longitudinal studies investigating change in participation among children with disability (Anaby et al., 2012; King et al., 2009). The barriers that people with disabilities experience regarding participation in physical activities are critical as inactivity is one of the Western world's biggest health challenges (World Health Organization (WHO), 2010); in addition, the consequences of inactivity are more extensive for persons with disabilities (Fowler et al., 2007; Imms, 2008a). Secondary impairments, such as chronic fatigue, pain, and osteoporosis, are among the health challenges upon which physical activity has a positive impact (Cardinal et al., 2004; Fowler et al., 2007; Jahnsen et al., 2003). During adolescence, there is a well-documented decrease in participation in physical activity for both children with and without disabilities (Dumith et al., 2011; King et al., 2009; Klasson-Heggebø & Anderssen, 2003). The decline is steepest from 10–12 years of age (Law et al., 2006). Furthermore, a gender difference has been shown in preferred activities. Boys are reported to participate more in physical activity compared with girls (Dumith et al., 2011; Law et al., 2006). However, staying active during adolescence does not only have an impact on children's immediate mental and physical health but it is through adolescence that an adult lifestyle is developed, and children with disabilities who have positive experiences with physical activity during childhood are more likely to stay active in adulthood (Claassen et al., 2011; Jahnsen et al., 2003).

Experience is a subjective aspect of participation and has been identified as a significant predictor for continuous participation among children with disabilities (Heah et al., 2007; Martin, 2006; McConachie et al., 2006). Imms (2008a) called for studies that measure the aspect of enjoyment in participation, an aspect characterized as a key indicator of successful participation. Hammel et al. (2008) supported the crucial aspect of enjoyment and claimed that "more is not necessarily better," indicating the importance of enjoyment of activity. Disability research highlights the importance of rehabilitation interventions with the objective of stimulating successful and enjoyable participation in physical activity, preventing further decline in participation for these children (Heah et al., 2007; Rosenbaum & Gorter, 2012).

The intervention in this study was conducted at the Beitostølen Health Sports Center (BHC) (Beitostølen Helsesportssenter, n.d.), a Norwegian public-funded rehabilitation center. The primary focus at BHC is to offer a resource-focused approach with a variation of adapted physical activities, which refers to those adapted for persons with a range of disabilities, including the use of technical devices (Hutzler & Sherrill, 2007). The aim is to achieve competence in the specific activities according to the children's self-defined goals. Another aim is to maintain participation in preferred activities in the local community post-intervention by involving parents and professionals to adapt both activities and physical and social environment, including use of technical aids. Children and parents are residents at the center for a period of 19 days. The intervention includes three to four individual or group-based activity sessions per day led by a multidisciplinary team (physical therapist, occupational therapist, and sports pedagogue). If a child's goal is ski learning, the therapist will provide the right equipment based on the child's function and needs and create an individual-adapted learning environment to develop necessary skills to achieve the goal. The parents are involved in the activities to secure transfer to the home environment, and they also follow an additional parental program. Thus, the intervention captures several of the factors noted by King et al. (2003) that are important for participation, including children's preferences and resources, environmental and parental support through training, and education and knowledge transfer.

This study addresses the need for longitudinal studies on participation in physical activities among children with disabilities (King et al., 2009; Shikako-Thomas et al., 2012). It also focuses on the children's self-experienced enjoyment of participation. Therefore, the potential knowledge contribution relates to the importance of the concept of enjoyment (Hammel et al., 2008; Rosenbaum & Gorter, 2012) as well as the need for studies analyzing this aspect (Imms, 2008a). The aims of this study were to examine changes in the participation profile in leisure time physical activity with regard to diversity, intensity, and enjoyment 15 months after a three-week rehabilitation intervention; to assess the association between participation and enjoyment; and to determine whether the participation profile of the children of this study differs from the results of comparable studies. Summarized, the long-term goal, and the expected outcome of the intervention, is to stimulate enjoyable, self-determined, and stable participation in physical activity among children with disability. This longitudinal study has no control group, therefore the findings will be discussed in the light of the results from other studies.

Methods

Design

This study applied a 15-month longitudinal quasi-experimental single group pre-/post-test design to the participation profile of children with disabilities using the Children's Assessment of Participation and Enjoyment (CAPE; King et al., 2004). Measurements were completed at: baseline (time 1) upon arrival at the rehabilitation center assessing participation during the last four months before intervention, three months post-intervention (time 2), and 15 months post-intervention (time 3). In Norway, there are significant seasonal differences. The three- and 15-month intervals after rehabilitation intervention were chosen so that the two measurements were conducted in the same season, avoiding differences in scores caused by season-dependent effects.

Participants

Participants in the study were recruited among children in a rehabilitation stay at BHC. The study was approved by the Regional Committee for Medical Research Ethics, South East Norway (REK-Southern East-A nr: S-08658a) and the Data Inspectorate (nr: 20055). Before participating in the study, both parents and children signed informed consent forms.

The children were aged 6–17 years with multiple disabilities, primary physical disabilities, and some with additional cognitive challenges. At baseline, 152 children (67 girls and 85 boys) participated, while 80 children (32 girls and 48 boys) completed all three data collections. The children who withdrew ($n = 72$) were compared with the children that completed all of the three measurements ($n = 80$). Characteristics for both groups of children are shown in Table 1. Older children were more likely to withdraw from the study than younger children, and the children with muscle/skeletal deformities and metabolic disorders of the CNS were more likely to withdraw than children with other diagnoses (Table 1).

Measures

Children's Assessment of Participation and Enjoyment (CAPE)

The translated Norwegian version of CAPE was used in this study. CAPE was designed for persons with or without disabilities from 6–21 years of age (King et al., 2004). Its aim

Table 1. Characteristics of the participants and dropouts at three measurement times.

Characteristic	Time 1	Time 2	Time 3	Dropout
Number	152	118	80	72
Gender *n* (%)				
Girls	67 (44.1)	51 (43.2)	32 (40)	35 (48)
Boys	85 (55.9)	67 (56.8)	48 (60)	37 (51.4)
Age; mean (SD). min–max*	11.9 (2.6)	11.6 (2.5)	11.1 (2.4)	12.5 (2.5)
Age group *n* (%)				
6–9 years	35 (23)	31 (26.3)	26 (32.5)	9 (12.5)
10–13 years	73 (48)	59 (50)	37 (46.3)	36 (50)
14–17 years*	44 (28.9)	28 (23.7)	17 (21.3)	27 (37.5)
Child's primary health and development problem *n* (%)				
Cerebral palsy	57 (37.5)	41 (34.7)	31 (38.8)	26 (36.1)
Developmental delay (mental retardation?)	18 (11.8)	18 (15.3)	13 (16.3)	5 (6.9)
Sensory loss (visual and hearing loss)	9 (5.9)	6 (5.1)	5 (6.3)	4 (5.6)
Muscle/skeletal deformities*	9 (5.9)	7 (5.9)	2 (2.5)	7 (9.7)
Deformities/metabolic disorders in the CNS*	10 (6.6)	6 (5.1)	1 (1.3)	9 (12.5)
Spina bifida	16 (10.5)	12 (10.2)	9 (11.3)	7 (9.7)
Neurological diseases	13 (8.6)	11 (9.3)	9 (11.3)	4 (5.6)
Other	20 (13.2)	17(14.4)	10 (12.5)	10 (13.9)

*Significant difference between participants at time 3 and dropouts.

is to document the participation profile in leisure activities and to assess the effectiveness of participation-based interventions (Imms, 2008b). The CAPE also seeks to capture the children's subjective experience of enjoyment and has been reported to be a reliable and valid measure in several countries as well as in Norway (Bult et al., 2010; Imms, 2008b; King et al., 2006, 2004; Nordtorp et al., 2013; Ullenhag et al., 2012). The responsiveness of CAPE has been reported to have potential (Anaby et al., 2012; King et al., 2009) but further studies are needed to establish substantial evidence (Imms, 2008b). Imms (2008b) stated that the conceptual strengths of CAPE include its measurement of multiple dimensions of participation.

The CAPE was developed to collect children's own experience of participation (Imms, 2008b; King et al., 2004; McConachie et al., 2006) and can be self-administered or conducted as part of an interview. The Preference for Activity of Children (PAC) is often considered as an extension of CAPE, but it can also be used independently. The PAC determines the child's preferences for activity in the same items covered by the CAPE (Imms, 2008b; King et al., 2006; King et al., 2004).

The CAPE consists of 55 items covering a range of leisure activities. Each of the items is scored in the following five dimensions: (1) diversity (how many activities), (2) intensity (how often an activity is performed), (3) with whom, (4) where, and (5) enjoyment. The dimensions of interest of this study are diversity, intensity, and enjoyment. The items are categorized into activity domains of *formal* (15 items) and *informal* (40 items) and activity types of *recreational* (12 items), *active physical* (13 items), *social* (10 items), *skill-based* (10 items), and *self-improvement* (10 items) (King et al., 2004). This study intended to investigate the potential change in the physical activity profile. Both *active physical activity* and *skill-based activity* categories include activities that are understood in a Norwegian cultural context as physical activities that are in line with those targeted in the intervention. Therefore, these two activity categories were analyzed further. However, the level of physical activity may vary across different activities in these two categories. The overall CAPE scores are included to allow comparison with other studies concerning participation in all leisure activities. Demographic information was collected by a questionnaire given to the parents and from the children's medical chart.

Procedure

Data collection at baseline (time 1) was performed using CAPE as a self-reported questionnaire under the supervision of trained therapists at arrival to the rehabilitation center. For times 2 and 3, the questionnaires were sent by post to the participants' homes for self-completion and return.

Data Analysis

Analyses were completed using IBM Statistical Package for the Social Sciences (SPSS) version 22 for Windows. The level of significance was set at $p < 0.05$. The data were treated as ordinal variables, and because the data were skewed, non-parametric tests were used. Differences between the drop out group and the group that completed all three measurements were tested by Chi-square, Mann–Whitney U, and Fisher's Exact tests. The Friedman test was used to detect differences between the three time points of data collection. With regard to possible gender differences, the Mann–Whitney U test was used, while differences between the three age groups were tested with the Kruskal–Wallis test (Field, 2013). Data were analyzed for the whole group, then for the two genders and the three age groups separately. The age range was 6–17 years and was divided into three equal age groups corresponding to the Norwegian school system (6–9, 10–13, and 14–17 years). The analyses were conducted for all 55 activities, including active physical activities and skill-based activities. The three dimensions analyzed were diversity, intensity, and enjoyment.

Results

Table 2 shows the scores for the total group, girls, and boys separately, all 55 leisure activities, active physical activities, and skill-based activities. The Friedman test revealed a significant decrease ($x^2 = 7.47$, $p = 0.02$) in the median score for overall diversity of participation at 15 months from 29 (range 16–39) to 27 (range 13–41). There also was a significant decrease ($x^2 = 9.28$, $p = 0.01$) in the median score for overall intensity of participation at 15 months from 2.4 (range 1–4) to 2.3 (range 1–4). Median scores for diversity and intensity of participation in physical and skill-based activities did not change.

Neither girls nor boys had a significant change in median score for overall diversity and intensity of participation (Table 2). For girls, the Friedman test indicated that the median diversity ($x^2 = 6.13$, $p = 0.05$) and intensity ($x^2 = 7.26$, $p = 0.03$) scores for active physical activities decreased at 15 months.

Comparison of Girls and Boys

Median scores for diversity of active physical activities were higher for boys than girls at time 2 (U = 1,102, $z = -3.34$, $p = 0.001$) and at time 3 (U = 497, $z = -2.70$, $p = 0.006$). Median scores for intensity of active physical activities were also higher for boys than girls at time 2 (U = 852.5, $z = -3.89$, $p = 0.001$) and time 3 (U = 440, $z = -2.95$, $p = 0.003$). Boys reported higher enjoyment of participation in active physical activities at time 1 (U = 2,024, $z = -2.72$, $p = 0.007$) and time 3 (U = 533.5, $z = -2.01$, $p = 0.045$) compared with girls.

Median scores for diversity of skill-based activities was higher for girls at time 3 (U = 551, $z = -2.18$, $p = 0.029$), and median scores for intensity of skill-based activities was higher for girls at time 2 (U = 1,070, $z = -2.70$, $p = 0.007$). Girls reported higher enjoyment of skill-based activities at time 3 (U = 456.5, $z = -2.51$, $p = 0.012$) than boys.

Table 2. The CAPE scores of participation for all 55 activities, in physical- and skill-based activities, and activities of physical character for all participants and the two genders separately.

	Time 1 mean (SD)/median (min/max)	Time 2 mean (SD)/median (min/max)	Time 3 mean (SD)/median (min/max)
Diversity			
All 55 activities, all* ($n = 80$)	28.2 (5.3)/29.0 (16/39)	27.3 (5.4)/27.0 (15/43)	27.1(5.7)/27.0 (13/41)
Girls ($n = 32$)	28.4 (5.9)/31.0 (16/38)	27.4 (5.6)/27.0 (15/43)	27.4 (6.1)/27.5 (17/38)
Boys ($n = 48$)	28.0 (4.9)/29.0 (18/39)	27.3 (5.3)/27.0 (16/37)	26.9 (5.5)/27.0 (13/41)
Physical all	3.9 (1.8)/4.0 (0/8)	3.7 (2.3)/4.0 (0/9)	3.6 (1.9)/4.0 (0/9)
Girls*	3.4 (1.5)/4.0 (0/6)	2.7 (1.8)/2.5 (0/8)	2.8 (1.7)/2.5 (0/7)
Boys	4.2 (2.0)/4.0 (1/8)	4.4 (2.3)/4.0 (0/9) **	4.1 (1.9)/4.0 (0/9) **
Skill-based all	2.5 (1.5)/2.0 (0/6)	2.7 (1.6)/3.0 (1/7)	2.5 (1.5)/2.0 (0/6)
Girls	2.8 (1.6)/3.0 (0/6)	3.0 (1.6)/3.0 (0/6)	3.0 (1.5)/3.0 (1/6) **
Boys	2.3 (1.4)/2.0 (0/6)	2.4 (1.5)/2.0 (0/7)	2.2 (1.4)/2.0 (0/5)
Intensity			
All 55 activities, all*	2.4 (0.7)/2.4 (1/4)	2.3 (0.5)/2.3 (1/4)	2.3 (0.5)/2.3 (1/4)
Girls	2.5 (0.6)/2.7 (1/4)	2.3 (0.6)/2.3 (1/4)	2.3 (0.6)/2.3 (1/4)
Boys	2.4 (0.5)/2.4 (1/4)	2.3 (0.5)/2.4 (1/3)	2.3 (0.5)/2.3 (1/4)
Physical all	1.4 (0.7)/1.2 (0/3)	1.3 (0.7)/1.2 (0/3)	1.3 (0.8)/1.2 (0/4)
Girls*	1.1 (0.5)/1.1 (0/2)	0.9 (0.5)/0.9 (0/3)	0.9 (0.6)/0.9 (0/3)
Boys	1.1 (0.8)/1.3 (0/3)	1.5 (0.7)/1.5 (0/3) **	1.4 (0.8)/1.2 (0/4) **
Skill-based all	1.3 (0.7)/1.2 (0/3)	1.3 (0.7)/1.2 (0/4)	1.3 (0.7)/1.1 (0/3)
Girls	1.4 (0.8)/1.4 (0/3)	1.5 (0.7)/1.3 (1/3) **	1.4 (0.8)/1.3 (0/3)
Boys	1.1 (0.7)/1.1 (0/3)	1.1 (0.7)/1.2 (0/4)	1.1 (0.6)/1.0 (0/2)
Enjoyment			
All 55 activities, all	3.9(0.5)/3.9 (3/5)	4.0 (0.5)/4.0 (3/5)	3.9 (0.5)/3.9 (2/5)
Girls	3.9 (0.5)/3.9 (3/5)	4.0 (0.4)/4.0 (3/5)	4.1 (0.5)/4.1 (3/5)
Boys	3.9 (0.5)/4.0 (3/5)	3.9 (0.5)/4.0 (3/5)	3.9 (0.5)/3.9 (2/5)
Physical all	4.1(0.7)/4.0 (2/5)	3.9 (0.9)/4.2 (1/5)	4.0 (0.7)/4.0 (1/5)
Girls	3.7 (0.7)/3.8 (2/5)	3.8 (1.0)/4.0 (1/5)	3.9 (0.7)/4.0 (3/5)
Boys	4.3 (0.6)/4.4 (3/5) **	4.0 (0.9)/4.3 (1/5)	4.1 (0.7)/4.3 (1/5) **
Skill-based, all	4.3(0.8)/4.5 (1/5)	4.3 (0.7)/4.5 (2/5)	4.3 (0.8)/4.5 (2/5)
Girls	4.2 (0.9)/4.5 (1/5)	4.4 (0.6)/4.6 (3/5)	4.5 (0.6)/4.8 (3/5) **
Boys	4.1 (0.9)/4.5 (2/5)	4.2 (0.8)/4.3 (2/5)	4.1 (0.8)/4.4 (2/5)

*Significant change between times: $p < 0.05$.
**Significant difference between gender: $p < 0.05$.

Comparison of Age Groups

Change in participation at 15 months was analyzed for three age groups (6–9, 10–13, and 14–17 years). Descriptive statistics are presented in Table 3. Children aged 10–13 years showed a decline in both diversity ($x^2 = 10.71$, $p = 0.005$) and intensity ($x^2 = 9.16$, $p = 0.01$) of overall participation at 15 months. Overall diversity and intensity of participation at 15 months did not change for children in the 6–9- and 14–17-year age groups.

The youngest children (6–9 years old) had higher diversity of overall participation at 15 months (H = 16.96, $p < 0.001$) than the two other age groups. Children 6–9 years of age also had a higher intensity of overall participation at time 1 (H(2) = 25.45, $p < 0.001$), time 2 (H(2) = 15.01, $p = 0.001$), and time 3 (H(2) = 12.87, $p = 0.002$). There were no other differences between the age groups.

Discussion

There has been a call for longitudinal studies examining change in the participation profile of children with disabilities over time (King et al., 2009; Shikako-Thomas et al., 2012). There was a well-described critical decline in physical activity participation among children with disabilities during adolescence. This study measured participation in leisure and physical activities specifically among children with disabilities over 15 months. The aim of this study was to describe changes in the participation profile in physical activities after an intensive

Table 3. Scores of participation for all 55 activities, physical- and skill-based activities, and activities of physical character divided in age groups.

	Time 1 mean (SD)/median (min/max)	Time 2 mean (SD)/median (min/max)	Time 3 mean (SD)/median (min/max)
Diversity			
All 55 activities			
6–9	29.4 (4.7)/30.0 (19/38)	28.7 (5.4)/28.0 (17/43)	30.0 (5.4)/29.0 (13/41)**
10–13*	28.4 (5.0)/29.0 (16/39)	27.0 (5.2)/27.0 (16/37)	26.1 (5.4)/26.0 (17/37)
14–17	25.6 (6.3)/25.5 (17/38)	25.8 (5.6)/25.5 (15/37)	24.9 (5.4)/25.0 (17/38)
Physical			
6–9	4.1 (1.8)/4.0 (1/8)	4.0 (2.1)/4.0 (0/8)	4.2 (1.3)/4.0 (1/9)
10–13	3.9 (1.7)/4.0 (0/8)	3.6 (2.3)/4.0 (0/9)	3.2 (2.1)/3.0 (0/9)
14–17	3.6 (2.1)/3.0 (1/7)	3.6 (2.6)/3.0 (0/9)	3.4 (1.6)/3.0 (1/6)
Skill-based			
6–9	2.7 (1.4)/2.5 (0/6)	2.6 (1.7)/3.0 (0/6)	2.6 (1.7)/2.0 (0/6)
10–13	2.3 (1.6)/2.0 (0/6)	2.5 (1.4)/2.0 (0/5)	2.5 (1.4)/2.0 (0/6)
14–17	2.6 (1.4)/3.0 (0/6)	2.9 (1.8)/2.5 (0/7)	2.4 (1.3)/2.5 (0/5)
Intensity			
All 55 activities			
6–9	2.6 (0.5)/2.5 (2/3)**	2.6 (0.5)/2.7 (2/4)**	2.6 (0.5)/2.0 (1/4)**
10–13*	2.5 (0.6)/2.6 (1/4)	2.3 (0.5)/2.3 (1/3)	2.3 (0.5)/2.2 (1/3)
14–17	2.1 (0.6)/2.1 (1/4)	2.0 (0.4)/2.0 (1/3)	2.0 (0.5)/2.2 (1/3)
Physical			
6–9	1.5 (0.8)/1.4 (0/3)	1.5 (0.7)/1.4 (0/3)	1.5 (0.8)/1.3 (0/4)
10–13	1.3 (0.6)/1.3 (0/3)	1.3 (0.7)/1.2 (0/3)	1.1 (0.7)/1.0 (0/3)
14–17	1.1 (0.7)/1.0 (0/3)	1.0 (0.8)/0.7 (0/3)	1.0 (0.7)/1.0 (0/2)
Skill-based			
6–9	1.3 (0.7)/1.3 (0/3)	1.3 (0.7)/1.3 (0/3)	1.3 (0.7)/1.4 (1/3)
10–13	1.2 (0.7)/1.1 (0/3)	1.2 (0.7)/1.2 (0/3)	1.2 (0.7)/1.1 (0/3)
14–17	1.2 (0.8)/1.2 (0/3)	1.4 (0.9)/1.2 (1/4)	1.1 (0.7)/1.0 (0/3)
Enjoyment			
All 55 activities			
6–9	4.0 (0.4)/4.0 (3/5)	4.1 (0.5)/4.2 (3/5)	4.0 (0.4)/4.1 (3/5)
10–13	3.8 (0.5)/3.9 (3/5)	3.8 (0.5)/3.9 (3/5)	3.8 (0.5)/3.9 (2/5)
14–17	4.0 (0.4)/4.0 (3/5)	4.0 (0.3)/4.0 (4/5)	4.0 (0.5)/3.9 (3/5)
Physical			
6–9	4.3 (0.7)/4.6 (3/5)	4.2 (0.7)/4.3 (2/5)	4.3 (0.5)/4.2 (3/5)
10–13	3.8 (0.7)/3.8 (2/5)	3.7 (0.9)/4.0 (1/5)	3.9 (0.8)/4.0 (1/5)
14–17	4.2 (0.6)/4.0 (3/5)	4.0 (1.0)/4.3 (1/5)	4.0 (0.8)/4.0 (3/5)
Skill-based			
6–9	4.1 (1.1)/4.7 (3/5)	4.4 (0.7)/4.6 (2/5)	4.3 (0.8)/4.5 (2/5)
10–13	4.2 (0.9)/4.5 (1/5)	4.2 (0.7)/4.3 (2/5)	4.2 (0.8)/4.5 (2/5)
14–17	4.0 (0.8)/4.3 (2/5)	4.7 (0.5)/4.7 (3/5)	4.3 (0.8)/4.7 (3/5)

*Significant change between times: $p < 0.05$.
**Significant difference between age group: $p < 0.05$.

intervention period using adapted physical activity in a resource-focused approach and to describe any association between stable participation and the score of participation enjoyment.

The findings support the results of previous studies that children with disabilities, similar to their peers, have a decline in leisure activity participation during adolescence regarding both diversity and intensity (Bult et al., 2010; Dumith et al., 2011; Longmuir & Bar-Or, 2000). They participate in fewer activities and at a decreasing frequency with age. The critical challenge is that, compared with their non-disabled peers, children with disabilities not only participate in fewer activities but also in more activities that are more sedentary (Carlon et al., 2013), and this gap widens with age (Brown & Gordon, 1987; King et al., 2006). The potential consequences of a sedentary lifestyle are also more severe in people with disabilities (Fowler et al., 2007). The steepest decline in overall scores in this study was in the group aged 10–13 years, which is consistent with the findings of King et al., (2010a) and Law et al. (2006), rendering this period of adolescence a vital target for interventions to prevent diminished participation.

In spite of significant decrease in the CAPE scores at 15 months, the children in this study reported stable participation in physical and skill-based activities, which represent the physical activities on CAPE. There was no decline in physical activities either in the group as a whole or in the three age groups. The children participated at the same level of activity, diversity, and intensity during the 15-month period. These findings differ from the results of other studies (Longmuir & Bar-Or, 2000; Maher et al., 2007) that indicated a diminished participation in physical activity over time, implying that older children participated in more passive recreational activities than younger children. Considering that children with disabilities already have a low level of physical activity (Majnemer et al., 2008) and that this level declines further among adolescents, the stable results of this study could be considered as a positive outcome. This is supported by Dumith et al. (2011), who concluded in their systematic review that interventions that managed to attenuate decline in participation also should be considered as effective. As stated in the introduction, the objective of the intervention was to stimulate enjoyable, self-determined, and stable participation, and this was the expected outcome, given a successful intervention.

Our findings revealed gender differences in participation in physical activities. Boys reported a significantly higher diversity and intensity of participation in active physical activity at 15 months compared with girls. They had a stable participation level, while girls showed a decline in active physical activity. The opposite trend emerged with the skill-based activities. Girls scored significantly higher on diversity of skill-based activities after 15 months than boys. They also scored significantly higher on intensity than boys after three months, but the difference was not significant after 15 months. These gender differences related to activity type are similar to the findings of Dumith et al. (2011) and Law et al. (2006). Both active physical and skill-based activities on CAPE involve physical activities. When active physical and skill-based activities merged into physical activities, there are no gender differences at the time of measurement. This indicates that the level of physical activity is stable in two genders, but the preference for activity-type differs. Boys prefer the activities categorized as active physical activities in CAPE, while girls prefer skill-based activities. It is essential when using CAPE to be aware that physical activities consist of more activities than those listed in the category of active physical activities.

Interestingly, the activities favored by girls and boys were the activities that scored highest on enjoyment. Boys scored significantly higher on enjoyment in active physical activities than girls; conversely, girls scored higher on enjoyment in skill-based activities. Supported by the findings of Heah et al. (2007), Imms (2008a), and Jahnsen et al. (2003), these results are important, emphasizing that enjoyment is a strong predictor of sustained participation in physical activity. This may indicate that children who participate in activities that they prefer are more likely to stay active. Published work from the baseline data supports this, illustrating that the children in this study at baseline were already participating in the activities they preferred but wished to have a higher level of participation (Nyquist, 2012). The preference of activities was measured using the Preferences for Activities of Children (PAC; King et al., 2004).

Several of our results agree with other findings concerning the participation of children with disabilities in leisure activities. This study confirms a low level of diversity and intensity (Law et al., 2006); however, our finding of a positive stable level of participation in active physical activities is rather unique. Several authors highlighted the importance of consulting children and parents about their preferences for activity and of approaches for interventions that focused on the resources of participants (Heah et al., 2007; King et al., 2009; Shikako-Thomas et al., 2014). According to a model of factors that influenced participation

of children with disabilities developed by King et al. (2003), environmental, family, and child factors may represent barriers that impact participation. The results from the present study indicated the potential of positive change in these factors after an intervention that targeted physical activity with a resource-focused approach. Involving the children in the choice of their preferred activities, guiding parents and professionals from the local community, and improving skills for the selected activities have all been shown to be important factors that influence children's participation in physical activity. A decline in the diversity of activities is not necessarily negative as it might be due to choice, and the frequency might still be stable among the fewer preferred activities. However, if the decline is due to a lack of accessibility, then it might be a clinically important change in the negative direction.

This study has several limitations. The sample size is moderate and the pre-/post-test design without a control group provides few possibilities for statistical generalizations. The pre-/post-test design can only describe trends of change and cannot offer conclusive effects of the intervention. In addition, children's participation is complex and influenced by several factors. This study has analyzed change in diversity, intensity, and enjoyment during a 15-month period after a rehabilitation intervention. The nature of the data did not allow the opportunity to model a wider range of factors that influenced participation, leaving only assumptions about the nature of the change in participation.

There is a need for longitudinal studies that model these complex factors. Personal factors, such as age, gender, and preferences (King et al., 2009), social factors, such as parental and peer support (Shields et al., 2012), and environmental factors, such as availability and use of suitably adaptive equipment (Shimmell et al., 2013), should be considered included in the future longitudinal studies. Furthermore, because the oldest children were more likely to drop out from the study than the younger ones, this could lead to selection bias. Lack of a large sample size to investigate the responsiveness of CAPE, in addition to lack of other studies establishing substantial evidence for responsiveness, decreases confidence in the findings.

The strength of this study is that it applied a longitudinal design investigating changes in participation among the same group of children over time. Such designs are scarce and called for by several studies in this field (Imms, 2008a; King et al., 2009; Shikako-Thomas et al., 2013). The results of the present study indicate that a three-week intensive and tailor-made rehabilitation program, which includes adapted physical activities with a resource-focused and goal-directed approach, may be beneficial for children with disabilities and may sustain participation in physical activity. Gender differences should be taken into consideration to facilitate stable participation in physical activities with a high level of enjoyment.

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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