DEVELOPMENTAL PATHS IN FINNISH YOUTH ATHLETES

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The Developmental Model of Sport Participation, or DMSP (Cote, Baker, & Abernethy, 2007) provides a framework that can account for the different pathways of involvement in youth sport. The model highlights that there are three different stages within each pathway that are based on changes in the amount of involvement in sport, play, and practice. According to the DMSP, these three stages of sport development are the sampling specializing, and investment stage. The present project was designed (a) to provide additional information about the developmental paths among Finnish youth athletes, and (b) to provide coaches, instructors, and parents working in or with sports clubs with additional insights of how to promote and foster positive youth development in competitive sport environments, expertise development, and lifelong sport participation. The participants for the study are 2523 Finnish athletes who were born in 1995. The main inclusion criterion was that the athlete holds a valid racing license. The athletes participating in the study represent three team sports (ice hockey, soccer and basketball) and four individual sports (track and field sports, cross-country skiing, gymnastics and figure skating). The project focuses on the following potential outcomes of youth sport participation: (1) Performance, (2) Participation, and (3) Personal development.

TRAINING QUALITY IN HIGH-PERFORMANCE YOUTH SPORT

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Introduction

It is an accepted premise that outstanding athletes are successful, amongst others, because of the type and amount of their training. Coaches and other practitioners in youth sport envisage questions like: At which age should “our kids” start training and competing? Which amounts of training are functional during childhood and adolescence? Which are the effects of an early intensification and specialisation of practice on the rapid and the long-term success development? Which are the consequences concerning motivation, health, and involvements external to sport? Equally, federations and umbrella organisations are concerned with the question which characteristics of youth training and competitions to recommend to their members.

This contribution issues the situation of research with regard to the quality of the long-term training process in high-performance sport. It describes characteristics of the practice history and their significance in the development of young “talents” toward successful senior performers, addressing the age-related location of developmental “milestones”, the training intensity,
volume and continuity, and the degree of specialization, i.e. the \textit{macrostructure} of the training process, and its relation to the success level during childhood, adolescence and in the senior category. It focuses on the \textit{instrumental quality dimension} of training with regard to the attainment of success.

Regarding the macro-structural design of the long-term training process, two major theoretical threads are discussed in the literature: \textit{Deliberate Practice} (DP, cf. Ericsson et al., 1993) and \textit{Diversification} (cf. Côté et al., 2007). DP describes types of practice characterised, amongst others, by purposing to increase performance, being relevant to skill development, allowing repetition for error correction, being supervised, and requiring sustained cognitive and/or physical effort. The DP approach asserts that performance development is described by a monotonic relation: The more accumulated DP the higher the performance. This implies an early start and intensification of specific practice in the domain sport (DS) and accelerated performance development according to the notion of “early specialization”. Alternatively, the diversification approach asserts that involving in a wider variety of sports together with a late specialization contributes to the long-term success attainment.

From practitioners’ perspective, recruiting “talents” at a young age and subjecting them to early high-intensity specialised practice while maybe restraining other involvements may on the one hand facilitate the rapid attainment of adolescent success. On the other hand it requires larger re-sources in terms of available coaching, facilities and equipment and it may be associated with enlarged costs and risks at the part of the young athlete as well: Conflicts with demands and interests external to sport (education, family, hobbies; i.e. opportunity costs), higher risks of emotional and motivational droop, burnout, health-related interference, and maybe attrition.

One difficulty is that the situation of research is well non-uniform. Numerous studies have compared the developmental practice histories of more and less successful athletes. However, the significance of each, an early training start, early specialisation, and intensive domain-specific training on the one hand, and the involvement in various sports and late specialisation on the other hand were in some studies supported and in others disapproved. Also, most studies refer to athletes from wide ranges across moderate success levels and in many cases sub-adult athletes. It is uncertain whether these findings can be extrapolated to the attainment of senior world class success (WC) and comparative studies examining the latter are altogether scarce.

\textbf{Biographies of High-Performers}

The study of a large sample of members of the German junior and senior national squads in all Olympic sports (\(n=1,558\)) may extend our respective insights by addressing the differences and commonalities between training patterns leading to early adolescent success and to long-term senior world class and national class success (WC, world top ten; NC, national top ten). Central results can be summarized as follows:
5. The success-homogeneous group of WC performers varied immensely in most characteristics of their training and competition biography between and within the singular sports. World class success is attained with relatively early or late start of training and competitions, early or late specialization, high or low training volume, continuity, and juvenile success.

6. The juvenile success level during childhood and youth did not contribute relevantly to explaining success differences at senior age.

7. An early training start in the respective DS, early intensive specific practice, little or no involvement in other sports (OS), and early success in childhood benefitted the rapid attainment of adolescent success.

8. The accumulated total practice volume or the training amount in their respective DS at any age did not contribute to distinguishing senior WC and NC performers. However, the former mostly differed from the latter in a later commencement of training and competitions in their respective DS, a later complete specialisation, and a larger and more durable involvement in training and competitions in OS (Figure 1).

These observations were confirmed in longitudinal testing over three years and in studying daily training diaries of squad athletes and they were consistent across different types of sports.

![Figure 1. Frequency of performed training sessions in other sports (beyond the athlete’s respective main sport), senior world class (white columns) and national class (colored columns) athletes.](image-url)
Discussion

In summary, these findings signify:

- WC success can be attained with very different developmental training patterns, highlighting the profoundly individual nature of the career in high-performance sport.

- The juvenile success represents no reliable indicator for the future long-term senior success.

- Both, WC and NC athletes exhibited each, correspondence with the DP approach and with the Diversification approach. However, the WC careers were mostly characterised by a relatively decelerated development in their DS and more varied involvement in OS, i.e. correspondence to Diversification rather than to DP.

- Macro-structural patterns of practice mostly leading to early adolescent success and to long-term senior WC success are inconsistent and in some aspects contrary (see Table 1).

The concept of sustained yield was first introduced in forestry by Von Carlowitz (1713) and later specified by Hartig (1795) denoting that only a quantity of wood be cut down that regrows in the same period. The balancing of the availability, consumption, preservation, and new generation of individual resources presumably represents a fruitful approach to understanding more and less successful career patterns. Outstanding performers must manage to end up in the sport of their individual “best fit”, successfully balance the time-costs of their sport involvement with demands external to sport, and to continuously improve the individual performance while equilibrating strain with their individual stress-tolerability. The situation of research suggests that (1) sampling various sports enhances the probability of a functional matching between an athlete and a certain sport. The assignment of young athletes to their most appropriate sport apparently proceeds through well durable differential experience (principle of multiple sampling and functional matching) rather than by a priori assignment (“talent identification”). (2) Early intensified training and pursuit of rapid success is associated with increased material and immaterial costs and risks (enjoyment, motivation, health, generally opportunity costs, premature dropout). Alternatively, the most successful careers were mostly characterised by rather resource-preserving patterns of investment: Comparable total investment volume while buffering the investment risk through larger initial investment, larger expenses in exploration costs with more variable distribution of the investment and reduced early specialised investment, longer delay of reward, but higher “return” on the long hand. (3) More varied motor experience may assist in developing “adaptive expertise” (Hatano & Iganaki, 1986, as opposed to “routine experts”) and also an amplified and closer-meshed “recall-recognition network” of skills (Wulf & Shea, 2002, Newell et al., 2001) facilitating the subsequent refinement of domain-specific skills.
Table 1. Review of characteristics of developmental practice patterns leading to early success in adolescence and to long-term success in international senior elite sport.

<table>
<thead>
<tr>
<th>Training and Competitions</th>
<th>Early Success</th>
<th>Senior Success</th>
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<tbody>
<tr>
<td><strong>In the Athlete’s respective Domain Sport</strong></td>
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</tr>
<tr>
<td>Early competitive success</td>
<td>+</td>
<td>o</td>
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<tr>
<td>Early start of training and competitions</td>
<td>+</td>
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<td>Early specialization</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>Training intensity in childhood</td>
<td>+</td>
<td>–</td>
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<tr>
<td>Training intensity in late adolescence/adulthood</td>
<td>–</td>
<td>o</td>
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<tr>
<td>Aggregated training volume</td>
<td>+</td>
<td>o</td>
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<tr>
<td><strong>In Other Sports</strong></td>
<td></td>
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<tr>
<td>Training intensity in childhood</td>
<td>–</td>
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<td>Training intensity in adolescence/adulthood</td>
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<td>Competitions in childhood</td>
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<td>Competitions in late adolescence/adulthood</td>
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<tr>
<td>Aggregated volume of training and competitions</td>
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+ = positive correlation with success,  o = no systematic correlation, – = negative correlation with success

References


