

Multi-Dimensional Interacting Constraints on Physical Activity Behaviours in the Finnish Population

Aki Karjalainen¹ · Jarmo Liukkonen² · Sami Kokko³ · Timo Jaakkola²

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Abstract Finnish sports organisations, local and federal government, and healthcare organisations have widely adopted the World Health Organization and national recommendations for physical activity for different age groups. However, studies have indicated that only 46 % of 3-year-old preschool children, approximately 50 % of primary school students (7–12 years), 10–17 % of secondary school students (13–15 years) and 16 % of Finnish adults (20–54 years) attain those recommendations. In Finland there are 33,620 built sports facilities and over 9000 sport clubs, meaning there are many possibilities for physical activity, yet people are still rather inactive. In this paper we argue that availability of facilities, although an important element, is not enough to promote physical activity. It is possible that the current built physical environmental design does not fulfil people's needs regarding participation in physical activity. More emphasis should be placed on the design and operation of the facilities to develop new affordances for physical activity.

Key Points

Despite having extensive sports facilities and physical activity recommendations, physical activity levels are declining in Finland.

The most dramatic decrease in physical activity within the Finnish population occurs around puberty, when girls become less active than boys.

One of the possible reasons for increased inactivity may be that the design of built environments does not consider psychological or social affordances for physical activity.

1 Introduction

It has been well-documented that physical activity has many positive effects on individuals' health, well-being and cognition [1, 2]. Many countries have adopted recommendations and guidelines for sufficient daily amounts of physical activity in order to help people obtain positive health benefits from physical activity [3]. For example, according to the Finnish national physical activity recommendations, children in early education (below 7 years of age) and students in elementary school (7–12 years) should be physically active 2 h a day [4, 5]. In secondary schools, the recommendation is for 90 min of physical activity a day [5]. According to the physical activity recommendations directed at children and adolescents, physical activity should be moderate-to-vigorous activities implemented in a

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✉ Aki Karjalainen
aki.i.karjalainen@jyu.fi

¹ Faculty of Sports and Health Sciences, University of Jyväskylä, PO Box 35, 40014 Jyväskylä, Finland

² Department of Sport Sciences, University of Jyväskylä, Jyväskylä, Finland

³ Department of Health Sciences, University of Jyväskylä, Jyväskylä, Finland

variety of ways suitable for each age group [4, 5]. The World Health Organization (WHO) [3] and US physical activity guidelines [6] recommend that all children and adolescents should attain moderate-to-vigorous levels of physical activity (MVPA) for at least 60 min per day. Self-reported (3071 participants) and objectively measured (698 participants) Finnish studies have indicated that only 46 % of 3-year-old preschool children [7], approximately 50 % of primary school students (7–12 years) [8, 9] and 10–17 % of secondary school students (13–15 years) [8, 9] attain at least 60 min of MVPA a day. A declining number of individuals reaching the recommended weekly physical activity level across age groups is a particularly strong trend among Finnish youth when compared with other countries [10].

Physical activity recommendations for adults in Finland [11], following WHO recommendations [3], suggest that adults should undertake a total of at least 2 h 30 min per week of moderate-intensity aerobic physical activity. This total can be accumulated in repeated bouts of at least 10 min in duration. Alternatively, one can perform vigorous-intensity aerobic physical activity with an accumulated total of at least 1 h 15 min per week. Furthermore, it is recommended that everyone should undertake muscle-strengthening and balance training activities at least twice a week. Research has demonstrated that 16 % of Finnish adults (20–54 years old) fulfil both sides of the physical activity recommendation, i.e. do enough aerobic physical activity and muscle training, with men achieving this somewhat less (15 %) than women (17 %) [12]. If only balance or muscle strengthening physical activity is included in the analyses, the number of adults in this age group fulfilling the physical activity recommendation increases to 36 %. Still, current data indicate that almost half (48 %) of the Finnish adult population have an insufficient level of physical activity [12].

Insufficient levels of physical activity in Finland have contributed to an increasing prevalence of overweight and obesity among the population [3]. This has been identified as a major cost to the Finnish economy, responsible for 1.7–7 % of total healthcare costs [13] and an estimated €330 million in health and social care costs in 2011, equating to €61/inhabitant [14]. When the increasing prevalence of lifestyle diseases such as type 2 diabetes mellitus is taken into account, the total cost of insufficient levels of physical activity in Finland is estimated to be approximately €1–2 billion annually, or approximately €185–370/inhabitant [15]. Consideration of all of these factors shows that one of the future challenges for Finnish society is to increase physical activity engagement within all age groups. Studies conducted in the Finnish population have also indicated that girls are less active than boys

[8, 10]. Additionally, it has been recognised that the most dramatic decrease in physical activity within the Finnish population occurs at puberty [16]. These findings concerning physical activity participation in girls, especially during adolescence, have raised special concerns in the Finnish public health system in the past few years and related changes have been made to the physical education curriculum. The aim of the new curriculum [17], which will commence implementation in autumn 2016, is to promote physical, social and psychological well-being and physical activity as well as to reduce levels of inactivity during the school day.

Physical activity engagement has been explained and understood by many models of behavioural change and participation motivation in combination with enhanced provision of facilities and access to leisure physical activity environments, such as parks, nature parks and forests [16, 18–21]. These models explain different psychological, social and physical factors of physical activity engagement. However, the theory of ecological dynamics [22–24] may also provide a useful framework for understanding physical activity participation because of its emphasis on the person–environment relationship as a relevant scale of analysis. To date, there have been few attempts to utilise an ecological dynamics approach in studying the engagement process in physical activity (but see Davids et al. [25] for an exception). The ecological dynamics framework considers the continuous interactions between individuals and an exercise environment, suggesting that human behaviours in these environments can be predicted by the utilisation of affordances or opportunities for action [23]. Affordances can be seen as invitations to act or behave in a particular environment. Environments where people are engaged in physical activity may include a variety of physical, psychological and social affordances that may increase or decrease the possibility to engage in physical activity. Therefore, physical activity participation may be analysed usefully from the perspective of affordances that are designed into activity-enhancing environments.

In Finnish built environments, there are many possibilities for physical activity, yet people are still rather inactive. The specific purposes of this article are to (a) review Finnish built physical activity environments, physical activity organisation, legislation and financing; and (b) discuss the role of physical, psychological and social affordances of physical activity environments in relation to physical activity participation. We argue that one of the possible reasons for increased inactivity of people may be that the design of built environments does not include psychological affordances for participation in physical activity.

2 Built Physical Activity Environments in Finland

In Finland, the Government and public authorities have made substantial efforts to enhance physical activity in the entire population through legislation, financing the building of physical activity environments and supporting the activities of sports clubs.

Data on Finland's sport facilities are collected in the national public Geographic Information System (GIS), the LIPAS database [26], which contains nationwide geographic and economic information for Finnish sport sites, recreational areas and outdoor routes, including a total of 33,620 sport facilities. The LIPAS database is maintained by the Faculty of Sport and Health Sciences at the University of Jyväskylä (Jyväskylä, Finland) and is funded by the Finnish Ministry of Education and Culture. The database is updated by the Finnish municipalities (local authorities) and includes mainly publicly funded and maintained sport sites. As the information gathering and updating is delegated to local authorities, the LIPAS database might include some outdated data. Despite this challenge, however, the database still gives a good overall picture of the state of Finnish sports facilities.

The most common sports facilities in Finland are outdoor fields and sports parks, with one site per 411 citizens. Other common built environments are indoor facilities (one site per 827 citizens) and cross-country sports facilities (one site per 851 citizens). The classification and number of sports facilities in Finland is given in Table 1.

In Finland, public policies have played a substantial role in physical activity promotion. The first Sport Act was passed in 1980 with the aim of promoting equality by sports bodies and in sports by providing equal sports services and facilities regardless of living location, sex or socio-economic status. Sport was viewed as an appropriate vehicle to promote health and to reduce disparities in well-being between citizens of different social classes. The main stipulations in the Sports Act were for the building of physical infrastructure and facilities and financial support to the third sector (sports clubs, organisations, etc.). The Act stipulated that the public sector would be responsible for building and maintaining the sports infrastructure and facilities, while the third sector would take responsibility for national and local sports activities [27].

In 2013, the Ministry of Education and Culture funded initiatives designed to enhance physical activity and sports with a grant of €147 million (€27 per inhabitant). Physical activities for children and adolescents were also supported by the Government through grants to voluntary sports organisations (€43.9 million in 2012) and programmes (€5.5 million in 2012) [28]. Government aid also supports the organisation of sport activities by municipalities at a cost of around €12 per inhabitant.

3 The Role of Sports Clubs

The Finnish sports system relies strongly on local-level sports club activities. There are about 9000 active sports clubs in Finland [29]. Finnish clubs are mainly based on voluntary civil activity, non-profit-making, funded by their members, and targeted at children and adolescents [30]. A recent national report highlights that a competitive orientation, early commencement of club activities and focusing on one sport domain are prevailing trends in club activities for youth [31]. Overall, about half of Finnish children and adolescents actively participate in sports club activities, although there is a strong declining trend with age during adolescence [10, 31]. In comparison, about 15–20 % of adults participate in club activities [30, 32].

4 Discussion

There are 33,620 built physical activity environments in Finland; however, the majority of the population is still very inactive. It is noteworthy that between the ages of 11 and 13 years Finnish children are considered physically very active in international comparisons, but activity levels decrease rapidly after 13 years of age compared with other developed countries [10]. We may thus infer that built environments are not enough to invite large cohorts of people to participate in physical activity and that, therefore, the design of physical activity should also be taken into account. It is possible that current built physical environmental design does not fulfil people's needs regarding participation in physical activity. Different psychological and motivational theories can provide useful frameworks to take into account when planning and building physical activity environments and what is included in them, including psycho-social constraints to engaging in physical activity. Further research about how these theories can be applied in an ecological dynamics context to promote physical activity is needed.

We have argued here that psychological and social needs can be seen as environmental psycho-social affordances that invite people to participate in physical activity, or to reject these opportunities for action. Special emphasis should be placed on understanding how to build affordances for motivating people of different age groups for physical activity. Modern mobile and sensor technologies provide new opportunities for environmental design to enhance physical activity by using digital technology to motivate and measure people's movements in sensory-rich, mediated, multimedia environments. They also allow creation of opportunities to explore, discover, create and adapt people's relationships with both physical and virtual

Table 1 Classification of built physical activity facilities in Finland

Facility type	Total	Per capita users per site	Categorised facility type	Sports facilities	
Recreational destinations and services	3266	1669.1	Recreational and outdoor areas	Neighbourhood park	
				Outdoor area	
				Hiking area	
				Multipurpose area with recreational services	
				Tourist services area	
				Recreational forest	
				Wilderness area	
				Other nature conservation area with recreational services	
				National park	
				National hiking area	
			Hiking facilities	Leisure park	
				Information	
				Nature observation tower	
				Boat dock	
				Fishing area/spot	
				Camping	
				Hut	
				Boating services	
				Cooking facilities	
				Outdoor/ski lodge	
Outdoor fields and sports parks	13,262	411.0	Neighbourhood sports facilities and parks	Lean-to, goahti (Lapp tent shelter) or 'kammi' earth lodge	
				Parkour area	
				Sports park	
				Neighbourhood sports area	
				Fitness training park	
				Cycling area	
				Velodrome	
				Skateboarding/roller-blading rink	
				Athletics fields and venues	Athletics training area
					Athletics field
			Ball games courts		Basketball court
					Volleyball court
					Beach volleyball court
				Ball field	
				Football stadium	
			Ice sports areas and sites with natural ice	Baseball stadium	
				Tennis court area	
				Roller hockey field	
				Mechanically frozen open-air ice rink	
				Ice-skating field	
Golf courses	Rink				
	Speed-skating track				
	Ice-skating route				
	Downhill skating track				
	Golf training area				
	Golf course				
	Golf training hall				
Minigolf course					

Table 1 continued

Facility type	Total	Per capita users per site	Categorised facility type	Sports facilities
Indoor sports facilities	6593	826.8	Fitness centres and sports halls	Gymnastics hall
				Fitness centre
				Weight training hall
			Sports halls	Martial arts hall
				Gymnasium
				Petanque hall
				Indoor skatepark
				Multipurpose hall/arena
				Sports hall
				Floorball hall
				Badminton hall
				Squash hall
				Tennis hall
			Indoor venues for various sports	Football hall
				Stand-alone athletics venue
				Artistic gymnastics facility
				Table tennis venue
Fencing venue				
Dance studio				
Indoor shooting range				
Ice-skating arenas	Indoor climbing wall			
	Parkour hall			
	Training ice arena			
Bowling alleys	Speed-skating hall			
	Competition ice arena			
Water sports facilities	2989	1823.8	Indoor swimming pools, halls and spas	Bowling alley
				Public indoor swimming pool
			Open air pools and beaches	Swimming pool
				Spa
				Unsupervised beach
				Winter swimming area
				Open-air pool
Supervised beach				

Table 1 continued

Facility type	Total	Per capita users per site	Categorised facility type	Sports facilities
Cross-country sports facilities	6403	851.4	Ski slopes and downhill ski resorts	Ski slopes and downhill ski resorts
			Covered winter sports facilities	Curling sheet
				Snowboarding tunnel
			Ski jumping hills	Downhill skiing hall
				Ski tunnel
				Ski jumping hill for training
			Sports and outdoor recreation routes	Ski jumping hill
				Walking route/outdoor route
				Cross-country biking route
				Nature trail
				Hiking route
				Biking route
				Disc golf course
				Dog skijoring track
				Horse track
				Official snowmobile route
			Orienteering areas	Ski track
Jogging track				
Canoe route				
Unofficial snowmobile route				
Water route				
Cross-country ski resorts	Orienteering area			
	Mountain bike orienteering area			
	Ski orienteering area			
Climbing venues	Training area for biathlon			
	Ski competition centre			
Shooting sports facilities	Cross-country ski park			
	Biathlon centre			
	Open-air climbing wall			
	Climbing rock			
Boating, aviation and motor sports	307	17,756.6	Boating sports facilities	Open-air shooting range
				Shooting sports centre
				Field archery course
			Sport aviation areas	Archery range
				Rowing stadium
				Water ski area
				Sailing area
				Motor boat sports area
				Rapid canoeing centre
				Indoor training facility for rowing and canoeing
			Motor sports areas	Sport aviation area
				Motor sports centre
				Motorcycling area
	Formula race track			
	Dragstrip			
	Kart circuit			
	Everyman racing and rallycross track			
	Ice speedway track			

Table 1 continued

Facility type	Total	Per capita users per site	Categorised facility type	Sports facilities
Animal sports areas	750	7268.4	Equestrian sports	Equestrian field Riding manège [arena, riding ring] Show jumping field Horse racing track
			Dog sports	Dog sports area Dog sports hall
Maintenance/service buildings	52	104,832.3	Maintenance/service buildings	Maintenance/service buildings

elements and objects as well as with other people who are both nearby and physically remote. Modern technologies provide design opportunities to use perceptual systems (e.g. visual, somatosensory, acoustic) to develop physical, cognitive, emotional and social skills and experiences through the medium of movement, thus fulfilling people's psycho-social needs. Interactive sound and music elements can also be designed into environments (i.e. play landscapes). When coupled coherently with the person's actions and movements, sonic feedback potentially 'resonates' with our spatio-kinaesthetic knowledge and imagination, and may even result in tactile sensations related to a movement [35].

With the aim of promoting physical activity, it is proposed that more design- and content-oriented approaches to infrastructure and environment planning should be used. Besides having affordances for physical activity, the environment should also be suitable for different purposes that fulfil other psycho-social needs, e.g. arranging events, having picnics, meeting friends, etc., where people fulfil their psycho-social needs and are also attracted to participating in physical activity and training in the form of an activity, play or game, such as Frisbee golf. It has to be noted that psycho-social needs differ between age groups and affordances for physical activity are different between user groups (i.e. children, families, elderly, special groups, etc.) as some prefer play, skills, enjoyment or socialising and others prefer physical performance or competition.

Some examples of the new approach can be seen in commercial solutions, e.g. in street workout equipment and parkour parks where autonomy and competence are enhanced by providing several options for exercises. Other examples also include smart tags and codes to allow online video streaming of exercise instructions. Unfortunately, these good examples have not yet been fully utilised at a system level. Affordances for physical activity could also be implemented in everyday settings. Examples of this could be the use of surface materials and designs inside a grocery store to invite balance skills being practised, public spaces where people meet having street workout equipment and playgrounds being designed for adult physical activity also.

5 Conclusion

The ecological dynamics theoretical framework suggests that affordances are both subjective and objective. This means that they should be seen as invitations for action [33]. However, since they are invitations, they can be accepted or rejected by people. Therefore, when we design physical activity facilities, we should understand how to design different affordances for physical activity. After all, an affordance for a young child to be active is different from an affordance for an elderly person to be active. The same consideration applies to males versus females, people of different cultures, and able-bodied and disabled people, etc. Therefore, a whole landscape of affordances needs to be designed so that different individuals with different needs are invited to engage in physical activity [34]. This approach requires a multi-disciplinary collaboration between ecological dynamists, developmental psychologists, gerontologists, educators, movement scientists, sociologists, urban planners, designers and engineers.

Compliance with Ethical Standards

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References

1. Janssen I, LeBlanc AG. Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *Int J Behav Nutr Phys Act.* 2010;7:40.
2. Warburton DE, Nicol CW, Bredin SS. Health benefits of physical activity: the evidence. *CMAJ.* 2006;176:801–9.
3. World Health Organization. Global recommendations on physical activity for health. Geneva: WHO; 2010. http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf. Accessed 3 May 2016.
4. Recommendations for physical activity in early childhood education [in Finnish]. Handbooks of the Ministry of Social Affairs

- and Health; 2005:17. <http://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/72925/URN%3aNB%3afi-fe201504225286.pdf?sequence=1>. Accessed 3 May 2016.
5. Tammelin T, Karvinen J, editors. Recommendations for the physical activity of school-aged children. Ministry of Education and Young Finland Association [in Finnish; abstract in English]. Helsinki: Reptalo Lauttasaari; 2008.
 6. The Office of Disease Prevention and Health Promotion. 2008 physical activity guidelines for Americans. Washington, DC: US Department of Health and Human Services; 2008. <http://health.gov/paguidelines/pdf/paguide.pdf>. Accessed 3 May 2016
 7. Soini A, Tammelin T, Sääkslahti A, et al. Seasonal and daily variation in physical activity among three-year-old Finnish pre-school children. *Early Child Dev Care*. 2014;184:589–601.
 8. Kokko S, Hämylä R, Villberg J, et al. Liikunta-aktiivisuus ja ruutu-aika [Physical activity and screen time]. In: Kokko S, Hämylä R, editors. Lasten ja nuorten liikuntakäyttäytyminen Suomessa; LIITU-tutkimuksen tuloksia 2014 [The physical activity behaviours of children and adolescents in Finland; results of the LIITU study, 2014]. Helsinki, Finland: State Sport Council Publications; 2015. p. 2.
 9. Tammelin T, Laine K, Turpeinen S. Physical activity of school-aged children. LIKES—Research reports on sport and health 272 [in Finnish; abstract in English]. Jyväskylä: LIKES—Foundation for Sport and Health Sciences; 2013.
 10. Aira T, Kannas L, Tynjälä J, et al. Hiipuva Liikunta Nuorusiässä. Drop off-ilmion Aikatrendejä ja Kansainvälistä Vertailua WHO-Koululaistutkimuksen (HBSC-Study) Aineistoilla 1986–2010. [Diminishing physical activity in adolescence. The time trends and international comparisons of the drop-off phenomena in the 1986–2010 Data of Health Behavior in School-aged Children Study]. Jyväskylä: Publications of Research Center for Health Promotion at University of Jyväskylä 5; 2013. https://www.jyu.fi/sport/laitokset/tutkimusyksikot/tetk/julkaisusarja/dropoff_julkaisu. Accessed 3 May 2016.
 11. UKK Institute. Physical activity pie. 2009. http://www.ukkinstituutti.fi/en/products/physical_activity_pie. Accessed 20 July 2015.
 12. Kaikkonen R, Murto J, Pentala O, et al. Alueellisen terveys- ja hyvinvointitutkimuksen perustulokset 2010–2014 [Regional health and welfare research results 2010–2014]. 2014. <http://www.thl.fi/ath>. Accessed 3 May 2016.
 13. Pekurinen M, Pokka-Vuento M, Salo H, et al. Lihavuus ja terveysmenot Suomessa 1997 [Obesity and health costs in Finland 1997]. *Suom Lääkäril*. 2000;55:11–6.
 14. Pekurinen M. Lihavuuden kustannuksia [Costs from obesity]. 2011. https://www.thl.fi/documents/10531/122367/Pekurinen_Kansanterveyspaivat12.pdf. Accessed 3 May 2016.
 15. Vasankari T. Mitä liikkumattomuus maksaa? [Costs of insufficient physical activity]. 2014. <http://www.sport.fi/system/resources/W1siZiIsIjIwMTQvMTAvMDEvMTBfNDNFNTVfNjY3X1RWYXNhbmthcmFtTG1pa3VudGFmb29ydW1pXzI4XzI4fMjAxNC5wZGYiXV0/TVasankari%20Liikuntafoorum%2028%209%202014.pdf>. Accessed 3 May 2016.
 16. Yli-Piipari S, Leskinen E, Jaakkola T, et al. Predictive role of physical education motivation: the developmental trajectories of physical activity during grades 7–9. *Res Q Exerc Sport*. 2012;83:560–78.
 17. Ministry of Education. Liikunnan opetus suunnitelman perusteet [Curriculum for physical education]. 2015. http://www.edu.fi/download/166299_ops2016_liikunnan_tukimateriaalit.pdf. Accessed 3 May 2016.
 18. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process*. 1991;50:179–211.
 19. Bandura A. Self-efficacy: the exercise of control. New York: Freeman; 1997.
 20. Deci EL, Ryan RM. Intrinsic motivation and self-determination in human behaviour. New York: Plenum Press; 1985.
 21. Noland MP, Feldman RH. An empirical investigation of leisure exercise behavior in adult women. *Health Educ*. 1985;16(5):29–34.
 22. Brymer E, Davids K, Mallabon E. Understanding the psychological health and wellbeing benefits of physical activity in nature: an ecological dynamics analysis. *Ecopsychology*. 2014;6:189–97. doi:10.1089/eco.2013.0110.
 23. Davids K, Araújo D, Hristovski R, et al. Ecological dynamics and motor learning design in sport. In: Williams AM, Hodges N, editors. Skill acquisition in sport: research, theory & practice. 2nd ed. London: Routledge; 2012. p. 112–30.
 24. Sharma-Brymer V, Brymer E, Davids K. The relationship between physical activity in green space and human health and wellbeing: an ecological dynamics perspective. *J Phys Educ R*. 2015;2:7–22.
 25. Davids K, Araújo D, Brymer E. Designing affordances for health-enhancing physical activity and exercise in sedentary individuals. *Sports Med*. 2016. doi:10.1007/s40279-016-0511-3.
 26. LIPAS database. <http://www.liikuntapaikat.fi>. University of Jyväskylä. Accessed 17 Aug 2015.
 27. Suomi K. Valtion liikuntapolitiikan linjauksia 1980–2014 [Governmental sport policies 1980–2014]. In: Itkonen H, Laine A, editors. Liikunta yhteiskunnallisena ilmiönä [Sports as a social phenomenon]. Research report 1. Jyväskylä: Faculty of Sport Sciences, University of Jyväskylä; 2015. p. 59–76.
 28. Liukkonen J, Jaakkola T, Kokko S, et al. Results from Finland's 2014 report card on physical activity for children and youth. *J Phys Act Health*. 2014;11(1):51–7.
 29. Anttila R, Pyhälä K. Liikunta- ja urheiluseurojen määrä Suomessa [The volume of sports clubs in Finland]. Helsinki: Suomen Liikunta ja Urheilu [Finnish Sports Confederation]; 2005.
 30. Koski P. Liikunta- ja urheiluseurat muutoksessa [Sports clubs in change]. SLU publications 7. Helsinki: SLU-paino; 2009.
 31. Blomqvist M, Mononen K, Kontinen N, et al. Urheilu ja seuraharrastaminen [Sport and club participation]. In: Kokko S, Hämylä R, editors. Lasten ja nuorten liikuntakäyttäytyminen Suomessa; LIITU-tutkimuksen tuloksia 2014 [The Physical activity behaviours of children and adolescents in Finland; results of the LIITU study, 2014]. Helsinki, Finland: State Sport Council publications; 2014. p. 2.
 32. SLU [Suomen Liikunta ja Urheilu—Finnish Sports Confederation]. Kansallinen Liikuntatutkimus 2009–2010. Aikuiset [The National Sports Survey 2009–2010. Adults]. SLU publications 6. Helsinki: SLU-paino; 2010.
 33. Withagen B, De Poel HJ, Araujo D, et al. Affordances can invite behavior: reconsidering the relationship between affordances and agency. *New Ideas Psychol*. 2012;6:250–8.
 34. Rietveld E, Kiverstein J. A rich landscape of affordances. *Ecol Psychol*. 2014;26:325–52.
 35. Parviainen J. Dwelling in the virtual sonic environment: a phenomenological analysis of dancers' learning processes. *Eur Leg Towar New Paradig*. 2011;16(5):633–47.