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Sport drop-out during adolescence: is it real, or an artefact of sampling behaviour?

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ABSTRACT
Understanding sport participation and drop-out are important for sport management. Many children sample or play multiple sports before specialising. However, quantifying these behaviours is challenging. Sport registration databases are potentially useful for this purpose. However, given privacy and data security issues, identification and direct linking of data records of individual participants across sports are not possible. This study demonstrates a feasible methodology for approximate cross-linking of de-identified data and thereby quantifying the extent of sampling behaviour, and hence investigating to what degree the decline in community club-based sport participation observed during adolescence is attributable to a ‘sampling to specialisation’ effect as opposed to drop-out from sport altogether. Participants were registered members of one of 11 state sporting associations in 2015. For this analysis, data (907,150 player records) were amalgamated, and players categorised by sex, age group and residential postcode. Numbers of individual players were estimated using demographic matching, comparing numbers of registrations and numbers of individual participants across age, sex and region. Results showed that the effect of individuals playing multiple sports is highest for ages 5–14, and then it diminishes as specialisation increases. Nevertheless, this study confirms that, after adjustment for this change in behaviour, the drop-off in community sport participation during adolescence persists, i.e. it is real and not simply an artefact of sampling/specialisation behaviour. It is recommended that sport policy focuses on overall participation across sports, taking into account the sampling and specialising phenomena which naturally occur, rather than merely asking individual sports to increase participation.

ARTICLE HISTORY
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KEYWORDS
Sport; participation; drop-out; sampling; specialising

Introduction
It is well known that participation in sport is popular among children, and that sport participation rates peak during childhood to early adolescence (Australian Sports Commission 2016, Wong \textit{et al.} 2016, Eime \textit{et al.} 2016c). A recent survey of children aged 0–14 years reported sport participation peaking at ages 9–11 (Australian Sports Commission 2016), and other studies of sport participants have reported peak participation at ages 10–14 years (Wong \textit{et al.} 2016, Eime \textit{et al.} 2016c). Recent research reports that nearly a third of sports participants are aged 10–14 years (Eime \textit{et al.} 2016b). However, many people drop out of sport during childhood and adolescence, especially females (Australian Sports Commission 2016, Wong \textit{et al.} 2016, Eime \textit{et al.} 2016b, 2016c). The sport
participation decline is further evident throughout the lifespan, when there is evidence of a shift away from competitive club-based sport towards non-competitive and non-organised forms of leisure-time physical activity (Eime et al. 2015a, 2016c, Australian Sports Commission 2016, Harris et al. 2017).

In a large recent longitudinal study of over 200,000 children aged 4–12, it was found that most children in a modified sports (introductory) programme in the first year of the study did not continue playing that particular sport for throughout a 4-year period (Eime et al. 2015b). Furthermore, two-thirds of those children who dropped out of the sport did so after the first year; it was conjectured that many of these had only a single year or season of participation in that particular sport (Eime et al. 2015b).

Whilst there are a range of intrapersonal, interpersonal, organisational, and environmental and policy factors influencing participation in sport across the lifespan, competency is a key determinant (Crane and Temple 2015, Eime et al. 2015c). If people do not perceive themselves as having adequate skills to play, they do not then enjoy playing sport and drop out (Crane and Temple 2015). Sport competency is in turn related to the development of fundamental motor skills (FMS). There has been much research around the importance of FMS for participation in sport (Veldman et al. 2017). FMS are learned skills, and children do not develop FMS naturally as part of normal growth and development. That is, they need to be taught, practiced and reinforced (Robinson and Goodway 2009, Veldman et al. 2017). Furthermore, FMS development is cumulative and relatively permanent, and sport skills may have an effect on sport participation that persists across the lifespan (Henrique et al. 2016). There is clear evidence that FMS are important for predicting continued sport participation or drop-out in children (Henrique et al. 2016). This is thought to be associated with those children with advanced FMS being more successful in sport and as a result having more enjoyment than those children with lower FMS. Having fun or enjoyment in sport is also a major predictor of drop-out of sport participation (Crane and Temple 2015, Gardner et al. 2017).

Whilst a lack of perceived competency and enjoyment may be contributing factors to drop-out from participation sport, it has been recently acknowledged that the drop-off in late childhood to early adolescence may be partly due to children sampling multiple sports, and then specialising in one (Eime et al. 2015b). This may be further explained through the Developmental Model of Sports Participation (DMSP) (Côté and Vierimaa 2014). Whilst this model is often used to describe the elite sport performance pathway we believe it is also relevant here. Within the DMSP, the first stage is the sampling stage at 6–12 years, followed by the specialisation stage at 12–15 years and the investment stage at 15+ years. At age 6–12, sampling is considered beneficial for athletic development because of the exposure to a number of different physical, cognitive, affective and psychosocial environments, reinforcing physical, personal and mental skills required for future sport elite success (Fransen et al. 2012, Côté and Vierimaa 2014). Conversely, early specialisation often leads to dropout (Fraser-Thomas et al. 2008). Children who specialise in a single sport, particularly with heavy training, risk burnout, overuse injuries and an actual decrease in performance due to overtraining (Myer et al. 2015). However, previous research has focused predominantly on elite athletes. We do not have knowledge about the extent of sampling and specialisation, or its effect amongst community sport participants.

Australian sport policy focuses on increasing participation generally, with no specific mention of sampling and specialising behaviours (Department of Health 2018). The current policy focuses on achieving increases in participation numbers and on high performance systems achieving sporting success (Department of Health 2018). The authors contend that this strategic focus influences sports to prioritise recruitment over retention, including the development of organised modified sports programmes to very young participants, in some sports as young as four years of age (Eime et al. 2016c). The authors have recommended a greater focus on retention strategies, specifically in relation to the sharp decreases in sport participation during adolescence (Eime et al. 2016c).
Sports organisations in Australia tend to work individually, each through their own network of state-based organisations and local sport clubs, with an absence of multi-sport clubs which are more evident in Europe (Breuer et al. 2015). It is conjectured that multi-sport clubs may make the transition of participants across sports easier than with individual sport clubs. It has also been reported that in European countries with larger multi-sports clubs, the sport sector is able to be more innovative and to drive public policy programmes more effectively than individual sport clubs (Harris et al. 2009).

In Australia, community sports clubs are most often run by local volunteers (Eime et al. 2009). In the Australian state of Victoria, some sports are funded by the Victorian Health Promotion Foundation to focus not just on traditional competitive sport participation, but also on the development of more social and recreational forms of sport participation in an effort to get more people active through sport (VicHealth 2018).

It is well known that many children sample or play multiple sports and then specialise. Sampling may involve playing a sequence of different sports or playing multiple sports in the same year. Some of the decline we see in a sport during childhood and adolescence may be due to a decline in the number of sports played in a particular year and not necessarily a true drop-out from sport participation (Eime et al. 2015b, 2016b). However, quantifying these behaviours is a challenging task. Population-wide sample surveys can provide direct evidence of the participation patterns of individuals, but sample sizes are determined from a national perspective, and so the capacity to produce estimates with acceptable levels of sampling error for smaller geographical areas or population segments is limited. Also, historically the scope of such surveys in Australia has generally been limited to persons 15+ years of age (Eime et al. 2015a). Furthermore, non-response and refusal rates are high, and recent research has suggested that, in addition to sampling error, estimates of participation counts and rates from such surveys are subject to substantial non-response bias (Harvey et al. 2018). Sport registration data are prima facie much less susceptible to bias and, as they purport to be complete enumerations of participants in each sport, are not subject to sampling error (Harvey et al. 2018). When registration data from multiple sports are amalgamated, the aggregated counts are inflated by individuals playing multiple sports in the same year.

Ideally, to quantify this phenomenon would require the capacity to identify individual participants across multiple sports. However, particularly given current awareness of privacy and data security issues, identification and direct linking of data records of individual participants across sports are not possible. The aim of this study was to demonstrate a feasible methodology, based on demographic characteristics, for approximate cross-linking of de-identified data and thereby to use sport registration data to quantify, for each age level, the extent of participation in multiple sports in a given year, and hence to investigate to what degree the decline observed in the per capita rate of aggregated registrations in community club-based sport during later childhood and adolescence is attributable to a reduction in the extent of participation in multiple sports, i.e. a ‘sampling to specialisation’ effect.

**Methods**

Data for this study were collected as part of the Sport and Recreation Spatial project, a research project funded by government and public health agencies in the Australian state of Victoria to monitor participation in sport and active recreation, for the purpose of informing policy development and programme planning in the sport and recreation sector. The data have been previously described in detail (Eime et al. 2016b, 2016c). Briefly, we studied the registration records of participants in one of 11 state sporting associations (Australian football, basketball, bowls, cricket, football (soccer), golf, gymnastics, hockey, netball, sailing and tennis) in Victoria in 2015. Most local community club-based competitions take place under the auspices of these associations, and so registered participants represent the great majority of participants in these sports, particularly among children and adolescents who are the primary focus of this study.
For this analysis, data for the eleven sports were amalgamated, and registered Victorian players aged 4–100 in 2015 were categorised by sex, age group and residential postcode. Individuals may play more than one sport, and therefore it is possible a player could be registered with more than one sport in any given year. Actual numbers of registrations and estimated numbers of individual players were calculated, to allow comparison of these two indicators across age, sex and region.

The number of registrations in each year were direct counts of the total of all registrations for the 11 sports. As the registrations for each sport were de-identified, it was not possible to directly link all data records for a particularly individual. An approximate count of individuals was generated by assuming that two registrations for different sports that were matched on year, sex, date of birth and residential postcode were the same person. Hence, by excluding all but the first occurrence of a particular combination of these four characteristics, estimated counts of individual players were obtained. This was done for each sport separately to provide an indication of ‘multiples’ per sport, and then for the sample as a whole.

A second player count estimate was also generated by assuming that multiple matching registrations within a sport genuinely represented different individuals (i.e. same-sex twins or children fortuitously matched on demographic characteristics). The ‘Multiple’ combinations of DOB, postcode and sex within each sport were retained, up to a maximum of five occurrences per sport (arbitrarily chosen in order to exclude blocks of spurious matches due to data quality issues). For example, two players in Sport A and four players in Sport C all with the same details would result in a registration count of six, and individual counts of one under the first option (referred to as Players 1) and four under the second option (Players 2). The Players 1 count is always less than or equal to the Players 2 count, which in turn is always less than or equal to the registration count.

**Results**

There were a total of 907,150 registrations, 757,564 unique individuals assuming ‘valid’ multiple individuals within sports as described (Players 2) and 714,054 unique individuals assuming no valid multiple individuals (Players 1) (Tables 1–3). Aggregated across all years and sports, the Players 2 count was 16.5% lower, and the Player 1 count was 21.3% lower, than the count of registrations. These are indicative of the proportion of sports participants who played multiple sports in 2015.

Figure 1(a) presents the number of registrations and estimated numbers of individual players (under the two exclusion rules) across the lifespan, and Figure 1(b) shows the corresponding participation rates per the Victorian population in standard age cohorts. The pattern within both figures is the same. The key result is that the excess of registrations over individual players declines with increasing age. That is, the effect of participants playing multiple sports is highest for ages 5–14, and then we see a clear specialisation effect where sports participants play one or fewer

![Figure 1](https://example.com/figure1.png)

*Figure 1. Participation numbers and rates: by age and estimation method.*
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<tbody>
<tr>
<td>Registrations</td>
<td>Victoria</td>
<td>24,303</td>
<td>243,264</td>
<td>222,265</td>
<td>103,026</td>
<td>60,982</td>
<td>43,807</td>
<td>32,526</td>
<td>25,112</td>
<td>25,575</td>
<td>21,834</td>
<td>18,894</td>
<td>16,631</td>
<td>17,169</td>
<td>18,883</td>
<td>32,879</td>
<td>907,150</td>
</tr>
<tr>
<td>Players 2</td>
<td>Victoria</td>
<td>20,396</td>
<td>182,393</td>
<td>169,974</td>
<td>88,464</td>
<td>54,725</td>
<td>40,583</td>
<td>30,402</td>
<td>23,844</td>
<td>24,380</td>
<td>20,866</td>
<td>18,218</td>
<td>16,139</td>
<td>16,693</td>
<td>18,373</td>
<td>32,114</td>
<td>757,564</td>
</tr>
<tr>
<td>Players 1</td>
<td>Victoria</td>
<td>18,905</td>
<td>165,022</td>
<td>155,845</td>
<td>83,807</td>
<td>52,874</td>
<td>39,535</td>
<td>29,790</td>
<td>23,342</td>
<td>23,966</td>
<td>20,536</td>
<td>17,978</td>
<td>15,942</td>
<td>16,498</td>
<td>18,132</td>
<td>31,792</td>
<td>714,054</td>
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sports as they age through 15–29. From age 30 the player and registration rates are almost identical, indicating that these older sports participants are mostly playing one of the sports only.

Figure 2(a–b) present the participation rates for metropolitan and non-metropolitan regions. Whilst the participation rate across the lifespan is generally higher in the non-metropolitan region compared to the metropolitan region, the proportional difference between registrations and actual players is very similar.

Figure 3(a–b) present the participation rates for males and females. The overall participation rate is much higher for males than females, and peaking at a registration rate of 81% for males aged 5–9 years and for females of 52% for ages 10–14 years. This corresponds to an actual player participation rate of 51% for males aged 5–14 and 51–52% for females aged 5–14 years. Therefore, whilst the actual player participation rate is very similar for these children for both males and females, males are much more likely than females to play multiple sports during childhood and early adolescence. That is, the sampling effect is much greater for males than for females.

Discussion

The existence of the sampling effect, whereby many younger sport participants play multiple sports in the same year, has often been reported (Fraser-Thomas et al. 2008, Delorme et al. 2011), but this is the first study to explore how this actually relates to player numbers and participation rates. This study is unique in quantifying the extent to which younger sports participants sample multiple sports in a single year, identifying the age range over which this behaviour diminishes with increasing age, and demonstrating differences between these patterns for males and females and between metropolitan and non-metropolitan sport participants. Furthermore, the majority of research on sampling and drop-out has been on elite or sub-elite athletes (Fraser-Thomas et al. 2008, Delorme et al. 2011, Bridge and Toms 2013), whereas this study examined a population of community-based players.

We have previously speculated that the considerable drop-off in registrations during adolescence, from 15 to 19 years, could conceivably be due to the sampling effect, and not truly indicative of dropping out of sport altogether (Eime et al. 2016a, 2016c). We conjectured that the considerable decline during adolescence might be attributable to children playing multiple sports when younger, and thereby being multiply counted in aggregated multi-sport participation data, and then choosing one sport to specialise in during adolescence (Eime et al. 2016a). The results of the present study show that while sampling does amplify the magnitude of the reduction in total registrations throughout the adolescent and early adult years, it explains only about 25% of the drop-off in the overall registration rate, 40% of the drop-off among males, 20% of the drop-off among females, and 25% for each of metropolitan and non-metropolitan residents.

Figure 2. Participation rates: by region, age and estimation method.
Table 2. Age-specific player numbers by player count estimate and region.

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<tbody>
<tr>
<td>Registrations</td>
<td>Metropolitan</td>
<td>17,757</td>
<td>166,930</td>
<td>153,977</td>
<td>68,667</td>
<td>41,685</td>
<td>30,251</td>
<td>22,395</td>
<td>16,853</td>
<td>17,828</td>
<td>15,688</td>
<td>13,494</td>
<td>11,439</td>
<td>11,780</td>
<td>19,271</td>
<td>619,119</td>
</tr>
<tr>
<td>Players 2</td>
<td>Metropolitan</td>
<td>14,893</td>
<td>125,487</td>
<td>117,788</td>
<td>59,542</td>
<td>37,651</td>
<td>28,371</td>
<td>21,075</td>
<td>16,158</td>
<td>17,073</td>
<td>15,006</td>
<td>13,000</td>
<td>11,078</td>
<td>10,783</td>
<td>11,411</td>
<td>18,762</td>
</tr>
<tr>
<td>Players 1</td>
<td>Metropolitan</td>
<td>13,791</td>
<td>113,546</td>
<td>107,738</td>
<td>56,042</td>
<td>36,183</td>
<td>27,532</td>
<td>20,588</td>
<td>15,858</td>
<td>16,758</td>
<td>14,751</td>
<td>12,806</td>
<td>10,943</td>
<td>10,663</td>
<td>11,285</td>
<td>18,567</td>
</tr>
<tr>
<td>Registrations</td>
<td>Non-metropolitan</td>
<td>6,546</td>
<td>76,334</td>
<td>68,288</td>
<td>34,359</td>
<td>19,297</td>
<td>13,556</td>
<td>10,131</td>
<td>8,259</td>
<td>7,747</td>
<td>6,146</td>
<td>5,400</td>
<td>5,192</td>
<td>6,065</td>
<td>7,103</td>
<td>13,608</td>
</tr>
<tr>
<td>Players 2</td>
<td>Non-metropolitan</td>
<td>5,503</td>
<td>56,906</td>
<td>52,186</td>
<td>28,922</td>
<td>17,074</td>
<td>12,212</td>
<td>9,327</td>
<td>7,686</td>
<td>7,307</td>
<td>5,860</td>
<td>5,218</td>
<td>5,061</td>
<td>5,910</td>
<td>6,932</td>
<td>13,352</td>
</tr>
<tr>
<td>Players 1</td>
<td>Non-metropolitan</td>
<td>5,114</td>
<td>51,476</td>
<td>48,107</td>
<td>27,765</td>
<td>16,691</td>
<td>12,003</td>
<td>9,202</td>
<td>7,574</td>
<td>7,208</td>
<td>5,785</td>
<td>5,172</td>
<td>4,999</td>
<td>5,835</td>
<td>6,847</td>
<td>13,225</td>
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</table>
When examining the estimated player numbers and participation rates only, and not the registrations, it is clear that there is a significant decline in sport participation from age 15–19. Player participation rates peak at 45–46% in ages 5–14 before a drop to only 23% from 15 to 19 years. The participation rate halves from the 10–14 age group (46%) to the 15-19 age group (23%) and then halves again for 20–24 year-olds (12%).

This current study highlights that the drop-off in sport participation during adolescence and into early adulthood is real, and is not simply the effect of sampling. Sampling itself confers a range of benefits, contributing to a range of diverse skills and to improved fitness and motor coordination (Fransen et al. 2012, Myer et al. 2015). Fransen et al. showed that for boys, those participating in more than one sport were exposed to a greater number of physical, cognitive, affective, and psycho-social environments than boys playing a single sport only (Fransen et al. 2012), and concluded that it is important to be sampling and playing multiple sports before the age of 12 rather than early specialisation (Fransen et al. 2012). There is evidence that a higher degree of sampling for ages 11–15 is significantly associated with increased performance, that is, competing at a national compared to community club level (Bridge and Toms 2013). We know that participation in sport during childhood and adolescence has a lasting positive effect on physical activity (Murphy et al. 2016). Furthermore, sports participants are often more active and fitter than participants in non-sport physical activity; however, these associated benefits of sport participation can diminish during adolescence and especially so for girls (Telford et al. 2015). Therefore, strategies are needed to keep children and adolescents engaged in sport for health benefits, not only physical but also psychological and social health (Eime et al. 2013a).

The sampling and participation rate patterns were broadly similar for both the metropolitan and non-metropolitan regions, and this is consistent with other research (Eime et al. 2016c, Hoekman et al. 2017), however the decline is not as pronounced for the non-metropolitan regions. A higher proportion of people living in non-metropolitan regions remain active in sport during adolescence. This may relate to the culture of community sport in rural and regional communities (Eime et al. 2015d). Further, as adolescents age and become more autonomous in their decisions regarding physical activity there are also more opportunities to participate in a wider range of leisure activities in metropolitan compared to non-metropolitan regions (Craike et al. 2011).

A concerning pattern is the more severe decline during adolescence for females compared to males. The participation rate for females for ages 15–19 is less than half of that for those aged 4–14 years. It is also very clear from the registration numbers that young males sample or play more sports than females. Firstly, there is evidence of a competency difference between young females compared to males, and we know that competency is a major factor relating to participation in sport (Veldman et al. 2017). There is evidence that young girls are less competent at ball skills than young boys (Veldman et al. 2017). Further, other research amongst 6–12-year-olds reports that playing multiple sports and spending more time playing sport contributes to improved gross figures.
Table 3. Age-specific player numbers by player count estimate and sex.

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<tbody>
<tr>
<td>Registrations</td>
<td>Male</td>
<td>15,837</td>
<td>152,170</td>
<td>136,768</td>
<td>67,657</td>
<td>44,053</td>
<td>32,388</td>
<td>24,011</td>
<td>17,571</td>
<td>17,611</td>
<td>15,401</td>
<td>13,553</td>
<td>11,913</td>
<td>11,904</td>
<td>12,998</td>
<td>22,678</td>
</tr>
<tr>
<td>Players 2</td>
<td>Male</td>
<td>12,699</td>
<td>107,872</td>
<td>98,722</td>
<td>56,403</td>
<td>38,714</td>
<td>29,669</td>
<td>22,249</td>
<td>16,601</td>
<td>16,696</td>
<td>14,631</td>
<td>13,014</td>
<td>11,526</td>
<td>11,561</td>
<td>12,606</td>
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<tr>
<td>Players 1</td>
<td>Male</td>
<td>11,757</td>
<td>96,567</td>
<td>89,822</td>
<td>53,179</td>
<td>37,281</td>
<td>28,882</td>
<td>21,786</td>
<td>16,325</td>
<td>16,421</td>
<td>14,416</td>
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<td>11,419</td>
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<td>Registrations</td>
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<td>91,094</td>
<td>85,497</td>
<td>35,369</td>
<td>16,929</td>
<td>11,419</td>
<td>8,515</td>
<td>7,541</td>
<td>7,964</td>
<td>6,433</td>
<td>5,341</td>
<td>4,718</td>
<td>5,265</td>
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<td>Female</td>
<td>7,697</td>
<td>74,521</td>
<td>71,252</td>
<td>32,061</td>
<td>16,011</td>
<td>10,914</td>
<td>8,153</td>
<td>7,243</td>
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<td>6,235</td>
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<td>Players 1</td>
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motor coordination (Fransen et al. 2012). Quite simply, by sampling multiple sports children are exposed to a greater number of physical, cognitive, affective and psycho-social environments than those playing only one sport (Fransen et al. 2012). Secondly, these gender differences may also be related to increased opportunities for boys to play multiple sports, relative to girls, and to parents encouraging boys to play sport more than girls (Wheeler 2012, Eime et al. 2016b). Further to this, in the case of this study, higher participation for males compared to females also relates to the traditional gender bias of Australian club-based sport, whereby for several sports, until very recently, females were not able to play in club-based competitions (Eime et al. 2016c).

The main correlates of youth sport attrition include competency and social factors such as enjoyment, support from parents, peers and coaches and a positive social club environment (Eime et al. 2013b, Balish et al. 2014, Henrique et al. 2016, Casey et al. 2017, Gardner et al. 2017). Higher sports competency in young childhood is associated with continued sport participation across childhood (Henrique et al. 2016). Competency is a cumulative and relatively permanent phenomenon, which is in contrast to physical activity in general (Henrique et al. 2016). Children exposed to more sports earlier in their life tend to have greater competency and therefore are more likely to continue to participate. Further to this, there is evidence that players who drop out participated in fewer sports than those who continue playing (Fraser-Thomas et al. 2008).

There is much research evidence that sampling is positive for skill development in children and young people, and for continued sport participation. In Australian sport policy, there is no specific mention of sport sampling, with the focus being the broader aim of getting more Australians, and especially young Australians, participating in sport more often, and in general trying to gain insights into participation trends. (Department of Health 2018). There is mention of the benefits of sampling for elite athlete development (Australian Sports Commission not dated), but nothing related to the general population. A major focus of the national sport policy is for each sport organisation to increase participant numbers each year. With this ‘individual silos’ focus, the issue of sampling versus specialisation in children and adolescents, and the implications for overall levels of participation, are not considered.

Beyond the quantification of sampling and specialisation demonstrated in this study, there remain important questions. Whilst we have many insights relating to sampling among elite and sub-elite youth, we do not have evidence from community club-based sport as to whether sampling leads to a greater likelihood of playing sport throughout life. Are the people that maintain participation in sport, albeit only a low proportion, those who have played and sampled many sports in childhood? Is the drop-off in sport participation primarily attributable to ‘late sports starters’ who have less sport competency than early sport adopters? Beside the modified sports programmes for young participants, what are the entry points to competitive sport throughout the lifespan for individuals who do not have specific sports competency? These questions await further research, as does the potential value of replication of the current study in other states of Australia and in other countries.

**Conclusion**

In conclusion, this study confirms that the drop-off during adolescence in community sport participation, as measured by aggregated sport registrations, is real and not simply a consequence of a reduction in sampling behaviour compared to younger participants. It is concerning that, from a peak at ages 10–14, the participation rate halves for the next age group of 15–19 years. Considering the magnitude of this drop-off, sport policy should specifically prioritise retention in sport, and not merely focus on increasing total sport 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 organisations with the lever to make this a priority for their sport-specific strategies.
It is also recommended that national sport policy should focus on overall participation across sports, taking into account the sampling and specialising phenomena which naturally occur during childhood and adolescence, rather than merely asking individual sports to increase participation numbers. From a health perspective, as long as people are regularly physically active, it does not matter if they initially play multiple sports and then subsequently specialise. 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 specialisation, and what proportion is due to drop-out from sport altogether. In the absence of a common unique participant identifier across sports, this study has demonstrated a feasible methodology, based on demographic characteristics, for approximate cross-linking of de-identified sport registration data and thereby providing a solution to this important gap in the knowledge informing policy development.

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Ethics approval and consent to participate

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