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REVIEW

# The Standard Model of Talent Development and Its Discontents

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Despite evident differences between approaches to talent development, many share a set of common characteristics and presumptions. We call this the Standard Model of Talent Development (SMTD). This model is articulated and the relevant literature drawn out to highlight the model's strengths and weaknesses. The SMTD has been enormously influential, in terms of both policy documentation and practice, and it retains an obvious common sense appeal. However, we will argue that not only is its attractiveness illusionary and inconsistent to the emerging evidence base from research, but it is also undesirable from a variety of perspectives and desired outcomes. In short, we suggest that the most common system for identifying talent is unsubstantiated from both a process and an outcome perspective.

***Keywords*:** pyramid model, physical activity participation, sport performance, talent pathway

Optimizing the trajectory from talent detection, to identification, through development to selection is a core construct in any sporting system (Williams & Reilly, 2000). Sometimes referred to as the performance pathway, this construct is a key concern for funding agencies and internal management alike. In some cases, such as former Eastern Bloc countries, this trajectory has been tightly managed and regulated. In most systems, however, the process is less autocratic, implicitly allowing the locus of control to shift to the invisible hand of individual and team performance.

A number of authors have raised doubts over the scientific foundations of most talent identification programs (Abbott, Collins, Martindale et al., 2002; Bartmus, Neumann, & de Marées, 1987; Durand-Bush & Salmela, 2001; Vaeyens, Lenoir, Williams et al., 2008). From the perspective of optimally effective performance pathways, the most powerful criticisms relate to their low predictive value and lack of validity (Durand-Bush & Salmela, 2001; Régnier, Salmela, & Russell, 1993). In other words, talent identification strategies are rarely very effective ways of detecting and identifying talent.

Some of these problems will be discussed later in this paper. However, it is interesting to note that, despite the doubts raised by researchers, national governing bodies of sport and key partner agencies continue to invest considerable amounts into "talent spotting" of young children who are subsequently directed toward carefully bespoke and presumably effective accelerated talent development programs (Abbott & Collins, 2004; Bailey, Collins, Ford et al., 2010).

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## The Standard Model of Talent Development

There is always a danger of using the language of "standard," "tradition," or "convention" simply as a straw man to knock down, rather than a genuine stance. However, there do seem to be working principles that have historically characterized discussions about talent development that are often entrenched or accepted as self-evident. The central working assumptions of the Standard Model of Talent Development (SMTD) can be represented in numerous ways, for example as trickle-down or foundation stones (Kirk & Gorely, 2000), but by far the most common metaphor is a pyramid (see Figure 1). Simply put, the model operates as follows: a broad base of foundation skills participation, with increasingly higher levels of performance, engaged in by fewer and fewer people. According to Prescott (1999), the pyramid metaphor represents the established way of thinking about talent development among capitalist countries (Klentrou, 1993; Régnier et al., 1993). In similar fashion, Fisher and Borms' (1990) international review found that "the pyramidal system of development [is] favored by most countries" (p. 15). Subsequently, Houlihan (2000) has suggested that versions of the pyramid model characterize many sports development policy statements, while Kirk, Brettschneider, and Auld (2005) argue that its influence can be seen in numerous international sports participation models and that "the assumptions underpinning the pyramid model continue to have a powerful residual influence on thinking about

junior sport participation and sport development in sport policy" (p. 2). Moreover, the language of a UK government-sponsored research report into elite dance development is interesting in part because of its explicitness: "Constructing a Pyramid of Progression for Talent in Dance" (Schmidt, 2006). It seems that, in the West at least, the pyramid model is entrenched in thinking about talent and its development.

What does the SMTD look like in practice? Indicative characteristics are as follows:

- The focus is solely on progressing those identified as talented, and not on the wider group of participants, even though these may meet the necessary standards later
- Progression from one level to the next involves removal of large numbers of players from the system (and possibly also from the sport)
- "Formal" threshold measures (e.g., county/state level representation for some, "ideal" body proportions for others) are often in place that select or de-select players for progression
- Once a player has been de-selected from a talent route, it is difficult or impossible to return to it
- Early specialization in one or a small number of activities is seen as necessary to achieve high performance
- It is presumed that early ability in an activity (which enables progression up the pyramid) is indicative of later success (Bailey, Leigh, Pearce et al., 2011; Kirk, Brettschneider, and Auld, 2005).

The longevity and widespread acceptance of the SMTD suggest that it is not without merit. In the words of a recent book on the success of ideas, it is "sticky." In this regard, Heath and Heath (2008) suggest that some ideas are accepted and repeated because they share certain basic qualities, including simplicity, concreteness, and credibility; others wither and die because they lack these same characteristics. However, whether these ideas stick or not has nothing to do with their truthfulness, per se. SMTD is certainly simple and concrete; consequently, it is passed on, both vertically (from one generation to the next) and horizontally (within the same generation). Before long, it has acquired the status of self-evident common sense.

The SMTD has one other virtue that might account for its success: it seems plausible, and—perhaps in the absence of accessible competitive theories—this plausibility has resulted in its wide dissemination around the world. Consequently, players' success in sport has usually been explained in terms of something like a pyramid-based model (Kirk et al., 2005; Prescott, 1999). We suggest that the apparent success of the SMTD is ultimately an optical illusion, as there is no way of knowing who might have succeeded through different systems, and who were de-selected from the system but might have (under different circumstances) gone on to achieve high performance. Indeed, since those cut from systems are rarely if ever the focus of study, it is unlikely that much evidence for the SMTD's lack of efficacy will be available. Furthermore, the equivocal predictive validity of these models is further compounded by the clearly demotivating early elimination of young participants (also

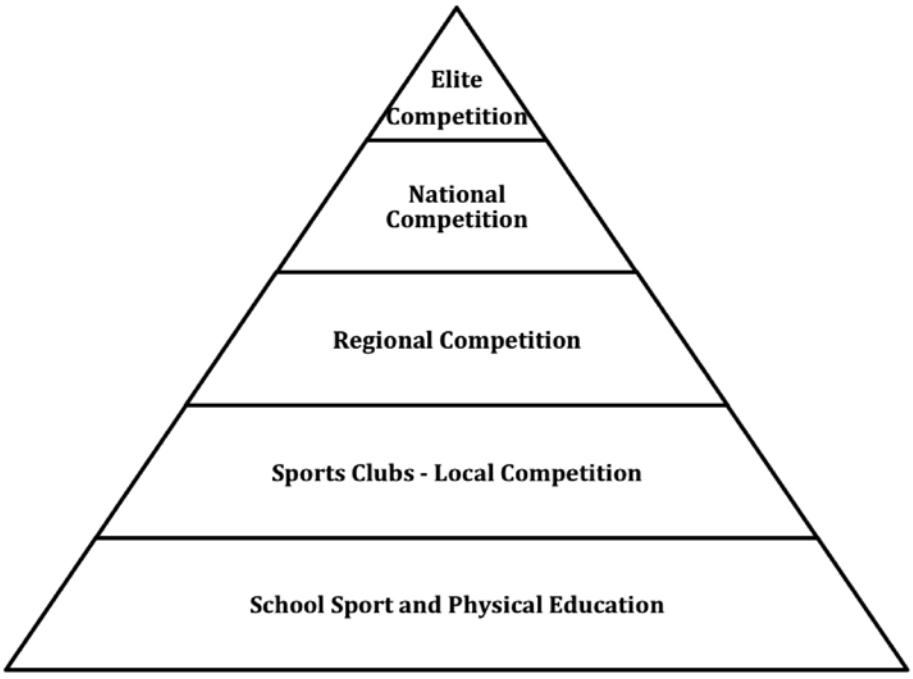


**Figure 1** — The pyramid model of sports development (adapted from Tinning, Kirk & Evans, 1993).

unrecorded) representing a double weakness. Unfortunately, in the absence of examination, the default model remains unchallenged and passes through systems, with increasingly strong face validity.

For these reasons, popularity and "stickiness" alone cannot be taken as sufficient evidence in favor of a theory. Just because an idea is tenacious does not mean it is correct. Based on these contentions therefore, the SMTD needs to be examined critically from a process standpoint, making use of the emerging body of literature base available in talent development.

## Difficulties With the Standard Model

### The Problems with Early Specialization

At the heart of the SMTD is an implicit acceptance that it takes a considerable amount of time and energy to achieve high performance in a specific domain. According to Régnier et al. (1993, p. 308), "the underlying method is to provide space and equipment for a number of athletes, let them practice for 10 years, and then skim the cream from the top." The allusion here is to the strong association found by some researchers between the amount of practice and the level of achievement (Howe, Davidson, & Sloboda, 1998). Indeed, in the motor learning literature, practice is generally seen as the variable having the greatest influence on skill acquisition (Vaeyens, Lenoir, Williams et al., 2008).

The most influential contemporary statement in favor of the importance of early and sustained training is the theory of deliberate practice developed by Ericsson and colleagues (Ericsson & Charness, 1994; Ericsson, Krampe, & Tesch-Römer, 1993). This work introduced an important distinction that had been missing from earlier models: not all forms of practice differentiate individual performance. The key was the specific form and volume of training.

Deliberate practice involves activities that are effortful, low in inherent enjoyment, and purposefully designed to address current areas of weakness. Ericsson et al. (1993) also argued that it was not simply the accumulation of hours of deliberate practice that lead to superior levels of performance, but that the accumulation must coincide with critical periods of biological and cognitive development (before puberty). On the one hand, they argued that early specialization is vital for future success because the earlier one starts adhering to a strict training regimen, the quicker one will attain the desired level of skill. On the other hand, someone starting serious training at a later age would be unable to "catch up" with those who started earlier.

Numerous studies have offered broad support for the importance of deliberate practice in the development of expertise, and the core thesis that a volume of structured, high quality, and well-focused practice is a necessary condition for the development of elite performance seems unarguable (Ericsson, Charness, Feltovich, & Hoffman, 2006; Starkes & Ericsson, 2006). However, research has raised serious questions regarding the detail of the theory, and especially its universal application (Abernethy, Farrow, & Berry, 2003). For example, some studies have empirically refuted the '10,000 hour rule' (van Rossum, 2000; Baker, Côté, & Abernethy, 2003). In fact, relatively few studies have shown 10,000 hours of deliberate practice to be a prerequisite for expert performance in sport. On the contrary, expert performance in sports where peak performance generally occurs after the age of 20 has often been achieved with 3,000–4,000 hours of sport-specific training (i.e., deliberate practice; Côté, Baker, & Abernethy, 2007). In some sports, the figure may be even lower, as was reported by Australian researchers whose training program for the skeleton event turned "Ice novice to Winter Olympian in 14 months" (Bullock, Gulbin, Martin, Ross, Holland, & Marino, 2009).

Côté and Fraser-Thomas (2007, p. 18) identify three testable tenets that they claim are at the foundation of the deliberate practice framework, which apply equally to the SMTD:

1. Elite athletes specialize in their main sport at a younger age than sub-elite athletes
2. Elite athletes start deliberate practice at a younger age than sub-elite athletes
3. Elite athletes accumulate more deliberate practice hours than sub-elite athletes throughout their career.

Evidence in support of Tenet 1 comes primarily from so-called "early specialization" sports (e.g., female gymnastics and figure skating). However, this relationship is tautologous because the competition framework also occurs very early in the performer's life. Outside this narrow scope, evidence does not support this tenet. Studies have demonstrated that elite performers from many sports actually participated in a wide range of activities throughout their childhood (MacNamara, Collins, Bailey, Ford, Toms, & Pearce, 2011). The sorts of early sporting experiences associated with later expertise are those that involve a variety of sports, often characterized by playful engagement, with little emphasis on skill development and competition (Baker, 2003). In Côté's phrasing, these players 'sampled' a wide range of sports before gradually 'specializing' on a small number, before focusing or 'investing' in one activity during mid- to late-adolescence (Côté & Hay, 2002). As such, there seems little direct evidence for the uncritical or universal acceptance of Tenet 1.

Evidence in favor of Tenet 2 also comes primarily from early specialization sports. Studies of women's gymnastics and women's figure skating indicate differences in sport-specific training between elite and sub-elite athletes as early as seven years of age. It has been hypothesized that this difference is due to biologically determined "critical periods" (Balyi & Hamilton, 2003). However, there have been few studies that specifically address appropriate training prescriptions to enhance the performance outcome in accordance with physical development (Naughton, Farpour-Lambert, Carlson, Bradney, & Van Praagh, 2000). Indeed, a recent comprehensive review

concluded that the case for the existence of such critical periods was, at best, unconvincing (Bailey et al., 2010; cf. Ford, De Ste Croix, Lloyd et al., 2011). Notably, no studies of later specialization sports (i.e., all other sports) have supported Tenet 2.

The strongest case seems to be with regard to Tenet 3, where "by and large, retrospective studies that compare elite and sub-elite athletes in various sports have shown support for this tenet" (Côté & Fraser-Thomas, 2007, p. 18). However, recorded differences in deliberate practice usually refer to players' total career investment: differences between groups of elite and sub-elite players do not occur until later in development (Strachan, Côté, & Deakin, 2009). Furthermore, the employment of chronological age as a grouping variable in many of these studies is problematic, especially as more recent work has suggested that the ages at which performers progress to be socioculturally specific, based on factors like school system transitions. Finally, it seems rather obvious to state that that elite players will be more motivated, more externally driven and more able to accumulate more training hours than the general population. So, the argument does seem to be somewhat self-fulfilling.

It seems unarguable that practice is a necessary feature of talent development. The notion of deliberate practice provides a valuable advance on earlier accounts by specifying the conditions necessary for practice to result in expert performance. Numerous studies have demonstrated that deliberate practice in a narrowly prescribed range of activities is one route to developing elite performers (Deakin & Cobley, 2003; Helsen, Starkes, & Hodges, 1998; Hodges & Starkes, 1996). However, other studies have raised serious questions about the universality of deliberate practice in the careers of expert players (Bullock, Gulbin, Martin et al., 2009). To be explicit, the findings from this research do not suggest that elite players do not practice for extensive periods of time, but they do seem to falsify the claim that early, specialized deliberate practice is the *only* way to achieve excellence.

In fact, Bloom's classic 'Developing Talent in Young People study' (1985) found that many elite performers in a range of fields (including sports) did not specialize early in their chosen activity, nor did their early experiences reflect those of deliberate practice (namely, a high amount of concentration on tasks that are not inherently enjoyable, and must be carried out over time). Subsequent studies of high achieving sports players made similar findings: These players often describe their early sporting experiences as playful and varied (Carlson, 1988; Côté, 1999). Côté went on to label these early experiences as "deliberate play" (Côté et al., 2007; Soberlak & Côté, 2003) to capture a form of activity that involves early developmental physical activities that are intrinsically motivating, provide immediate gratification and are specifically designed to maximize enjoyment. Deliberate play usually involves a modified version of standard rules, requires minimal equipment, flexible contexts, and challenges, and allows children the freedom to experiment with different movements and tactics.

Côté's work suggests that highly structured practice may not be essential for early skill acquisition during childhood: Some athletes who had diversified sport backgrounds and engaged in deliberate play during childhood still reached an elite level (Baker et al., 2003; Baker, Côté, & Deakin, 2005; Soberlak & Côté, 2003). Of course, it does not follow from this that deliberate practice will not be needed at a later stage; on the contrary, it becomes progressively more important as players move into adolescence and adulthood (Côté, Horton, MacDonald et al., 2009). The Deliberate Play approach also neglects the importance of an early base of actual and perceived motor competence, coupled with other altitudinal/behavioral characteristics which seem to facilitate subsequent involvement and progress. These caveats notwithstanding, however, there seems little or no evidence in support of the essential need for early specialization which is such a big part of other approaches.

Judgments about the appropriateness of early specialization also need to be made with reference to the specific sport context. There is no convincing evidence that most sports require an early investment of training in one activity. In fact, what evidence is available suggests that across a number of eventual elite players, early specialization is negatively correlated with eventual success (Gullich, 2011). Moreover, there are reasons to be cautious of its application, not least because most models of sports development recognize that elite performance is only one among many worthwhile goals of sports participation. Positive attitudes to sport and healthy, lifelong development would seem to be at least as important as competitive success, even for those on elite pathways (Collins, Bailey, Ford et al., 2013).

## Proposed Importance/Lack of Evidence Base for the Role of Fundamental Movement

The exact mechanisms by which deliberate play activities translate into later performance are unclear, but we can assume that it is the result of a complex interaction of biopsychosocial factors that underpin development (Bailey et al., 2010). Although there has been limited research on the causal relationships between playful learning and expert performance, there is a growing body of literature that supports the claim that such activities contribute to the development of what are usually called Fundamental and Specialized Movement Skills (FMS and SMS; Abbott et al., 2002; Gallahue, & Ozmun, 2002). It is widely believed that these basic skills and patterns of physical activity track from childhood to adolescence and beyond (Fulton, Burgeson, Perry et al., 2001; Okely, Booth, & Patterson, 2001). More specifically, the conjecture is that FMS are essential prerequisites for participation in sport and physical activity because the specialized movements of different activities are constructed on building blocks of basic skills (Gallahue & Ozmun, 2002; Payne & Isaacs, 1995). Children who lack these basic skills "are often relegated to a life of exclusion from organized and free

play experiences of their peers, and subsequently, to a lifetime of inactivity because of their frustration in early movement behavior" (Seefeldt et al., cited in Abbott et al., 2002, p. 19). There is limited empirical work in this area to date, but the logic of the development of progressively more sophisticated movement skills that refine, combine and extrapolate from earlier skills means that it is likely that high-level skill acquisition in any formalized physical activity will be at least highly unlikely without an adequate foundation of constitutive skills. There is certainly a growing body of correlational if not fully understood evidence that supports this stance (Berry, Abernethy & Côté, 2008). Furthermore, there are strong links between a paucity of FMS and low levels of activity. For example, children who spend three-quarters of their time in sedentary behavior have up to nine times poorer motor coordination than active peers (Lopes, Santos, Pereira, & Lopes, 2012). Even more positively, FMS level seems to predict activity level and even be associated with academic achievement (Syväoja, Kantomaa, Ahonen et al., 2013). In short, there seems to be a strong and growing evidence base for the potential contribution of FMS as an integral feature of any coherent participant development program.

There are, however, a number of issues with FMS that need investigation if the concept is to be firmly established and effectively used. For example, sound FMS patterns are proposed as preventing injury and easing movement efficiency (Giles, 2011), seen as central to subsequent physical activity participation (Jess, Dewar, & Fraser, 2004), and as the essential underpinnings of the widely established and desirable characteristic of physical literacy (Whitehead, 2001a; 2001b). In all these case however, and in almost all of the rest of the burgeoning literature, there is a crucial absence of exactly what constitutes an acceptable level of fundamental skill, how this can be measured and, consequently, any causative evidence for the important roles claimed for FMS. As a consequence of this weak foundation, fundamental movement courses and activities have tended to focus on enjoyment rather than on a consistent and well-justified content.

Measures of physical competence (that is skill in coordination rather than fitness) are often related to the identification of motor impairment (the bottom 5% of the population; Van Waelvelde, Peersman, Lenoir et al., 2007) rather than a diagnostic tool which subsumes an acceptable standard of physical literacy and which offers direction to both initial training and remediation. Work on evaluation of normal motor ability has frequently been related to checks for age-appropriate development. For example, the McCarron Assessment of Neuromuscular Development (MAND; McCarron, 1997) offers a norm-related marker of coordination on ten broad tasks against expected averages at six monthly intervals. These coordination measures appear to hold some external validity, such, scores showing close correlations with performance on novel but age-appropriate fundamental skills (Miller, 2006). Even here, however, the content and conduct of Motor Assessment Batteries (MABs) has been questioned in the literature. For example, with regard to content, it may be that FMS could be said to represent sport-specific norms for movement "understandable within a hegemonic, white, middle-class masculinity matrix" (Larsson & Quennerstedt, 2012, p. 293). In addition, there are several procedural issues that need to be considered, such as the influence of observation and demonstration before test execution, which seems to make the MAB as much a test of imitation as ability (Cools, De Martelaer, Samaey et al., 2008). Finally, MABs implicitly assume those optimal movement patterns exist. However, based on the movement constraints perspective, each individual has their own optimal way of moving (Davids, Button, & Bennett, 2007).

In summary, there seems to be some way to go in the operationalization and measurement of the FMS construct before we can make clear, causative and definite claims for its importance. Reflecting these various challenges of examination, few studies have examined the relationship between FMS and physical activity with sufficient rigor (Fisher, 2008). For this reason, caution is needed when reading prescriptions like the following: "If the fundamental and basic sport specific skills are not established before ages 11 and 12 respectively, athletes will never reach their optimal or genetic potential" (Balyi & Hamilton, 2003, p.8). As stated before, the implied critical window of opportunity is not supported by the current state of the literature (Bailey, Collins, Ford et al., 2010). Something like Côté's (1999) sampling approach (in which children try out a variety of activities) seems more plausible, with its focus on intrinsic motivation and diversity during the early years for the background development of capacities for flexible maximum responses in the later years and higher performance categories of participation" (Rushall, 1998, p. 27). Importantly, recent research suggests that, while FMS might be easiest to acquire and develop thanks to the luxury of time during early childhood, they can also be learned later (even during adulthood) through participation in focused and specific programs (Polman, Walsh, Bloomfield et al., 2004).

So, once again, the precepts of the SMTD are questioned. The idea of a gradual progression up the performance pyramid, once specialization decisions are taken is hardly likely if FMS are important, even though clarifying the exact nature of this input is overdue. If such inputs can be made at various stages of development then the SMTD's chronological hierarchy based on early specialization is even less likely (Polman et al., 2004; Newall, 2011).

## The Risks of Ill-Focused or Incorrectly Administered Pyramids

Given the lack of evidence for the requirement of early specialization, it is worthwhile noting concerns raised by researchers of physical and psycho-social risks associated with early intensive sports training (Baker, 2003). The most obvious risks linked to adult-like training at early

periods of development are over-use injuries, and studies have found that intensive training during maturation (i.e., childhood) can increase susceptibility to conditions such as Osgood-Schlatter disease, Sinding-Larson-Johansson syndrome, and Sever's disease (Brenner, 2007; Dalton, 1992).

The literature also points to psychological risks of early intensive training (Boyd & Yin, 1996). Some of these concerns relate directly to the immaturity of the players, and the subsequent dangers of pressure, frustration and a sense of failure (Martens, 1993). Further psychosocial concerns linked to early specialization include compromised social development, sport dropout, burnout, and eating disorders (Baker, 2003). These concerns are even more telling when the vital need to encourage lifelong physical activity participation as well as elite performance is considered. Early dropout following early specialization can often inhibit or even prevent adherence to physical activity in later age (Collins, Bailey, Ford et al., 2013. Talent transfer (encouraging unsuccessful or retired performers to try another sporting pathway) is also blocked by such obstacles. Moreover, some have questioned the moral justification of entering children into a process of very serious sports training and performance when the logical of the SMTD is that the vast majority are destined to failure (David, 2004).

Competition and failure need not be harmful experiences for children; indeed, they are probably essentially elements of the sporting experience (Shields and Bredemeier, 2009). Difficulties may only arise when such experiences are located in a context filled with adult-based concepts and values, and—as is the necessary logic of the SMTD—the almost inevitable lack of success equates with exclusion from participation.

## The Limits of Unitary Development

Traditionally, researchers have tended to conceptualize the development of ability as unitary, genetically inherited, and measurable (Abbott & Collins, 2004), and this assumption lies implicit within the SMTD (Vaeyens et al., 2008). This presumption is in contradiction to contemporary theorists who almost universally favor multidimensional models of high ability, cognizant of a wide range of factors (Simonton, 1999; Ziegler & Heller, 2000). By contrast, domain-specific theories generally make distinctions between different, relatively autonomous sets of abilities, which frequently relate to specific areas of achievement.

There is an increasing acceptance among sport scientists that performance in all forms of sport is multifactorial, requiring the performer to develop a range of skills and abilities (such as physical fitness, movement competence, and mental skills; Bartmus et al., 1987; Vaeyens et al., 2008; Williams & Ericsson, 2005). Indeed, this may be the case in all domains (Feldman & Goldsmith, 1986). For example, Simonton (1999) proposed that multiple components contribute to the development of ability within any area and that these components interact in a multiplicative rather than an additive way. He offered four implications of this multiplicative model:

1. The area in which an individual displays ability will not be determined by any highly specialized component, but rather by the "specific weighted multiplicative integration of the contributing innate components" (p. 438)
2. Individuals talented in an area will all have some value of each necessary component, but individual values within any area will vary (uni-dimensional models are unable to account for such diversity)
3. Many young people will not have exceptional talent in an area because of the absence of one of the components, even if they excel in another component (uni-dimensional models are not capable of making this distinction)
4. The number of innate components necessary for performance will vary from area to area and some will be extremely complex (contrast, for example, open and closed sport skills).

To date, there have been relatively few attempts to take a multifactorial perspective in the prediction of high ability in specific activities. Those that have done so have highlighted the necessity of measuring a number of dimensions over a period of time (Prescott, 1999; Régnier & Salmela, 1987), rather than single measures on a singular occasion.

The complexity of this predicament seems to be written large in sporting activities. Success in sports is very rarely determined by a narrow range of characteristics, and even those that seem to place particular reliance on a relatively small number of physical characteristics (such as rowing or body-building) actually place considerable demands on psychological and social competence as well (Abbott, Collins, Martindale et al., 2002). Different roles within a particular sport mean that the necessary skills and abilities are not evenly distributed across all positions, although players at the highest levels presumably possess a fundamental competence in all areas (Vaeyens et al., 2008). Moreover, success in most sports is irreducible to a predetermined set of skills and attributes, as deficiencies in one area can be compensated for by strengths in another (Williams & Ericsson, 2005).

## The Conflation of (Future) Potential With (Current) Performance

One of the most common manifestations of the unitary conception of development in sport occurs when the assessment of potential in an area is reduced to levels of current performance (Neelands, Band, Freakley, & Lindsay, 2005). It is clear why this reduction takes place, as current performance seems to be the most obvious indicator of potential (Bailey, Tan, & Morley, 2004). However, numerous researchers have suggested that this conflation is a fundamental error (Abbott, Collins, Martindale et al., 2002; Bailey & Morley, 2006; Vaeyens et al., 2008;

Walker, Nordin-Bates, & Redding, 2010). It is hardly controversial in the context of recent developmental sciences to claim that individual development is the result of an interaction between inherited abilities, social and cultural learning (Oyama, 2000; Scarr & McCartney, 1983), and it is this interaction of processes that undermines simplistic correlations of potential and performance. Unfortunately, such approaches still characterize many talent pathways across sport.

The distinction between potential and performance in this context is made clear if we consider two young people: one has wealthy parents who are very supportive of her participation in physical activities, who pay for private coaching in a number of sports, who transport her to training and competitions, and who play sports with her from an early age, and continue to do so whenever they get the chance. The other student's (single) parent does not have much money, and the little she does have is not "wasted on games," especially as her social set think that girls ought not to get too good at sport, anyway. Presumably, all readers will accept that the first player has a significantly greater chance of performing best in assessments of ability, and simple observation will make it impossible to ascertain whether this is due to superior potential or simply superior opportunity. This is not just a theoretical point. For example, Ward and Williams (2003) concluded that elite soccer players as young as eight had better skills due to extra opportunities rather than any genetic advantage.

The relative age effects (RAE) seen across sports, whereby early birth dates in the competitive year grouping are systematically but disproportionately selected, is another manifestation of this differential opportunity (Musch, & Grondin, 2001). These effects have been identified in numerous contexts, including male team selection, where coaches tend to favor the physical maturity of relatively older players (Hancock, Ste-Marie, & Young, 2013). Selection advantages in the early competitive years mans that relatively older players within a cohort tend to receive better and more coaching, training, and competition which are important factors associated with later sporting success and consequent continued selection to teams further up the performance pyramid (Helsen, Van Winckel, & Williams, 2005).

Performance in any domain is the result of a complex choreography between various causal influences (van Rossum & Gagné, 2005). Many social and environmental factors influence the developing ability of students. To base a judgment of talent on current performance, therefore, is to conflate those things that are within the student's control and those that are not (Bailey, 2007), and to mistakenly believe that talent development is merely a probabilistic enterprise (Vaeyens et al., 2008). This is why it is wise to "to distinguish between determinants of performance and determinants of potential/skill acquisition" (Abbott, Collins, Martindale et al., p. 26). Current performance can be a poor indicator of ability since it rewards things that have nothing at all to do with talent, such as parental income and support (Bailey, 2007).

Taken together, these factors demonstrate the relevance of the kind of distinction Gagné (1985) makes between "gifts" and "talents"; between an above average level of competence in naturally developed abilities within one or more domains of human aptitude and the level of performance in those systematically developed abilities or skills that constitute expertise in a particular field of human activity. Although these aptitudes are genetically constrained, the emergence of talent is always mediated by the influence of intrapersonal and environmental catalysts, in addition to systematic learning, considerable practice, and training. It is simply naïve to overlook the real-world gap between the abilities an individual brings to an activity and the sports player, athlete, or dancer who emerges at the end of the process.

A further difficulty with performance-based assessments of ability is that coaches and teachers tend to focus on narrow measures, primarily physical competence and fitness,, and overlook other contributory aspects, like interpersonal skills, decision-making, and understanding of the game (Bailey, Morley, & Dismore, 2009; Bailey et al., 2004; Morley, 2008). Obviously, physical qualities are extremely important in sport, but not solely so. Excellence requires the development of a relatively broad range of abilities, including interpersonal skills (Holt, 2008), tactical and strategic awareness (Helsen, Hodges, Van Winckel et al., 2000), and grit (Duckworth, Kirby, Tsukayama et al., 2011). This suggests that, while performance-based approaches should have a part to play in the development of a young person's emerging talent, they should not be attributed primary importance during the formative years because

- they are not accurate measures of the abilities of all young people and are particularly affected by gender, ethnicity, or socioeconomic background
- they can overlook other abilities that are also important aspects of talent
- until later age, they systematically discriminate against later birth date individuals
- they ignore individuals who are potentially talented, but who, due to lack of opportunity or support, are currently underachieving.

## An Alternative View: Stressing Development and Inclusion

Ultimately, research findings support talent development frameworks that stress long-term development (Vaeyens et al., 2008). The journey from novice to elite performance usually takes many years, and there are countless challenges and obstacles along the way. This might explain three peculiar findings from the literature:

1. extremely talented adults rarely start out identified as highly able children (Abbott, Collins, Martindale et al., 2002; Bloom, 1985)

2. "those who eventually become expert performers do not start out in a domain of expertise with an already exceptional level of performance as compared with their peers, when the benefits from earlier engagement in other related activities are considered" (Ericsson, 2003, pp. 65–66)
3. a large proportion of those identified as protégés fail to realize their early promise (Bailey & Morley, 2006). Each of these points undermines the validity of the SMTD.

Implicit within the SMTD is a conception of development and performance in sports as conceptually simple, linear and predictable. It also presumes that successful progression from one level to the next is indicative of later or emergent ability (which is the premise of the pyramid model). All of these presumptions are mistaken. Some skills and knowledge that are important for later performance success can be trained and improved at early ages, but do not become fully developed or explicitly apparent until later (Abernethy & Russell, 1987; Tenenbaum, Sar-El, & Bar-Eli, 2000). Furthermore, the determinants of performance do not characterize success through the different age groups (Régnier & Salmela, 1987), and skills and physical qualities likely to result in short-term success may become redundant a year later. For example, hard running and physical maturity may be key to rugby or American Football success at age 12 but, as players get older, and size and strength factors balance out, mental factors such as decision-making and anticipation become more important for success (Abbott & Easson, 2002). The danger here is obvious: Short-term talent identification strategies run the risk of expelling potentially talented players because their current performance does not match age-group expectation. Conversely, activities that do seem to be associated with long-term development and retention in sport, such as FMS (Morley, 2008; Haywood & Gretchell, 2001), certain perceptual and cognitive skills (Ward & Williams, 2003), and learning-orientated motivation to participate (Duda, 2001) might be overlooked in the short-term.

In this context, it is perhaps not surprising that the single most significant characteristic that distinguishes evidence-related approaches from the SMTD is their promotion of long-term engagement and development, and their rejection of short-term identification (Abbott, Collins, Martindale et al., 2002; Bailey & Morley, 2006; Côté & Hay, 2002; van Rossum & Gagné, 2005). A host of factors undermine the central importance given to talent identification, as opposed to its development (Vaeyens et al., 2008), such as relative age effect (Helsen, Hodges, Van Winckel et al., 2000; Musch & Grondin, 2001), the unpredictability of childhood-to-adult physical measures and childhood-to-adult performance standards (Abbott, Collins, Martindale et al., 2002), and the subjective or arbitrary nature of most talent assessment procedures (Burwitz et al., 1994). In fact, some researchers have suggested that many of the qualities that distinguish elite adult performers in the physical domain do not appear until late in adolescence, therefore invalidating the talent selection methods premised on preadolescent selection practices altogether (French & McPherson, 1999; Tenenbaum et al., 2000; Williams & Franks, 1998).

Evidence of this sort implies a radical departure from standard talent practices. For a start, it stresses the need for a strict distinction between valid and invalid identification measures, accompanied by an abandonment of developmentally inappropriate methods of assessing young people. More generally, it undermines the heavy emphasis on identification and selection and replaces it with a stress on developmentally appropriate activities and environments (Martindale, Collins, & Daubney, 2005).

## Conclusion

What lessons have emerged from this inquiry? Overall, the literature supports talent development that a) is multifactorial, involving the development of different abilities; b) allows opportunity for playful sampling of a range of sports during the early stages; c) progressively introduces time and resources necessary for sustained, deliberate practice; d) addresses the gap between a child's potential and the player (or spectator or couch potato) they turn out to be as an adult; and e) recognizes that some young people grow up in environments that make it extremely difficult for them to realize their talents, unless an external agent (like a committed coach or teacher) or agency (such as an nongovernment organization or national governing body) breaks the pattern of exclusive opportunity that has traditionally characterized elite sport and the SMTD.

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