

This is a self-archived version of an original article. This version may differ from the original in pagination and typographic details.

Author(s): Soini, Anne; Watt, Anthony; Sääkslahti, Arja

Title: Relationships between pre-service teachers' self-reported physical activity and their perceptions of physical education in early childhood teacher education

Year: 2024

Version: Published version

Copyright: © The Author(s) 2024

Rights: CC BY 4.0

Rights url: <https://creativecommons.org/licenses/by/4.0/>

Please cite the original version:

Soini, A., Watt, A., & Sääkslahti, A. (2024). Relationships between pre-service teachers' self-reported physical activity and their perceptions of physical education in early childhood teacher education. *European Physical Education Review*, OnlineFirst.
<https://doi.org/10.1177/1356336x231225626>

Relationships between pre-service teachers' self-reported physical activity and their perceptions of physical education in early childhood teacher education

European Physical Education Review
1–16

© The Author(s) 2024



Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/1356336X231225626

journals.sagepub.com/home/epe



Anne Soini 

University of Jyväskylä, Finland

Anthony Watt

Victoria University, Australia

Arja Sääkslahti

University of Jyväskylä, Finland

Abstract

This study aimed to explore the relationships between Finnish early childhood pre-service teachers' ($N = 274$; aged 20–49; 92% female) self-reported physical activity (PA) and perceptions of their own enjoyment of schooltime physical education (PE), self-evaluation of the content of their current PE studies, perceived importance of PE, and perceived competencies in PE. The one-way analysis of variance revealed that pre-service teachers with higher self-reported levels of PA reported higher scores for perceived importance of PE in supporting a child's physical functionality ($p = 0.004$), and perceived competencies to support a child's PA ($p = 0.017$) and teach PE ($p = 0.023$). Results of independent sample t -tests indicated that pre-service teachers meeting daily PA guidelines reported higher scores for enjoyment of schooltime PE ($p = 0.001$) and perceived competence to teach PE ($p = 0.001$). Findings highlighted that pre-service teachers' self-reported PA was positively related to their perceptions of PE, supporting the recommendation within early childhood teacher education to encourage pre-service teachers to engage in PA.

Keywords

Early childhood teacher education, physical education, pre-service teacher, self-reported physical activity, perception, competence

Corresponding author:

Anne Soini, Faculty of Education and Psychology, University of Jyväskylä, Seminaarinkatu 15, Jyväskylä 40014, Finland.

Email: anne.j.soini@jyu.fi

Introduction

Every child has the right to progress towards their full potential in all areas of education, social and emotional well-being, and physical health (UNICEF UK, 1989). Early childhood education and care (ECEC) plays a crucial role in implementing early childhood policies into practice and supporting children's sustainable development goals (see Richter et al., 2020). Therefore, an essential need exists to invest in social sustainability, such as equality, inclusion, physical activity (PA), and overall well-being within families and young children.

Children must have appropriate knowledge, skills, and habits to support their engagement in movement to maintain a healthy lifestyle (World Health Organization [WHO], 2019). While it has been noted that high-quality ECEC can positively affect the PA levels and well-being of children (Bower et al., 2008; Dowda et al., 2004; Mavilidi et al., 2021), relatively little attention has been placed on developing ECEC teachers' pedagogical skills for teaching physical education (PE) (e.g. Stork and Sanders, 2008; Tsangaridou et al., 2023). According to Niemistö et al. (2023), skilled teachers serve a critical role as they may have significant input in fostering a child's perceived motor competence in early childhood. A recent study by Tsangaridou et al. (2023) noted that ECEC teachers must be taught how to develop quality PE content. Investing in the professional competence of ECEC teachers is an important element in achieving this goal. Therefore, it is essential to make sure ECEC teachers are adequately qualified and meet the basic occupational requirements (Mak et al., 2021; Martyniuk and Tucker, 2014). In particular, the shortage of training has most often occurred during early childhood teacher education (Bruijns et al., 2020; Sevimli-Celik, 2020). Consequently, universities are uniquely positioned to create circumstances where early childhood pre-service teachers can implement their own ideas into practice and prepare new learning for the distinct context (Cochran-Smith, 2002). Moreover, developing early childhood teacher education makes education and working in ECEC attractive and motivates teachers in ECEC to remain working in the sector (Ministry of Education and Culture, 2021).

Previous research has shown that PA can influence children's well-being and health (Timmons et al., 2012), high-level cognition, relevant holistic development in multiple life domains (Bidzan-Bluma and Lipowska, 2018; Johnstone et al., 2022; Pesce et al., 2021), and academic learning outcomes (Nielsen-Rodríguez et al., 2022). Furthermore, it is important to acknowledge that the physically active lifestyles and PA patterns adopted in the early years are more likely to be maintained throughout life (Aira et al., 2021; Corder et al., 2019; Lounassalo et al., 2019; Telama et al., 2014; WHO, 2019). PE in ECEC can provide all children with regular and goal-oriented PA and thus, support children's health and well-being to become physically active adults (Brown et al., 2009). In guiding children towards a physically active lifestyle, PE experiences in early childhood must include (a) the learning of developmentally appropriate skills, (b) personnel trained in appropriate instructional practices for PA, (c) promotion of a positive and safe PA environment, including child-sized equipment, and (d) an inclusive curriculum based on an understanding of moving concepts and skill themes (Stork and Sanders, 2008).

In Finland, ECEC teachers are obligated to support the child's development (i.e. physical, motor, socio-emotional, cognitive, psychological, and ethical-moral) and learning as required by the regulatory expectations of the needs of the children (Finnish Recommendations for PA in Early Childhood, 2016; The Finnish National Agency for Education, 2022). According to the Finnish National Agency for Education (2022), ECEC teachers are expected to deliver compulsory PA and teaching curricula associated with personal health and well-being (e.g. creating a safe

environment for physically active play, teaching children fundamental motor skills, providing children the opportunity to participate in the planning, implementation, and evaluation of the PA) (see also Soini et al., 2023).¹ Finnish Recommendations for PA in Early Childhood (2016) suggest that children in ECEC should be offered guided PE daily concerning on an individual basis and weekly with a group of children. Besides guided PE, goal-oriented PE is also delivered by offering children daily opportunities for free play and time outdoors. Staff are encouraged to plan the daily activities so that children can meet the PA recommendations in ECEC. Furthermore, ECEC teachers must also regularly observe, assess, and document children's PA and motor skills (The Finnish National Agency for Education, 2022). Despite PE being delivered in ECEC settings, many Finnish children may not have additional opportunities for daily vigorous PA (Finnish Recommendations for PA in Early Childhood, 2016; Repo et al., 2019; Sääkslahti et al., 2021). Moreover, recent studies conducted with preschool-aged children have shown low levels of PA, particularly at the moderate- to vigorous-intensity level, and also unacceptably high levels of engagement in screen time (Finland's Report Card 2022 on Physical Activity for Children and Youth, 2022).

In considering Bandura's social cognitive theory (1977), it can be proposed that teachers act as role models influencing children's behaviours (see, e.g. Bruijns et al., 2021; Cheung, 2020; Hesketh et al., 2017). Hu et al.'s (2021) systematic review highlighted that teachers could proactively shape school-aged children's PA participation. Similarly, Ellis et al. (2018) reported that it is essential to acknowledge that ECEC teachers' positive perceptions towards PA are fundamental for promoting young children's PA participation. Furthermore, it is more likely for physically active teachers to support children's PA and motor skills than physically inactive teachers. For instance, Cheung (2020) indicated that preschool children had higher PA levels in PE classes taught by more active teachers than those taught by less active teachers. Also, Smuka (2012) reported that physically active teachers provide role-modelling that increases school-aged children's PA levels. Comparable findings were found in Bruijns et al.'s (2020) study, where personal PA habits positively influenced early childhood pre-service teachers' values and perceptions of their role in promoting PA in childcare. In addition, the pre-service teachers who met the Canadian PA guidelines had significantly higher levels of PA-related self-efficacy (Bruijns et al., 2019) and took personal responsibility for and placed greater importance on items related to promoting PA than those not meeting the PA guidelines (Bruijns et al., 2020). While it may not be necessary for ECEC teachers to meet PA recommendations, they must be aware of their strong influence on young children's PA behaviours (Bruijns et al., 2019). Therefore, emphasising the health benefits of PA might be significant, considering pre-service teachers' low self-reported PA levels (see also Martyniuk and Tucker, 2014).

Previous research regarding professional development in PE has typically focused on in-service teachers (Wang and Ha, 2008). However, early childhood pre-service teachers must also be targeted during their teacher education years to ensure that they enter the workforce with sufficient PA-related knowledge, skills, and training (Martyniuk and Tucker, 2014; Niemistö et al., 2023). Sevimli-Celik's (2020) investigation indicated that pre-service teachers who held negative attitudes regarding PE from previous PE experiences reversed their attitudes after participating in a practice-based course of PE in early childhood teacher education. Indeed, existing research evidence underscores the benefit of PA-related training's positive influence on pre-service teachers' values and perceptions (Bruijns et al., 2019, 2020, 2021; Mavilidi et al., 2021). Therefore, this study aimed to examine the relationships between Finnish early childhood pre-service teachers' self-reported PA and perceptions of their own enjoyment of schooltime PE, self-evaluation of the content of their current PE studies, perceived importance of PE, and perceived competencies in PE.

Materials and methods

Participants

The study took place in all seven universities providing early childhood teacher education in Finland. All Finnish pre-service teachers in their final year of a bachelor's degree in early childhood education, of which there were 509 at the time of data collection, were invited to participate in the study. During the academic year 2019–2020, 289 completed the self-report questionnaire. The eligibility for involvement in the research required completing compulsory PE studies included in their early childhood teacher education. A group of 13 respondents were excluded from the final data due to incomplete PE studies, and two respondents did not fully complete the questionnaire. The pre-service teachers were given the choice of whether to answer an online or paper version of the questionnaire to provide them with the best possible form to participate in the study.

In total, 274 (response rate of 54%) participants provided responses either online (49%, $n = 134$) using digital devices or in paper form (51%, $n = 140$). Responses were provided using Finnish (98%, $n = 269$) or English (2%, $n = 5$). Participants took approximately 15 minutes to complete the questionnaire. Pre-service teachers responded to the questionnaire as part of their ordinary early childhood teacher education course of study or in their leisure time. All the pre-service teachers involved in the survey had completed their PE studies before COVID-19. The pre-service teachers were aged 20–49 (mean [M] = 26; standard deviation [SD] = 6.26), 92% were female ($M_{\text{age}} = 26$; $SD = 6.20$), and 8% were male ($M_{\text{age}} = 28$; $SD = 6.85$).

The questionnaire

The questions in the current instrument were developed to examine the pre-service teachers' perceptions of their PE studies in early childhood teacher education programmes. The question content precisely reflected the objectives and requirements of The National Core Curriculum for Early Childhood Education and Care (2018) and Recommendations for PA in Early Childhood (2016).

The questionnaire consisted of four parts, as follows: (1) respondent's background information (nine items, e.g. age, gender, university, and enjoyment of schooltime PE), (2) respondent's PA behaviour (six items, The International PA Questionnaire-Short Form [IPAQ-SF]), (3) respondent's teacher education and PE studies (eight items), and (4) perceived importance of PE aims and perceived competence implementing PE (four items). The questionnaire included 27 questions, of which nine were multiple-choice, three were yes/no, and six were Likert scale. In addition, nine questions were open-ended; however, these questions were not examined or reported in the current study (see Soini et al., 2023). The questionnaire (in English or Finnish) is available on request from the corresponding author. The examined items were as follows:

Pre-service teachers' self-reported PA. IPAQ-SF: Six items required participants to report the frequency and duration of their walking, moderate and vigorous PA performed in bouts greater than 10 minutes in length. The IPAQ sitting question was not included in this assessment. It is an additional indicator variable of time spent in sedentary activity and does not comprise part of any summary score of PA (IPAQ Group, 2005). Weekly minutes of walking and moderate- and vigorous-intensity PA were calculated separately by multiplying the number of days per week by the duration on an average day. To determine a total PA, Metabolic Equivalent of Task (MET) – minutes per week was calculated (sum of walking [$3.3 \times \text{walking minutes} \times \text{walking days}$] + moderate [$4.0 \times \text{moderate-intensity activity minutes} \times \text{moderate days}$] + vigorous [$8.0 \times$

vigorous-intensity activity minutes \times vigorous days] scores) as recommended in the guidelines for data processing and analysis of the IPAQ (2005). The IPAQ questionnaire was selected because of its global validation, strong correlation with device-based PA measures, and capacity to classify individuals achieving current PA guidelines (Ekelund et al., 2006).

Based on their responses, the pre-service teachers were grouped into three IPAQ (2005) categories: low, moderate, and high levels of PA. This approach is commonly implemented to classify populations in PA studies (e.g. Bauman et al., 2009). Those individuals who did not meet the criteria for moderate or high PA levels were considered to have *low levels of PA*. Individuals who were meeting (a) three or more days of vigorous-intensity activity of at least 20 minutes per day or (b) five or more days of moderate-intensity activity and/or walking at least 30 minutes per day or (c) five or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum total PA of at least 600 MET – minutes per week were defined as accumulating a minimum level of activity and therefore, were classified as *moderately active*. Individuals who engaged in vigorous-intensity activity on at least (a) three days achieving a minimum total PA of at least 1500 MET – minutes per week or (b) seven or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum total PA of at least 3000 MET – minutes per week were considered to be *highly active* (IPAQ Group, 2005).

A final assessment was completed to determine if participants met the current WHO (2020) guidelines on PA and sedentary behaviour. Participants who reported they had (a) at least 150–300 minutes of moderate PA per week or (b) at least 75–150 minutes of vigorous PA per week were considered to meet the recommended levels of daily PA. Due to incomplete answers to the IPAQ questions, cohorts of missing cases for IPAQ categories (7.7%) and PA guidelines (6.9%) were identified.

Enjoyment of schooltime PE. Participants' perceived enjoyment of their own previous experiences in mandatory schooltime PE was assessed using a 10-point (1 = *not enjoyable at all*; 10 = *extremely enjoyable*) Likert scale. Subsequent reference to this variable will be used to label *enjoyment of schooltime PE*.

The adequacy of PE studies. Participants were asked to evaluate, from 1 = *completely disagree* to 5 = *completely agree*, their experience of the adequacy of the PE studies in their early childhood teacher education (11 sub-items, e.g. 'I have adequate training in my PE studies to teach PE in ECEC'). The subscale for the adequacy of PE studies showed satisfactory reliability (Cronbach's alpha coefficient [α] 0.80).

The value of PE. Pre-service teachers' values regarding PE were assessed using a modified version of the Task-Perception Scale, initially developed by Eccles et al. (1983) (see Wigfield and Eccles, 2000). The respondents were asked to answer two questions: (a) 'How important/useful/interesting do you think PE is in early childhood teacher education?' and (b) 'How important/useful/interesting do you think PE is in ECEC?' Respondents rated their responses from one (*completely disagree*) to five (*completely agree*) in regard to separate perceptions of importance, usefulness and interest. In this study, the *M* of two item sets of questions was calculated and taken as the pre-service teachers' PE attainment and intrinsic interest. The alpha coefficient for the subscale of the value of PE (six items) was 0.84, indicating the items had relatively high internal consistency.

The perceived importance of PE aims. Participants were required to respond to the question: 'How important are the following aims of PE in ECEC? Please select the number that best corresponds to your view' using a five-point Likert scale (1 = *not important at all*; 5 = *extremely important*). The question included 36 sub-items; however, 35 were used in the analyses. The

following sub scales were developed: supporting a child's *physical functionality* (sub-items 7, 13, 18, 24, 29, 33, and 36, e.g. 'Improving children's respiratory and circulatory function') ($\alpha = 0.89$); *motor development* (sub-items 2, 8, 14, and 19, e.g. 'Teaching children fundamental motor skills') ($\alpha = 0.61$); *socio-emotional development* (sub-items 3, 9, 15, 20, 25, and 30, e.g. 'Teaching children co-operation and interaction skills') ($\alpha = 0.81$); *cognitive development* (sub-items 4, 10, 21, 26, 31, and 35, e.g. 'Supporting children's development of language') ($\alpha = 0.79$); *psychological development* (sub-items 5, 11, 16, 22, 27, 32, and 34, e.g. 'Providing children with opportunities to be independent [autonomy]') ($\alpha = 0.75$); and *ethical-moral development* (sub-items 6, 12, 17, 23, and 28, e.g. 'Teaching children the spirit of fair play') ($\alpha = 0.83$).

Perceived competence in PE. Information regarding participants' perceived skills and competencies in PE were assessed using a five-point Likert scale (1 = *not competent at all*; 5 = *highly competent*) and the following question: 'What are your views of your skills/competence when teaching PE in ECEC?' The question included 16 sub-items that have been highlighted in the Finnish National Core Curriculum for Early Childhood Education and Care (2018). The Cronbach's alpha coefficients indicated that the perceived competence in PE had satisfactory subscale reliability. Results were as follows: *supporting a child's PA* (sub-items 1, 2, and 3, e.g. 'Supporting a child's physically active free play') ($\alpha = 0.56$); *teaching PE* (sub-items 4, 5, 6, 7, 8, 9, 10, 11, and 12, e.g. 'Teaching physically active games based on rules') ($\alpha = 0.76$); *observing and assessing a child's motor skills and PA* (sub-items 13, 14, 15, and 16, e.g. 'Observing children's fundamental motor skills') ($\alpha = 0.88$).

Trustworthiness of the questionnaire

Firstly, to ensure the data's trustworthiness, the existing PE questionnaires in ECEC and schools were reviewed (see, e.g. Mäkelä, 2014; Nieminen and Salminen, 2010; Valtonen, 2016), and suitable items were selected for the current study. Next, six professionals with research and applied experience in early childhood or PE teacher education programmes inspected and approved the questions developed for this study. Furthermore, the questionnaire was test-retested with 27 pre-service teachers outside the study. Overall, the test-retest for the questionnaire variables intraclass correlation coefficients resulted in a moderate agreement (range 0.55–0.92) for most items.

Statistical analysis

All analyses were performed using SPSS Version 26. The normality of the data and descriptive statistics was assessed. Descriptive statistics are expressed as *Ms* with *SDs* or 95% confidence intervals (CIs) and counts with percentages. The independent and dependent variables used within each analysis were as follows:

1. *Independent variables* (two items): IPAQ categorical PA levels (0 = *missing case*; 1 = *low*; 2 = *moderate*; 3 = *high*), and meeting the WHO guidelines on PA and sedentary behaviour (2020) (no was coded 0, yes 1, and missing case 2).
2. *Dependent variables* (13 items): pre-service teachers' perceptions of their enjoyment of schooltime PE (1 = *not enjoyable at all*; 10 = *extremely enjoyable*), the adequacy of PE studies in early childhood teacher education (1 = *completely disagree*; 5 = *completely agree*), and the value of PE (1 = *completely disagree*; 5 = *completely agree*). The pre-service teachers' perceived importance of PE aims variable comprised the following scored sub-scales: supporting a child's physical functionality, motor development, socio-emotional

development, cognitive development, psychological development, and ethical–moral development (1 = *not important at all*; 5 = *extremely important*). Finally, the pre-service teachers' perceived competence in PE variable comprised the following scored sub scales: supporting a child's PA, teaching PE, and observing and assessing a child's motor skills and PA (1 = *not competent at all*; 5 = *highly competent*). An overview of the independent and dependent variables of the study is presented in Table 1.

A one-way analysis of variance (ANOVA) was used when dependent variables were compared with participants' categorical PA levels, and an independent sample *t*-test was used for comparisons between dependent variables and participants meeting the PA guidelines. Effect sizes were determined using the eta squared (η^2) for one-way ANOVA analysis and Cohen's *d* for independent sample *t*-test. Cronbach's alpha was used to report subscale reliability. The *p*-value for this analysis was <0.05.

Ethical considerations

In Finland, research with human participants must comply with the guidelines of the Finnish National Board on Research Integrity (2019). Ethical reviews from the universities were not required based on the policies regarding anonymised data. Instead, heads of departments from all seven universities provided permission for data collection. Before the data collection, participants were informed about the research objectives and the participants' rights. In addition, respondents were encouraged to explore the privacy statement provided and approved by the University of Jyväskylä, where the study was based. By answering the questionnaire, the respondents gave their consent to the study. Participation in the survey was voluntary, and participants could withdraw at any time. No personal information, except age, gender, and nationality, was requested within the questionnaire. All material was collected, stored, analysed, and reported so that no participants were identifiable. Researchers used and handled the material's storage on the University of Jyväskylä's password-protected server.

Table 1. Overview of independent and dependent variables of study.

Independent variables

IPAQ categorical PA levels (low/moderate/high)

Meeting the PA guidelines (no/yes)

Dependent variables

Enjoyment of schooltime PE (1–10)

Adequacy of PE studies in early childhood teacher education (1–5)

Value of PE (1–5)

Perceived importance of PE aims (1–5)

Supporting a child's: physical functionality, motor development, socio-emotional development, cognitive development, ethical–moral development, psychological development

Perceived competence in PE (1–5)

Supporting a child's PA, teaching PE, observing, and assessing a child's motor skills and PA

IPAQ: International Physical Activity Questionnaire; PA: physical activity; PE: physical education.

Results

Approximately 13% of the pre-service teachers ($N=253$) reported engaging in low levels of daily activity, 43% in moderate levels of daily PA, and 44% in high levels of daily PA. Most (73%) of the pre-service teachers ($N=255$) reported that they met the daily PA recommendations of at least 150 minutes of moderate PA per week or at least 75 minutes of vigorous PA per week. In contrast, nearly a third (27%) of the pre-service teachers did not fulfil the current PA recommendations.

Pre-service teachers' perceptions of PE

When the pre-service teachers were asked about their *enjoyment of schooltime PE*, the scores varied substantially ($M=7.36$, $SD=2.10$, range = 9). The scores for *the adequacy of PE studies* in early childhood teacher education ($M=3.27$, $SD=0.50$) were the lowest, whereas the value of PE ($M=4.76$, $SD=0.37$) was the highest.

Additionally, the pre-service teachers reported high scores for the perceived *importance of PE aims* in ECEC. Across the six PE aims, the pre-service teachers rated their perceptions of the importance of supporting a child's *psychological development* the highest ($M=4.67$, $SD=0.36$) and supporting a child's *socio-emotional development* ($M=4.50$, $SD=0.47$) the second highest. The third highest score was rated for supporting a child's *ethical-moral development* ($M=4.42$, $SD=0.58$). Supporting a child's *cognitive development* ($M=4.40$, $SD=0.52$) was fourth, and fifth was supporting a child's *motor development* ($M=4.35$, $SD=0.52$). The lowest mean score was reported for supporting a child's *physical functionality* ($M=4.21$, $SD=0.67$).

The highest mean score was recorded for pre-service teachers' perceived skills to *support a child's PA* ($M=3.86$, $SD=0.51$). The second-highest M was scored for their perceived skills to *teach PE* ($M=3.63$, $SD=0.50$). The lowest mean score was recorded for pre-service teachers' perceived skills for *observing and assessing children's motor skills and PA* ($M=3.42$, $SD=0.69$) (see Table 2).

Self-reported PA in relation to perceptions and competencies

A one-way ANOVA was performed to compare the effect of the IPAQ categorical PA levels (low/moderate/high) on the dependent variables of the study. Independent sample t -tests were conducted to compare the relationships between participants' self-reported attainment of the WHO (2020) guidelines on PA and sedentary behaviour (no/yes) and the dependent variables of the study (see Table 1).

The analysis revealed that there was a statistically significant difference in the pre-service teachers' self-evaluated mean scores for perceived importance of PE in supporting a child's *physical functionality*, $F(2, 248) = [5.616]$, $p = 0.004$, $\eta^2 = 0.043$, and perceived competence of supporting a child's *PA*, $F(2, 249) = [4.166]$, $p = 0.017$, $\eta^2 = 0.032$, and *teaching PE*, $F(2, 249) = [3.851]$, $p = 0.023$, $\eta^2 = 0.030$, between at least two groups. Tukey's honestly significant difference test for multiple comparisons found that the mean values of perceived importance of supporting a child's *physical functionality* were significantly different between the low and high categories ($p = 0.005$, 95% CI = $[-0.73, -0.11]$) and perceived competence supporting a child's *PA* was significantly different between the moderate and high categories ($p = 0.013$, 95% CI = $[-0.36, -0.0344]$). There was no statistically significant difference in mean perceived competence of *teaching PE* between the low and high categories ($p = 0.078$ and $p = 0.061$, respectively) or between the moderate and high categories ($p = 0.160$ and $p = 0.065$, respectively).

Table 2. The relationships between early childhood pre-service teachers' self-reported PA and their perceived importance of PE aims and perceived PE competencies.

Dependent variables	All			Low			Moderate			High			ANOVA			Do not meet the PA guidelines		Meet the PA guidelines		t-test p-value	d
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)			
Enjoyment of schooltime PE (1–10)	7.36 (2.10)	7.35 (1.85)	7.13 (2.10)	7.59 (2.16)	0.278	0.011	6.63 (2.22)	7.63 (2.03)	0.001	0.47											
Adequacy of PE studies (1–5)	3.27 (0.50)	3.10 (0.46)	3.27 (0.48)	3.31 (0.52)	0.117	0.018	3.29 (0.50)	3.26 (0.49)	0.606	0.06											
Value of PE (1–5) Perceived importance of PE aims (1–5)	4.76 (0.37)	4.69 (0.31)	4.73 (0.42)	4.81 (0.34)	0.129	0.017	4.71 (0.39)	4.78 (0.37)	0.176	0.18											
	(a) 4.21 (0.67)	3.92 (0.64)	4.16 (0.72)	4.34 (0.61)	0.004	0.043	4.10 (0.73)	4.25 (0.65)	0.123	0.22											
	(b) 4.35 (0.52)	4.16 (0.50)	4.34 (0.52)	4.41 (0.51)	0.058	0.023	4.30 (0.52)	4.37 (0.52)	0.337	0.14											
	(c) 4.50 (0.47)	4.42 (0.50)	4.47 (0.49)	4.55 (0.45)	0.310	0.009	4.53 (0.45)	4.48 (0.49)	0.492	0.11											
	(d) 4.40 (0.52)	4.28 (0.53)	4.37 (0.54)	4.45 (0.50)	0.226	0.012	4.37 (0.51)	4.40 (0.53)	0.740	0.06											
	(e) 4.67 (0.36)	4.59 (0.39)	4.63 (0.38)	4.73 (0.31)	0.063	0.022	4.67 (0.36)	4.67 (0.36)	0.988	0.00											
Perceived competence in PE (1–5)	(f) 4.42 (0.58)	4.35 (0.59)	4.39 (0.59)	4.46 (0.56)	0.550	0.005	4.46 (0.55)	4.40 (0.59)	0.403	0.11											
	(A) 3.86 (0.51)	3.83 (0.48)	3.77 (0.53)	3.96 (0.49)	0.017	0.032	3.75 (0.48)	3.90 (0.53)	0.051	0.30											
	(B) 3.63 (0.50)	3.50 (0.46)	3.58 (0.51)	3.73 (0.49)	0.023	0.030	3.46 (0.49)	3.70 (0.51)	0.001	0.48											
(C) 3.42 (0.69)	3.23 (.71)	3.41 (0.66)	3.49 (0.71)	0.184	0.014	3.29 (0.81)	3.47 (0.65)	0.095	0.26												

PE: physical education; M: mean; SD: standard deviation; ANOVA: analysis of variance. Perceived importance of PE aims, supporting a child's, a = physical functionality, b = motor development, c = socio-emotional development, d = cognitive development, e = psychological development, and f = ethical-moral development. Perceived competence in PE, A = supporting a child's PA, B = teaching PE, and C = observing and assessing a child's motor skills and PA. Effect sizes eta squared (η^2) and Cohen's d.

Independent sample *t*-test results revealed a statistically significant difference in *enjoyment of schooltime PE* scores for pre-service teachers who fulfilled the PA guidelines ($M=7.63$, $SD=2.03$) and did not fulfil the PA guidelines ($M=6.63$, $SD=2.22$) conditions ($t(245)=-3.34$, $p=0.001$, $d=0.47$). A statistically significant difference was also observed in perceived competence to *teach PE* scores for pre-service teachers meeting the PA guidelines ($M=3.70$, $SD=0.51$) and not meeting the PA guidelines ($M=3.46$, $SD=0.49$) conditions ($t(252)=-3.40$, $p=0.001$, $d=0.48$). The power results of the inferential comparisons were typically *small*; however, the variations in enjoyment of schooltime PE and perceived competence to teach PE showed a *medium* effect (see Cohen, 1988). The relationships between early childhood pre-service teachers' self-reported PA and their perceived importance of PE aims and perceived PE competencies are presented in Table 2.

Discussion

In this study, we examined the relationships between Finnish early childhood pre-service teachers' self-reported PA and perceptions of their own enjoyment of schooltime PE, self-evaluation of the content of their current PE studies, perceived importance of PE, and perceived competencies in PE. Overall, pre-service teachers' perceptions of all variables examined were indicative of a positive experience. However, pre-service teachers gave relatively low assessments of the adequacy of their PE studies, in contrast to their higher scores for the value of PE (in ECEC and early childhood teacher education programmes). Pre-service teachers' self-reported PA levels were high, indicative of meeting the WHO (2020) guidelines on PA and sedentary behaviour. Nevertheless, some differences between pre-service teachers' self-reported PA and their perceived competencies in PE were found.

Pre-service teachers' self-reported PA levels

According to the WHO (2020) guidelines on PA and sedentary behaviour, all adults should do at least 150–300 minutes of moderate-intensity PA or at least 75–150 minutes of vigorous-intensity PA daily. A substantial number of the early childhood pre-service teachers participating in the study reported high PA levels, and approximately 73% of them indicated that they engaged in the daily PA recommendations. However, 13% of the pre-service teachers reported engaging in low levels of daily PA, and approximately one in four (27%) of all participants did not fulfil the current PA guidelines, which is in line with global estimates (Guthold et al., 2018). The high PA levels in the present study could be justified by the fact that the participants in the study were university-level pre-service teachers. Indeed, previous research indicates that higher educational attainment is linked to higher levels of PA and that education may lead to healthier lifestyle choices (Kari et al., 2020).

Teachers' fitness levels play an important role in their participation in children's physically active play (Cheung, 2020; Rink et al., 2010; Smuka, 2012). In addition, adequate levels of daily PA and physical fitness engagement may also assist ECEC teachers in coping with physically demanding work within the ECEC profession. For instance, frequent lifting, stooping, squatting, and carrying children pose constant ergonomic challenges, especially for teachers' musculoskeletal health (Gratz et al., 2002; King et al., 2006). However, a cohort of the teachers in Smuka's (2012) study did not engage in PA with their school-aged students. Therefore, given the possible association between teacher PA behaviour and children's PA participation, it is important to support the

enhancement of health and fitness knowledge in teacher education (Bruijns et al., 2021; Cheung, 2020; Martyniuk and Tucker, 2014; Mavilidi et al., 2021). Indeed, early childhood teacher education courses should, therefore, continue providing opportunities that foster the desire for early childhood pre-service teachers to be curious and self-motivated in PE (see Ryan and Deci, 2000).

Self-reported PA and perceived importance of PE

This study supports previous research, showing that when teachers are physically active, have positive attitudes towards movement, or feel competent in PE, they implement PE and support children's activity in their work. For instance, Bruijns et al. (2020) highlighted that pre-service teachers meeting the PA guidelines reported higher agreement for the importance of, and personal responsibility for, promoting children's PA in childcare. Similarly, the current results demonstrated that participants' higher self-reported PA levels were related to a higher perceived importance of supporting a child's physical functionality than those with low self-reported levels of PA. However, it should be acknowledged that the importance of supporting a child's psychological, socio-emotional, ethical-moral, and cognitive development through PE revealed the highest mean scores. In the spirit of Finnish ECEC curricula (Finnish National Agency for Education, 2014, 2022), the present positive findings highlighted that participants may see PE as a way to support a child's overall growth and development. Pre-service teachers' attitudes toward PA may translate into their teaching practices. Indeed, opportunities to engage in PA for young children may only be provided in ECEC settings if teachers feel interested and personally responsible (Bruijns et al., 2020; see also Wigfield and Eccles, 2000). Therefore, it could be assumed that participants in this study with the high perceived importance of PE aims may perform well when implementing PE within the ECEC workforce.

In this study, pre-service teachers who did not meet PA recommendations reported significantly lower scores for their enjoyment of schooltime PE than those who achieved the PA recommendations. It is unclear whether teachers form their values related to PA and PE during their own school experiences, within their teacher education studies, or are shaped by the setting in which they are employed. Nevertheless, it is crucial to be aware that previous negative PE experiences or low levels of PA do not entirely define what kind of teacher a person will be in the future. Several previous studies have shown that early childhood teacher education programmes can have a positive effect on pre-service teachers' negative PE perceptions (see, e.g. Bruijns et al., 2021; Martyniuk and Tucker, 2014; Mavilidi et al., 2021). In fact, Sevimli-Celik (2020) reported that pre-service teachers' negative attitudes changed during their teacher education training. Integrating PA-related education into early childhood teacher education programmes is essential because it has been shown to positively contribute to pre-service teachers' PA-related self-efficacy to engage preschoolers in PA (see also Bruijns et al., 2021).

Relationship of self-reported PA with perceived competencies

This investigation showed that pre-service teachers' perceived competencies in PE were typically high. However, some variations between pre-service teachers' perceived competence in PE were observed based on the participants' self-reported PA. First, the pre-service teachers who met the daily PA recommendations or reported high levels of PA also perceived higher competencies to teach PE compared to those who reported lower self-reported PA levels. Furthermore, pre-service teachers with higher self-reported levels of PA had higher perceived competence in supporting a

child's PA. Similarly, Canadian pre-service teachers meeting the PA guidelines had greater confidence in facilitating and encouraging young children's active play than those not meeting the guidelines (Bruijns et al., 2019). A possible explanation for the pre-service teachers' relatively congruent perceptions and high perceived competencies in PE may be an outcome of the comparable implementation of the early childhood teacher education programmes in Finland. For instance, mandated professional studies, including PE studies, are delivered in all seven Finnish universities that offer three years of bachelor's degree education. Although there is no specific PE curriculum specification, and universities can independently decide on the total amount and content of PE studies, no significant variations exist in the current PE subjects implemented in universities (see Soini et al., 2023). It is important to continue sharing professional knowledge, objectives, and course content throughout the Finnish universities' early childhood teacher education networks.

Limitations and future directions

Although the research produced valuable information for developing PE in early childhood teacher education programmes, some limitations must be acknowledged. Firstly, due to the exploratory design of this cross-sectional study, causal relationships could not be identified. Secondly, even though the study aimed to recruit as many early childhood pre-service teachers as possible, and achieved a 54% response rate, this group of voluntary participants may have been those who are already physically active or demonstrate positive perceptions towards PA. However, we are confident that the sample size incorporated is representative of the population of final-year early childhood pre-service teachers in Finland. Thirdly, although the IPAQ has been commonly used and seen as valuable in improving PA information based on self-reports among adults in diverse settings (Craig et al., 2003), some limitations have been identified. For instance, as with similar PA measures, self-report bias is demonstrated through the IPAQ-SF, typically overestimating PA compared to data collected using objective measures (Ekelund et al., 2006; Lee et al., 2011). In the future, exploring early childhood teacher education programmes' PE syllabi and content, determining the best PE practices, and comparing pre-service teachers' PE perceptions to their objectively measured PA levels between different countries and cultures would be stimulating and assist the development of the PE studies in early childhood teacher education.

Conclusion

Policies of early childhood teacher education programmes, PE curricula, and professional requirements of an ECEC teacher vary from country to country; therefore, international comparisons across the subject domain have been warranted (see Howells and Sääkslahti, 2019). A strength of this study was that all Finnish universities providing early childhood teacher education were involved. Furthermore, the findings provided comparable information to support new investigations of the role of PE in early childhood teacher education internationally.

The current findings demonstrated that Finnish early childhood pre-service teachers' self-reported PA was associated with higher perceived competence in PE. The results also underscored the important role of the PE curriculum in early childhood teacher education programmes in facilitating pre-service teachers' awareness of the importance of PA in their own lives. This goal could be achieved through future programme development in early childhood teacher education, incorporating an extension to the number of hours pre-service teachers engage in the PE curriculum. It is hoped that the research results will have implications for developing early childhood teacher

education programmes whereby pre-service teachers, regardless of their previous experiences, have equal opportunities to develop their pedagogical skills in PE, (re)evaluate their perceptions towards PA, and become competent PE teachers in the early years. Finally, the findings reinforce the importance of pre-service teachers adopting an active lifestyle that contributes to their physical and emotional well-being and, consequently, supports the positive PA engagement of the children they teach.

Acknowledgements

The research team would like to thank the pre-service teachers for the participating in this study, participating the universities, and the people in the universities who helped with the data collection.


Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Anne Soini  <https://orcid.org/0000-0001-9168-9437>

Note

1. A previously published study (Soini et al., 2023) presented findings related to PE curricula in early childhood teacher education.

References

- Aira T, Vasankari T, Heinonen OJ, et al. (2021) Physical activity from adolescence to young adulthood: Patterns of change, and their association activity domains and sedentary time. *International Journal of Behavioral Nutrition and Physical Activity* 18: 85.
- Bandura A (1977) Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review* 84(2): 191–215.
- Bauman A, Bull F, Chey T, et al. (2009) The international prevalence study on physical activity: Results from 20 countries. *International Journal of Behavioral Nutrition and Physical Activity* 6: 21.
- Bidzan-Bluma I and Lipowska M (2018) Physical activity and cognitive functioning of children: A systematic review. *International Journal of Environmental Research and Public Health* 15: 800.
- Bower JK, Hales DP, Tate DF, et al. (2008) The childcare environment and children's physical activity. *American Journal of Preventive Medicine* 34(1): 23–29.
- Brown WH, Googe HS, McIver KL, et al. (2009) Effects of teacher-encouraged physical activity on preschool playgrounds. *Journal of Early Intervention* 31(2): 126–145.
- Bruijns BA, Adamo KB, Burke SM, et al. (2019) Exploring the physical activity and screen-viewing related knowledge, training, and self-efficacy of early childhood education candidates. *BMC Pediatrics* 19(1): 5.
- Bruijns BA, Adamo KB, Burke SM, et al. (2020) Early childhood education candidates' perspectives of their importance and responsibility for promoting physical activity and minimising screen-viewing opportunities in childcare. *Journal of Early Childhood Teacher Education* 43(1): 87–104.
- Bruijns BA, Johnson AM, Irwin JD, et al. (2021) Training may enhance early childhood educators' self-efficacy to lead physical activity in childcare. *BMC Public Health* 21: 386.

- Cheung P (2020) Teachers are role models for physical activity: Are preschool children more active when teachers are active? *European Physical Education Review* 26(1): 101–110.
- Cochran-Smith M (2002) Learning and unlearning: The education of teacher educators. *Teaching and Teacher Education* 19(1): 5–28.
- Cohen J (1988) *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. Hillsdale, NJ: Erlbaum.
- Corder K, Winpenny E, Love R, et al. (2019) Change in physical activity from adolescence to early adulthood: A systematic review and meta-analysis of longitudinal cohort studies. *British Journal of Sports Medicine* 53: 496–503.
- Craig CL, Marshall AL, Sjöström M, et al. (2003) International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise* 35(8): 1381–1395.
- Dowda M, Pate RR, Trost SG, et al. (2004) Influences of preschool policies and practices on children's physical activity. *Journal of Community Health* 29(3): 183–196.
- Ekelund U, Sepp H, Brage S, et al. (2006) Criterion-related validity of the last 7-day, short form of the International Physical Activity Questionnaire in Swedish adults. *Public Health Nutrition* 9(2): 258–265.
- Ellis Y, Cliff DP and Okely AD (2018) Childcare educators' perceptions of and solutions to reducing sitting time in young children: A qualitative study. *Early Childhood Education Journal* 46(4): 377–385.
- Finland's Report Card 2022 on Physical Activity for Children and Youth (2022) LIKES Research Reports on Physical Activity and Health 407. JAMK University of Applied Sciences. Available at: <https://www.activehealthykids.org/wp-content/uploads/2022/03/Finland-report-card-long-form-2022.pdf> (accessed 15 November 2023).
- Finnish National Agency for Education (2014) *Perusopetuksen opetussuunnitelman perusteet*. [The Basics of the Compulsory Primary Education Curriculum]. Määräykset ja ohjeet 2014:96. Helsinki: Finnish National Agency for Education. Available at: https://www.oph.fi/sites/default/files/documents/perusopetuksen_opetussuunnitelman_perusteet_2014.pdf (accessed 5 June 2023).
- Finnish National Agency for Education (2018) Varhaiskasvatussuunnitelman perusteet. [The National Core Curriculum for Early Childhood Education]. Regulations and Guidelines 2018:3a. Helsinki: Finnish National Agency for Education. Available at: https://www.oph.fi/sites/default/files/documents/varhaiskasvatussuunnitelman_perusteet.pdf (accessed 5 June 2023).
- Finnish National Agency for Education (2022) Varhaiskasvatussuunnitelman perusteet. [The National Core Curriculum for Early Childhood Education]. Regulations and Guidelines 2022:2a. Helsinki: Finnish National Agency for Education. Available at: https://www.oph.fi/sites/default/files/documents/Varhaiskasvatussuunnitelman_perusteet_2022_0.pdf (accessed 5 June 2023).
- Finnish National Board on Research Integrity (2019) Available at: <https://tenk.fi/en> (accessed 5 June 2023).
- Finnish Recommendations for Physical Activity in Early Childhood (2016) *Joy, Play and Doing Together*. Ministry of Education and Culture 2016:35. Available at: <https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/78924/OKM35.pdf?sequence=1&isAllowed=y> (accessed 5 June 2023).
- Gratz R, Claffey A, King PM, et al. (2002) The physical demands and ergonomics of working with young children. *Early Child Development and Care* 172: 531–537.
- Guthold R, Stevens GA, Riley LM, et al. (2018) Worldwide trends in insufficient physical activity from 2001 to 2016: A pooled analysis of 358 population-based surveys with 1.9 million participants. *The Lancet Global Health* 6(10): e1077–e1086.
- Hesketh KR, Lakshman R and van Sluijs EMF (2017) Barriers and facilities to young children's physical activity and sedentary behaviour: A systematic review and synthesis of qualitative literature. *Obesity Reviews* 18: 987–1017.
- Howells K and Sääkslahti A (2019) Physical activity recommendations for early childhood: an international analysis of ten different countries' current national physical activity policies and practices for those under the age of 5. In: *Physical Education in Early Childhood Education and Care: Research-Best Practices-Situation*. Bratislava, Slovakia: Slovak Scientific Society for Physical Education and Sport FIEP. Available at: <http://urn.fi/URN:NBN:fi:jyu-202001201340> (accessed 17 November 2023).

- Hu D, Zhou S, Crowley-McHattan ZJ, et al. (2021) Factors that influence participation in physical activity in school-aged children and adolescents: a systematic review from social ecological model perspective. *International Journal of Environmental Research and Public Health* 18: 3147.
- The IPAQ Group (2005) *Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire: Short and Long Forms*. Available at: <https://sites.google.com/view/ipaq/download?authuser=0> (accessed 5 June 2023).
- Johnstone A, Martin A, Cordovil R, et al. (2022) Nature-based early childhood education and children's social, emotional and cognitive development: A mixed-methods systematic review. *International Journal of Environmental Research and Public Health* 19(10): 5967.
- Kari JT, Viinikainen J, Böckerman P, et al. (2020) Education leads to a more physically active lifestyle: Evidence based on Mendelian randomization. *Scandinavian Journal of Medicine and Science in Sports* 30(7): 1194–1204.
- King PM, Gratz R and Kleiner K (2006) Ergonomic recommendations and their impact on child care workers' health. *Work* 26: 13–17.
- Lee PH, Macfarlane DJ, Lam TH, et al. (2011) Validity of the international physical activity questionnaire short form (IPAQ-SF): A systematic review. *International Journal of Behavioural Nutrition and Physical Activity* 8: 115.
- Lounassalo I, Hirvensalo M, Kankaanpää A, et al. (2019) Associations of leisure-time physical activity trajectories with fruit and vegetable consumption from childhood to adulthood: the cardiovascular risk in young Finns study. *International Journal of Environmental Research and Public Health* 16(22): 4437.
- Mak TCT, Chan DKC and Capio CM (2021) Strategies for teachers to promote physical activity in early childhood education settings—a scoping review. *International Journal of Environmental Research and Public Health* 18: 867.
- Martyniuk OJM and Tucker P (2014) An exploration of early childhood education students' knowledge and preparation to facilitate physical activity for preschoolers: a cross-sectional study. *BMC Public Health* 14: 727.
- Mavilidi MF, Rigoutsos S and Venetsanou F (2021) Training early childhood educators to promote children's physical activity. *Early Childhood Education Journal* 50: 785–794.
- Mäkelä K (2014) *PE teachers' job satisfaction, turnover, and intention to stay or leave the profession*. In *studies in sport, physical education and health* 208. PhD Thesis, University of Jyväskylä, Finland.
- Ministry of Education and Culture (2021) *Varhaiskasvatuksen koulutusten kehittämissuunnitelma 2021–2030 [Programme for Developing Education and Training Provision and Programmes in Early Childhood Education and Care 2021–2030]*. Varhaiskasvatuksen koulutusten kehittämissuunnitelma. Available at: https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/162662/OKM_2021_3.pdf?sequence=1&isAllowed=y (accessed 5 June 2023).
- Nielsen-Rodríguez A, Romance R, Dobado-Castaneda JC, et al. (2022) Evaluation of a proposal for movement integration in the teaching–learning process in early childhood education. *Children* 9: 231.
- Nieminen P and Salminen K (2010) Viiden maan liikunnanopiskelijoiden arviot liikuntakasvatuksen tavoitteiden tärkeydestä [The importance of the objectives of physical education. Physical education students' perceptions in five countries]. *Liikunta Tiede* 47: 45–53.
- Niemistö D, Barnett LM, Laukkanen A, et al. (2023) Perceived motor competence in early childhood predicts perceived and actual motor competence in middle childhood. *Scandinavian Journal of Medicine & Science in Sports* 33(10): 2025–2038.
- Pesce C, Vazou S, Benzinger V, et al. (2021) Effects of chronic physical activity on cognition across the lifespan: A systematic meta-review of randomised controlled trials and realist synthesis of contextualised mechanisms. *International Review of Sport and Exercise Psychology* 16(1): 722–760.
- Repo L, Paananen M, Eskelinen M, et al. (2019) *Varhaiskasvatuksen laatu arjessa - Varhaiskasvatussuunnitelmien toteutuminen päiväkodeissa ja perhepäivähoidossa [Every-day quality in early childhood education and care – ECEC curriculum implementation at day care centre and in family care]*. Kansallinen koulutuksen arviointikeskus. Karvi julkaisut 15:2019. Available at: https://karvi.fi/wp-content/uploads/2019/09/KARVI_1519.pdf (accessed 5 June 2023).

- Richter LM, Cappa C, Issa G, et al. (2020) Data for action on early childhood development. *The Lancet* 396(10265): 1784–1786.
- Rink J, Hall T and Williams L (2010) *Schoolwide Physical Activity: A Comprehensive Guide to Designing and Conducting Programs*. Champaign, IL: Human Kinetics.
- Ryan RM and Deci EL (2000) Self-determination theory and the facilitation of intrinsic motivation, social development, and wellbeing. *American Psychologist* 55(1): 68–78..
- Sääkslahti A, Mehtälä A and Tammelin T (eds) (2021) *Piilo – Pienten lasten liikunnan ilon, fyysisen aktiivisuuden ja motoristen taitojen seuranta. Kehittämisympäristön 2019–2021 tulokset* [A research and development project on monitoring the joy of motion, physical activity and motor skills of young children]. Available at: https://www.likes.fi/wp-content/uploads/2021/09/Piilo_tulosraportti-1.pdf (accessed 5 June 2023).
- Sevimli-Celik S (2020) Moving between theory and practice: Preparing early childhood teachers for teaching physical education. *Journal of Early Childhood Teacher Education* 42(3): 281–298.
- Smuka I (2012) Teacher role model and students' physical activity. *Polish Journal of Sport and Tourism* 19(4): 281–286.
- Soini A, Takalo S, Kalari J, et al. (2023) Physical education in Finnish early childhood teacher education-curricula and preservice teachers' perceptions. *Journal of Early Childhood Education Research* 12(1): 6–31.
- Stork S and Sanders SW (2008) Physical education in early childhood. *The Elementary School Journal* 108(3): 197–206.
- Telama R, Yang X, Leskinen E, et al. (2014) Tracking physical activity from early childhood through youth into adulthood. *Medicine & Science in Sports & Exercise* 46: 955–962.
- Timmons BW, LeBlanc AG, Carson V, et al. (2012) Systematic review of physical activity and health in the early years (aged 0–4). *Applied Physiology, Nutrition, and Metabolism* 37: 773–792.
- Tsangaridou N, Pieroua M and Charalambous CY (2023) An analysis of content development in physical education: Preschool teachers' selection of instructional tasks. *European Physical Education Review* 29(1): 91–106.
- UNICEF UK (1989) *The United Nations Convention on the Rights of the Child*. Available at: <https://www.unicef.org.uk/what-we-do/un-convention-child-rights/> (accessed 14 November 2023).
- Valtonen J (2016) *Askelmerkkejä liikuntaa opettavaksi luokanopettajaksi. Opettajankoulutusta edistävät liikunnan sosiaalisuustyöympäristöt, koetut vahvuudet ja käsitykset hyvästä liikunnanopetuksesta* [Step marks to become a PE teaching class teacher in the primary school]. PhD Thesis, University of Helsinki, Finland. Available at: <http://urn.fi/URN:ISBN:978-951-51-2007-6> (accessed 5 June 2023).
- Wang CL-J and Ha AS-C (2008) The teacher development in physical education: A review of literature. *Asian Social Science* 4: 3–18.
- WHO (2020) *WHO Guidelines on Physical Activity and Sedentary Behaviour*. Geneva: World Health Organization.
- Wigfield A and Eccles JS (2000) Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology* 25: 68–81.
- World Health Organization (WHO) (2019) *Guidelines on Physical Activity, Sedentary Behaviour and Sleep for Children Under 5 Years of Age*. Geneva: World Health Organization.

Author biographies

Anne Soini is a University Teacher in Physical Education in the Faculty of Education and Psychology at the University of Jyväskylä, Finland.

Anthony Watt is a Professor of Physical Education in the College of Arts and Education at Victoria University, Melbourne, Australia.

Arja Kaarina Sääkslahti is an Associate Professor in Sport Pedagogy at the Faculty of Sport and Health Sciences at the University of Jyväskylä, Finland.