Development of Elite Adolescent Golfers

Richard Hayman¹*, Remco Polman², Jamie Taylor³, Brian Hemmings⁴ and Erika Borkoles²

Abstract: This study examined the nature of developmental, psychosocial and contextual factors experienced by elite adolescent golfers in an effort to establish which factors might be important to achieve elite status in golf. Participants were guided through a structured interview collecting quantitative data (after Cote, Ericsson & Law, 2005). Participants were eight Caucasian male adolescent amateur golfers with a handicap between +2 and +4. All were affiliated with international representative teams run by the English Golf Union. Participants did not follow an early specialisation trajectory and refrained from engagement within long term golf specific deliberate practice. Instead, participants encountered numerous sporting activities within a playful, developmentally supportive environment until selection for international representative teams during late adolescence, at which point deliberate practice became more evident. Such findings may provide practitioners within golf talent development systems with stronger scientific basis for their coaching and development interventions.

Keywords:
deliberate practice, deliberate play, development, expertise, specialisation, diversified activity

There has been a growing interest in the contributions of innate abilities and environmental factors in the development of expertise across multiple disciplines including sport. In particular, recent research has tried to identify appropriate early developmental pathways for athletes as they progress from early sport engagement in childhood to expert performance in adulthood (e.g., Cote, Baker, & Abernethy, 2007, Cote, Lidor, & Hackfort, 2009; Ericsson, 2007; Ford, Ward, Hodges, & Williams, 2009). Considerable evidence across multiple disciplines including sport, academia and medicine emphasises the importance of domain specific deliberate practice in acquiring exceptional abilities (Ericsson, Charness, Feltovich, & Hoffman, 2006). Deliberate practice theory suggests that any healthy individual whose development includes a sufficient amount of deliberate practice (approximately 10,000 hours or ten years) can achieve expert status within any given field. Key in this theory is that training activities have to be designed to specifically improve an individual’s performance and that mere engagement in the activity is not sufficient (Ericsson, Krampe, & Tesch-Romer, 1993). Deliberate practice activities require sustained effort and attention, are not intended to be enjoyable, do not lead to immediate social or financial rewards and are performed solely for the purpose of performance enhancement rather than enjoyment (Starkes, 2000).

Research during the past 15 years has provided support for the critical role of deliberate practice as a form of training for developing exceptional levels of performance in cricket (Weissensteiner, Abernethy, Farrow, & Muller, 2008), road and track cycling (Schemacher, Mroz, Mueller, Schmid, & Ruecker, 2006), figure skating (Starkes, Deakin, Allard, Hodges, & Hayes, 1996), karate (Hodge & Deakin, 1998), wrestling (Hodges & Starkes, 1996).

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soccer (Helson, Hodges, Van Winckel, & Starkes, 2000, Ford et al., 2009), rhythmic dancing (Law, Cote, & Ericsson, 2007), swimming (Kjendlie, 2007) and field hockey (Helsen, Starkes, & Hodges, 1998; Ward, Hodges, Williams, & Starkes, 2007). Sport-specific deliberate practice activities and levels of performance were consistent with tenets of deliberate practice theory, indicating more hours of deliberate practice were undertaken by experts in comparison to non-experts.

While the association between deliberate practice (including early specialisation) and expertise development across numerous sporting disciplines exists (see Williams & Ford, 2008 for a review), there is opposing research which suggests that the decision to embark upon an early specialisation developmental pathway involves several trade-offs that may not provide an optimal environment for achieving lifelong involvement or elite status in sport (Cote et al., 2009). In particular, a number of negative consequences have been associated with early specialisation affecting physical, psychological and social development including dropout and burnout (Butcher, Linder, & Johns, 2002; Fraser-Thomas, Cote, & Deakin, 2008; Gould, Tuffey, Udry, & Loehr, 1996a, 1996b; Wall & Cote, 2007) increased injury rates (Baxter-Jones & Helms, 1996; Law, Cote, & Ericsson, 2007) and eating disorders (Anshel, 2004) in young athletes.

In contrast to deliberate practice theory, the Developmental Model of Sport Participation (DMSP; Cote & Hay, 2002) emphasises the importance of developmentally appropriate training patterns, activities and social influences in the prolonged engagement and attainment of increased sports participation and performance levels. The model claims athletes should pass through three stages of development: Sampling (aged 6–12), specialising (aged 13–15) and investment (aged 16 and above; Cote & Fraser-Thomas, 2007), and attaining sporting excellence may occur in fewer years than is predicted by deliberate practice theory. DMSP suggest that aspiring elite and recreational athletes should experience high quantities of deliberate play activities during the sampling years and refrain from undertaking deliberate practice until the specialising and investment years (Fraser-Thomas et al., 2008).

Evidence supporting the DMSP highlights the merits of late specialisation and engagement in a diversity of playful sporting activities as a superior means of nurturing athletic potential. For example, research examining early sport participation trends and developmental pathways experienced by elite international athletes in Australian rules football (Berry, Abernethy, & Cote, 2008), ice hockey (Soberlak & Cote, 2003), field hockey, basketball, and netball (Baker, Cote, & Abernethy, 2003), tennis (Carlson, 1988; Cote, 1999), triathlon (Baker, Cote, & Deakin, 2005) swimming (Barynina & Vaitsekhovskii, 1992; Johnson, Tenenbaum, Edmonds, & Costillo, 2008), and rowing (Cote, 1999) suggest early specialisation is not an essential component of elite athlete development. Findings from these studies suggest that following an introduction period consisting of unstructured and unsupervised playful enjoyable experiences, parents encouraged their children to attend training with a coach and engage in a selection of deliberate play and practice activities. This was followed by an increase in daily amounts of deliberate practice and exposure to superior training facilities as the children became older. Superior volumes of deliberate play and supportive social frameworks were frequently experienced by elite status sports performers prior to specialising in their predominant sport between ages 13–15.

It is widely accepted that considerable engagement within sport specific related activities will have a beneficial effect on subsequent performance but exactly how much and what type is not yet fully understood. Although contrasting rationales regarding the acquisition of exceptional performance levels within numerous sports exists, research examining the development of expert golf performance is sparse. The aim of the present study was to examine the developmental pathways of elite male adolescent golfers. In particular we examined which theoretical approach, deliberate practice or DMSP best described the pathway travelled by elite adolescent golfers.
Method

Participants
Participants were eight Caucasian male adolescent amateur golfers (age: $M = 18.8, SD = 2.1$) with a handicap between +2 and +4 (handicap: $M = +2.6, SD = 1.3$). All participants were affiliated with international representative teams run by the English Golf Union (EGU) and played golf competitions across a spectrum of levels (i.e. county, regional, national & international). Two players were under 18 internationals, four were England Senior A Team Development Squad members and two were current England Senior Men’s A Team members. The competitive playing experience of the sample ranged between 6 and 12 years. The participants were assigned a number to protect their anonymity (1 to 8). The study had the approval of the University Ethics Committee and all participants provided informed consent prior to participation.

Procedure
Following approval by the EGU participants from various development squads were approached for participation in the study via email and telephone calls. Prior to being interviewed, participants were provided with verbal and written information on the procedure to be followed. As part of the process to develop a level of rapport prior to the interviews, participants were offered the choice of interview location in an effort to make them feel as comfortable as possible (Shuy, 2002), which in all cases was their home golf course.

Data collection and analysis
Participants were guided through a number of structured questions regarding their golfing history. Based on a retrospective interview procedure developed by Cote, Ericsson and Law (2005) quantitative data on the elite adolescent golfer’s patterns of activity involvement and psychosocial influences throughout their development were collected. The interview schedule was guided by the theoretical framework of deliberate practice (Ericsson et al., 1993; Ericsson & Charness, 1995) and DMSP (Cote, 1999; Cote & Hay, 2002) and consisted primarily of closed questions. In particular, data were collected in five areas (a) Demographic information (i.e. place of birth); (b) Early activity involvement (i.e., time line of involvement in all leisure activities throughout development); (c) Developmental milestones (i.e., age golfers reached significant golf related milestones); (d) Golf specific activities (i.e., time spent undertaking specific types of golf training at each stage of golf development), and (e) Psychosocial influences (i.e., subjective ratings of parent, peer and coach influences during each stage of golf development). This procedure allows the examination of the changing environment of elite adolescent golfers throughout their development in golf. Participants were guided through the questions by the researcher and descriptive analysis of all data was conducted.

Results

Demographic Information
Based on parental professions and their post-code the golfers in the present study could be classified as coming from middle to upper socio economic backgrounds. Two of the participants attended private secondary schools and one participant was home schooled since the age of 13. The mean number of siblings was 1.13 who tended to be older than the participants (age: $M = 27.8$ years). Three siblings were ex-international sport
performers (one under 16 ice skater; two senior level international swimmers). One sibling is a current professional golfer playing on the Euro pro tour. All participants spent most of their life living in the same location they were born which had a mean population of 17,682 inhabitants (range 41,364–3,015).

**Early Activity Involvement**

Opposing deliberate practice theory, engagement within 10 years sustained golf practice was not a necessary requirement for acquiring adolescent golfing excellence. Participants did not undertake long term golf specific deliberate practice until they decided to specialise in golf once it became their sole purpose in life aged approximately 16. Instead, participants encountered a playful introduction to several team and individual sporting activities within a developmentally supportive environment until selection for international representative golf teams during mid to late adolescence. Year by year accounts of participant involvement within a range of sports revealed the mean number of sports undertaken during the sampling, specialising and investment years was 4.8, 4.5 and 1.8 respectively.

**Developmental Milestones**

Findings of pertinent golf related milestones were remarkably consistent across participants during childhood and early adolescence. Generally, participants did not experience early specialisation developmental pathways or display signs of exceptional golfing ability. During childhood and early adolescence, time spent undertaking deliberate practice golf activities was limited with participants preferring to experience a diverse selection of sports and physical activities in a fun environment. First participation in golf started aged approximately 9.5 years (SD = 2.2) with engagement in regular golf competitions starting at 11.1 years (SD = 2.2). The participants engaged in playful golf specific practice on their own or with a parent or coach from 12.8 years (SD = 2.7). This was followed quickly by a decision to become an elite golfer (age: $M = 13.0$ years; $SD = 3.4$) and the development of a close relationship with a golf coach (age: $M = 13.3$ years; $SD = 2.7$). From 14.9 years of age (SD = 2.2) participants spent most of their leisure time undertaking golf related practice and from 16.1 years of age (SD = 2.2) they also engaged in non-golf specific training practices (e.g., stretching, fitness).

**Golf Specific Activities**

Table 1 provides an overview of years in golf and total practice hours of the participants in the present study.

<table>
<thead>
<tr>
<th>Golfer</th>
<th>Years competing in golf</th>
<th>Total hours golf participation</th>
<th>Mean hours golf per year</th>
<th>Mean hours golf per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8 (11–18)</td>
<td>5,032</td>
<td>629</td>
<td>12.1</td>
</tr>
<tr>
<td>2</td>
<td>11 (10–20)</td>
<td>12,016</td>
<td>1,092.4</td>
<td>21.0</td>
</tr>
<tr>
<td>3</td>
<td>10 (12–21)</td>
<td>10,588</td>
<td>1,058.8</td>
<td>20.4</td>
</tr>
<tr>
<td>4</td>
<td>11 (11–21)</td>
<td>6,224</td>
<td>565.9</td>
<td>10.9</td>
</tr>
<tr>
<td>5</td>
<td>12 (7–18)</td>
<td>4,460</td>
<td>371.7</td>
<td>7.1</td>
</tr>
<tr>
<td>6</td>
<td>8 (9–16)</td>
<td>8,466</td>
<td>1,058.3</td>
<td>20.4</td>
</tr>
<tr>
<td>7</td>
<td>13 (9–21)</td>
<td>10,572</td>
<td>813.2</td>
<td>15.6</td>
</tr>
<tr>
<td>8</td>
<td>8 (9–16)</td>
<td>5,004</td>
<td>625.5</td>
<td>12.1</td>
</tr>
<tr>
<td>Mean</td>
<td>10.125</td>
<td>7,795</td>
<td>776.9</td>
<td>14.95</td>
</tr>
</tbody>
</table>
Figure 1 shows the performance development of the participants expressed as their annual handicap. Annual golf handicap scores revealed individuals performance levels generally advanced gradually year on year after initial progression plateau after approximately 4 years.

Figure 2 demonstrates the development of the training resources, the physical effort, mental effort and fun experienced during the golfing career to date. Figure 3 highlights how time spent undertaking golf specific provision increased annually in a non linear fashion. Larger step wise increments were encountered aged approximately 16 after commitment to deliberate practice activities and completion of secondary education.

**Psychosocial Influences**

For all golfers, an important motive to take up golf was their father. Although fathers played a range of sports recreationally throughout their lives they were all single figure handicap golfers ($M = 7.4$) at the time of data collection. Fathers also undertook a combined coaching and mentor role that increased in capacity until selection for county squads and exposure to qualified coaches aged approximately 14. During all stages of development, participants were heavily reliant on their parents for pastoral and financial support. Once established EGU squad players, participants had limited interaction with school friends and associates external to golf and tended to socialise with fellow elite sports performers who were generally older EGU squad and professional golfers. Likewise, professional standards, preparation for training and competitions and post practice and competition reflections became meticulous.
Figure 2. Mean annual ratings (0–10) for training resources, physical effort, mental effort and fun experienced during the participants golf career.

Figure 3. Annual participant engagement within golf activities.
Discussion

Limited research has examined factors that contribute towards the development of golfing excellence. Therefore, in an effort to establish which factors might be important to achieve elite status in golf, the aim of this study was to examine the nature of developmental, psychosocial and contextual factors experienced by elite adolescent golfers. In addition, we examined which theory is better in explaining developmental pathways in golf, deliberate practice theory or DSMP.

Demographics

All participants in the study were from middle to upper socio economic backgrounds. This finding mirrors a body of research emphasising how children from middle class backgrounds participate within more sporting activities and receive additional support to do so from family members in comparison with children from lower-income families (Lin-Yang, Telama, & Laakso, 1996; Van Deventer, 2000; Zeijl, TePoel, Du Bois-Raymond, Ravesloot, & Meulman, 2000). Furthermore, research by Rowley and Graham (1999) established excessive time demands and financial cost of participation in training led to drop out of children from predominantly working-class and single-parent families. In short, individuals from higher socioeconomic status backgrounds experience greater opportunity and support to continue participating in sport throughout their lives.

Research by Bloom (1985) and Cote (1999) also emphasised the influence of the family at contrasting periods throughout children's talent development across a range of domains. Their research demonstrated how internationally recognised performers experienced significant parental support and were normally introduced to a particular activity by their parents.

A developing argument within the talent development literature suggests being raised away from major city centres is advantageous to developing both superior sporting performance and long term participation in later life. Cote, Macdonald, Baker and Abernethy (2006) examined the population size of where elite sports performers resided during their childhood and adolescent years and found living in a city with a population of less than 500,000 inhabitants significantly increased the possibility of becoming an elite athlete in later life. It appears that the size of the city where athletes gain their formative experience has a considerable influence on numerous issues including how they are initially exposed to sports, their long term performance, participation, and personal development. All participants in the present study lived in the same location for all of their lives, which tended to be located in relatively sparsely populated rural areas. The participants also lived close to a local golf course of which the father was a member.

One of the few studies to examine the development of elite golfers found that 75% of participant's fathers played golf during their childhood and 70% had a handicap of 12 or below. Also, the majority of participants started playing golf aged ten and went on to engage within long term golf specific deliberate practice activities during late adolescence (Zaichkowsky & Morris, 2002). These conclusions are supported by the findings of this study as fathers were competent golfers, who played and practiced regularly, provided strong encouragement to pursue the game of golf and regular teaching/coaching points up to late adolescence.

Early Activity Involvement

Long term exposure to repetitious golf training was not a prerequisite for achieving international adolescent status as participants did not engage exclusively within golf during their childhood and adolescence. An absence of structured golf specific training protocols during childhood and early teenage years was evident, as participants were also involved with a variety of other sports, where golf was one in a playful,
developmentally supportive environment. This pathway continued until selection for regional and international representative golf squads during the late teenage years. Also, in agreement with Vaeyens, Gullich, Warr and Philippaerts (2009), participants did not display significant signs of promise during their childhood and early adolescent years. This finding lends support to the idea that exceptional abilities at a young age are not a necessary precondition for later success.

It must also be stressed that participants experienced unique developmental journeys on their way to adolescent golfing excellence. The distinctive non-linear pathway opposes the assumptions of well accepted talent development models such as Long Term Athlete Development (Balyi, 2001) and the assertion that the pathway to excellence is a linear process. This was evident in the development of the participants' golf-handicap. Participants experimented in various sports which appeared crucial for the development of adolescent excellence. However, there were variations between the nature and duration of early activity involvements undertaken by participants during their sporting careers to date. Like the studies by Ollis, Macpherson and Collins (2006), and Philips, Davids, Renshaw and Portis (2010), no two participants were found to have followed an identical developmental route to excellence with many engaging in a multitude of team and individual sporting activities at a range of standards.

**Developmental Milestones**

The present study did not support deliberate practice theory as engagement within ten years sustained golf practice was not a necessary requirement for acquiring adolescent excellence. Specifically, participants did not follow an early specialisation trajectory and refrained from engagement within long-term golf specific deliberate practice until they decided to specialise in golf and only after it became their sole purpose in life at approximately 16 years of age. Instead, participants encountered a playful introduction to several sporting activities within a developmentally supportive environment until selection for EGU international representative teams during late adolescence. These findings parallel recent studies (Baker et al., 2003; Baker et al., 2005; Berry et al., 2008; Cote, Horton, MacDonald, & Wikes, 2009; Johnson et al., 2008) which suggest as a substitute to deliberate practice, aspiring adolescent sports performers should be exposed to playful, non competitive learning environments that foster involvement within a diversity of sports in order to develop children’s intrinsic motivation and motor skills in preparation for transition into their adult sporting careers.

**Golf Specific Activities**

Ten years experience instead of ten years deliberate practice appears fundamental to developing adolescent golfing excellence. The findings of this study demonstrate similarity with existing research in that although participants had experience of playing their primary sport (golf) for between eight and ten years, the majority of this time was spent undertaking playful practice and competitions. Similarly, after ten years involvement in soccer (Helsen et al., 1998) and wrestling (Hodges & Starkes, 1996), participants went on to achieve international selection after accumulating approximately 4,000 and 6,000 hours of sport specific practice respectively. The study by Baker et al. (2003) found that selected Australian athletes achieved national team selection after only 4,000 hours of sport-specific practice during a 13 year time period, whilst one participant achieved national selection after only 6 years experience and 600 hours of participation in their sport.

A regular finding within the talent development literature is the increases in annual training volumes of those who are on the path of achieving excellence (Starkes, 2000). Participants in the present study reported spending on average five hours per week undertaking golf related activity for the first two years of their sports involvement. After
approximately eight years, average weekly practice volumes ranged between 25 and 30 hours per week. Once the decision to specialise in golf was made, aspects of participants’ daily lives were sacrificed to cater for the demands of extended deliberate practice; as they grew older they become increasingly committed and self-determined in their pursuit of golfing excellence (e.g. Cote et al., 2009; Jess, Dewar, & Fraser, 2004; Schoon, 2000; Soberlak & Cote, 2003; Treasure, 2001).

Psychosocial Influences

A recurrent finding in previous research (e.g. Cote, 1999; Durand-Bush & Salmela, 2002; Gould, Dieffenbach, & Moffett, 2002; Keegan, Spray, Harwood, & Lavallee, 2010; Vernacchia, McGuire, Reardon & Templin, 2000) suggests the development of sporting excellence requires long-term social support from various sources. Consistent with this literature, the roles undertaken by parents and in particular fathers who were found to provide financial, emotional and practical support were evident. Although previous research emphasizes the critical role of coaches in youth sport development systems (Cote & Fraser-Thomas, 2007; Fraser-Thomas et al., 2008; Macphail & Kirk, 2006; Wiersma, 2000; Zaichkowsky & Haberl, 1999), in this study participants did not receive professional golf coaching until selection for county representative teams was established, which tended to occur between 14 and 16 years of age. The emergence of day to day coaching roles undertaken by fathers throughout their child’s golf career until selection for EGU squads expands on previous research (e.g. Holt, Tamminen, Black, Sehn, & Wall, 2008; Horn & Horn, 2007, Kay, 2000; Wolfenden & Holt, 2005) that examined the role of family in long-term athlete development and highlights the reliance the golfers placed upon their fathers within the context of their golf development.

Limitations

A cautionary note about the retrospective paradigm employed in this study must be acknowledged. Data were not compared to official statistical records, developmental pathways of existing elite senior level golfers who compete on international standard golf circuits or interviews with parents or coaches. Ideally, this study may have utilised a longitudinal design to track the nature of golf provision undertaken by current elite adolescent golfers instead of relying on retrospective recall. Future longitudinal research that tracks developmental processes experienced by current and aspiring elite adolescent golfers as they unfold is warranted. The argument that participants have not yet actually achieved excellence as they were competing at elite adolescent and not elite senior levels must also be stressed. Considering the nature of daily golf provision up to selection for EGU squads and mean age once commitment to deliberate practice was made (approximately 16 years), it seems logical that several more years of deliberate practice may be required to display the hallmarks of elite senior status at which time participants would be aged 25–28. If that was found to be the case, it would imply participants had undertaken approximately ten years highly specialised golf training and would lend support to the deliberate practice model in the acquisition of senior level golfing excellence.

Conclusion

The evidence in this study suggests long term deliberate practice is not an essential requirement for the attainment of excellence as an adolescent sports performer. Alternatively, international adolescent golfing status appears to arise through the interaction of developmental, familial and contextual factors as opposed solely to high volumes of specialised golf training from an early age. The findings of the study lend support to the theories of early diversification and deliberate play but also acknowledge the critical role that deliberate practice has to offer as a key catalyst in the transition from
elite adolescent to senior level competitor. These findings are comparable with the recommendations made by Cote and colleagues in recent years who advocate young aspiring sports performers up to the age of approximately 16 should experience multiple sports within a non-competitive, task orientated, fun based learning environment that facilitates the refinement of motor skills as opposed to deliberate practice. Participants did not demonstrate any striking indications of golf supremacy until late teenage years which implies extraordinary golfing skills and accomplishments as a youngster are not necessary requirements for success in later life.

These findings may provide coaches and policy makers working in golf talent development systems with stronger evidence for designing interventions that may be more appropriate for meeting the needs of aspiring elite golfers in the future.

References


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