In this chapter we contrast two approaches to talent development in sport. The first approach is centered on a deliberate practice-oriented model in which early specialization in one sport is the main feature of talent development. The second approach is centered on a late specialization model that considers the interaction of skill development with psychosocial variables and the sampling of various sports during childhood. We draw a working distinction between learning activities that are typically regarded as practice or training and those that may be more accurately regarded as play, and draw a contrast between the concepts of early specialization and early sampling for the acquisition of skill in sport.

Practice and play

We have used the term practice for organized activities in which the principal focus is on skill development and performance enhancement and the term play to describe activities undertaken primarily for intrinsic enjoyment, but which may nevertheless ultimately contribute to the acquisition of skills (Côté, Baker, & Abernethy, 2007). Although practice is uniformly regarded in the motor learning literature as the variable having the greatest singular influence on skill acquisition, there remains a host of unanswered questions about how much and what type of practice is necessary and/or is best for the development of expertise. Much of the experimental work on the relationship between practice conditions, learning, and performance has been conducted using laboratory tasks in which the changes in performance are recorded over a relatively small number of trials of practice in which untrained individuals (novices) are used as participants. Such approaches have proven useful in addressing motor learning of new skills (see Lee, Chamberlin & Hodges, 2001), yet they have contributed less to the understanding of the long-term development of sport skills. This relative lack of impact is largely because the acquisition and performance of sport skills may require literally millions of trials and typically a decade or more of regular, sustained practice to acquire. Because experimental work examining the acquisition of skills in a prospective, longitudinal manner is fraught with logistical difficulties, the bulk of knowledge regarding the relationship between practice quantity and type has come, by necessity, from studies in which the practice histories of experts are determined retrospectively. Much of this work
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has been profoundly influenced by the conceptualization of deliberate practice as the single type of activity leading to elite performance in sport (Ericsson, Krampe, & Tesch-Römer, 1993).

Ericsson and colleagues (1993) produced a seminal paper on the role of practice and expert development that shaped a great deal of the research that followed. Their position (based on work of Simon & Chase, 1973, and others) was that with due attention to what they called “deliberate practice” one could prevent performance improvements from leveling off, thus circumventing the asymptotic effects that underpin the power law of practice. Deliberate practice was operationalized as any training activity (1) undertaken with the specific purpose of increasing performance (e.g., not for enjoyment or external rewards); (2) requiring cognitive and/or physical effort; and (3) relevant to promoting positive skill development. Ericsson et al. (1993) suggested, on the basis of an intensive examination of the training and performance of elite musicians, that the relationship between time spent in deliberate practice and performance was monotonic (i.e., linear) rather than a power function. Moreover, they contended that the primary factor distinguishing performers at different skill levels was the number of hours spent in deliberate practice, thus attributing it a causal role in the attainment of expertise. For instance, in their examination of violinists, experts had accumulated over 7,400 hours of deliberate practice by 18 years of age, compared with 5,300 hours for intermediate-level performers and 3,400 hours for lower-level performers.

Although the original data and conceptual arguments were based on work with musicians, Ericsson and his colleagues have repeatedly contended that it also applies to the development of expertise in other domains, including sport. There is a body of evidence to support this contention (e.g., Deakin & Cobley, 2003; Helsen, Starkes, & Hodges, 1998; Hodges & Starkes, 1996; Starkes, Deakin, Allard, Hodges, & Hayes, 1996). There is, however, some controversy about definitional aspects of deliberate practice, especially in relation to the contention that practice must be deliberate in order to be beneficial, and to the proposition that practice alone rather than in combination with other activities or hereditary factors sets the limits to performance (see, for example, Abernethy, Farrow, & Berry, 2003; Baker & Horton, 2004; Sternberg, 1996).

Recognizing that athletes tend to first experience sport through fun and playful games, Côté (1999) coined the term deliberate play to characterize a form of sporting activity that involves early developmental physical activities that are intrinsically motivating, provide immediate gratification, and are specifically designed to maximize enjoyment. Deliberate play activities, such as street hockey or backyard soccer, are regulated by rules adapted from standardized sport rules and are set up and monitored by the participants themselves. It is a form of sport activity that differs from (1) the physical play activities of infancy and early childhood (Denzin, 1975; Pellegrini & Smith, 1998; Piaget, 1962); (2) the specific pedagogical games/play designed to improve performance (Griffin & Butler, 2005; Launder, 2001); (3) the structured practice activities typical of organized sport; and (4) deliberate practice activities (Ericsson et al., 1993).

Practice and play activities in youth sport can be conceptualized along a continuum that shows how much instruction and input is vested by the adult (i.e., coach)
versus the youth. At one end of the continuum are sport activities in which adults have minimal roles in providing instructions, as in play activities. At the other end are sport activities in which adults set the direction and provide the instruction in a structured environment, such as the structured practices and competitions of organized sport.

**Early specialization and sampling**

The early specialization approach to talent development has gained popularity in the last few years because of the work of Ericsson and colleagues (1993) on deliberate practice. In their original study, Ericsson et al. (1993) proposed that non-expert violinists could not catch up to expert violinists since the latter group had started deliberate practice at an earlier age and had accumulated more total hours of deliberate practice throughout development. Furthermore, Ericsson and colleagues (1993) proposed that violinists need to accumulate approximately 10,000 hours of deliberate practice to become experts. Those who advocate early specialization believe that investment in deliberate practice in one activity from a young age distinguishes future experts from non-experts. Advocates of early specialization within the sport domain also propose that the timing at which deliberate practice begins is imperative for elite performance since some skills and movements (e.g., extending the back when pitching in baseball) are best developed before the body physiologically matures (e.g., bones calcify; Ericsson, 2003). It is apparent that commitment to large quantities of deliberate practice in one sport from a young age (early specialization) is one approach to developing elite athletes. For example, researchers (Helsen, Hodges, Van Winckel, & Starkes, 2000; Helsen et al., 1998; Ward, Hodges, Williams, & Starkes, 2004) have found support for the relationship between the amount of deliberate practice and the attainment of expertise across a variety of sports.

A number of researchers, however, have demonstrated that some athletes who had diversified sport backgrounds and engaged in deliberate play during childhood still reached an elite level in sport (e.g., Baker, Côté, & Abernethy, 2003b; Baker, Côté, & Deakin, 2005; Berry, Abernethy, & Côté, 2008; Bloom, 1985; Carlson, 1988; Soberlak & Côté, 2003). Early sampling was defined as participation in a wide variety of sports that involve high levels of deliberate play and low levels of deliberate practice (Côté, Baker, & Abernethy, 2003; Côté, Baker, & Abernethy, 2007). A diversified approach to early athlete development may not be at odds with monotonic or power profiles of the practice/proficiency relationship. During the initial stages of development, increases in performance occur on account of rapid improvement in general capabilities. With prolonged practice and training over time, improvements become much more specific and more difficult to attain. During the initial exposure to the task, however, the same general adaptations may be produced through similar activities that share the same elements. For instance, Abernethy, Baker, and Côté (2005) showed that experts from different sports consistently outperformed non-experts in their recall of defensive player positions, suggesting that some selective transfer of pattern recall skills may be possible. From a physical conditioning point of view, childhood involvement in running or cycling
will produce the same general physiological adaptations (e.g., increases in blood volume and maximal cardiac output) as sport-specific involvement. Once general cognitive or physical adaptations have been made through play and involvement in various sport activities during childhood, training should become more specific.

When considering the dichotomy of early specialization and sampling, it is apparent that both approaches can lead to expertise development under optimal conditions. Although experts typically accumulate more hours of sport-specific practice than non-experts by the time they reach national level competition as adults, some retrospective studies have indicated that these differences between elite and less elite athletes do not occur until adolescence (Baker et al., 2003a; Berry, Abernethy, & Côté, 2008; Hodges & Starkes, 1996). On the other hand, other retrospective studies (Helsen et al., 1998; Ward, Hodges, Starkes, & Williams, 2007) showed that the accumulated amount of structured practice discriminated between soccer players’ skill levels in Europe as early as age 7. Higher amounts of training at earlier ages are also a discriminator between elite and less elite athletes in sports in which peak performance occurs before biological maturation or adulthood, such as women’s gymnastics (Law, Côté, & Ericsson, 2007) and women’s figure skating (Deakin & Cobley, 2003). However, as will be indicated later, this level of involvement during early periods of development can have significant negative consequences for continued sport participation and can ultimately affect the number of prospects available for talent development programs.

**Athlete development models**

Over the last three decades, a number of athlete development models that integrate the concepts of practice/play and early specialization/sampling have been proposed. Alfermann and Stambulova (2007) highlighted and reviewed five research-based models (Bloom, 1985; Côté, 1999; Salmela, 1994; Stambulova, 1994; Wylleman & Lavallee, 2004). More recently, Bruner, Erickson, Wilson, and Côté (2010) conducted a citation network analysis and revealed two additional models published in peer-reviewed journals (Abbott & Collins, 2004; Bailey & Morley, 2006).

One of the earliest models of expertise development emerged from Bloom’s (1985) examination of experts in disciplines such as mathematics, art, science, and sport. Bloom utilized qualitative, retrospective interviews to describe the life story of these talented individuals. A general pattern of development was inferred to be characterized by three stages: (1) initiation stage, in which the individual becomes involved in the activity and is identified as talented; (2) development stage, in which the individual becomes committed to the activity and the levels of training and specialization are increased; and (3) perfection stage, in which the activity becomes the center of the individual’s life and the individual reaches his or her highest level of proficiency. The existence of such stages suggests that individuals must tackle the unique challenges associated with each stage and successfully transfer between stages. Although Bloom’s (1985) model does not specifically focus on sport, the influence of this early model can still be seen today, as a recent citation analysis found that Bloom’s (1985) *Developing Talent in Young People* is the most prominently
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cited text within the athlete development literature (Bruner, Erickson, McFadden, & Côté, 2009).

Building upon the work of Bloom (1985), the athlete development models proposed by Salmela (1994), Stambulova (1994), and Wylleman and Lavallee (2004) provide complementary ways of conceptualizing the pathway to athletic excellence. Salmela (1994) and Wylleman and Lavallee (2004) identified normative transitions occurring between the stages of initiation, development, perfection, and discontinuation. The model put forth by Stambulova (1994) suggests that the athletic career is characterized by five stages: (1) preparatory stage; (2) beginning of specialization; (3) intensive training in chosen sport; (4) culmination stage; and (5) the final stage, followed by discontinuation. Whereas all three models were designed to characterize the different stages of athlete development, Stambulova’s (1994) and Wylleman and Lavallee’s (2004) models were constructed to depict key transitions in an athlete’s career. Wylleman and Lavallee’s (2004) developmental model also integrates athlete development with three other levels of development: (1) psychological; (2) psychosocial; and (3) academic-vocational, to encourage researchers to take into account athletes’ demands and transitions outside the sport environment.

The models proposed by Abbott and Collins (2004) and Bailey and Morley (2006) challenge researchers to broaden the conceptualization of athlete development. Abbott and Collins (2004) emphasize the influence of psychosocial behaviors in facilitating successful transitions. According to Abbott and Collins (2004), an athlete’s ability to travel along the talent development pathway is shaped by the development and application of mental skills such as goal setting and imagery. They suggest that psychomotor (e.g., hand–eye coordination, balance) and physical (e.g., height, muscle composition) factors can either facilitate or inhibit an athlete’s ability to successfully negotiate developmental transitions, but that it is crucial to place early and continual emphasis on the development of key psycho-behavioral strategies.

The model proposed by Bailey and Morley (2006) was derived from empirical research investigating the processes of talent development within the physical education, rather than sport, setting (e.g., Bailey, Dismore, & Morley, 2009; Bailey, Tan, & Morley, 2004). These authors sought to gain a greater understanding of the perspectives of teachers, students, and policymakers regarding the nature, content, and character of the talent development process in physical education and to identify the strategies used to foster development. Based on a series of studies, three main hypotheses have been put forward. The first relates to the differentiation between potential and performance. Like Abbott and Collins (2002), the authors contend that current performance is a poor indicator of ability since it can be mediated by a myriad of other influences, such as inherited abilities, training, support, parental investment, and social values. The second hypothesis is that talent development needs to be viewed as a multi-dimensional construct that stems from the emergence of a wide range of abilities (including interpersonal, intrapersonal, cognitive, and creative ability). The third hypothesis is that practice plays an important role in fostering talent development.

Although all these models provide a wealth of insightful information regarding
athlete development, it is important to outline their limitations. First, the majority of these models fail to provide testable tenets that can enhance our understanding of athlete development. For instance, there is a lack of information relating to the quantifiable components that characterize each stage of development. Second, several of the models encompass variables that are difficult to test retrospectively, such as psychosocial behaviors (Abbott & Collins, 2004) or an athlete’s potential (Bailey & Morley, 2006). A third limitation is that many of the stage-based models (e.g., Bloom, 1985; Stambulova, 1994) comprise qualitative stages that are hard to define. For example, although Stambulova (1994) suggests that athletic careers are characterized by five stages, it is unclear what indicators could be employed to track transitions between these stages. Thus, these development models have been atheoretical or descriptive in nature, providing no account of individual differences in attained performance among top-level athletes with similar developmental opportunities. As a result, the knowledge base would greatly benefit from models that address how changes in athlete development can be tracked over time. The ability to quantitatively chronicle the transitions of athletes along the talent development pathway holds significant potential. There is consequently a need for quasi-experimental research designs that contrast pathways of development of experts and less expert athletes by tracking variables that are known to make a difference to long-term performance achievement.

One model that has attempted to address these limitations is the Developmental Model of Sport Participation (DMSP; Côté, 1999; Côté et al., 2007). Recent citation analysis studies (Bruner et al., 2009; Bruner et al., 2010) have found the DMSP to be the most prominent conceptualization of athletes’ development within the sport literature. It is a conceptual framework that integrates the developing person and their environment. As illustrated in Figure 15.1, the DMSP has three sport participation trajectories: (1) recreational participation through early sampling and deliberate play; (2) elite performance through early sampling and deliberate play; and (3) elite performance through early specialization and deliberate practice. The different stages within a trajectory are based on changes in the type and amount of involvement in sport, play, and practice and are linked to specific outcomes in terms of long-term performance, continued participation, and personal development.

The DMSP has been developed and refined over the last 10 years and presents a set of concepts and variables about the development of athletes that are quantifiable and testable. An advantage of this model is that the stages of the DMSP are identified by clear indicators that are consistent with both sport-specific and general theories of child and adolescent development. Furthermore, research conducted with the DMSP has been guided by a unique methodology that can be effectively used to empirically test the propositions of this athlete development model.

The DMSP was developed in four steps. The first step involved an initial conceptualization of athletes’ development resulting from interviews with parents, coaches, and athletes (Côté, 1999). This original model was in line with results from other qualitative studies of athletic development (e.g., Bloom, 1985; Carlson, 1988)
while providing explicit and original propositions that could be quantified and tested empirically. In a second step, a quantitative, retrospective methodology was developed over several years (Côté, Ericsson, & Law, 2005) to test the main assumptions of the DMSP. Using this methodology, a series of studies were conducted to compare groups of expert and non-expert athletes to refine the DMSP and provide clarity on its different processes, outcomes, and trajectories (e.g., Baker, Côté, & Abernethy, 2003a, 2003b; Berry et al., 2008; Law et al., 2007). Third, the retrospective method was adapted and used to test the DMSP in terms of other outcomes associated with sport involvement (i.e., personal development, dropout, and continued participation; e.g., Fraser-Thomas, Côté, & Deakin, 2008a; Strachan, Côté, & Deakin, 2009b; Wall & Côté, 2007). This holistic approach was further substantiated with new qualitative studies with athletes who have achieved various outcomes in sport (Fraser-Thomas & Côté, 2009; Strachan, Côté, & Deakin, 2009a). A final fourth step involved the refinement of the DMSP through the writing of theoretical papers and the creation of seven postulates related to the process variables inherent to the different pathways of the DMSP and its various outcomes (Côté et al., 2007; Côté, Lidor, & Hackfort, 2009).
The postulates of the DMSP feature characteristics of sport programs that promote not only performance, but also continued participation and personal development for all involved in sport. The DMSP is based on a developmental approach that features the interaction of variables across time. The DMSP and its postulates integrate the various outcomes of sport – performance, participation, and personal development – by focusing on key proximal processes (deliberate play, deliberate practice, and early diversification) and the environment in which these processes are happening (role of coaches, peers, and parents).

Postulates underpinning early involvement in sport

The underpinning principle of sport programs for children is to provide space, opportunities for playing and training, and equipment for a large number of children across various sports, so that the best athletes among a large pool of motivated adolescents can be selected. The following are seven postulates associated with the different pathways of the DMSP that have received various levels of empirical support (see Table 15.1). The postulates highlight the efficiency of sport programs based on early sampling (postulates 1, 2, and 3), deliberate play (postulates 4 and 5) and key transitions throughout development (postulates 6 and 7).

Table 15.1 Seven postulates about youth sport activities

<table>
<thead>
<tr>
<th>Postulate 1</th>
<th>Early diversification (sampling) does not hinder elite sport participation in sports in which peak performance is reached after maturation</th>
</tr>
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<tbody>
<tr>
<td>Postulate 2</td>
<td>Early diversification (sampling) is linked to a longer sport career and has positive implications for long-term sport involvement</td>
</tr>
<tr>
<td>Postulate 3</td>
<td>Early diversification (sampling) allows participation in a range of contexts that most favorably affects positive youth development</td>
</tr>
<tr>
<td>Postulate 4</td>
<td>High amounts of deliberate play during the sampling years build a solid foundation of intrinsic motivation through involvement in activities that are enjoyable and promote intrinsic regulation</td>
</tr>
<tr>
<td>Postulate 5</td>
<td>A high amount of deliberate play during the sampling years establishes a range of motor and cognitive experiences that children can ultimately bring to their principal sport of interest</td>
</tr>
<tr>
<td>Postulate 6</td>
<td>Around the end of primary school (about age 13 years), children should have the opportunity either to choose to specialize in their favorite sport or to continue in sport at a recreational level</td>
</tr>
<tr>
<td>Postulate 7</td>
<td>Late adolescents (around age 16 years) have developed the physical, cognitive, social, emotional, and motor skills needed to invest their effort into highly specialized training in one sport</td>
</tr>
</tbody>
</table>
Postulate 1: Early diversification (sampling) does not hinder elite sport participation in sports in which peak performance is reached after maturation

There is a common belief that, in order to become elite, athletes must specialize in their sport from an early age (Côté & Fraser-Thomas, 2011). However, evidence exists to suggest that early involvement in a variety of sports can also lead to elite performance. Studies of elite athletes in several sports, including ice hockey (Soberlak & Côté, 2003), field hockey, basketball, and netball (Baker et al., 2003b), baseball (Hill, 1993), tennis (Carlson, 1988; Côté, 1999; Monsaas, 1985), triathlon (Baker et al., 2005), Australian rules football (Berry et al., 2008), and rowing (Côté, 1999) demonstrate that elite performance in these sports is usually preceded by a period of sampling various sports and often includes early participation in the specializing sport. A common characteristic of these sports is that the age of peak performance usually occurs after the athlete has fully matured, generally in the late twenties or early thirties. Typically, athletes in these sports will specialize in their main sport around age 13–15 years and fully invest in their training around age 16 years.

Nonetheless, in sports such as women’s gymnastics or women’s figure skating, in which peak performance usually occurs before full maturation, athletes do not appear to benefit from a period of sampling or diversification. Studies of gymnasts (Law et al., 2007) and figure skaters (Starkes et al., 1996) suggest that early specialization is a strong predictor of elite performance. However, it is important to keep in mind that peak performance in these sports generally occurs in the middle and late teens, thus indicating the value of early specialization.

Postulate 2: Early diversification (sampling) is linked to a longer sport career and has positive implications for long-term sport involvement

Current research suggests that engaging in a variety of sports may help to promote long-term sport participation. For example, in their study of Russian swimmers, Barynina and Vaitsekhovskii (1992) found that athletes who began specialized training in swimming around age 12–13 years spent a longer time on the national team and ended their sport careers later than swimmers who specialized at around age 9–10 years. The results of this study are congruent with the work of Baker and colleagues (2005), whose study of Master triathletes showed that sampling a range of sports during childhood was associated with sport participation that extended into late adulthood. Previous studies have also indicated that early specialization may have detrimental effects on athletes’ sport careers. Gould, Udry, Tuffey, and Loehr’s (1996) study of burnout in elite tennis players demonstrated that a sole focus on tennis at a young age led to more youth sport dropout/burnout. Furthermore, intense and repeated training in one sport at a young age has been associated with higher rates of injury (Law et al., 2007), which ultimately has an effect on the length of a sport career. Two recent studies show that sport programs that focus on large amounts of deliberate practice during childhood are more likely
to lead to dropout (Fraser-Thomas et al., 2008a; Wall & Côté, 2007). These results, along with qualitative data of dropout and burnout athletes (e.g., Carlson, 1988; Fraser-Thomas, Côté, & Deakin, 2008b), indicate that sport programs that focus solely on the accumulation of vast amounts of deliberate practice during childhood may have more psychological and physical costs than childhood sport programs that focus on deliberate play and sampling.

Therefore, early specialization has been shown to shorten peak performance, increase dropout/burnout, and increase injuries in young athletes in some sports. Athletes in sports in which peak performance is reached after maturation generally have a longer career than athletes from sports in which early specialization is the norm, such as women’s gymnastics and figure skating. Given the various costs associated with early specialization and the possible benefits of early diversification, in postulate 2 we suggest that early diversification may be a more favorable pathway to elite performance.

Postulate 3: Early diversification (sampling) allows participation in a range of contexts that most favorably affects positive youth development

It is clear that different sports offer distinct social contexts and opportunities for socialization. For example, a tennis player may spend a greater amount of one-on-one quality time with an adult (i.e., coach) than a basketball player. On the other hand, the broader social system of a basketball team may provide learning experiences that are not available in an individual sport such as tennis. Even sports that are similar in terms of structure (e.g., soccer and field hockey) can result in very different types of experiences because of the unique context (e.g., different teammates and coaches) in which they take place. Therefore, it is suggested that early diversification has the potential to promote a broader spectrum of developmental experiences and outcomes than early specialization. Wright and Côté (2003), in their examination of university-level athletes, reported that diversified sport experiences during childhood fostered positive peer relationships and leadership skills. Additionally, several longitudinal studies indicate that young people who are involved in varied activities score more favorably on personal and social outcome measures such as well-being (Busseri, Rose-Krasnor, Willoughby, & Chalmers, 2006) and positive peer relationships (Fredricks & Eccles, 2006) than those who specialize in one activity. The underlying assumption of this postulate is that early diversification between the ages of 6 and 12 years is an important contributor to the physical, cognitive, social, and emotional development of elite athletes.

Postulate 4: High amounts of deliberate play during the sampling years build a solid foundation of intrinsic motivation through involvement in activities that are enjoyable and promote intrinsic regulation

From a motivational perspective, children become involved in deliberate play because of their own interest in the activity, as opposed to external reasons such as improving performance or winning medals (Soberlak & Côté, 2003). Since
deliberate play activities tend to be freely chosen and directed by children, they will ensure that deliberate play sessions are enjoyable (Lester & Russell, 2008). This type of early involvement in sport may help children become more self-directed toward their participation in sport (Ryan & Deci, 2000; Vallerand, 2001). This contention is supported by the tenets of self-determination theory, which predict that early intrinsically motivating behaviors (e.g., deliberate play) will have a positive effect over time on an individual’s overall motivation and ultimately the individual’s willingness to engage in more externally controlled activities (e.g., deliberate practice). Furthermore, promoting a deliberate play environment during the sampling years is closely linked to creating a “mastery” or “task” climate in sport that will ultimately foster children’s motivation for sport (Biddle, 2001; Treasure, 2001).

Self-control is a dimension that clearly differentiates between deliberate practice and deliberate play. Because deliberate play is freely chosen and not prescribed by an adult, it can be quickly changed by the children involved to maximize enjoyment. Whereas several studies show that deliberate practice could be perceived as enjoyable (e.g., Hodges, Kerr, Starkes, Weir, & Nananidou, 2004; Ward, Hodges, Williams, & Starkes, 2004; Young & Salmela, 2002), deliberate play, by definition, is enjoyable and intrinsically motivating. By exercising this free choice and self-direction, children ensure that the overall course of an active play or deliberate play session is enjoyable (Lester & Russell, 2008). If they lack ownership of control, as is the case in deliberate practice, children are not able to continuously structure and direct their own participation toward intrinsically motivated forms in the same manner. Viewed from this perspective, deliberate play can therefore become an activity in childhood that may help promote the development of children’s harmonious passion towards sport. According to Vallerand and colleagues (2007), harmonious passion results from the autonomous internalization of an activity. This occurs when an activity that an individual enjoys and engages in on a regular basis becomes internalized to the extent that it is highly valued. Given that deliberate play is an activity that children tend to enjoy, value, and freely choose to engage in, it is evident that deliberate play may play an important role in fostering harmonious passion. This may be beneficial since harmonious passion has been linked with both performance attainment in sport (Vallerand et al., 2007) and positive sport experiences (Vallerand et al., 2006).

**Postulate 5: A high amount of deliberate play during the sampling years establishes a range of motor and cognitive experiences that children can ultimately bring to their principal sport of interest**

Deliberate play serves as a way for youth to explore their physical capacities in various contexts and at a minimal cost in terms of resources. Qualitative analyses of children’s early involvement in sports such as tennis (Carlson, 1988; Côté, 1999), rowing (Côté, 1999), and baseball (Hill, 1993) showed that deliberate play-like activities were important in the first few years of elite athletes’ engagement in sport. Soberlak and Côté (2003) showed that elite hockey players spent slightly more time in deliberate play activities than deliberate practice activities before age 20 years.
Berry et al. (2008), in a study of elite Australian football players, found that both the amount of time invested in structured practice activities in invasion-type sports and the amount of time spent in deliberate play of the same types of sports were significantly greater for players classified by coaches as exceptional decision-makers than ones classified as poor decision-makers. In this study, the amount of experience accumulated in the playing of invasion-type sport activities rather than the specific intent of the activity (play or practice) appeared to be the most crucial factor for the eventual emergence of expert perceptual and decision-making skills.

Although the majority of coaches continue to use explicit instruction to guide a developing athlete’s attention to a specific aspect of his or her performance, research examining the concept of implicit learning shows that a significant degree of learning can occur in situations where attention is not directed consciously to the mechanics of movement production. Implicit learning may be therefore more likely to occur in deliberate play activities than it is in deliberate practice in which conscious attention to error correction is the principal focus. For long-term skill acquisition, there is evidence that tasks learned implicitly are more resistant to performance-related pressure than explicitly learned skills (Reber, 1989).

Deliberate play activities involve an engagement of time in physical activities that is difficult to match with any kind of structured practice. When children play one-on-one basketball, for fun, in a driveway for 2 hours, there are few periods of waiting like those found in structured practice. Since deliberate play provides young people with the opportunity to generate and experiment with new skills, they can learn how to adapt to novel and uncertain situations (e.g., Lester & Russell, 2008; Memmert & Roth, 2007; Pellegrini, Dupuis, & Smith, 2007). In doing so, authors have suggested that play activities and deliberate play may help foster skill innovation, creativity, and flexibility (Côté et al., 2007; Lester & Russell, 2008; Pellegrini et al., 2007). Therefore, although there are obvious advantages to having a coach available to provide feedback during practice, monitor success, and provide instruction, it is unclear if, during early stages of development, the benefits of organized practice are superior to the benefits gained from engagement in deliberate play.

Postulate 6: Around the end of primary school (about age 13 years), children should have the opportunity either to choose to specialize in their favorite sport or to continue in sport at a recreational level

Early adolescence (i.e., ages 13–15) is an important period for the development of psychological processes, such as identity and competence (Lerner, Freund, De Stefanis, & Habermas, 2001). MacPhail, Gorely, and Kirk (2003) conducted an 18-month-long ethnographic study of an English athletic club and noted a shift of position of its members from sampler to specializer in the age range 12–15 years. During that period, the young athletes decided to focus their energy and resources on specific sporting activities in order to develop competence and achieve a higher level of performance in fewer selected sports. According to Horn and Harris (2002), it is only at about the age of 12 or 13 years that children are able to fully understand the effects that effort, practice, and ability have on their competence
and performances. Therefore, the quality of early learning experiences through sampling and play during childhood develops perceptions of competence, which in turn leads to motivation for continued participation during adolescence (Kirk, 2005). The important characteristics that mark the transition between the sampling and the specializing or recreational phases in early adolescence include a reduction in the number of sporting activities, an increase in practice hours and/or intensity of practice, a greater emphasis on competition and success, and more support provided by the family, school, and club (MacPhail & Kirk, 2006).

Postulate 7: Late adolescents (around age 16 years) have developed the physical, cognitive, social, emotional, and motor skills needed to invest their effort into highly specialized training in one sport

Professional ice hockey players from the age of 6 to 20 years had accumulated 3,072 hours of sport-specific practice (including organized hockey practice, power skating, hockey school, and dry-land/weight training), of which an average of 459 hours was accumulated during the sampling years (ages 6–12 and representing 10% of the total hours invested; Soberlak & Côté, 2003). Conversely, an average of 2,215 hours of sport-specific practice occurred during the investment years (ages 16–20, representing 56% of the total hours invested). These findings support evidence from previous studies (e.g., Baker et al., 2003b; Bloom, 1985; Côté, 1999; Helsen et al., 1998), identifying the investment years as the period in which elite athletes are devoted to specialized training. In a review of developmental factors that affect sport participation, Patel, Pratt, and Greydanus (2002) suggest that late adolescents have the psychological, social, emotional, and physical maturity to meet the demands of competitive sports. Individuals at this stage of development also have the capacity to understand the benefits and costs of intense focus on one sport and are able to make an independent decision about investing in a particular sport.

Conclusions

The postulates and models of athlete development reviewed in this chapter highlight that the achievement of expertise in sport is not the result of a particular physical, psychological, or sociological factor; rather, it is the integration of factors from the individual and the context. The DMSP (Côté et al., 2007) provides a comprehensive framework that outlines different pathways of involvement in sport. Early sampling can lead to either recreational participation or elite performance in sport and is based on two main elements of childhood sport participation: (1) involvement in various sports; and (2) participation in deliberate play. Early specialization implies a focused involvement in only one sport and a high amount of deliberate practice activities with the goal of improving skills and performance in this sport during childhood. This pathway is likely to lead to elite performance, but also to more overuse injuries and dropout.

The seven postulates associated with the DMSP highlight the benefits of early sampling for continued sport participation, elite performance, and personal
development through sport. Through early sampling and deliberate play, children have the opportunity to learn emotional, cognitive, and motor skills in several contexts that will be important in their later participation or investment in sport. By the time athletes reach adolescence, they will have learned a variety of fundamental movement skills during the sampling years and will have the experiential base to develop more mature cognitive and emotional skills. The decision to choose an early sampling or early specialization pathway involves several trade-offs. Accordingly, before embarking on a specific type of activity and training, athletes, parents, and coaches should weigh the potential health, psychological, sociological, and motor benefits and risks associated with early sampling or early specialization in children aged 6–12 years.

When coaches develop activities for youth practices and when sport organizations design youth sport programs, they should consider the seven postulates of the DMSP and the outcomes associated with certain sport development pathways. In particular, coaches and practitioners must consider the differing implications of deliberate play, deliberate practice, sampling, and early specialization. This chapter has showed that young people’s health, psychosocial development, and motor skill development should and must be considered as a whole, instead of as separate entities, by youth sport programmers. Young people should be encouraged to participate in diverse sports and extracurricular activities that focus on fun, play, excitement, recreation, personal involvement, games, friendships, variety, and choice. Activities and contexts that promote regular participation, enjoyment, and skill acquisition are the building blocks of all effective youth sport programs.

References


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