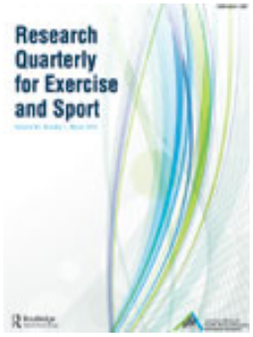

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Youth Sport Participation Trends Across Europe: Implications for Policy and Practice

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ABSTRACT

Purpose: Despite the known health and wellbeing benefits of taking part in sport for children and adolescents, it is reported that sports participation declines during adolescence. The purpose of this study was to explore current organized youth sport participation rates across Europe for both males and females and update current understanding. **Method:** Sport participation registration data was collected for 18 sports from 27 countries. In total, participation data was collected from over 5 million young people from Under 8s (U8s) to Under 18s (U18s). Differences in the participation rates between age categories were investigated using a generalized linear mixed effects model. **Results:** Overall, males were four times more likely to participate in organised youth sport than females' participants, with this trend apparent across all age categories and across most sports. There was a significant decrease across sports in participation rates for males during adolescence from U14-U16 and U16-U18. There was a significant decrease in participation rates for females from U14-U16 for most sports except but an increase in participation rates from U16-U18 for 12 out of 18 sports. Soccer (1262%), wrestling (391%) and boxing (209%) were the sports that had greater male sport participation rates. In contrast, dance sports (86%) and volleyball (63%) had more female participants than males. This research shows male sports participation is significantly greater than female in youth sport across Europe. **Conclusion:** Furthermore, findings showed that for both male and female participants, participation rates increased from U8-U14 for the majority of sports followed by reduced participation rates during adolescence. Findings of this research can be used by national governing bodies and sporting organizations to inform youth sport participation initiatives.

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Drop out; participaiton; physical activity; youth sport

Organised sport plays an important role in the development of today's youth. The health and wellbeing benefits of taking part in sport for adolescents have been widely reported (e.g Eime et al., 2019). For example, sport participation during the teenage years leads to increased physical activity and is associated with decreased risk of cardiovascular disease and metabolic risk factors (Smith et al., 2014), improved mental health (Biddle & Asare, 2011) and improved academic performance (Fox et al., 2010). Furthermore, sport participation during adolescence has been shown to be a protective factor against sedentary behavior, risk for depression and body esteem issues (Alberga et al., 2012). All of the above highlight the importance of sports engagement during adolescence as a tool to enhance health, promote lifelong sports participation, and prepare and support young people for life outside of sport. Moreover, physical activity and sports participation during adolescence are predictors of physical activity and sport participation in adulthood (Kjønniksen et al., 2009; Scheerder et al., 2006; Telama et al., 2005). A physically active lifestyle helps to prevent disease in adulthood including cancer, type II diabetes, osteoporosis and cardiovascular diseases (Endes et al., 2016; Van de Laar et al., 2011).

Engagement and participation in sport also has a range of psycho-social benefits. Sport has been heralded as an environment containing a large number of positive features which can support the personal and social development of young people (Holt et al., 2017). Research has shown how participation in sport can lead to cognitive, emotional, moral, social and identity development (Lara-Bercial & McKenna, under review). These gains are due to the amalgamation of a number of generative mechanisms including capturing the attention of the young person, providing a nurturing and caring environment, building young people's self-confidence and providing opportunities to experience situations, positive and negative, similar to those that appear in adult life (i.e., conflict, disappointment, failure, success, struggle, competition, diversity) (Alberga et al., 2012; Holt et al., 2017). Thus, engagement in sport by the largest possible number of adolescents thus constitutes, in the short and long term, a major public health issue.

Despite the known benefits of sports participation for adolescents it has been reported that the positive aspects of sport participation are often underutilized (Duda et al., 2013). In recent years, there has been a decline in the number of adolescents participating in sport (Eime et al., 2019; Murphy et al., 2016). The onset of puberty (i.e., approximately 11 years for girls and 14 years for boys) has been particularly identified as a key time point where such a decline is observed (Alberga et al., 2012; Brown et al., 2017). A survey of children aged 4–14 years reported sport participation rates peaking at ages 9–11 years (Australian Sports Commission, 2016), whilst other studies of sport participants have reported peak participation at ages 10–14 years (Wong et al., 2016). Furthermore, national participation reports in England (Sport England, 2019) and Ireland (Sport Ireland & Sport Northern Ireland, 2018)

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suggested that adolescents are the least likely participant population to be active. Noteworthy, participation rates have been reported to be particularly low for females (De Knop et al., 1996; Eime et al., 2016; Wong et al., 2016). Therefore, the need to understand participation rates and look at strategies to keep more adolescents engaged in sport and physical activity is evident (Drake et al., 2012).

As such, monitoring and tracking sport participation is one of the essential components to evaluate youth sport participation trends and drop out (World Health Organization, 2018). It can provide important evidence to inform public health initiatives and to identify key participation trends. However, to date, the majority of this research has been conducted in the United States and Australian contexts, with limited contemporary research on sport participation trends in Europe. Therefore, although it is safe to assume certain similarities, the European context has not been fully explored and further, pan-European research in this area is required. Furthermore, there are a lack of studies that have compared participation patterns between different sports and age groups, which is important given that participation trends may vary by sport. Therefore, the aims of this study were to explore current organized youth sport participation rates across Europe for both males and females. Understanding sport participation trends across Europe can provide the necessary evidence to inform governing body policy and practice related to a large range of contexts from community "grassroots" participation to elite levels of competition.

Methods

Study design

This study is part of the three-year project ICOACHKIDS+, and part of the overall activities of the ICOACHKIDS Global Movement, a nonprofit initiative led by Leeds Beckett University and the International Council for Coaching Excellence to support coaches and sport organizations "put kids first in sport" (www.icoachkids.org). ICOACHKIDS+ is co-funded by the Erasmus+ Sport programme of the European Commission. It aims to enhance sport participation and reduce dropout for children aged 13–18 years, and to maximize sport's health enhancing properties. This will be achieved by conducting various research projects and developing relevant web-based educational tools for coaches and clubs based on the findings. ICOACHKIDS+ includes the following partners: International Council for Coaching Excellence, Leeds Beckett University, Hungarian Coaching Association, Sport Ireland Coaching, the Netherlands Olympic Committee and Sport Confederation (NOC*NSF), the European University of Madrid (Spain), the Royal Belgian Football Association, the German Youth Sport Council (DSJ), and FIBA Europe. To explore the current participation rates in organized youth sport across Europe, data was collected from all ICOACHKIDS+ partner organisations for as many sports as possible.

Data collection

For the initial stage of data collection, all ICOACHKIDS+ partner organizations were asked to provide participation data for as many sports as possible within their respective country across multiple years. Specifically, participants were asked to contribute registration/licenses data in organized National Governing Body (NGB) led sports. Organisations were provided with an excel template and were asked to use this template to provide data where possible in order to standardize data collection methods. Organisations could send their sports' participation data for any period of time in the last 10 years. On review of the data received it was decided that 2017 to 2020 were the years used for data analysis that aligned with the study aim to have an up-to-date understanding of youth sport participation.

The initial data structure included participation totals per continuous age category (e.g. Under 7, U8, U9), gender and sport for multiple years (e.g. 2017 to 2020). Each annual age category (e.g. U7, U8, U9, U10) were firstly summed to create bi-annual age categories (e.g. U8, U10). Bi-annual age categories were used to align with methods in previous research and thus allow comparison of findings (Eime & Harvey, 2018). For each country, multiple years of data within a sport, gender and bi-annual age category were then averaged to provide a single value of participation per country for each sport, gender and age category. This provided the final dataset for analysis. Sport participation registration data was collected for 18 sports from 27 countries. Unfortunately, data could not be included for some sports and countries due to the lack of standardized data collection methods which made it not possible to explore participation trends in bi-annual age categories (i.e. data was collected in broader age groupings such as 8-12 years). In total, participation data was collected from over 5 million young people from U8s to U18s.

Data analysis

Differences in the participation rates between age categories were investigated using a generalized linear mixed effects model. To account for the variability in participation rates between countries within an age category, the country ID was specified as a random effect. This allowed comparison to the true difference in participation rate between bi-annual age categories for each sport and by gender (all fixed effects). Estimates of participation (accounting for country) were then produced for each age category. From those, odds ratios (95% confidence interval) were calculated for each bi-annual age category comparison for each sport and gender to examine the extent of participation increases/decreases across age-groups, sports and genders.

Differences in the participation rates between age categories within a sport were investigated using generalized linear mixed effects models using the *lme4* package in R studio (Bates et al., 2015). To account for the variability in participation rates between countries within an age category, the country ID was specified as a random effect with sport and gender fixed effects. Estimates of participation (accounting for country) were then produced for each age category. From those, odds ratios (95% confidence interval) were calculated for each bi-annual age category comparison for each sport and gender to examine the extent of participation increases/decreases across sports and genders. Statistical analysis was conducted using

R Studio. An alpha level of $\rho \leq 0.05$ was set as the level of significance for all models.

Results

Table 1 displays the number of participants per age category by gender. Figure 1 shows the difference in participation number between females and males for each sport. Overall, males were four times more likely to participate in organized youth sport than females with significantly more male participants (approx. 80%) than female participants, with this trend apparent across all age categories and across most sports.

Figure 1 displays the odds ratio (95% confidence interval) for difference in participation number between females and males for each sport and Table 2 displays the number of participants by sport for each age category by gender. Soccer (1262%), wrestling (391%) and boxing (209%) were the sports that had greater male participation rates. In contrast, dance sports (86%) and volleyball (63%) had more female participants than males. The sports with similar participation rates for males and females were athletics (2%), swimming/diving (2%) and skiing (14%).

Gender comparison by sport

Male participation

Table 3 presents the overall changes in participation rates between consecutive bi-annual age categories for male participants. There was a significant decrease across sports in participation rates for males during adolescence from U14-U16 and U16-U18. The largest decrease in participation rates was a 92% between U14 (n = 2130) and U18 (n = 174) for cycling. The highest increase in participation was 1086% between U8 (n = 8412) and U12 (n = 99734) for basketball.

Figure 2 displays the odds ratio (95% confidence interval) for change in male participation numbers between consecutive bi-annual age category. During childhood, most sports increased participation between consecutive age categories. For example, 61% of sports saw an increase from U8-U10, and this figure rose to 72% from U10-U12. In contrast, from U14-U16, 61% of sports observed a decrease in participation. Noteworthy, martial arts and swimming demonstrated a significant decrease in participation rates between consecutive age categories from U8-U18, while volleyball saw an increase in participation between all age categories (see Table 3). For example, in swimming there was a decrease in participation observed for each consecutive age category regardless of gender, with decreases of approximately 370% from U8 to U18.

Female participation

Table 4 presents the overall changes in participation rates between consecutive bi-annual age categories for female sports. There was a significant decrease in participation rates for females from U14-U16 for all sports except boxing and badminton but an increase in participation rates from U16-U18 for 12 out of 18 sports (see Table 4). The largest decrease in participation rates occurred for swimming/diving with a 71% decrease in participation observed from U8 (n = 22831) to U18 (n = 6576). The largest increase in participation rates was table tennis, with a 2367% increase in participation from U8 (n = 152) to U14 (n = 3750).

Figure 3 displays the odds ratio (95% confidence interval) for change in female participation numbers between consecutive bi-annual age categories. During childhood, the majority of sports increased participation rates between consecutive age categories. For example, from U8-U10, 11 out of 18 sports saw an increase and 10 out of 18 sports increased participation from U10-U12. In contrast, from U14-U16, 16 out of 18 sports had a decrease in participation. Noteworthy, martial arts and swimming demonstrated a significant decrease in participation rates between U8-U18, while volleyball saw an increase in participation between consecutive years across all categories (see Table 4).

Discussion

This study aimed to explore the current organized youth sport participation rates across Europe for both males and females between U8-U18 by using data from over 5.5 million participants across 18 sports and 27 countries. The study provides the first wide scale analysis of participation trends across European youth sport considering gender and sport.

Overall, the findings demonstrated significant differences in youth sport participation between genders with males approximately four times more likely to participate in organized sport than females. Findings also showed youth sport participation trends in males decreased during adolescence (U14-U18) whilst female participation decreased between U14-U16 but increased from U16-U18 for some sports. However, participation trends were sport specific suggesting sports participation trends are both gender and sport specific. These findings can be used to inform strategies to increase sport participation and reduce drop out in organised youth sport.

Participation rates for males versus females

Overall, male participation in youth sport was significantly higher than females. This trend was evident across all age categories from U8 to U18 (80% male vs. 20% female)

Table 1. Number of participants and percentage per age category and gender.

	Under 8s	Under 10s	Under 12s	Under 14s	Under 16s	Under 18s	Total
Males	597,556 (82%)	808,525 (81%)	868,166 (80%)	796,721 (79%)	683,699 (79%)	702,248 (79%)	4,456,915 (80%)
Females	125,671 (18%)	185,436 (19%)	217,131 (20%)	216,408 (21%)	179,913 (21%)	184,386 (21%)	1,108,945 (20%)
					Total Number of Participants		5,565,860

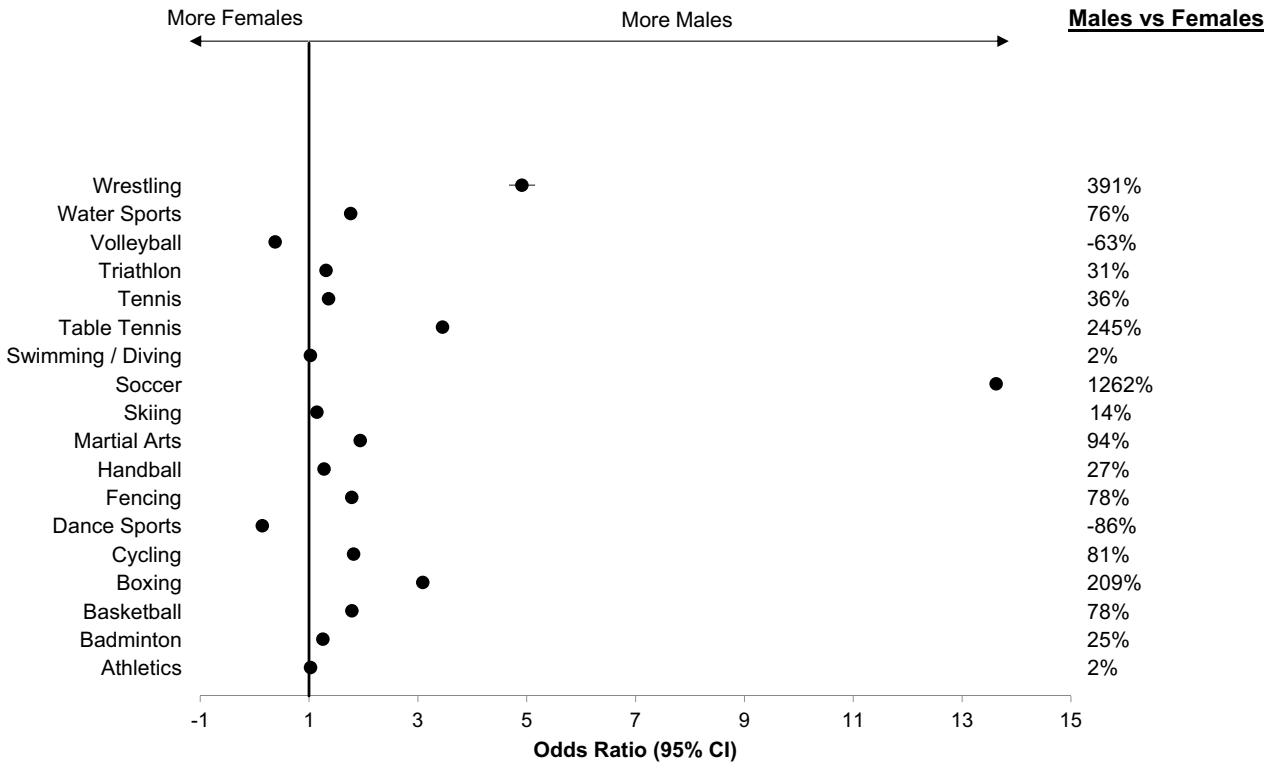

Figure 1. Odds ratio (95% confidence interval) for difference in participation number between females and males for each sport. Values represent % difference between female and male for that sport. Red sports highlights non-significant changes.

demonstrating a consistent participation disparity across childhood and adolescence. This trend is consistent with previous literature, which has highlighted that males participate more in sport and generally sample or play more sports than females from a young age (Eime et al., 2019). The higher participation rates observed in male children and adolescents in this report, supports previous literature which has suggested that males are often afforded increased opportunities to play multiple sports from a young age relative to females, and that parents often encourage males to play sport more than females from a young age (Eime et al., 2016; Wheeler, 2012). This is significant because previous studies have shown that higher sports competence in young childhood is associated with continued sport participation into adolescence (Henrique et al., 2016). Furthermore, research amongst 6–12-year-olds has reported that playing multiple sports and spending more time playing sport contributes to improved gross motor coordination and is correlated with continued engagement in sport (Fransen et al., 2012). Therefore, the higher participation rates of males in comparison to females in childhood, would support previous findings in the literature regarding more males being afforded the opportunity to play sport from a young age in comparison to females. Furthermore, previous research has reported that there is evidence of a competence difference between young males and females, particularly at ball (manipulation) skills (Behan et al., 2019; Veldman et al., 2017) and that competence (i.e., the ability to do something successfully or efficiently) is a major factor relating to current and future participation in sport (Veldman et al., 2017). Therefore, the continued disparity in sport participation between genders in this study supports previous research and may be explained by females being given less opportunity to engage in organized sport from a young age and as such, females not developing the competencies required to continue to engage in sport during adolescence. Therefore, the findings of this study support the need to increase participation rates of young girls in sport across Europe to break this vicious circle of early nonparticipation leading to nonparticipation during adolescence and later in life. If more young girls can sample a broader variety of sports from a young age, this is likely to lead to greater competence and continued engagement in sport during adolescence and beyond.

A further interesting finding of this study was that lower participation sports for females were boxing, soccer and wrestling. In contrast the higher participation sports for female included volleyball and dance sports. This may suggest that a phenomenon of gendered sports is evident, whereby certain sports may be seen as masculine or feminine (Eime & Harvey, 2018). Therefore, there is a need for further research why participants may choose to participate in certain sports.

Participation trends by age category

Overall, for the majority of sports, participation rates increased from U8-U14 for both males and females. However, a significant decrease in participation was observed in adolescence. For example, for males, 11 (61%) and 12 (66%) sports had decreased participation trends between U14 to U16 and U16 to U18 respectively. For females, 17 (94%) sports demonstrated decreasing participation trends at U14 to U16. These findings are consistent with previous literature, which has

Table 2. The number of participants by sport for each age category by gender.

Sport	Gender	Under 8s	Under 10s	Under 12s	Under 14s	Under 16s	Under 18s
Wrestling	Male	2238 (81%)	1760 (83%)	1673 (83%)	1519 (84%)	1363 (86%)	1139 (82%)
	Female	518 (19%)	367 (17%)	347 (17%)	294 (16%)	220 (14%)	251 (18%)
Water sports	Male	2068 (60%)	5666 (73%)	5798 (64%)	7130 (65%)	7056 (68%)	6538 (61%)
	Female	1405 (40%)	2149 (27%)	3212 (36%)	3918 (35%)	3310 (32%)	4181 (39%)
Volleyball	Male	1075 (37%)	1924 (31%)	3496 (28%)	4661 (24%)	5115 (27%)	5540 (27%)
	Female	2027 (63%)	4330 (69%)	9097 (72%)	14584 (76%)	13669 (73%)	14776 (73%)
Triathlon	Male	400 (54%)	473 (55%)	562 (58%)	593 (58%)	525 (62%)	493 (56%)
	Female	337 (46%)	381 (45%)	405 (42%)	424 (42%)	324 (38%)	384 (44%)
Tennis	Male	13154 (58%)	16152 (58%)	18649 (59%)	20036 (58%)	18008 (61%)	14703 (51%)
	Female	9397 (42%)	11502 (42%)	13102 (41%)	14330 (42%)	11351 (39%)	14371 (49%)
Table Tennis	Male	3108 (67%)	7125 (73%)	11953 (77%)	14664 (80%)	13515 (83%)	11067 (76%)
	Female	1523 (33%)	2583 (27%)	3575 (23%)	3750 (20%)	2816 (37%)	3571 (24%)
Swimming/diving	Male	23468 (51%)	16112 (51%)	13348 (50%)	11409 (51%)	8400 (55%)	5826 (47%)
	Female	22831 (49%)	16058 (49%)	13393 (50%)	11330 (49%)	6802 (45%)	6576 (53%)
Soccer	Male	476296 (95%)	599070 (94%)	639153 (93%)	565826 (93%)	470993 (92%)	523121 (92%)
	Female	24483 (5%)	37390 (6%)	48720 (7%)	45212 (7%)	40361 (8%)	44226 (8%)
Skiing	Male	5174 (52%)	4919 (52%)	5683 (53%)	6246 (54%)	6455 (60%)	6373 (49%)
	Female	4750 (48%)	4479 (48%)	5089 (47%)	5417 (46%)	4249 (40%)	6589 (51%)
Martial Arts	Male	23645 (68%)	21439 (66%)	18355 (65%)	14935 (65%)	10927 (69%)	7718 (60%)
	Female	11154 (32%)	11088 (34%)	9731 (35%)	7942 (35%)	5001 (31%)	5208 (40%)
Handball	Male	16698 (58%)	16749 (56%)	18346 (56%)	18561 (56%)	16891 (60%)	14999 (52%)
	Female	12282 (42%)	13272 (44%)	14562 (44%)	14847 (44%)	11261 (40%)	14123 (48%)
Fencing	Male	419 (66%)	834 (67%)	1081 (66%)	1041 (63%)	822 (66%)	627 (56%)
	Female	220 (34%)	403 (33%)	561 (34%)	609 (37%)	431 (34%)	486 (44%)
Dance Sports	Male	1054 (9%)	957 (11%)	1019 (12%)	991 (13%)	969 (17%)	931 (15%)
	Female	11160 (91%)	7934 (89%)	7325 (88%)	6853 (87%)	4756 (83%)	5248 (85%)
Cycling	Male	1358 (63%)	1679 (60%)	2006 (63%)	2130 (66%)	1921 (70%)	1741 (65%)
	Female	785 (37%)	1132 (40%)	1163 (37%)	1120 (34%)	822 (30%)	948 (35%)
Boxing	Male	1765 (71%)	2230 (74%)	2613 (77%)	3308 (77%)	3966 (80%)	3842 (74%)
	Female	711 (29%)	788 (26%)	790 (23%)	1007 (23%)	1012 (20%)	1322 (26%)
Basketball	Male	8412 (66%)	90619 (65%)	99734 (63%)	93314 (63%)	83293 (64%)	69503 (66%)
	Female	4290 (34%)	48207 (35%)	59800 (27%)	55808 (37%)	45891 (37%)	35381 (34%)
Badminton	Male	884 (60%)	1668 (56%)	2797 (56%)	3802 (56%)	3752 (59%)	3177 (51%)
	Female	589 (40%)	1321 (44%)	2202 (44%)	2976 (44%)	2610 (41%)	3174 (49%)
Athletics	Male	16340 (49%)	21129 (49%)	21905 (48%)	26553 (51%)	29720 (54%)	24798 (51%)
	Female	17199 (51%)	21995 (51%)	23944 (52%)	25829 (49%)	24915 (46%)	23453 (49%)

reported that sport participation rates peak between the ages of 10–14 years (Eime et al., 2016c; Wong et al., 2016) with significant decreases in sport participation rates observed for both adolescent males and females from U14 onwards. While it is not possible to determine the specific cause of this within this report, previous literature has hypothesized that this may be an artifact of sampling behavior with adolescents specializing within a specific sport (Eime et al., 2019). However, the authors reported that even when this is accounted for, there is a significant decrease in sports participation in adolescents (Eime et al., 2019). Other research has suggested there is evidence of a shift away from competitive club-based sport toward noncompetitive and non-organized forms of leisure-time physical activity during late adolescence (Australian Sports Commission, 2016; Harris et al., 2017). Previous research has suggested causes of adolescent sport attrition include competency and social factors such **as lack of enjoyment**, support from parents, peers and coaches and a positive social club environment (Balish et al., 2014; Casey et al., 2017; Gardner et al., 2017; Henrique et al., 2016). It is also possible that factors related to growth and maturation during these ages may influence participant competency levels (Lloyd et al., 2014) with competency reported as a major factor relating to participation in sport (Veldman et al., 2017). The period of adolescence is associated with a variety of biological, morphological and psychological changes, whereby accelerated periods of development may lead to momentary changes to physical capabilities often referred to as the "adolescent awkwardness" (Lloyd et al., 2014) and "the relative age effect" (Baker et al., 2009). This, coupled with psychosocial development changes during these ages, may impact participant capabilities and their perceived competency. Sport studies indicate that it may not an appropriate time to commit to intense training in one sport until athletes are about 16 years of age (Côté & Vierimaa, 2014). Moreover, research in sports where intense investment in one sport occurs before age 16 (e.g., swimming has indicated several negative outcomes associated with this specialization such as more injuries and less enjoyment (Starkes et al., 1996). As such it is important that coaches are educated on such the relative age effect, growth, maturation and development during

Table 3. Summary matrix of changes in MALE participation between age categories for different sports.

	U8 - U10	U10 - U12	U12 - U14	U14 - U16	U16 - U18	Largest Increase	Largest Decrease
Athletics	↑	↑	↑	↑	↓	U8=16340-U16=29720 (82%)	U16=29720- U18=24798 (17%)
Badminton	↑	↑	↑	↔	↓	U8=884-U14=3802 (330%)	U14=3802-U18=3177 (16%)
Basketball	↑	↑	↓	↓	↓	U8=8412-U12=99734 (1086%)	U12=99734-U18=69503 (30%)
Boxing	↑	↑	↑	↑	↔	U8=1765-U16=3966 (125%)	U16=3966-U18=3842 (3%)
Cycling	↑	↑	↔	↓	↓	U8=1358-U14=2130 (57%)	U14=2130-U18=174 (92%)
Dance Sports	↓	↔	↔	↔	↔	U10=957-U12=1019 (6%)	U8=1054-U10=957 (9%)
Fencing	↑	↑	↔	↓	↓	U8=419-U12=1081 (158%)	U12=1081-U18=627 (42%)
Handball	↔	↑	↔	↓	↓	U10=16749-U12=18346 (10%)	U14=18561- U18=14999 (19%)
Martial Arts	↓	↓	↓	↓	↓	N/A	U8=23645- U18=7718 (67%)
Skiing	↓	↑	↑	↔	↔	U10=4919 – U16=6455 (31%)	U8=5174 – U10=4919 (5%)
Soccer	↑	↑	↓	↓	↑	U8=476296-U12=639153 (34%)	U12=639153-U16=565826 (11%)
Swimming / Diving	↓	↓	↓	↓	↓	N/A	U8= 23468-U18 =5826 (75%)
Table Tennis	↑	↑	↑	↓	↓	U8=3108-U14=14664 (372%)	U14=14664-U18=11067 (25%)
Tennis	↑	↑	↑	↓	↓	U8=13154 – U14=20036 (52%)	U14=20036-U18=14703 (27%)
Triathlon	↑	↑	↑	↓	↔	U8=400 U14=593 (48%)	U14=593-U18=493 (17%)
Volleyball	↑	↑	↑	↑	↑	U8= 1075 - U18 = 5540 (515%)	N/A
Water Sports	↑	↑	↑	↔	↓	U8=2068 - U14=7130 (344%)	U14=7130-U18=6538 (8%)
Wrestling	↓	↓	↓	↓	↓	N/A	U8=2238-U18=1139 (51%)
Key: ↑ = Significant increase; ↓ = Significant decrease; ↔ = No significant change, N/A=. not available							

adolescence, understand the impact that these may have on participant competence and perceived competency, and factor these considerations into their coaching to maximize participation and continued involvement in sport. Furthermore, there is a need for further research to explore the reasons for reduced sport participation numbers in late adolescence and a need for sporting governing bodies to implement strategies and initiatives to try to reduce youth sport attrition rates in adolescence.

Sport attrition by girls

A concerning pattern is the more severe decline in participation rates for females between U14-U16 which demonstrated that 94% of sports observed a significant decrease in female participation between these ages. This is coupled with the lower participation rates of females in comparison to males overall, which is consistent with previous findings highlighting a higher decrease in female participation during adolescent versus males (Eime et al., 2016; Wong et al., 2016). However, an interesting finding of this research was that 72% of sports also experienced an increase in female participation rates between U16-U18, while there was a 67% decrease in male adolescent participation rates between U16-U18. Despite this, female participation at U18 was still significantly less than for males (approx. 79% of participants male versus 21% female). A range of intrapersonal, interpersonal, organizational,

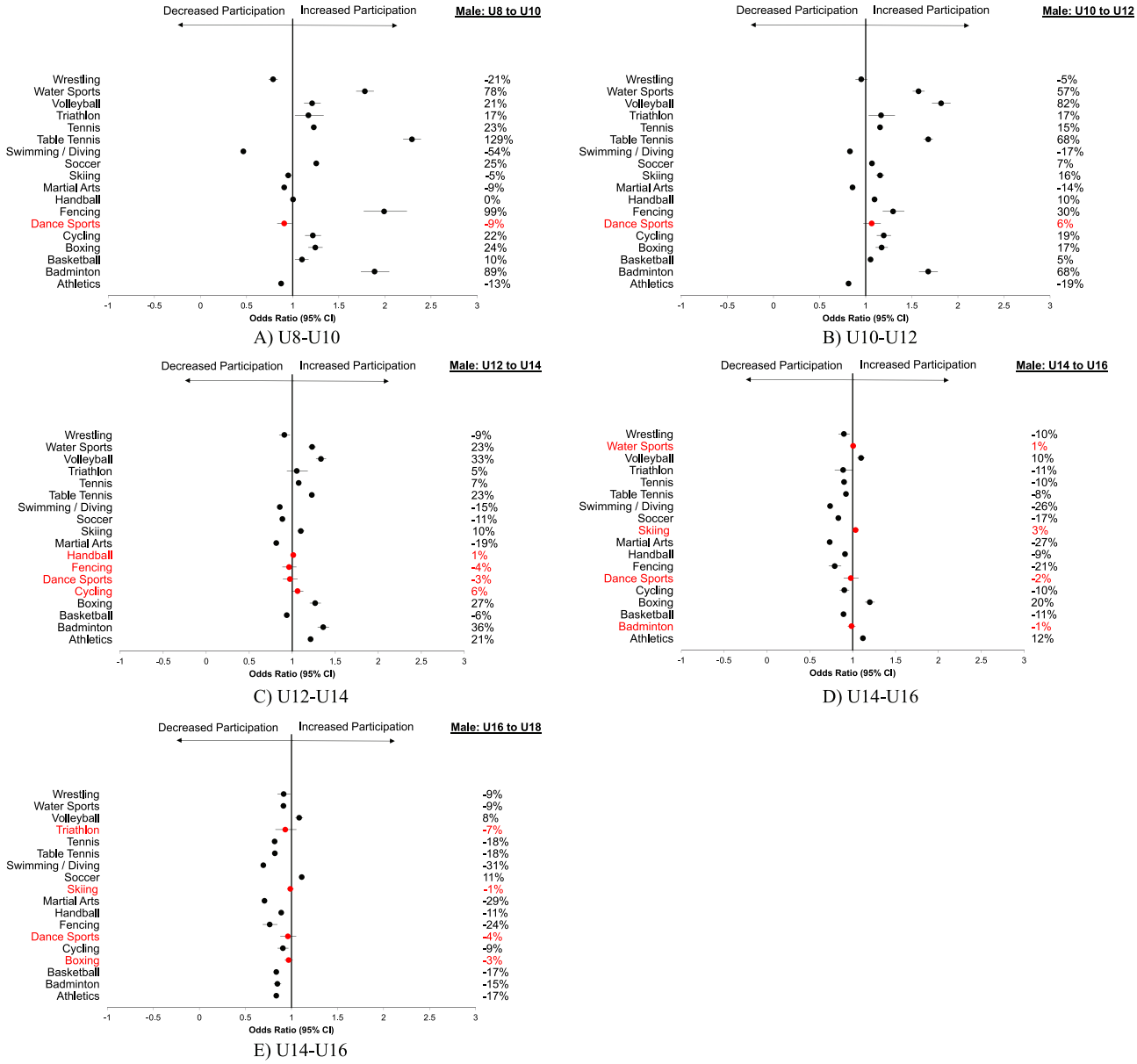

Figure 2. Odds ratio (95% confidence interval) for change in participation numbers between age categories for male sports. Values represent % change between consecutive age categories for a given sport. Red sports highlights non-significant changes.

environmental and policy factors, such as enjoyment, peers, parental support and coach interactions have been suggested to influence participation in sport in youths (Crane & Temple, 2015), however it is not possible to determine the specific cause for the trend observed within this report and future research is currently underway as part of ICOACHKIDS+ to explore this area.

Youth sport attrition is an individual, context-specific event

Based on the findings of this research, a key consideration is that a "One Size Fits All" approach to preventing decreasing participation trends and dropout in youth sport may not be appropriate (Crane & Temple, 2015). While it has been established that overall participation rates were higher in children (peaking at U12s) and that lower participation rates were observed in adolescents, there were some interesting trends observed for some specific sports. For example, in swimming there was a decrease in participation observed for each consecutive age category regardless of gender, with decreases of approximately 370% from U8 to U18. Previous research has reported that early specialization often leads to drop-out (Fraser-Thomas et al., 2008). While expert performance can be achieved with early specialization in one sport and a high amount of deliberate practice during childhood, it may provide a sport structure that is more costly in terms of mass participation and long-term personal development through sport (Côté & Vierimaa, 2014). Furthermore, children who specialize in a single sport, particularly with a high training load, risk burnout (Myer et al., 2015). Given that swimming may be considered an early specialisation sport, this may explain the trends

Table 4. Summary matrix of changes in FEMALE participation between age categories for different sports.

	U8 - U10	U10 - U12	U12 - U14	U14 - U16	U16 - U18	Largest Increase	Largest Decrease
Athletics	↓	↓	↑	↓	↓	U8=17199-U14=25829 (50%)	U14=25829-U18=23453 (9%)
Badminton	↑	↑	↑	↔	↑	U8=589-U14=2976 (405%)	U14=2976-U16=2610 (12%)
Basketball	↑	↑	↓	↓	↓	U8=4290-U12=59800 (1294%)	U12=59800-U18=35381 (41%)
Boxing	↑	↔	↑	↔	↑	U8=711-U18=1322 (86%)	N/A
Cycling	↑	↔	↔	↓	↑	U8=785-U12=1163 (48%)	U12=1163-U16=822 (29%)
Dance Sports	↓	↓	↓	↓	↑	U16=4756-U18=5248 (10%)	U8=11160-U16=4756 (57%)
Fencing	↑	↑	↔	↓	↑	U8=220-U14=609 (177%)	U14=609-U16=431 (29%)
Handball	↔	↑	↔	↓	↑	U8=12282-U14=14847 (21%)	U14=14847-U16=11261 (24%)
Martial Arts	↓	↓	↓	↓	↑	U16=5001-U18=5208 (4%)	U8=11154-U16=5001 (55%)
Skiing	↓	↑	↑	↓	↑	U16=4249-U18=6589 (55%)	U14=5417-U16=4249 (22%)
Soccer	↑	↑	↓	↓	↑	U8=24483-U12=48720 (99%)	U12=48720-U16=40361 (17%)
Swimming / Diving	↓	↓	↓	↓	↔	N/A	U8=22831-U18=6576 (71%)
Table Tennis	↑	↑	↑	↓	↑	U8=152-U14=3750 (2367%)	U14=3750-U16=2816 (25%)
Tennis	↑	↑	↑	↓	↑	U8=9397-U14=14330 (52%)	U14=14330-U16=11351 (21%)
Triathlon	↑	↔	↔	↓	↔	U8=337-U14=424 (26%)	U14=424-U16=324 (24%)
Volleyball	↑	↑	↑	↓	↑	U8=2027-U14=14584 (619%)	U14=14584-U16=13669 (6%)
Water Sports	↑	↑	↑	↓	↑	U8=1405-U14=7130 (407%)	U14=7130-U16=3310 (54%)
Wrestling	↓	↔	↓	↓	↔	N/A	U8=518 U18=251 (52%)
Key: ↑ = Significant increase; ↓ = Significant decrease; ↔ = No significant change, N/A = not available							

observed in this study and it requires further research to understand the trends in dropout observed before strategies to prevent dropout from such sports can be developed. The opposite was observed in other sports. Increases in participation during adolescence were observed for sports such as volleyball and boxing. Speculatively, the increase in participation during adolescence for these sports may be influenced by the development of certain physical attributes (i.e. height or strength) of the participants which may not become apparent until adolescence (Drake et al., 2012). Therefore, there is a need for a follow up to this study to explore the reasonings behind the general adolescent attrition observed within this study and specific sports. Furthermore, research should explore why parents choose to introduce their children to specific sports during early childhood versus others. These findings, however, suggest that there is not one strategy to maintaining and increasing sports participation across childhood and

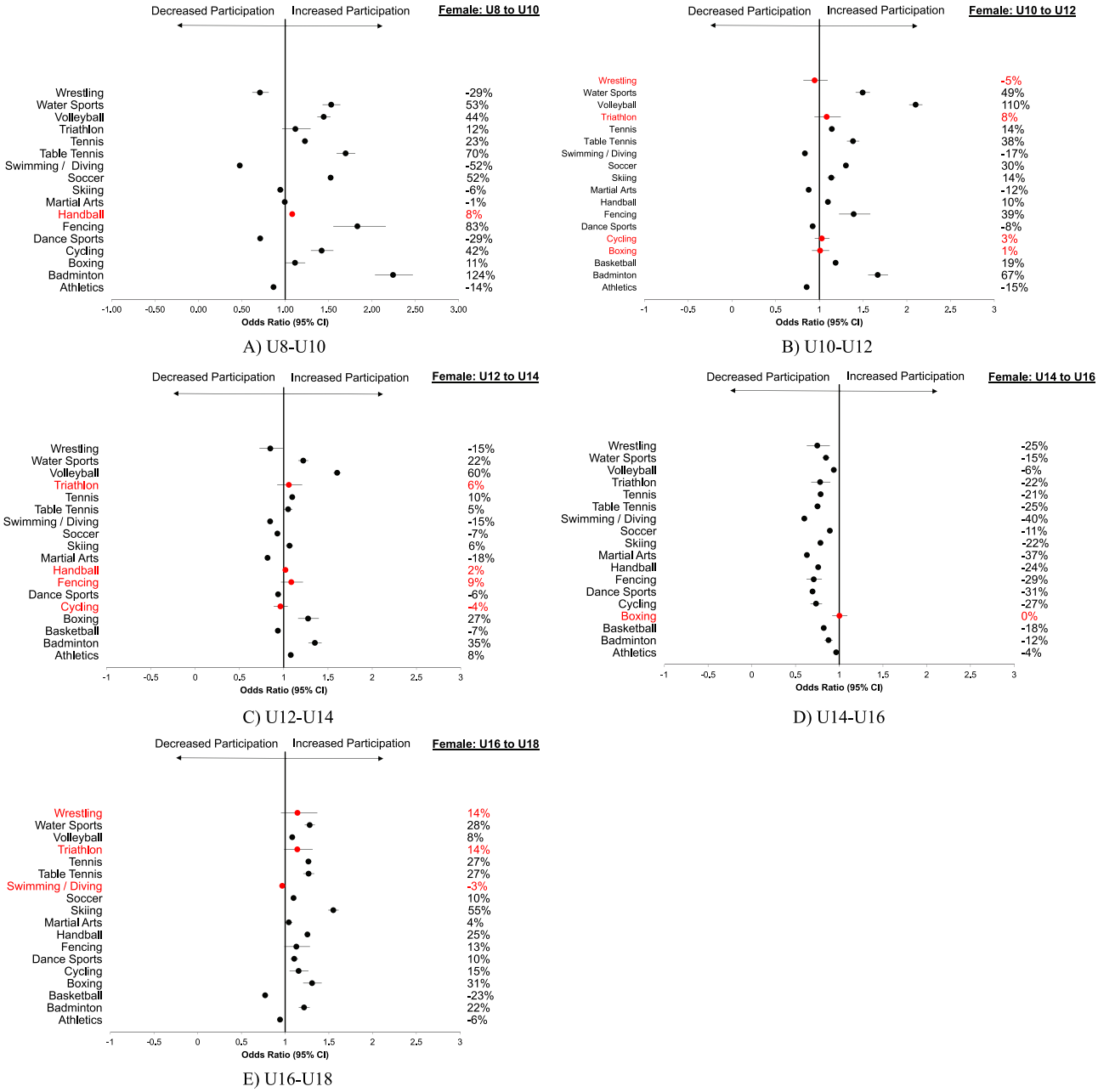

Figure 3. Odds ratio (95% confidence interval) for change in participation numbers between age categories for female sports. Values represent % change between consecutive age categories for a given sport. Red sports highlights non-significant changes.

adolescence, and that sports and countries may need to consider different strategies specific to their local situation and the different age categories. Furthermore, future research should explore how reasons for drop out may differ by sport. For example, exploring whether factors such as cost may impact participation rates, whether a lack of qualified coaches in certain sports impacts participation and if there are differences in dropout rates between organized sports academies and school-based sport.

Considering the magnitude of sport attrition observed in this study, findings suggest that sport policy should specifically prioritize retention in sport, and not merely focus on increasing total sport participation numbers. This requires a longitudinal rather than cross-sectional approach to the monitoring of participation. A policy relating to retention is needed to provide sporting organizations with the lever to make this a priority for their sport-specific strategies. However, from a policy and planning perspective it is important to know what proportion of the apparent drop off in late childhood and adolescence, both in individual sports, and in data aggregated across sports, is due to increased specialization, and what proportion is due to drop-out from sport altogether. In the absence of a common unique participant identifier across sports this is currently not possible to track. Unique participant identifiers and a standardized approach between sports and nations for tracking sports participation would be a welcome tool.

Limitations and future directions

Whilst this research report provided the participation trends of over 5.5 million children and adolescents, limitations do exist. Firstly, a limitation of this research was the amount of data that could not be included as it could not be accessed in a format that would allow comparisons between age categories, or where it was not possible to establish differences between male and female participants. For example, some sports in certain countries grouped age categories together (e.g. U9-U12). Secondly, a limitation of the research is that due to the way data is currently recorded, it is only possible to get a cross-sectional interpretation of youth participation rates at a given time point. Therefore, assumptions are made regarding dropout by comparing participation rates between two consecutive age categories. However, from this approach is not possible to confidently determine whether participants began a sport during childhood and continued in that sport until adolescence, or if the dropout observed in adolescence is to some degree an artifact of sampling versus specialization in adolescence.

In order to truly track youth participation in sport and identify when participants drop out of sport or transfer to a different sport, there is a need to implement data collection strategies that allow individual participants to be tracked longitudinally (Palomäki et al., 2018). Therefore, it is recommended that individual identifiers should be used for each participant which is assigned to the individual and is also used to track them within a specific sport and if they change sports. Should a participant transfer from one sport to another, then they would keep the same identifier number. Such an approach to tracking, would provide a much more robust method to assess youth participation and dropout rates in sport. It is therefore recommended that this is something that is explored further and a standardized approach implemented.

Future research should also aim to explore the reasons why specific dropout trends were observed. By understanding the barriers and facilitators to sports participation in adolescence in sport across Europe, this will allow tailored strategies to be implemented to decrease dropout rates in youth sport. This is essential to keeping children and adolescents engaged in sport for health benefits, not only physical but also psychological, and to support their psychosocial development. This research is underway as part of ICOACHKIDS+.

Conclusion

This research shows male sports participation is significantly greater than female in youth sport across Europe. Furthermore, findings showed that for both male and female participants, participation rates increased from U8-U14 for the majority of sports followed by reduced participation rates during adolescence. Overall, female participation in sport shows a concerning declining pattern. The more severe decline in participation rates for females takes place between U14-U16. This is demonstrated by the fact that 94% of sports observed a significant decrease in female participation. Therefore, the need to look at strategies to keep more adolescents engaged in sport and physical activity is evident (Drake et al., 2012) and future research should explore the causes for this reduction in sport participation (i.e. specialization or drop out Côté et al., 2007). It is recommended that sport policy focuses on overall participation across sports using a longitudinal tracking approach which takes into account the sampling and specializing phenomena which naturally occur, rather than merely asking individual sports to increase participation. Based on the findings of this research, a "one size fits all" approach to increasing sports participation is unlikely to be appropriate. It is suggested that strategies toward increasing youth sport participation are sport and country specific.

Practical applications of the findings

- Sport participation rates for male and female children and adolescents are significantly lower in females (80%/20%). Therefore, there is a need to increase and support female participation and retention within sport from a young age.
- There is a significant decrease in sport participation for youth males from U14-U18s for most sports. Therefore, there is a need to understand male sport participation trends and minimize dropout in sport post 14 years.
- There is a significant decrease in sports participation for youth females between U14-U16 but an increase in participation between U16-U18. Therefore, there is a need to understand female sport participation trends and minimize dropout between 14-16 years.
- There is a need to standardize longitudinal participation tracking methods between sports and different countries to allow a true comprehensive analysis of sport participation rate and drop out in youth sport.
- A "one size fits all" approach may not be an appropriate method to increase youth sports participation. Factors such as gender and sport must be considered, and specific strategies developed.
- Education of coaches and practitioners on the growth, maturation and development of the adolescent period seems key to establish strategies to maximize participation in sport by understanding the needs of both male and female participants

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