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Daily physical activity and sports participation among children from ethnic minorities in Denmark

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Abstract

Purpose: The purpose of this study was to investigate whether Danish children from immigrant backgrounds are less physically active than children from the ethnic majority, and to investigate possible reasons for any differences found **Methods:** Accelerometer measures of physical activity as well as questionnaire data about organized sports, family demography, resources and values were collected from 594 children of whom 60 had other ethnic background than Danish. Data were collected when the children were 6-7 years old and again later when the children where 9-10 years old. **Results:** It was found that children from immigrant backgrounds were not less physically active than other children when their amounts of daily physical activity was measured by direct objective measures, despite their participation rate in organized sports being much lower. Using multiple logistic regression modelling this study showed that lack of parental experience with organized sports and lack of economic/material resources explained much of the difference in sports participation. **Conclusion:** Children of immigrant background had significant lower participation in club sports but this did not affect their overall physical activity level.

Key words: Accelerometry, Ethnicity, physical activity, Sports participation, Inequality, Resources, Children, Health

Introduction

In Denmark and other Scandinavian countries children's overall physical activity is often central in health promotion policies and children's participation in club-organized sports is a central part of the welfare political agenda. This focus on physical activity, and more specifically on club sports, seems legitimate for both health and social reasons. On the one hand, a lack of physical activity in children has been shown to increase their risk of cardiovascular diseases later in life (Andersen et al., 2006; Dencker & Andersen, 2008); on the other, the relatively high rates of children's participation in club-organized sports in Scandinavia (approx. 70% dependent on country and age) has been found to be associated with the creation of socio-cultural resources such as the establishment of social networks in local communities, social integration of individuals (Pestoff, 2009; Anderson, 2008; Ibsen & Ottesen, 2005; Korsgaard, 1997), and socialization into sports participation later in life (Kjønniksen, Anderssen, & Wold, 2009; Ottesen & Skjerk, 2006; Horne, Tomlinson, & Whannel, 1999).

Research into the association between ethnicity and children's physical activity in various countries has reported differing results, ranging from children of ethnic minority background being more active (Hassapidou, Papadopoulou, Frossinis, Kaklamanos, & Tzotzas, 2009; Duncan, Schofield, & Duncan, 2006), equally active (Sun et al., 1998; Lindquist, Reynolds, & Goran, 1999), or less active (Owen et al., 2009; Sallis et al., 1998; Duncan et al., 2006) than their contemporaries from the ethnic majority. These variations suggest that the relation between children's ethnic background and physical activity is dependent on the national context but also on the measures used for quantifying physical activity.

In Denmark all studies in this area have used questionnaire surveys (often focusing on sports participation) and have concluded that children from ethnic minority backgrounds participate in club-organized sports less often than children from the ethnic majority (Ibsen, 2007; Nielsen & Ibsen, 2008; Lykkegaard, 2001; Pilgaard, 2009). Despite the fact that self-report methods have been shown to produce unreliable measures of the amounts of physical activity among children (Harro & Riddoch, 2000; Kohl, Fulton, & Caspersen, 2000; Sallis & Saelens, 2000), these questionnaire surveys have often been used in public practice of health policies and health promotion as evidence that children from non-Danish ethnic backgrounds are more often physically inactive. From a physiological health perspective, this interpretation may have little merit since participation in club-organized sports (often a few hours a week) cannot be regarded as a valid indication of whether children are physically active or not. Nevertheless, since participation in club-organized activities seems important to children's network building and social integration in local communities, it is problematic that children from ethnic minorities are less active in club sports as this may be a barrier to their integration into the wider society.

This study investigates the association between children's ethnic background and their daily amount of general physical activity, as well as their participation in club-organized sports more specifically. Secondly, it examines the underlying factors for any observed differences using a P. Bourdieu inspired understanding of ethnicity as a socioeconomic position (Bourdieu 1984, Nielsen 2009) and multiple regression modelling.

Methods

Participants

Participants were 704 out of 1024 children from 18 schools in the two Danish suburban municipalities - Tårnby and Ballerup - who participated in the CoSCIS study (Andersen & Froberg, 2006). From these 704 participants questionnaire data combined with valid measures of physical activity (Nielsen, Bugge, Hermansen, Svensson, & Andersen, 2010) was obtained from

594 children (of whom 67 were from other ethnic backgrounds than Danish) at pre-school age (age 6-7 years) and from 518 (of whom 58 were from other ethnic backgrounds than Danish) when these children went to third grade (age 9-10 years). In height and weight these children were found to be representative of the whole population of children in Ballerup and Taarnby (Eiberg et al., 2005); the sample also seemed representative of the general Danish population in terms of social parameters such as the distribution of rental and self-owned accommodation, socio-economic position and the proportion from ethnic minorities.

Measurements of physical activity (PA)

The children's habitual PA was measured using MTI 7164 accelerometers (Actigraph, Fort Walton Beach, Florida, USA). Accelerometers are physical activity monitors that provide precise measurement of children's daily activity levels, overcoming children's lack of ability to recall and quantify their physical activities in detail. Accelerometers have been well validated in children against a range of outcomes (Ekelund et al., 2001) and have been shown to compare favourably with other similar objective measuring instruments (de Vries, Bakker, Hopman-Rock, Hirasig, & van Mechelen, 2006). The monitors record body movement as a combined function of the frequency and intensity of the movement allowing detection of normal human motion and rejecting high frequency vibrations encountered in activities such as car or bus transport. In order to best reflect the distribution of school days and school-free days (weekends and holidays) in school children's lives, two working days and two weekend days were selected for the measuring period. To minimize any biasing effect from the novelty of wearing an activity monitor, the MTI monitors were worn by the children for one day before recording. Data were corrected for variation in sleeping patterns and periods when the accelerometers were not worn; data was included in the final dataset only if the monitor had recorded more than eight hours of valid recordings a day for at least three days (preschool: 4 days n=466, 3 days n=128, third grade: 4 days n=379, 3 days n=139).

As cycling has been found to be associated with the amount of physical activity of Danish children and is poorly measured with accelerometers (Kristensen et al., 2010) it can distort the measured amounts of physical activity. Therefore questionnaire answers on weekly cycling habits (times per week cycling to and from school which is the main cycling activity of Danish children) were used to check and, (in case of significant differences), adjust for differences in the amount of cycling between groups.

Data transformation to physical activity variables

To obtain information on the activity levels of the children in their various daily contexts data were analysed for Total Time (7am to 11pm on all the measured days), School Time (defined by the schedule of the class, typically weekdays from 8am to 2pm) and Free Time (all other time than School Time). These time periods were then subdivided into their more specific contexts using the time table of each child's school class and self-reported activities from questionnaire dairies filled out during the days of accelerometer measurements. School Time was subdivided into "Class Hours", "Physical Education Classes" and "School Breaks" (using the timetable of the class). Free Time was subdivided into time in "After School Day Care Institution" (SFO), time at "Organized Club Sports" and "Other Free Time" (using the children's and parent's self-report). Time spent in activity of at least moderate intensity (4-6 METS or 2500-5000 counts per minute reflecting medium exertion in an upright position e.g. walking approximately 5.2 km/h) and vigorous intensity (>6 METS or >5000 counts per minute reflecting a high level of exertion in the upright position e.g. running faster than 6.4 km/h) was calculated. The selection of the counts/min cut-off points identifying moderate and vigorous PA was based on trade of from five different validation studies

of accelerometer measures of PA in children (Trost et al., 1998; Puyau, Adolph, Vohra, & Butte, 2002; Treuth et al., 2004; Sirard, Trost, Pfeiffer, Dowda, & Pate, 2005; Mattocks et al., 2007). Defining and categorizing children as being physically active was based on current health-related PA recommendations (Strong et al., 2005) of one hour a day of activity of at least a moderate level recommended by many health organisations and authorities (including the Danish National Board of Health).

Indicators of family socio-cultural characteristics and resources

Ethnicity was assessed by a dichotomous variable of having either only Danish-born parents or another ethnic background than Danish. Children were categorised as having an ethnic minority background if one or both parents had immigrated to Denmark.

Four socio-economic categories were defined to reflect the main groupings of job qualification level, salary and job security in the Danish work force: Unqualified worker, Trades person, Job qualified at Bachelors level, Job qualified at Masters level. The highest job qualification level of both parents was used as an indicator of the general socio-economic position or social class of the family.

In order to assess the social, cultural and economic resources of hypothetical importance to children's participation in sports and other physical activities a number of questionnaire answers were used.

Reported ownership of cars, house and access to garden were used as indicators of a family's material resources. The yearly pre-tax income of the family was also used as a measure of material resources but was not included in the summation of total material resources, as income is a prerequisite and therefore a proxy variable for the other more specific material resources.

Whether the children had access to a playground was also included in the analysis but was not included in the summation of the family's total amount material resources, since it is most often connected to living in rental apartment blocks and hence a public funded resource and not a family resource as such.

Whether the child lived with one or two parents/caretakers, had siblings and lived in one or two different homes were used as indicators of social resources of potential importance to their physical activities.

The high school and university degrees of parents were used as indicators of educational resources in the home (the educational part of so-called cultural capital).

Parents' current and childhood participation in organized sports, were used as indicators of their experience with and knowledge about participation in club-organized sports (a cultural resource or capital of potential relevance for participation in sports).

To gain indicators of the familie's normative resources of relevance to the children's participation in sports and other physical activities, parents' evaluation of the importance of their children's general physical activity and the importance of school PE was used.

As a measure of the families' amount of the above described types of resources (material, social, cultural/sporting and normative resources) the family's possession (yes=1, no=0) of each indicator was added up to a total sum for each type of resource. As a measure of the total amount of resources owned by the family, the total sum of all resource indicators was calculated.

Results

Associations between ethnic background and children's physical activities

In Table 1, children from other ethnic backgrounds than Danish are compared with children from only a Danish ethnic background on a range of measures of their daily physical activity.

At the age of 6-7 years, ethnic minority children were equally physically active but had a significantly lower rate of participation in organized sports, when compared to children from the ethnic majority. Also at this age ethnic minority children more often played outside than ethnic majority children. At the age of 9-10 years the only differences found were that children from other ethnic backgrounds less often participated in organized sports. At both age groups no differences were found in the number of days cycling to and from school. Gender divided analyses showed the same tendencies: it was less common among boys and girls from other ethnic backgrounds than Danish to participate in club-organized sports but this did not result in these children having lower amounts of daily physical activity or more often not undertaking the recommended 1 hour of PA daily (data not shown).

Table 1. Physical activity levels and sports participation rates by ethnic background

		Only Danish ethnic background	Other ethnic background than Danish	<i>P</i>
Age 6-7 years	PA minutes >2500 cpm ^a /day	83.3 (29.6)	86.4 (33.3)	0.523
	Weekly days of cycling to school	0.94 (1.67)	1.06 (1.70)	0.588
	PA minutes >2500 cpm.<1hour/day	22.3%	18.2%	0.468
	Participates in club sports**	55.7%	29.9%	<0.001
	Plays outdoors in his/her free time*	93.8%	100.0%	0.032
	Likes school PE	79.6%	76.9%	0.473
	Active transport to school	52.1%	49.3%	0.465
Age 9-10 years	PA minutes >2500 cpm/day	82.29 (28.84)	78.21 (25.42)	0.382
	Weekly days of cycling to school	2.28 (2.22)	1.93 (2.23)	0.278
	PA minutes >2500 cpm.<1hour/day	24.1%	22.2%	0.681
	Participates in club sports**	82.6%	62.7%	<0.001
	Plays outdoors in free time*	84.9%	86.3%	0.438
	Likes school PE	94.6%	95.9%	0.284
	Active transport to school	77.6%	74.5%	0.598

Data are presented as mean (SD) and as %, ^a Accelerometer counts per minute.

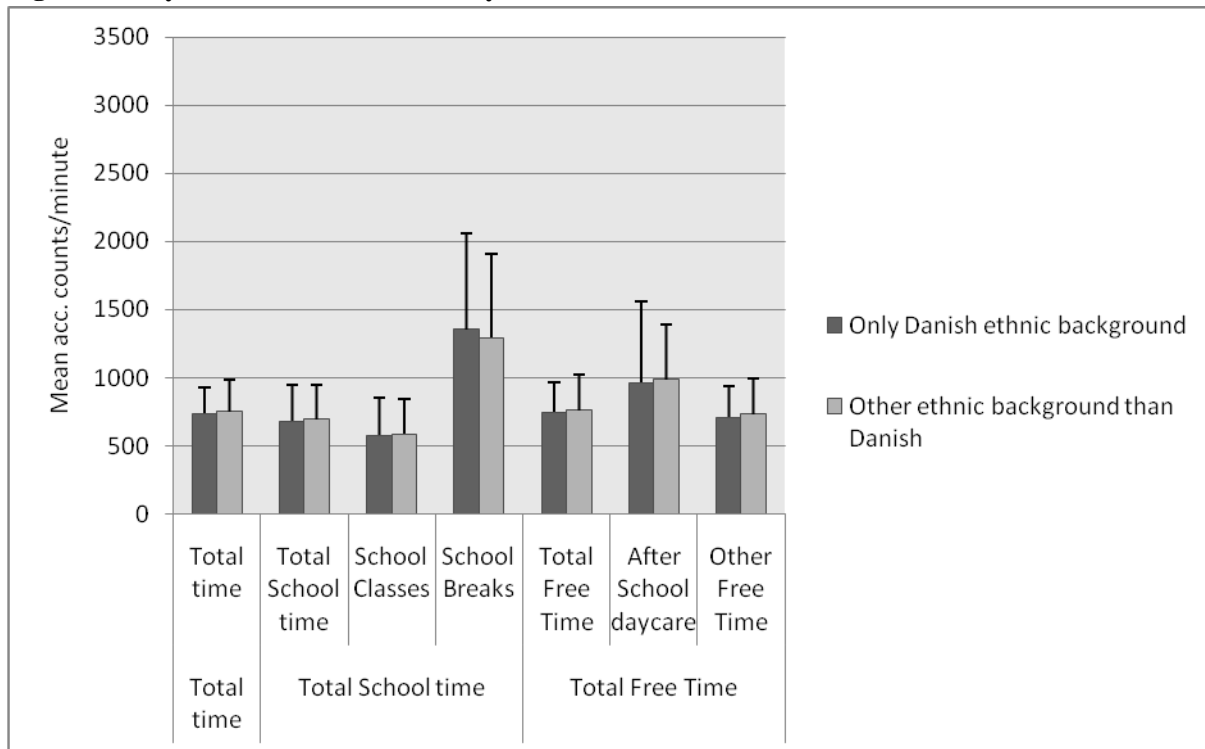
Looking into the details of the activity patterns of the children's daily activities provides an explanation for why lower rates of sports participation does not equate to lower overall amounts of PA. At age 6-7 years the sports-active children spent 1.66 hours weekly on their sports activities and at age 9-10 they used 2.91 hours weekly in organized sport (see Table 2). During organized sports participation the children were physically active (above moderate level) 28% percent of the time (see Fig. 2). In comparison, all the children spent many more hours in settings for self organized physically active play and sports, (school breaks and afterschool day care; preschool mean = 15 h/week, third grade mean = 17 h/week). As shown in Figures 1 and 2 these are settings in which mean PA levels are also rather high and where children with ethnic minority backgrounds are as active as the other children.

Table 2. Children’s amount of physical activity (95% CI) through participation in organized sports

	Age 6-7 years		Age 9-10 years	
	Sports active (n=355)	Not sports active (n=239)	Sports active (n=400)	Not sports active (n=118)
Weekly hours spend at sport	1.66 (1.56:1.76)	0	2.91 (2.74:3.07)	0
Weekly minutes of PA ^a	9.72 (9.32:10.12)	9.83 (9.34:10.33)	9.53 (9.19:9.87)	9.26 (8.64:9.89)
Weekly minutes of vigorous PA ^b	2.31 (2.16:2.46)	2.31 (2.11:2.50)	2.71 (2.55:2.87)	2.51 (2.25:2.77)
Active ^a more than 1 hour daily	77,24%	79,73%	78,19%	70,87%

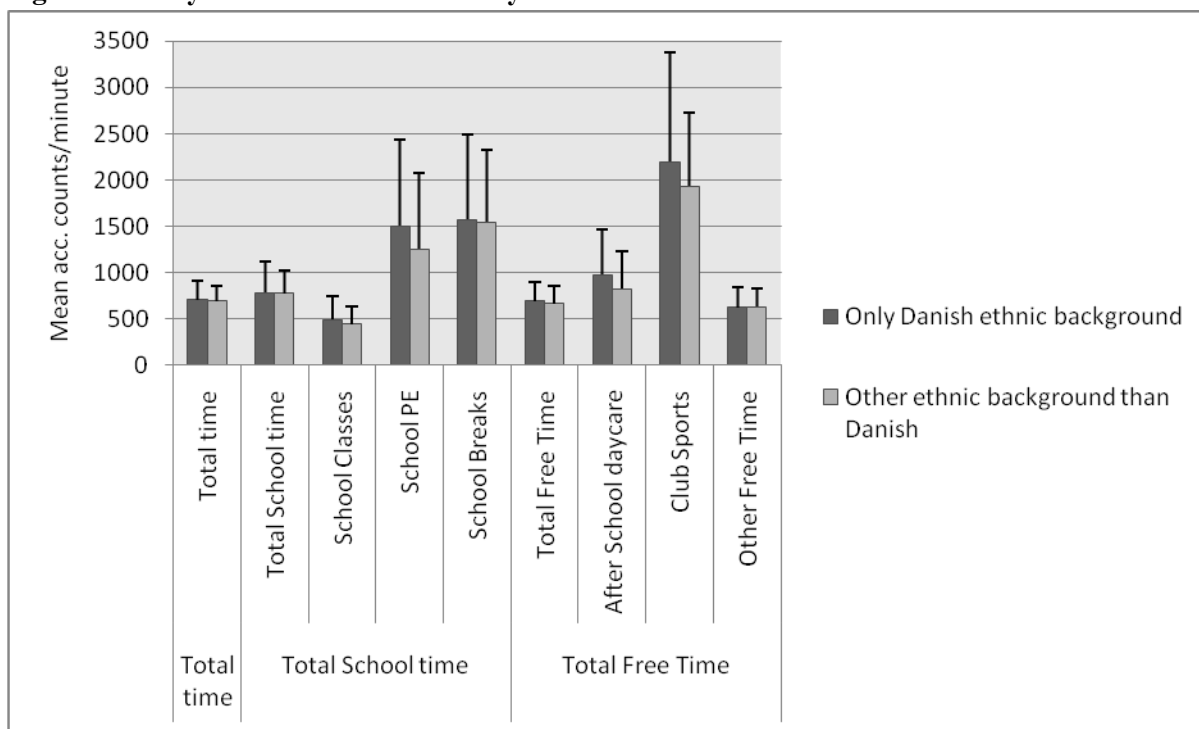
^a>2500 cpm. ^b>6000 cpm. Weekly minutes of PA are estimates extrapolated from the four days of measurements of equal number of schooldays and non-school days, representative of the children’s lives. No significant differences were found between sports active and not sports active children.

Figure1. 6-7 year old children’s activity levels in different contexts



Data are expressed as mean (+SD) accelerometer counts per minute (by the children participating in the context)

Figure 2. 9-10 year old children’s activity levels in different contexts



Data are expressed as mean (+SD) accelerometer counts per minute (by the children participating in the context)

Other ethnic backgrounds than Danish as a socio-economic position – inequalities in resources

Even though not associated with the general amount of physical activity among children it is still important to try and identify the reasons for the observed lower participation rates in club-organized sports of children from ethnic minorities, as these types of club-organized activities may be beneficial to their social integration into society and their amount of daily PA later in life.

Table 3 investigates to what extent other ethnic backgrounds are associated with less socio-cultural family resources of potential importance to children’s physical activities. The families from other ethnic backgrounds than Danish on average had less material and social resources as well as lower amounts of experience with club sport participation. More specifically, parents from these families less often had job qualifying educations and were less likely to own a car or house. They had lower income and lower amounts of experience with sports both as adults and as children. On the other hand children from immigrant families more often had access to a playground nearby (due to them more often living in rental apartment accommodation where these facilities are often provided). Finally, the total sum of their measured resources was significantly lower among families from other ethnic backgrounds indicating that being from another ethnic background is often associated with a low socio-economic position in society. Whether this position of lower resource ownership and access can explain the observed lower participation rates in the children’s sports participation is analyzed below.

Table 3. Family resources by ethnic background of family

	Only Danish ethnic background	Other ethnic background than Danish
Amount of material resources ^a **	2.44(0.91)	1.99 (1.11)
Amount of educational resources ^b	1.07 (0.81)	1.13 (0.81)
Amount of social resources ^c **	3.57 (0.73)	3.09 (1.11)
Amount of sporting capital ^d **	2.57(0.92)	2.21 (0.99)
Amount of parental normative resources ^e	1.49 (0.75)	1.30 (0.82)
Total amount of family resources ^f **	9.45 (1.71)	8.20 (1.69)
Total family income in kr. Per year **	555,093 (200,494)	460,483 (211,578)

Data is presented as mean (SD) number of each type of resources in the families. ^a House, garden, car. ^b number of parents graduated from high school + number of parents with a university degree. ^c two parent family, live one place, non-divorced. ^d Number of parents that do sport + number that did sport as children. ^e Whether parents find either or both children's PA and PE very important. ^f Material + social + sporting + educational resources. * Difference between groups is significant at P<0.05. ** Difference between groups is significant at P<0.01

Mediators of the association between ethnic background and sports participation

Both at age 6-7 years and 9-10 years the association between ethnicity and children's club sports participation was reduced to statistically insignificance when adjusted for the families' total amount of resources (Table 4).

Looking into the mediating effect of each type of resource it can be observed that both at age 6-7 and 9-10 years the differences in parents' own experience with club sports participation explains (or accounts for) the largest part of the association between ethnic background and children's sports participation. Adjusting for material resources has some reducing influence on the association while all the other types of resources measured have negligible impact on the association between ethnic background and sports participation.

Table 4. Associations between ethnic background and children's sports participating, unadjusted and adjusted for different types of family resources. The ethnic minority group was used as reference.

	Odds ratio (95% CI) for participation in club sports at age 6-7 years	Odds ratio (95% CI) for participation in club sports at age 9-10 years
Ethnic background, unadjusted (Only Danish ethnic background vs. Other ethnic background)	2.11 (1.27:3.53)**	2.74 (1.47:5.10)**
Ethnicity ^a adjusted for SEP	1.86 (1.01:3.44)*	2.61 (1.27:5.35)**
Ethnicity adjusted for number of material resources	1.80 (1.05:3.07)*	2.54 (1.31:4.91)**
Ethnicity adjusted for number of social resources	1.93 (1.14:3.26)*	2.76 (1.47:5.19)**
Ethnicity adjusted for amount of education	2.10 (1.22:3.61)**	2.84 (1.46:5.53)**
Ethnicity adjusted for amount of family sporting capital	1.65 (0.78:3.47)	2.26 (0.94:5.42)
Ethnicity adjusted for total amount of normative resources	1.93 (1.13:3.29)*	2.50 (1.30:4.81)**
Ethnicity adjusted for total amount of resources	1.57 (0.71:3.46)	2.10 (0.85:5.23)

Data are presented as odds ratios (95% CI) with other ethnic background than Danish as a reference category. ^aOnly Danish ethnic background vs. Other ethnic background. *Difference between the two groups is significant at P<0.05.

**Difference between the two groups is significant at P<0.01

Discussion

In this study of the daily physical activities of more than 500 children aged 6-7 and 9-10 years in two Copenhagen suburbs it was observed that, despite a lower participation rate in organized sports, children of immigrant background were not less physically active when their amounts of daily physical activity was measured by direct objective accelerometer measurements.

Very few studies, none of them Danish have used direct and objective measures of physical activity to address the question of whether ethnicity is associated with the amounts of physical activity among children. The few that have report mixed results. In an American setting, children of ethnic Mexican-American background have been found to be less physically active than children from an Anglo-American background (Sallis et al., 1998) while another small American study found no clear association between ethnicity and children's PA (Sun et al., 1998). A large British study observed that children from a South Asian (India, Pakistan Bangladesh) background were less physically active than children from a European background while children from an African-Caribbean background tended to be more active (Owen et al., 2009). Overall therefore the association between ethnic background and children's daily amounts of PA seems dependent on the national and regional context as well as the specific minority group analysed.

This study focused on the influence of having ethnic and minority backgrounds on children's physical activity in Danish society. Previous questionnaire-based studies have found that ethnic minority groups participate less in organized sport, and this has been interpreted to imply that children from ethnic minorities are less physically active. However in this study it was observed that children of ethnic minorities, while having lower rates of club sports participation, were equally

physically active. This was partly due to sports participation not resulting in a higher mean amount of total physical activity at the age groups investigated. It was also due to children from other ethnic backgrounds being equally physically active in the many self-organized settings for physical activity that take up large parts of children's days and contribute substantially to their total amounts of physical activity.

This is encouraging as it indicates that children from migrant backgrounds, and perhaps other children from low-resourced backgrounds, can be involved in physical activities in other ways than in the resource-demanding club-organised activities. It emphasizes that settings for children's outdoors play activities such as school grounds, afterschool day-care institutions and local neighbourhoods are important for the physical activity of children in the 6-10 year age group. In these settings for self-organized physical play and sports, children from ethnic minority backgrounds are able to participate to the same extent as children.

However, as the generally high level of participation in club sports among Scandinavian children has been found to be important to children's participation, integration and network building in local communities (Anderson, 2008; Ibsen & Ottesen, 2005; Pestoff, 2009) and may be important to their physical activity level later in life (Kjønniksen et al., 2009; Ottesen & Skjerk, 2006) it is problematic that this study found children from immigrant backgrounds had lower participation rates in club sports. This finding is in line with numerous Danish (Ibsen, 2007; Nielsen & Ibsen, 2008; Lykkegaard, 2001) as well as international studies (Horne, Tomlinsin, & Whannel, 1999; DeKnop, Theboom, Van Engelan, & Van Puymbroeck, 1995; DeKnop, Theboom, Wittock, & DeMartelaer, 1996; Gajendra & Darby, 1994). However this study goes a step further by showing that lower amounts of material resources as well as sporting experience among ethnic minority families are part of the explanation for the lower participation rates of their children. This suggests that if the participation of ethnic minority children in club sports is to be increased the demands for parental support need to be addressed: lowering the cost of car transport, sports' fees and gear, as well as providing insights into the expectations and rules of conduct required for children's participation in Danish club sports, could increase involvement. The evaluation of projects working with engaging ethnic minority children in club sports mainly report good results from providing more information about the many official, and unofficial, rules, expectations and aims associated with participating in club sports to the often sports-inexperienced parents of ethnic minority children (Boeskov & Ilkjær, 2005; Rasmussen, 2008). Some clubs have also found that lending out expensive gear to new beginners is an effective way of increasing participation (Boeskov & Ilkjær, 2005).

However it is also worth noting that children of immigrant background could still be observed to have lower participation rates in club sports when measured family resources were adjusted for, even though it decreased the difference to a statistically insignificant level. This may indicate that there are other barriers to club-sport participation for children from other ethnic backgrounds than Danish than the differences in social, cultural and material family resources measured in this study.

The primary strength of this study is that accelerometers were used to measure the actual physical activity carried out by the children. This may be of special importance in studies involving participants of different cultural and social background as perceptions and hence self-report of what is considered a physical activity may be culturally dependent. However in general it is important to use such direct objective measures because questionnaire measures have been found to be very unreliable measures of the highly sporadic physical activities of children. In contrast questionnaire methods seems to provide valid information on whether children participate in club-organized sports as it is very clear to children and their parents whether they are members of a sports club and whether they participate in sports club activities (Kjønniksen et al., 2009). This study was limited by only including 60 children from other ethnic backgrounds than Danish.

This limited the possibility to investigate potentially important sub-groups such as gender and the specific ethnic background of the families. In other words the study was only able to investigate the broad and very general influence of having other ethnic backgrounds than the majority of the (Danish) population, making the findings more or less applicable when it comes to a particular individual's specific ethnic background. However this does not alter the main contribution of the study that the lower sports participation often found among ethnic minority children does not necessarily result in these children being less physically active and that low amounts of material resources and parental experience with club sports are part of the explanations for their lower sports participation.

Practical perspectives

The findings of this study suggest that the participation of ethnic minority children in club sports could be increased by lowering the costs associated with transport, fees and sports gear, as well as by making more explicit the ideas behind and the rules of conduct for children's participation in Danish club sports. However, this study also showed that children from ethnic minority backgrounds, and perhaps other children from low-resourced backgrounds, can obtain relatively high amounts of daily physical activity in other ways than through the resource-demanding club-organised activities. This finding calls for projects to look at ways of empowering those children not participating in the traditional organized sports clubs to be active in a way that fits their resources and interests in physical activity. A large proportion of children's daily physical activities take place in school and day-care institutions, and these activities have shown to be dependent on the available social and material structures (Taylor et al., 2006; Nielsen, Taylor, Williams, & Mann, 2009; Hannon & Brown, 2008; Davison & Lawson, 2006; Ferreira et al., 2007), School and day-care staff, as well as playground architects, can therefore be key in providing the necessary inspiring facilities, encouragement and support for all children to be physically active.

Conclusion

This study has confirmed the findings of others in Denmark and elsewhere that children from ethnic minority backgrounds participate less often in club-organised sports. This was found to be partly due to them having fewer family cultural and material resources of relevance to sports participation. However this did not result in ethnic minority children being less physically active when the amount of their daily physical activity was measured objectively by accelerometers. In respect of the total daily minutes of physical activity as well as the physical activity levels in different everyday settings for children's self-organized physical active play and sports, children from minority background were as active as other children. Furthermore they equally often cycled to and from school. This indicates that while sport club settings with their demands for material and cultural resources can exclude children from minority family backgrounds, the many other everyday settings for physical activity for children from 6-10 years old, such as school grounds, after-school day care and local neighbourhoods, do not.

Reference List

- Andersen, L. B. & Froberg, K. (2006). Sundhedsmæssige aspekter af fysisk aktivitet hos børn - et treårigt forsøg i to kommuner ved København: Ballerup og Tårnby. Sundhedsstyrelsen.
- Andersen, L. B., Harro, M., Sardinha, L. B., Froberg, K., Ekelund, U., Brage, S. et al. (2006). Physical activity and clustered cardiovascular risk in children: a cross-sectional study (The European Youth Heart Study). *Lancet*, 368, 299-304.

- Anderson, S. (2008). *Civil Sociality - Children, Sport and Cultural Policy in Denmark*. Charlotte, North Carolina: Information Age Publishing, Inc.
- Boeskov, S. & Ilkjær, T. (2005). *Integration og det frivillige foreningsliv. En undersøgelse af barrierer og løsninger i relation til foreningsdeltagelse hos unge med anden etnisk baggrund* København: Institut for Idræt, Københavns Universitet.
- Davison, K. K. & Lawson, C. T. (2006). Do attributes in the physical environment influence children's physical activity? A review of the literature. *Int.J.Behav.Nutr.Phys.Act.*, 3, 19.
- de Vries, S. I., Bakker, I., Hopman-Rock, M., Hirasings, R. A., & van Mechelen, W. (2006). Clinimetric review of motion sensors in children and adolescents. *J.Clin.Epidemiol.*, 59, 670-680.
- DeKnop, P., Theboom, M., Van Engelan, E., & Van Puymbroeck, L. (1995). Sport and ethnic minority youth. *Journal of Comparative Physical Education and Sport*, 1.
- DeKnop, P., Theboom, M., Wittcock, H., & DeMartelaer (1996). Implications of Islam on Muslim girl's sport participation in Western Europe. Literature review and policy recommendations for sport promotion. *Sport, Education and Society*, 1, 147-164.
- Dencker, M. & Andersen, L. B. (2008). Health-related aspects of objectively measured daily physical activity in children. *Clin.Physiol Funct.Imaging*, 28, 133-144.
- Duncan, J. S., Schofield, G., & Duncan, E. K. (2006). Pedometer-determined physical activity and body composition in New Zealand children. *Med.Sci.Sports Exerc.*, 38, 1402-1409.
- Eiberg, S., Hasselstrom, H., Gronfeldt, V., Froberg, K., Svensson, J., & Andersen, L. B. (2005). Maximum oxygen uptake and objectively measured physical activity in Danish children 6-7 years of age: the Copenhagen school child intervention study. *Br.J.Sports Med*, 39, 725-730.
- Ekelund, U., Sjostrom, M., Yngve, A., Poortvliet, E., Nilsson, A., Froberg, K. et al. (2001). Physical activity assessed by activity monitor and doubly labeled water in children. *Med.Sci.Sports Exerc.*, 33, 275-281.
- Ferreira, I., van der Horst, K., Wendel-Vos, W., Kremers, S., van Lenthe, F. J., & Brug, J. (2007). Environmental correlates of physical activity in youth - a review and update. *Obesity Reviews*, 8, 129-154.
- Gajendra, V. K. & Darby, D. S. (1994). *Winners and Losers: Ethnic minorities in sport and recreation*. (1 ed.) (vols. 1) London: The Falmer Press.
- Hannon, J. C. & Brown, B. B. (2008). Increasing preschoolers' physical activity intensities: An activity-friendly preschool playground intervention. *Prev.Med*, 46, 532-536.
- Harro, M. & Riddoch, C. (2000). Physical activity. In N.Armstrong & W. van Mechelen (Eds.), *Paediatric Exercise Science and Medicine* (pp. 77-84). Oxford: Oxford University Press.
- Hassapidou, M., Papadopoulou, S. K., Frossinis, A., Kaklamanos, I., & Tzotzas, T. (2009). Sociodemographic, ethnic and dietary factors associated with childhood obesity in Thessaloniki, Northern Greece. *Hormones.(Athens.)*, 8, 53-59.
- Horne, J., Tomlinson, A., & Whannel, G. (1999). Socialisation - social interaction and development. In J.Horne, A. Tomlinson, & G. Whannel (Eds.), *Understanding Sport* (1 ed., pp. 129-155). London: Spon Press.
- Horne, J., Tomlinsin, A., & Whannel, G. (1999). Social stratification and social division in sport. In J.Horne, A. Tomlinsin, & G. Whannel (Eds.), *Understanding Sport - An introduction to the Sociological and Cultural Analysis of Sport* (pp. 95-128). London: Spon Press.
- Ibsen, B. (2007). *Børns idrætsdeltagelse i Københavns Kommune* Odense: Syddansk Universitet, Institut for Idræt og Biomekanik.
- Ibsen, B. & Ottesen, L. (2005). Foreninger som læringsrum for demokrati og sundhed. In C.N.Jensen (Ed.), *Voksnes læringsrum* (pp. 413-431). Værløse: Billesø og Baltzer.
- Kjønniksen, L., Anderssen, N., & Wold, B. (2009). Organized youth sport as a predictor of physical activity in adulthood. *Scand J Med Sci in sports*, 646-654.
- Kohl, H. W., Fulton, J. E., & Caspersen, C. J. (2000). Assessment of physical activity among children and adolescents: a review and synthesis. *Preventive Medicine*, 31, 54-76.

- Korsgaard, O. (1997). *Kampen om kroppen*. (1 ed.) Copenhagen: Gyldendal.
- Kristensen, P. L., Moeller, N. C., Korsholm, L., Kolle, E., Wedderkopp, N., Froberg, K. et al. (2010). The association between aerobic fitness and physical activity in children and adolescents: the European youth heart study. *Eur J Appl Physiol*, 109.
- Lindquist, C. H., Reynolds, K. D., & Goran, M. I. (1999). Sociocultural determinants of physical activity among children. *Preventive Medicine*, 29, 305-312.
- Lykkegaard, L. (2001). *Integration af flygtninge- og indvandrerbørn i foreningslivet* Viborg Kommune.
- Mattocks, C., Leary, S., Ness, A., Deere, K., Saunders, J., Tilling, K. et al. (2007). Calibration of an accelerometer during free-living activities in children. *Int.J.Pediatr.Obes.*, 2, 218-226.
- Nielsen, G., Bugge, A., Hermansen, B., Svensson, J., & Andersen, L. B. (2010). School ground facilities as a determinant of children's daily activity - a cross-sectional study of Danish school children.
- Ref Type: Unpublished Work
- Nielsen, G. & Ibsen, B. (2008). *Kommunale forskelle på børns idrætsdeltagelse* Center for forskning i idræt sundhed og civilsamfund samt IDAN.
- Nielsen, G., Taylor, S. J., Williams, S. M., & Mann, J. I. Permanent play facilities in school playgrounds as a determinant of children's activity. *Journal of Physical Activity and Health*, (in press).
- Ottesen, L. & Skjerk, O. (2006). *Inaktivitetsundersøgelse. Sammenfatning* København: Institut for Idræt, Københavns Universitet.
- Owen, C. G., Nightingale, C. M., Rudnicka, A. R., Cook, D. G., Ekelund, U., & Whincup, P. H. (2009). Ethnic and gender differences in physical activity levels among 9-10-year-old children of white European, South Asian and African-Caribbean origin: the Child Heart Health Study in England (CHASE Study). *Int.J.Epidemiol.*, 38, 1082-1093.
- Pestoff, V. A. (2009). *A Democratic Architecture for the Welfare State*. (1 ed.) (vols. 1) Oxon: Routledge.
- Pilgaard, M. (2009). *Sport og motion i danskernes hverdag*. Copenhagen: Idrættens Analyseinstitut.
- Puyau, M. R., Adolph, A. L., Vohra, F. A., & Butte, N. F. (2002). Validation and calibration of physical activity monitors in children. *Obes.Res.*, 10, 150-157.
- Rasmussen, P. V. (2008). *Foreninger og Integration* Odense: Institut for Idræt og Biomekanik, Syddansk Universitet.
- Sallis, J. F., McKenzie, T. L., Elder, J. P., Hoy, P. L., Galati, T., Berry, C. C. et al. (1998). Sex and ethnic differences in children's physical activity: Discrepancies between self-report and objective measures. *Pediatric Exercise Science*, 10, 277-284.
- Sallis, J. F. & Saelens, B. E. (2000). Assessment of physical activity by self-report: status, limitations, and future directions. *Res.Q.Exerc.Sport*, 71, S1-14.
- Sirard, J. R., Trost, S. G., Pfeiffer, M., Dowda, M., & Pate, R. P. (2005). Calibration and Evaluation of an Objective Measure of Physical Activity in Preschool Children. *J Phys Act Health*, 345-357.
- Strong, W. B., Malina, R. M., Blimkie, C. J., Daniels, S. R., Dishman, R. K., Gutin, B. et al. (2005). Evidence based physical activity for school-age youth. *J.Pediatr.*, 146, 732-737.
- Sun, M., Gower, B. A., Nagy, T. R., Trowbridge, C. A., Dezenberg, C., & Goran, M. I. (1998). Total, resting, and activity-related energy expenditures are similar in Caucasian and African-American children. *Am.J.Physiol*, 274, E232-E237.
- Taylor, R. W., Mcauley, K. A., Williams, S. M., Barbezat, W., Nielsen, G., & Mann, J. I. (2006). Reducing weight gain in children through enhancing physical activity and nutrition: the APPLE project. *Int.J.Pediatr.Obes.*, 1, 146-152.
- Treuth, M. S., Schmitz, K., Catellier, D. J., McMurray, R. G., Murray, D. M., Almeida, M. J. et al. (2004). Defining accelerometer thresholds for activity intensities in adolescent girls. *Med Sci Sports Exerc*, 36, 1259-1266.
- Trost, S. G., Ward, D. S., Moorehead, S. M., Watson, P. D., Riner, W., & Burke, J. R. (1998). Validity of the computer science and applications (CSA) activity monitor in children. *Med Sci.Sports Exerc.*, 30, 629-633.