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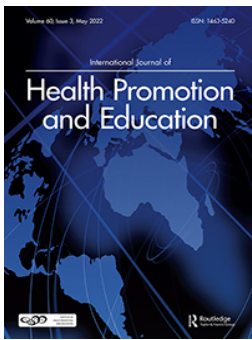
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Educational and family-related determinants of organized sports participation patterns from adolescence to emerging adulthood: A four-year follow-up study

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ABSTRACT

This study aimed to identify organized sports participation patterns and their prevalence from adolescence to emerging adulthood, and the educational and family-related determinants of the patterns. Adolescents in the Finnish Health Promoting Sports Club (FHPSC) study answered a health behaviour questionnaire and reported on sports club participation at ages 15 and 19 ($N = 609$). In emerging adulthood, dropouts (total 41.05%; females 43.72%; males 36.56%), maintainers (30.87; 26.44; 38.33), nonparticipants (27.59; 29.32; 24.67), and joiners (0.49; 0.52; 0.44) ($p = .024$) were identified. A mixed multinomial logistic regression analysis showed, that male gender, as compared to female gender, increased the odds of being a maintainer rather than a nonparticipant or dropout. Among females, high achievement at school and aspiration towards upper secondary school at age 15 increased the odds of being a maintainer at age 19 rather than a nonparticipant. High achievement at school and experiencing a (strong) decrease in parental support for physical activity/sport increased the odds of being a dropout rather than a nonparticipant. Having no experience of a strong decrease in parental support increased the odds of being a maintainer rather than a dropout. Among males, aspiration towards upper secondary school increased the odds of being a maintainer or dropout rather than a nonparticipant. The most common reason for dropping out was study, which was also the most prevalent life status at age 19. The findings highlight a need

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for more flexible possibilities to combine organized sports participation and school studies, and the importance of parental support for physical activity/sport.

Introduction

Organized sports (OS) constitutes a popular leisure activity among young people (Kokko et al. 2019; Mathisen et al. 2019). OS participation among adolescents supports physical activity (PA) in adolescence (Basterfield et al. 2015; Telford et al. 2016), emerging adulthood (Aira et al. 2021; Arnett 2000), and adulthood (Batista et al. 2019). Moreover, it has many physical (Telford et al. 2016), psychological, and social (Eime et al. 2013) benefits despite some disadvantages, including possible injuries (Mattila et al. 2009) and binge drinking (Wichstrøm and Wichstrøm 2008). OS can also be viewed as an informal education setting where, in addition to physical skills, transferable life skills are developed (Mossman et al. 2021). However, after an increase in OS participation during childhood, the participation rate tends not to change, or else to decrease during adolescence, in line with the overall PA trend (Kemp et al. 2019). In Finland too, OS participation reaches its peak among 11-year-olds (71%), but decreases into adolescence (44% at age 15) (Blomqvist et al. 2019) and into emerging adulthood (30% at age 18–20; Mononen et al. 2021).

Beyond the overall change in OS participation, many longitudinal studies have identified a range of OS participation patterns (e.Desroches, Poulin, and Denault 2019; Howie et al. 2016; Kwon et al. 2015; Manz et al. 2016). For example, one study extending to emerging adulthood has shown patterns of consistent sports participation (46.2%), dropout from sports participation (40.2%), and no sport participation (13.6%) (Kwon et al. 2015). However, longitudinal studies on the transition to adulthood are lacking (Howie et al. 2016; Lounassalo et al. 2019).

Systematic reviews – mainly based on cross-sectional, retrospective studies – have shown that various intrapersonal, interpersonal, and structural factors may affect adolescents' OS participation and dropout status (Balish et al. 2014; Crane and Temple 2015; Hopkins et al. 2022). The main factors in dropout include competing priorities (Crane and Temple 2015) or (partially school-related) time-use factors (Deelen, Ettema, and Kamphuis 2018; Hardie Murphy, Rowe, and Woods 2017; Persson et al. 2020). Educational factors such as high achievement at school (Jakobsson et al. 2012; Paakkari et al. 2017) have also shown an association with OS participation. Wattie et al. (2014) found an association between OS participation and the choice of academic (post-compulsory) education as opposed to vocational education, but a study by Jakobsson et al. (2012) found no significant association. Family-related encouragement towards sporting activities (Desroches, Poulin, and Denault 2019; Jakobsson et al. 2012) seem to predict adolescents' OS participation. However, the findings concerning family affluence (Jakobsson et al. 2012; Paakkari et al. 2017) are inconsistent. Some findings have suggested that more males than females participate in OS (Desroches, Poulin, and Denault 2019; Howie et al. 2016; Manz et al. 2016), but Kwon et al. (2015) found that both participate equally.

Educational factors, family affluence and parental support for PA/sport have not been explored with regard to specific OS participation patterns; nor have they been followed to emerging adulthood. With the overall aim of promoting OS participation, this study aimed to identify OS participation patterns from age 15 to 19, the prevalence of each pattern, and the educational and family-related factors associated with the different patterns.

Materials and methods

Data

The study was based on longitudinal online health behaviour questionnaire data from the Finnish Health Promoting Sports Club (FHPSC) Consortium study (Kokko et al. 2015). At baseline (years 2013–14), the study participants (aged 15) were recruited from civic sports clubs (SCs) and from schools. The SC participants were approached through SCs encompassing the ten most popular sport disciplines in the six districts of the Centres of Excellence in Sports and Exercise Medicine in Finland. The school participants were approached through schools in the same districts, and they included both SC participants and nonparticipants. A detailed description is provided in the protocol article (Kokko et al. 2015). Follow-up data collection was carried out when the study participants were at age 19 (years 2017–18) the approach being made via mail. Overall, 2149 adolescents took part in the baseline study. Of these, 651 (30%) participated in the follow-up study, and out of these, 609 (29%) reported OS participation at both time points.

Informed written consent was collected from the participants, and from their guardians when the participants were aged under 18. Ethical approval was granted by the Ethics Committee of the Healthcare District of Central Finland for both time points (record number 23 U/2012&2016). The study was carried out in accordance with the Declaration of Helsinki (Kokko et al. 2015).

Measures and variables

The questions were compiled from questionnaires validated in other studies (Currie et al. 2008; Kannas 2004; Kokko et al. 2015). We explored educational and family-related factors that have shown an association with adolescents' OS participation, and were available from the data. The residential area correlated strongly with plans after comprehensive school, and was therefore excluded from the study.

At baseline, the variable *organized sports participation* was formed. The adolescents approached through SCs were added to the category of participants. Adolescents approached through schools reported their membership in a sports club within three categories (*no; yes, and I participate in training; yes, but I don't participate in training*). The respondents were categorized as *participants* and *nonparticipants* according to the participation in training. In the follow-up, *all* the study participants reported their membership of a sports club as follows: (i) *no*; (ii) *yes, and I participate in training*; (iii) *yes, but I don't participate in training*; (iv) *yes, I act as a coach or other club official*; and (v) *yes, and I participate in training and act as a coach or other club official*. Follow-up respondents were categorized as *participants* and *nonparticipants*, as at baseline.

Thereafter, the variable *longitudinal OS participation patterns* was constructed by combining the information from the two time points into four categories: *maintainers* (i.e. those who maintained participation), *dropouts*, *nonparticipants*, and *joiners*.

Gender (baseline data) was asked (*female* or *male*). The participants reported their *school achievement* at baseline (the response scale being from <6.5 to 10.0, with the grading scale in Finnish comprehensive school ranging from 4=fail to 10=excellent). Responses were re-categorized as *low or medium* (<6.5–8.9) and *high* (9.0–10.0).

Plans after comprehensive school (i.e. compulsory education) were assessed (baseline data) (upper secondary school; vocational education; apprenticeship training; a double degree (upper secondary school and vocational education); go to work; be unemployed; I don't know). The respondents were re-categorized into *upper secondary school* and *other than upper secondary school*. In 2013, 98.5% of the Finnish ninth-graders at the end of the compulsory education applied for upper secondary education, and of these 55% applied for upper secondary school and 45% for vocational school (StatFin. 2022).

Family affluence (baseline) was assessed using the family affluence scale (FAS II). Sum scores (0–9) were obtained for *number of computers* (0, 1, 2, >2); *cars* (0, 1, ≥2); *holiday trips during the last year* (0, 1, 2, >2); *participants having their own bedroom* (no, yes). Scores were re-categorized into *low* (0–5), *medium* (6–7), and *high* (8–9) *family affluence*.

Parental support for PA and sport (baseline and follow-up data) was assessed by the following questions: *During a typical week: how often does your mother (stepmother)/father (stepfather)* (asked separately) (i) *encourage you to do PA or sport?* (ii) *take you to the PA/sports venue or your sports activities?* (iii) *do PA or sport with you?* A 6-point response scale was used: *I don't have/meet her/him; never; rarely; sometimes; often; very often*. At both time points, sum scores were calculated (0–30). At baseline, scores were re-categorized into *low* (0–14), *medium* (15–19), and *high* (20–30) *parental support for PA/sport*. Changes were calculated by subtracting the sum score at baseline from the sum score at follow-up, and re-categorized into *weak decrease/no change/increase* (from 7 to 4), *decrease* (from 3 to –1), and *strong decrease* (from –2 to –21) in parental support for PA/sport.

At follow-up, OS dropouts were asked to report the *age* they had *dropped out*. In addition, they were asked to report to what degree various *reasons for dropping out* had affected their decision to quit the SC participation. The items (23) included e.g. 'a desire to concentrate on studies' (see Supplementary file, Figure S1). A 5-point scale was used from not at all to very much. Responses were re-categorized as *no* (= not at all) and *yes* (= all the other options).

At follow-up, the participants reported their *life status* (study; work/entrepreneur; temporary lay-off/unemployed; military/civilian service; maternity/parental leave; other). If the participants reported 'study', they were asked the *educational institution* (upper secondary school; vocational school; university of applied sciences; university; job training; apprenticeship training; open university/open university of applied science; other). These options were re-categorized into *upper secondary school/university*, *vocational school/university of applied sciences*, *all other options*.

Statistical analyses

The analyses were conducted using SPSS Version 26, with the statistical significance set at $p < 0.05$. *Frequency analyses* were conducted by gender on both baseline and follow-up data regarding OS participation and nonparticipation, with analysis also of longitudinal OS participation patterns. The educational and family-related factors relating to the patterns were compared using *Chi-square tests*. A *mixed multinomial logistic regression analysis* was used to test how the statistically significant factors identified in the bivariate analyses were associated with patterns. As there were interactions between gender and the factors, the analyses were conducted separately for females and males.

Descriptive analyses were conducted on dropout from OS. *Chi-square tests* were used to compare the life status and the current study institution in relation to OS participation patterns by gender.

Results

The patterns of dropouts (41.05%), maintainers (30.87%), nonparticipants (27.59%), and joiners (0.49%) (insufficient for further analyses) were identified ($N = 609$). The most prevalent patterns among males were maintainers (38.33%) and dropouts (36.56%) but among females the most prevalent pattern was that of dropouts (43.72%) ($p = .024$), see [Table 1](#).

The distributions of educational and family-related factors in the OS participation patterns are shown in [Table 2](#).

Being male as opposed to female increased the odds of being a maintainer rather than a nonparticipant (OR 2.04, CI 1.29 to 3.24, $p = .002$) or a dropout (OR 1.74, CI 1.15 to 2.62, $p = .008$) (see Supplementary file, Table S1). Among *females*, having high achievement at school (OR 1.96, CI 1.07 to 3.59, $p = .029$) and aspirations towards upper secondary school (OR 2.28, CI 1.04 to 4.97, $p = .039$) increased the odds of being a maintainer rather than a nonparticipant. Having high achievement at school (OR 2.5, CI 1.43 to 4.39, $p = .001$) and experiencing a *strong decrease* (OR 3.79, CI 1.97 to 7.30, $p < .001$) or *decrease* (OR 1.94, CI 1.07 to 3.50, $p = 0.029$) in parental support for PA/sport increased the odds of being a dropout rather than a nonparticipant. Not experiencing a strong decrease in parental support increased the odds of being a maintainer (OR 0.45, CI 0.24 to 0.86, $p = 0.016$) rather than a dropout. Among *males*, having aspirations towards upper secondary school increased the odds of being a maintainer (OR 2.13, CI 1.01 to 4.51, $p = .048$) or a dropout (OR 3.99, CI 1.79 to 8.88, $p = 0.001$) rather than a nonparticipant ([Table 3](#)).

The dropout proportions varied per year the mean dropout age being 17.12 years among females and 17.02 among males ([Table 4](#)). The most common reason for dropping out was 'a desire to concentrate on studies' (70.23% females, 68.12% males) (see Supplementary file, Figure S1). In every OS participation pattern, the most prevalent life status at age 19 was 'study' (females 50.00–62.38%; males 41.07–56.10%). Among females, those who studied at upper secondary school or in a university were more typically dropouts (46.62%) or maintainers (34.46%) than nonparticipants (18.92%) ($p = .002$). This was also the case among males, but lacked statistical significance ([Table 4](#)).

Table 1. Distributions of organized sports participation at T1, T2, and of longitudinal organized sports participation patterns by gender (%).

| T1 | Female n=382 | Male n=227 | Total n=609 | T2* | Female n=382 | Male n=227 | Total n=609 | OS participation patterns* | Female n=382 | Male n=227 | Total n=609 |
|-----------------|-----------------|---------------|----------------|-----------------|-----------------|---------------|----------------|-------------------------------|-----------------|---------------|----------------|
| Participants | 70.16 | 74.89 | 71.92 | Participants | 26.96 | 38.77 | 31.36 | Maintainers | 26.44 | 38.33 | 30.87 |
| Nonparticipants | 29.84 | 25.11 | 28.08 | Nonparticipants | 73.04 | 61.23 | 68.64 | Joiners | 0.52 | 0.44 | 0.49 |
| Total | 100.00 | 100.00 | 100.00 | Total | 100.00 | 100.00 | 100.00 | Dropouts | 43.72 | 36.56 | 41.05 |
| | | | | | | | | Nonparticipants | 29.32 | 24.67 | 27.59 |
| | | | | | | | | Total | 100.00 | 100.00 | 100.00 |

T1=baseline, T2=follow-up, OS= organized sports.

*significant difference between females and males in T2 ($p = .002$) and in OS participation patterns ($p = .024$).

Table 2. Distributions of educational and family related factors in organized sports participation patterns (%).

| | n | OS participation patterns (%) (n=601–606) | | | p |
|--|-----|---|-----------------------|------------------------------|-----------------|
| | | Maintainers n=186–188 | Dropouts n=248–250 | Nonparticipants n=167–168 | |
| School achievement (T1) | | | | | <.001 |
| low or medium (<6.5–8.9) | 376 | 29.79 | 36.70 | 33.51 | |
| high (9.0–10.0) | 230 | 33.04 | 48.70 | 18.26 | |
| Plans after comprehensive school (T1) | | | | | <.001 |
| other than upper secondary school | 133 | 26.32 | 29.32 | 44.36 | |
| upper secondary school | 473 | 32.35 | 44.61 | 23.04 | |
| Family affluence (T1) | | | | | .98 |
| low | 148 | 29.05 | 41.89 | 29.05 | |
| medium | 279 | 31.90 | 40.50 | 27.60 | |
| high | 179 | 31.28 | 41.90 | 26.82 | |
| Parental support for PA and sport (T1) | | | | | <.001 |
| low | 151 | 17.22 | 27.81 | 54.97 | |
| medium | 212 | 31.60 | 40.57 | 27.83 | |
| high | 243 | 39.09 | 50.21 | 10.70 | |
| Change in parental support for PA and sport (T1->T2) | | | | | .004 |
| weak decrease/no change/increase | 183 | 31.15 | 33.33 | 35.52 | |
| decrease | 222 | 31.98 | 39.64 | 28.38 | |
| strong decrease | 196 | 29.59 | 50.51 | 19.90 | |

T1=baseline, T2=follow-up, OS=organized sports.
(p-values from Chi-square test).

Discussion

The study explored OS participation patterns from adolescence to emerging adulthood, as evidence was lacking on this age cohort (Howie et al. 2016; Lounassalo et al. 2019). Moreover, it explored educational and family-related factors as these aspects have not previously been studied with regard to specific OS participation patterns and have not been followed to emerging adulthood (Desroches, Poulin, and Denault 2019; Jakobsson et al. 2012; Paakkari et al. 2017). The findings could help promoting OS participation, which in turn supports PA (Aira et al. 2021; Batista et al. 2019) and health (Eime et al. 2013; Telford et al. 2016).

The patterns of *dropouts*, *maintainers*, *nonparticipants* and *joiners* were identified. Compared to previous research extending to emerging adulthood (Kwon et al. 2015), the proportion of dropouts was similar, but that of maintainers smaller, and that of nonparticipants larger. Also, gender differences emerged that were not previously identified in emerging adulthood (Kwon et al. 2015), insofar as males were more likely than females to be maintainers rather than nonparticipants or dropouts. The differences in the findings may be due to differences in the organizing bodies of the sports. Previous research (Kwon et al. 2015) explored OS in schools and sports clubs and showed that females had substantial opportunities to participate in school sports teams. The present study focused on SCs organized at local level mainly by associations typical in Finland. The implication would be that SCs, together with schools, need to find more ways of promoting females participation in particular. Note that in the current study, as in previous studies, there were very few joiners (Howie et al. 2016; Jakobsson et al. 2012), reinforcing the point that individuals rarely start OS participation in later adolescence.

Table 3. Mixed multinomial logistic regression analysis of the educational and family related factors associated with the organized sports participation patterns by gender.

| Educational and family-related factors | Females | | | Nonparticipants (n=111) vs. | | | Males | | | Nonparticipants (n=56) vs. | | | |
|--|---------|---------------------------------|------------------|------------------------------|------------------|-------|--------------------------------------|------|-----|--------------------------------|------|-----------------------------|------|
| | n | Maintainers (n=101) OR (95% CI) | p | Dropouts (n=165) OR (95% CI) | | p | Dropouts vs. Maintainers OR (95% CI) | p | n | Maintainers (n=85) OR (95% CI) | p | Dropouts (n=83) OR (95% CI) | |
| | | 1 | 1.96 (1.07–3.59) | .029 | 2.50 (1.43–4.39) | | | | | .001 | 1 | 1.85 (0.73–4.70) | .20 |
| School achievement (T1) | | | | | | | | | | | | | |
| Low or medium | 200 | 1 | | 1 | | | 1 | | 172 | 1 | | 1 | |
| High | 177 | | | 2.50 (1.43–4.39) | .029 | .001 | 0.78 (0.46–1.34) | .37 | 52 | 1.85 (0.73–4.70) | .20 | 1.29 (0.50–3.34) | .60 |
| Plans after comprehensive school (T1) | | | | | | | | | | | | | |
| Other than upper secondary school | 67 | 1 | | 1 | | | 1 | | 65 | 1 | | 1 | |
| Upper secondary school | 310 | | | 1.77 (0.90–3.47) | .039 | .10 | 1.29 (0.58–2.88) | .54 | 159 | 2.13 (1.01–4.51) | .048 | 3.99 (1.79–8.88) | .001 |
| Change in parental support for PA and sport (T1->T2) | | | | | | | | | | | | | |
| Weak decrease/no change/increase | 130 | 1 | | 1 | | | 1 | | 53 | 1 | | 1 | |
| Decrease | 138 | | | 1.59 (0.85–2.97) | .15 | .029 | 0.82 (0.45–1.49) | .51 | 84 | 0.86 (0.36–2.08) | .74 | 1.02 (0.41–2.55) | .96 |
| Strong decrease | 109 | | | 1.71 (0.82–3.57) | .15 | <.001 | 0.45 (0.24–0.86) | .016 | 87 | 1.44 (0.58–3.58) | .44 | 1.80 (0.71–4.58) | .22 |

R² = .10 (Cox & Snell), .12 (Nagelkerke), Model $\chi^2(8) = 41.28$ R² = .08 (Cox & Snell), .09 (Nagelkerke), Model $\chi^2(8) = 19.12$

T1=baseline, T2=follow-up, PA=physical activity, OR=odds ratio, CI=confidence interval.

Table 4. Dropout, life status, and educational institution.

| | n | Female | | p | n | Male | | p |
|---|-----|------------------------|---------------------|-------|----------------------------|-----------------------|--------------------|---------------------------|
| | | Dropouts | Maintainers | | | Dropouts | Maintainers | |
| Dropout | | 17.12 (SD 1.27) | | | 17.02 (SD 1.23) | | | |
| mean age (in years) | | | | | | | | |
| by age year (%) | | | | | | | | |
| age 15 | 13 | 11.50 | | | 8 | 12.50 | | |
| age 16 | 26 | 23.01 | | | 15 | 23.44 | | |
| age 17 | 29 | 25.66 | | | 17 | 26.56 | | |
| age 18 | 25 | 22.12 | | | 16 | 25.00 | | |
| age 19 | 20 | 17.70 | | | 8 | 12.50 | | |
| Total | 113 | 100.00 | | | 64 | 100.00 | | |
| Life status (%) | | | | | | | | 0.69 |
| Study | 219 | Maintainers n = 101 | Dropouts n = 167 | 0.47 | Nonparticipants n = 112 | Maintainers n = 87 | Dropouts n = 82 | Nonparticipants n = 56 |
| Work/Entrepreneur | 100 | 62.38 | 59.88 | | 50.00 | 51.72 | 56.10 | 41.07 |
| Temporary lay-off/unemployed | 25 | 25.74 | 22.75 | | 32.14 | 18.39 | 17.07 | 28.57 |
| military/civil service | 3 | 5.94 | 6.59 | | 7.14 | 10.34 | 6.10 | 10.71 |
| maternity/paternity leave | 2 | 0.00 | 1.80 | | 0.00 | 13.79 | 15.85 | 16.07 |
| other | 31 | 0.00 | 0.60 | | 0.89 | 0.00 | 0.00 | 0.00 |
| Total | 380 | 5.94 | 8.38 | | 9.82 | 5.75 | 4.88 | 3.57 |
| Educational institution (%) | | | | | | | | |
| upper secondary school or university | 148 | 100.00 | 100.00 | 0.002 | 100.00 | 100.00 | 100.00 | 100.00 |
| vocational school or university of applied sciences | 44 | 34.46 | 46.62 | | 18.92 | 42.86 | 39.29 | 17.86 |
| other | 188 | 20.45 | 36.36 | | 43.18 | 36.36 | 36.36 | 27.27 |
| Total | 380 | 21.81 | 43.62 | | 34.57 | 35.83 | 35.00 | 29.17 |

SD=standard deviation.

This study is in line with previous findings showing that *high achievement at school* is related to OS participation (Jakobsson et al. 2012; Paakkari et al. 2017), but also adds information, since the relation was found among female maintainers and dropouts as compared to nonparticipants. This study further added information compared to previous research (Jakobsson et al. 2012) indicating that *upper secondary school aspiration* is related to being an OS maintainer and also a male dropout, as opposed to being a nonparticipant. Furthermore, this study showed that dropping out of OS was at a maximum at age 17; also that (consistent with earlier findings; see Eime et al. 2008; Hardie Murphy, Rowe, and Woods 2017; Persson et al. 2020) *schoolwork* was an important reason for it. Note that at age 19 both maintainers and dropouts participated in academic studies more often than was the case among the nonparticipants, although the difference was non-significant among males. This contrasts with previous research indicating that in schools of high academic proficiency both females and males tend to be OS maintainers rather than dropouts (Wattie et al. 2014).

One interpretation of the findings is that higher educational goals are associated with OS participation but may also lead to dropout. Female maintainers may be goal-oriented in both academic education and OS, while dropouts may have academic success and need time for studies without seeing a future in OS. Male maintainers may want to have both academic education and OS, but for their part, dropouts may aim at academic education and need time for their studies, or see no future in OS. In this regard, one can identify a need to provide less time-consuming sporting activities for those who want to devote more time to studies – but also allow flexibility in studies (e.g. more time to complete a degree, or fewer compulsory courses) for those who want to have both OS and education in their life. This would help to maintain OS participation among those who have not yet started to live on their own, as research shows that change to living on one's own tends to lead to dropout (Van Houten, Kraaykamp, and Breedveld 2017).

There were no differences in *family affluence* between the patterns. In previous studies, the measures of wealth have varied, as have the findings (Jakobsson et al. 2012; Paakkari et al. 2017). This could indicate that family wealth may not determine OS participation as reliably as family income, which has been used in various studies (Desroches, Poulin, and Denault 2019; Findlay, Garner, and Kohen 2009; Manz et al. 2016). Our results may also have been affected by the financial support mechanisms in Finland: the level of economic wellbeing (typical of Nordic countries), and also of participants from the selected districts, may have provided fairly equal possibilities to participate.

Compared to nonparticipants, both maintainers and dropouts had typically experienced higher levels of parental support for PA and sport. The experience of a *decrease in parental support* increased the likelihood of being a female dropout rather than nonparticipant or maintainer. It seems reasonable to assume that the level of parental support remains relatively constant in cases where either participation or nonparticipation in OS is constant. However, among males the difference was not detected between dropouts and the other patterns, which may indicate that male dropouts had gone independently to the sports venue, or that they were still being encouraged towards PA. Causality could not be confirmed between participation change and changes in parental support; nevertheless, the common experience of a decrease in parental support suggests that it is related to growing up, as shown in previous research (Scarapicchia et al. 2017), and that it may precede dropping out of OS.

This study reinforces earlier findings that parental support is important for adolescents' sports participation (Howie, Daniels, and Guagliano 2020; Scarapicchia et al. 2017), and that this constitutes a stronger family-related determinant than purely economic factors (Desroches, Poulin, and Denault 2019; Jakobsson et al. 2012). Thus, even if peer support may also be an important determinant for PA in this age bracket (Howie, Daniels, and Guagliano 2020; Scarapicchia et al. 2017), the maintenance of parental support especially among females needs to be considered in efforts to maintain OS participation. Moreover, the fact that joining in OS was rare in late-teenage underlines the importance of receiving parental support during childhood.

Maintainers in this study may include persons who have finished with one sport and joined in another (drop-off) (Fraser-Thomas, Falcão, and Wolman 2018) or who have changed their training volumes or competition level within a club (drop-through) (Geidne and Quennerstedt 2021). Moreover, dropouts included persons who had stopped doing sports but now functioned as coaches or other club officials in emerging adulthood. In addition, factors such as parental education or a sports background, plus adolescents' early sports experiences, may affect academic success and aspiration together with parental support for PA and sport. Future studies could explore more precisely the associations between diverse situations (in life, sport disciplines, training volumes, and goals) and OS participation patterns, and characterize patterns more precisely.

One strength of this study was that it included a comprehensive, longitudinal sample of a rarely studied age bracket. Moreover, it included educational and family-related factors and demonstrated gender differences within these that have not been encompassed in previous studies exploring OS participation patterns. On the other hand, a limitation lies in the fact that the aim of the original FHPSC study was to focus on OS participants. Thus, the sample was not nationally representative, given that OS participants were over-represented as compared to the national prevalence at age 15 (Blomqvist et al. 2019): this could also explain the higher average dropout age as compared to that of a nationally representative sample (at age 11; Blomqvist et al. 2019). Moreover, more of the study participants had academic aspirations compared to the national prevalence (StatFin. 2022). Note also that the study sample decreased substantially in the follow-up due to the data being collected directly from the participants and not through sports clubs and schools. It is also true, that females, and persons who had academic success and aspiration, and high parental support for PA/sport were overrepresented in the follow-up. However, the longitudinal sample was sufficient for the analyses by gender, and the study was able to show the substantial dropout pattern pertaining to OS – as well as the considerable degree of maintained participation and nonparticipation when adolescents grow up.

Another limitation is that the OS joiners were insufficient in number to obtain characterization. Note also that this study was based on self-reported data involving possible social desirability bias. However, self-reporting was unavoidable, given the nature of the factors explored. A final point to consider is that the study could not show conclusively that a decrease in parental support for PA and sport actually constituted a *cause* of dropping out of OS.

In conclusion, this study identified OS *dropouts*, *maintainers*, *nonparticipants* and *joiners*. Males were more likely than females to be maintainers than nonparticipants or dropouts. Among females, maintained participation was associated with academic

success and aspiration, and with *not* experiencing a strong decrease in parental support for PA and sport, while dropping out was associated with academic success and a (strong) decrease in parental support. Among males, maintained participation and dropping out were associated with academic aspiration. The desire to concentrate on studies emerged as the main reason for dropping out among both genders. These findings highlight a need for more flexible possibilities to combine OS participation and school studies, and the importance of parental support for sports.

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Data availability statement

The data for this study are not publicly available as they contain identification information. However, some parts of the data may be requested from the Principle Investigator (SK), upon reasonable request.

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