A Critical Examination of Talent Development Systems in High Performance Sport

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Authors Declaration

I hereby declare that the work contained within this thesis is my own work, and was completed without collaboration or assistance from others apart from the counsel received from my supervisors, Dr Ciarán MacDonncha and Dr Áine MacNamara. This work has also not been submitted to any other University of higher education institution, or for any other academic award within this University.

__________________________

Name Lynne Algar
Athletes come to you with already certain fundamentals regarding running in place. All I’m doing as a coach is taking what is already in the athlete and developing it from within. Rather than taking any fixed formula approach and saying this is what you have to do to become an athlete. Always keep in mind what the athlete is bringing to you first [Br. Colm O Connell].
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- Finally, thank you to the late Prof Pat Duffy. Your passion for athlete and coach support and development lives on.
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<tr>
<td>HP</td>
<td>High Performance</td>
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<td>HPC</td>
<td>High Performance Centre</td>
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<td>HPD</td>
<td>High Performance Director</td>
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<tr>
<td>TDE</td>
<td>Talent Development Environment</td>
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<td>TDP</td>
<td>Talent Development Pathway</td>
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<td>TDS</td>
<td>Talent Development System</td>
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<tr>
<td>ASSAQ</td>
<td>Athlete Support and Skill Assessment Questionnaire</td>
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<tr>
<td>SPLISS</td>
<td>Sports Policy Leading to International Sporting Success</td>
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<tr>
<td>EFA</td>
<td>Exploratory Factor Analysis</td>
</tr>
<tr>
<td>PAF</td>
<td>Principle Axis Factoring</td>
</tr>
<tr>
<td>KMO</td>
<td>Kaiser-Meyer-Olkin</td>
</tr>
<tr>
<td>NGB</td>
<td>National Governing Body</td>
</tr>
<tr>
<td>CPP</td>
<td>Centralised Preparation Programme</td>
</tr>
<tr>
<td>FTEM</td>
<td>Foundations, Talent, Elite, Mastery</td>
</tr>
<tr>
<td>LTAD</td>
<td>Long Term Athlete Development</td>
</tr>
<tr>
<td>PCDE</td>
<td>Psychological Characteristics of Development Excellence</td>
</tr>
<tr>
<td>NSC</td>
<td>National Sports Council</td>
</tr>
<tr>
<td>GAA</td>
<td>Gaelic Athletics Association</td>
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<tr>
<td>DSPM</td>
<td>Development in Sport Participation Model</td>
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Abstract

A critical examination of talent development systems in high performance sport

Talent development (TD) in high performance sport is a complex process of interacting genetic and experiential factors (Farrow, Baker, & MacMahon, 2013). In current practice, there appears to be a considerable gap between what research informs us we need for successful TD and what is applied in a real world setting (Martindale et al., 2007). Consequently, if athletes fail to acquire essential psychological characteristics or learn proficient fundamental movement skills then they may never maximise their potential and dropout from sport prematurely. The reasons underlying this apparent loss in translation between research and applied sports science may be due to a lack of understanding of the TD processes and inexperienced coaches operating at an under-age level when the fundamentals of sports performance should be acquired. National Governing Bodies (NGBs) may also be guilty of attempting to use a generic ‘one-size fits all’ approach to TD before acknowledging and addressing the underlying competencies of their system. This research project aims to help resolve these issues by critically examining a sample talent development systems (TDS) of aspiring high performance athletes and identify the key support factors and challenges that are instrumental for success. These findings were used to offer support for existing research and provide novel methods for coaches and those responsible for TD to operate more effective systems and translate potential into successful performance.

The true value of this thesis is its strong interaction with coaches, athletes and support staff, particularly when exploring means to better facilitate athletes in pursuit of performance excellence. Accordingly, a series of semi-structured, qualitative interviews were conducted with development level and high performance athletes and their coaches to identify critical factors for successful negotiation of the talent development pathway (TDP). The results point towards specific social and tangible sources of support as well as the use of psychological skills. Notable findings suggest that many coaches perceive that they are not fully equipped with the knowledge, experience or skillset to support athletes toward the next level of performance. Further evidence suggests that the lack of coherency across the TDP, including poor communication networks and equivocal development and performance objectives impede the progress of an athlete toward sustainable senior international performance. Qualitative findings were used to develop the Athlete Support and Skill Assessment Questionnaire; a questionnaire designed to inform coaches and NGBs of the competency of their TDS to support their athletes and the ability of the athlete to negotiate the TDP. The resulting 40-item 4 factor ASSAQ (41.33% total variance) provides key stakeholders with a means to assess and monitor critical factors and themes (i.e., Social Support, Tangible Resources, Psychological Skills, and Signs of Stress) important for effective facilitation of TD. This thesis offers novel findings through empirical studies that help to bridge the gap between research and applied practice by improving the present understanding and knowledge about effective talent development systems in sport.
Chapter 1

Introduction

The environment is extremely important. You have to develop the talent that lies in your genes. It is crucial in a society that you get the option [Prof. Bengt Saltin] (O'Flynn, 2008).
1.1 Introduction

With the ever increasing standards in elite sports, athletes must have both a competent support system and the appropriate skills and characteristics to negotiate the pathway to world class success. The process of high performance athletic development is multifaceted and dynamic. A considerable amount of literature in this area has identified that numerous factors (e.g., coaching, psychological characteristics, specialist services, socio-economic background) have a significant and multiplicative effect on the initiation, trajectory, and rate of development in athletes (Côté, Baker & Abernethy, 2007; Hassell, Sabiston, & Bloom, 2010; Philips, Davids, Renshaw, & Portus, 2010). Research in the area of talent development (e.g., Gulbin, Weissensteiner, Oldenziel, & Gagné, 2013; Martindale, Collins, & Abraham, 2007) has highlighted the need to recognise the optimal deployment of resources (e.g., sport science and medicine specialists) and skills (e.g., time management and strategies to induce motivation) throughout the pathway as these may be different for young athletes, late developers and talent transfer athletes (Côté, Baker, & Abernethy, 2007; MacNamara & Collins, 2014). That body of research exposes a major gap between research and practice in talent development as it seems that this literature has not fully infiltrated talent identification and development (TID) programmes in applied sports settings. For example, in terms of policy in sport, Bailey and colleagues (2010) suggest that most national sports long-term athlete development and performance strategies are presented in the form of models, which set out what their architects consider being the most salient features. Balyi’s Long Term Athlete Development (LTAD) and Cote’s
Developmental Model of Sport Participation (DMSP) (Balyi & Hamilton, 2004; Côté et al., 2007) are two examples of models that are used to guide practice and policy in talent development. These models tend to assume generic talent development environments (TDEs) and outline a relatively simple and generic, staged approach that describes how athletes are proposed to progress as they move from novice to elite levels of performance (Balyi & Hamilton, 2004; Gulbin, Croser, Morley, & Weissensteiner, 2013). Although these models provide some good guidelines to consider when attempting to facilitate talent development the extent to which they actually accurately describe development in sport has been questioned. For example, Balyi, Way and Higgs (2013) noted many of the most knowledgeable and experienced coaches are found operating at the senior elite end of the developmental spectrum as such many sports struggle to coach a high quality of physical literacy at sensitive periods of trainability. Previous research (MacNamara & Collins, 2014) has also highlighted that the pathway to elite success is likely to be more complex and dynamic than the relatively linear pathways depicted by LTAD or DMSP models. Despite the attractiveness to national governing bodies and sport organisations of neat conceptualisations of talent development, recent research has criticised these models for providing prescriptive approaches and failing to provide innovative guidelines for applied practice (MacNamara & Collins, 2014).

As such, there is a need to look beyond these models towards a consideration of the dynamic pathway athletes encounter as they develop, and the processes and skills required to successfully negotiate the challenges and opportunities of development. Indeed, focusing on the factors that support development and
equipping aspiring elites with the skills to progress in their sport (or indeed transfer to another sport) would appear to be a more effective approach rather than a focus on descriptive and prescriptive stages of development. Essentially, investigating how sport systems can facilitate more effective talent development is a worthy overall objective of this thesis.

Reflecting the issues raised in the previous paragraph, this project is cognisant of the dynamic and individualised nature of the environment in which the athlete develops and the talent development pathway (TDP) they attempt to negotiate. In order to bridge the theory-practice divide that is often evident (Knowles, Gilbourne & Eubank, 2006) the findings of this project aim to yield better dividends in the applied field by equipping key stakeholders with the knowledge to successfully overcome the challenges associated with the talent development process. Notably, the intention of this research project was not to encourage coaches or performance directors to implement a prescribed pathway or ‘hold the athlete’s hand’, but instead to identify the boundaries of their own talent development system (TDS) and maximise the resources at their disposal. This could be achieved by paying closer attention to the competency of those involved in the process and the effectiveness of the environment in facilitating development. Assessing and monitoring the ability for an athlete to utilise the appropriate skill-set to adapt to the increasing demands of high performance sport as well as ensuring that the support offered to an athlete is clearly accessible and adequate would prove a rewarding strategy for a talent development system (TDS). At the same time this research project aims to define a fact/value contrast (Putnam, 2002) and avoid the perils of previous researchers by proposing that
the findings be considered and adapted to specific evidence supported contexts (Bailey et al., 2010).

The underpinning of this thesis was on development rather than the identification of talent. This delineation is important given the wastefulness associated with such talent identification procedures (Vaeyens, Lenoir, Williams, & Philippaerts, 2008) especially at early stages of an athlete’s career (Abbott & Collins, 2004). Focusing on the factors that promote development should also impact on dropout along the pathway to excellence and the often premature deselection of potential world class performers due to a lack of ability to cope with the development process. Clearly this could have both performance and financial implications that would be of importance to sporting organisations. Furthermore, this emphasis on the skills and support required to achieve at the highest level is important given that NGBs often fail to offer the required support to athletes to achieve their potential. NGBs are often criticised for ‘fire-fighting’ challenges rather than being proactive and supporting athletes through significant time points (Bailey et al., 2010).

It is important to remember that the lifestyle of a high performance athlete is naturally demanding; in fact, these challenges are a welcome part of development if managed correctly. Most athletes are liable to unique individual challenges and environmental stressors are found in all sporting arenas. However, research suggests that NGBs are often unaware of the obstacles that their athletes face both within and outside of their sport domain (Russell, 1989) and how best to support athletes in negotiating these. Greater efforts therefore need to be directed toward considering, identifying and developing these factors which, over the course of time, may both
promote and limit development (Abbott, Collins, Sowerby, & Martindale, 2007) but also providing methods to optimise the use of resources within the TDE and the athlete’s coping skills. For example, recognising how successful athletes learn to adapt and progress from significant episodes (e.g. the transition from junior to senior or injury) during their development could serve as a useful strategy to teach important psychological skills. Just as schools and universities are responsible for the academic development of students, NGBs are accountable for the development and support of individuals that are willing to work hard for success in their sport’s career. In this way a more holistically developed athlete emerges from the sport system endowed with more highly developed personal traits fundamental for optimised performance both within and outside of their sport’s career (Côté, Young, Duffy, & North, 2007; Miller & Kerr, 2002).

1.1.2 Objectives of the Research Project

This research project began its examination of TDEs in an Irish context using qualitative methodology. The inductive open-ended strategy used in this research has advantages, in this context, over quantitative processes of data collection. Rather than assessing the value we were better able to understand the processes, and the specific contexts in which things happen. Engaging in action and participating with participant’s training environment gave an enriched meaning and enhanced face credibility (Maxwell, 2012).

The first objective was to identify what development level and high performance athletes and their coaches perceive as critical factors for successful development and whether these factors are relative to specific developmental time
points. As stated previously, NGBs need to provide sufficient resources to support
talent development but also athletes must also be equipped with the skills to
effectively utilise and maximise these resources to benefit their progress. Research to
date has mainly focused on cohorts of successful elite athletes or athletes already in a
successful TDS when identifying these factors (Durand-Bush & Salmela, 2002; Hassell
et al., 2010). As well as this, considering that coaches have been identified as the most
prevalent provider of social support (Sheridan, Coffee, & Lavallee, 2014) it was
important to include their response in the results.

Building on this, the second objective of this thesis sought to identify the
significant challenges that athletes experience throughout a typical training year, and
observe how these athletes utilise the resources available to them within their TDE as
they attempt to negotiate these obstacles. Research shows that once there is an
understanding of the specific demands of transitions, resources can then be made
available to athletes to assist them in making transitions successfully (Park, Lavellee &
Tod, 2012; Reeves, Nicholls & McKenna, 2009; Wylleman & Lavallee, 2004) or more
effectively provide them with the right skills to allow them to negotiate these
challenges themselves (MacNamara, Button, & Collins, 2010). This progression is an
important aspect of the TDP as the aspiring elite potentially faces different challenges
as they develop compared to those experienced at the elite level.

Subsequently, further evidence was warranted to get a clearer picture of the
how organisational issues can impact on athletes as they attempt to develop from
under-age to senior levels of performance. Research has identified that a well-
managed integrated high performance system plays a major role in the sustained
success of a world class athlete (Henriksen, Stambulova, & Roessler, 2010a; 2010b; Martindale, Collins, & Daubney, 2005). As such, the third objective aimed to critically evaluate the coherence and efficacy of a typical TDP in developing athletic potential into sustainable senior international performance.

The final objective describes the development and initial validation of a formative assessment tool designed specifically for coaches and athletes to assess and monitor the competency of the sport’s support system and the ability of the athlete to utilise the system effectively. This tool aimed to build a useful link between evidence and practice, responding to the lack of empirical base and practical guidance for effective talent development (Gulbin et al., 2013b; Henriksen et al., 2010a, 2010b; Martindale et al., 2005).

In summary, the objectives of this research project were:

1. To identify the critical factors required for successful development in elite sport from the perspective of developmental and high performance athletes and coaches.

2. To identify the key challenges athletes experience throughout a typical training season and examine how athletes prepare, cope and reflect on these experiences.

3. To examine the coherency of a talent development pathway from an under-16 to senior International level of performance and examine its impact on the development of talented athletes.
4. To design and conduct the initial validation of a questionnaire for coaches and high performance directors to assess and monitor the competency of a sport’s support system and the athletes’ ability to utilise the support offered.

The central motivation of this research project was to assist in bridging the gap between theory and talent development practices in real life. Throughout the investigation, multiple methods were used, both qualitative and quantitative, to ensure that the input and needs of those at the core of talent development (i.e., the coaches, support staff, and the athletes) were at the forefront. The following chapter aims to provide an overview of the literature in the area and to highlight some of the key gaps that need to be addressed. Later in Chapter 3, the logic for this research approach is described including justification for a constructivist grounded theory approach and an outline of the research method. The proceeding studies and their findings are presented and discussed with relevance to the literature and applied practice in chapters 4, 5, 6, 7 and 8.
Chapter 2

Literature Review

We have to improve going forward for the next four years. The sport is changing we have to adapt and change with it. We need to secure services of people within the system. A lot of people live in the past; we’re living in the future, creating history as we go along. We want to keep doing that, keep pushing barriers and boundaries.

[Billy Walsh, 2012, Head Coach, Irish Amateur Boxing Association].
2.1 Introduction

Seeking to optimise the resources of a TDS and capitalise on athletic talent is especially relevant to all nations in pursuit of consistent world class performance. To clarify, this project considers the TDS (i.e., the TDE and the TDP) as a multi-dimensional sphere of key factors (e.g., social support, tangible resources, and developmental challenges) that interact in unique patterns to cater for the demands of the sport and needs of the athlete. Numerous models of talent development are available in the literature (e.g., Balyi & Hamilton, 2004; Bloom, 1985; Côté, Baker, & Abernethy, 2002) and these describe various stages of development that an athlete should progress through in order to reach an elite level. The stage-based DMSP proposed by Côté and his colleagues advocates an early and diversified sporting investment resulting in specialisation at later stages. Indeed, Balyi’s LTAD model spans the entire athlete pathway from an active start and “Fundamental” level to an “Active for Life” level incorporating recreational sporting pursuits and life after sport (Gulbin & Weissensteiner, 2013). The LTAD model also provides guidelines for sport practitioners specific to training and competition loads associated with the developmental levels of; Learning to Train, Training to Train, Training to Compete and Training to Win (Gulbin & Weissensteiner, 2013). From a multifactorial perspective Gagné’s Differentiated Model of Giftedness and Talent (DMGT) was created to take advantage of the distinction between the two terms claiming that a person can start with natural abilities or gifts that may be influenced by genetic endowments and have the chance to develop talents through a variety of controllable “catalysts” (e.g., motivation, interests, chance,
Gagné’s model emphasises that talent emergence results from a complex choreography between gifts, interpersonal and environmental factors, and the development process; a choreography that is unique to each individual (Gagné, 2008). On a global scale, these models have been used to guide TDSs closer toward constructing and operating more effective TDEs by emphasising important key core factors such as developing specialised and fundamental movement skills (physical literacy) at a grassroots level. More recently, however, research has criticised their linear underpinnings by suggesting that progression through stages of development is more complex and idiosyncratic than what is described (Bailey et al., 2010; Ford et al., 2011). Further evidence has supported that the “real world” experiences of young athletes do not follow the linear trajectory described by staged approaches to talent development (Ollis, MacPherson, & Collins, 2006; Gulbin, Weissensteinera, Olderziela & Gagné, 2013; MacNamara et al., 2010). For example, Gulbin and colleagues (2013) showed that in an elite population of 256 athletes approximately 15.6% of Junior National representatives descended two competition levels to Senior Local competition whilst 15.1% descended one competition level to Senior Regional competition before commencing their ascent once more to Senior National representation. Gulbin and colleagues (2013) provide significant evidence that a single linear assault on expertise is rare and suggest that more developmental ‘granularity’ is needed to advance the current understanding and practices in talent development. There are many examples of elite athletes who have not followed the staged approaches (e.g., LTAD) that have underpinned sporting policy both in Ireland and internationally. As a result sport systems have struggled to apply these models...
effectively and attempted to adapt these models to better support the context in which their sports operate (e.g., NCTC Pathways Report, 2003). Generally, although existing models of talent development provide reasonable frameworks for conceptualising the various types of training and practice athletes experience throughout their careers, it is important that coaches, trainers, and athletes are aware that there could be significant variability in athletes’ paths to expertise (Baker & Cobley, 2013). In fact, in recent years there is a call by Farrow, Baker and MacMahon (2013) amongst others, to compare talent development models against real-world contexts of sport performance and expose these models of deficiencies. In doing so, it is suggested that the implementation of many of these models may not be the most appropriate architecture for talent development. This research project aims to contribute to the literature and provide practitioners with a greater understanding and skillset to cater for this theory-practice divide.

Considering the objectives of this project it is also important to understand talent development from the perspective of sport’s policy between NGBs and national sporting councils and associations. In 2006, De Bosscher and colleagues presented ‘the nine pillars of Sports Policy Factors leading to International Sporting Success’ (SPLISS) as a model to build effective TDSs in for high performance sport (see Figure 2.1). The first pillar presented in the SPLISS model are described as macro factors. Mirroring the innate talents of an athlete, financial support outlines the boundaries within which a NGB can afford to operate. The remaining eight pillars represent factors that are more variable and act to develop and deliver sporting success. These factors include government sports policy, support resources, athletic career support, training facilities,
coach development, talent identification and development systems, scientific research and coaches’ provisions. Despite the amount of theoretical evidence to support these factors as important to successful talent development (Duffy, Lyons, Moran, Warrington, & MacManus, 2006; Martindale et al., 2007; Vaeyens et al., 2008) certain elements (i.e., coaching provision and development) still remain highly under-resourced in NGBs, especially in the areas of talent development and coach support (De Bosscher, De knop, van Bottenburg, Shibli, & Bingham, 2009). Further to this, De Bosscher and colleagues (2009) suggest that elite sporting success is based on a strong strategic plan where countries invest in a blend of pillars and emphasise a combination of factors relative to the needs and resources of a sport, rather than adopting a homogenous model.

Figure 2.1 SPLISS Analytical Model (De Bosscher, et al., 2006)
This has important implications for how NGBs structure and support their TDSs and helps to facilitate a more effective individualised approach to talent development (Martindale et al., 2005). Considering the importance of this, questions still remain as to why NGBs mis-invest time and resources by implementing poor-fitting models before considering a more individualised strategic approach (Green & Oakley, 2001). To add to this, the challenges NGBs experience when attempting to implement talent development strategies are unclear. As such, further research should aim to detect differences instead of trends in elite sport systems. This approach should provide new insights into the pathways to success (De Bosscher et al., 2009).

Reflecting these issues, it seemed useful to firstly identify and then examine the challenges that athletes face and how they affect their progress as they develop in their sport. Whilst at the same time exposing valuable means by which a TDE can support this development. An aspiring athlete typically must negotiate and adapt to expected (e.g., first time appearances at a new level of competition) and non-expected events (e.g., injury; Wylleman & Lavellée, 2004). As such, focusing on the mechanisms by which athletes successfully develop rather than prescriptive models may be a more effective avenue of investigation. In this manner, the key factors (e.g., coaching, financial support) of development from both an individual and sport system perspective can be identified and subsequently incorporated into the TDE to meet the needs of the developing performer. This chapter provides a critical exploration of the literature to encapsulate what is known about the TDS and how this translates to effective practice in a real world setting. The review is presented in two sections:
• Section 1 explores the TDE and identifies key factors for successful talent development and examines research that links these factors to applied practice.

• Section 2 explores the TDP specifically focusing on research that identifies developmental challenges within the athletes’ immediate and macro-environment.

Given the applied focus of this research project, care was taken in each section to emphasise, where appropriate, weaknesses between theory and practice and more specifically where challenges arise for coaches and athletes as they work to develop within a TDS. It is important to highlight at this stage that this review understands the TDP as a unique talent development journey, shaped by the developmental challenges of the athlete and factors embedded in a sport’s TDE. Collectively, the relationship between the TDE and TDP process along with the associated factors make up the TDS as depicted in Figure 2.2.
2.2 Understanding Talent Development Environments

The TDE should aspire to be a social and organisational climate that provides the circumstances in which talented individuals can develop into elite athletes and continue to achieve at the highest levels in their sport (De Bosscher, Bingham, & Shilbli, 2008). In essence, it should create an opportunistic sphere with adequate support resources for an athlete to effectively negotiate the TDP and fulfil their personal and performance potential (Miller & Kerr, 2002). Due to complex interaction of interdisciplinary factors (e.g., parental support and financial support) that directly impact on athletic opportunity and progression (Ford et al., 2011) the TDE should be holistic in nature. This section critically explores several studies in this area and
presents some of the key factors associated with effective TDEs together with a
discussion regarding both gaps in the literature and the extent to which literature has
infiltrated applied practice in this area. To begin, the extent to which coherence across
the TDP is examined against its effect on talent development.

2.2.1 Coherency across the Sport System

The effectiveness of the TDE is limited by the strength of cohesion of those
involved (e.g., key stakeholders such as coaches, parents, athletes and NGBs) across
the system and integrative use of key factors (e.g., social support, tangible resources).
Cohesion has often been cited as a central and crucial element in the development of a
team of people working together toward athlete development and includes developing
a team vision, seasonal planning, administrational matters, and working with staff
(Durand-Bush & Salmela, 2002; Henriksen et al., 2010a; 2011). In 2005, Martindale and
colleagues presented several key features of an effective TDE. The themes, methods
and nature that make up the content of the TDE model are depicted in Figure 2.3.
Later in 2007, Martindale and colleagues validated this model in a real sport setting
with 13 experienced coaches working in 16 sports. Following an inductive and
deductive analysis, findings revealed support for many of the features of talent
development (i.e., long term aims and methods, wide ranging coherent messages and
support, emphasise on appropriate development not early success, and individualised
and on-going development). However, most interestingly, coaches considered that the
model was a yet-to-be-reached ideal in the applied sports practice (Martindale et al.,
2007). To establish a more effective and sustainable TDE, Martindale et al. suggest that
those involved in athletic development should initially direct effort toward developing
competent contexts and then competent individuals to work in these settings. It seems that if real positive changes are to occur the TDE needs to be inspirationally led, effectively managed, and competently executed (Fletcher & Wagstaff, 2009). Further evidence is required to emphasise the positive affect of these features and identify the constraints which sport systems are confronted with when attempting to apply these features into practise. The effect of coherency on a TDP is explored further in Chapter 8 but further discussion of the key factors associated with effective TDE continues in the next section.
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<tr>
<th>KEY FEATURES</th>
<th>KEY METHODS</th>
<th>NATURE OF MODEL</th>
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<tr>
<td>Long Term Aims and Methods</td>
<td>• Develop a Long Term Vision, Purpose and Identity</td>
<td>Integrated, Holistic and Systematic</td>
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<td>• Develop Systematic Planning and Implementation</td>
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<td>• Provide Coherent Reinforcement at a Variety of Levels</td>
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<tr>
<td>Wide Ranging Coherent Messages and Support</td>
<td>• Provide Coherent Philosophies, Aims and Methods at a Variety of Levels (e.g. Parents, Coach Content, Practice and Reward Systems, Selection, Funding, Competition Structure, NGBs, Educate Parents, Schools, Peers, Coaches &amp; Important Others (and encourage positive contributions))</td>
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<td>• Utilize Role Models at a Variety of Levels</td>
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<td>• Set Up a Variety of Support Networks Over the Long Term (e.g. Peer, Coach, Sport Staff, Family)</td>
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<td>• Provide Forums for Open and Honest Communication Patterns at a Variety of Levels</td>
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<td>Emphasize Appropriate Development NOT Early Success</td>
<td>• De-Emphasize ‘Winning’ as Success at Developmental Stages</td>
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<td>• Provide Clear Expectations, Roles, and Meaning Within the ‘Big Picture’ at Every Level</td>
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<td>• Provide ‘Stage Specific’ Integrated Experiences and Teaching</td>
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<td>o Sport Specific Skills (Technical, Tactical, Mental, Physical, Perceptual)</td>
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<td>o Balance</td>
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<td>• Encourage Increasing Responsibility and Autonomy in Learning/Development</td>
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<td>• Develop intrinsic Motivation and Personal Commitment to Process</td>
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<td>• Promote Personal Relevance, Athlete Understanding and Knowledge</td>
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<td>Individualized and Ongoing Development</td>
<td>• Provide Opportunities and Fundamentals to as Many Youngsters as Possible</td>
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<td>• Provide Flexible Systems to Allow for Performance and Physical Development Variation</td>
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<td>• Identity, Prepare for and Support Individuals Through Key Transitions</td>
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<td>• Provide Regular Individual Goal Setting and Review Processes</td>
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<td>• Provide Systematic Reinforcement Contingencies</td>
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Figure 2.3 The model of effective TDEs (Martindale et al., 2005)
2.2.2 Interaction with other Athletes

Henriksen and colleagues (2011) examined two models of talent development (i.e., athletic talent development environment (ATDE) and Environment Success Factors (ESF)) against a sample of elite kayakers’ training in a high performance setting. The two models were designed in earlier work (Henriksen et al., 2010a, 2010b) in an effort to transform the ecological approach to talent development into a more manageable framework for applied practice. At the centre of the ATDE are the ‘Prospective Elite Athletes’. The ATDE working model is viewed as a system based on clear roles and functions of the different components (e.g., school, family, educational system, sports federation) and relations (e.g., athletic and non-athletic domain, micro and meso realms) within the environment. This is clearly linked to the issues of coherence described previously. The ESF model represents the holistic ecological approach with structures and factors (e.g., organisational culture and values, competition, training camps) that are integral to the ATDE’s success (Henriksen et al., 2011). The two models complement each other in such a manner that the former provides a framework to describe the environment and the latter helps to summarise factors influencing its effectiveness (Henriksen et al., 2011). The outcomes of their investigation in 2011 are discussed with emphasis on the gaps in the literature and applied practice that should stimulate further research. Henriksen and colleagues’ investigation involved interviews with a small cohort of athletes (n = 5) from different age groups ranging from 16 to 19 years. Data was collected from multiple perspectives including; elite athletes, coaches, and parents. Further information was collected through a desk-top examination of the NGB’s strategy as well as observation of the participants in training. Findings
supported the two working models (ATDE and ESF) as well as new practical ideas to assist in applying these models into practice. Henriksen et al. present key ESFs in their findings. Specifically they observed how aspiring pre elite athletes were directly influenced by the community in which they were training, especially by the presence of elite athletes and guest/visiting athletes. One of the coaches suggested that this interaction encouraged a daily exchange of knowledge and understanding between the athletes in an osmotic fashion. These findings offer applied evidence to support the positive influence of training partners as sources of competition, motivation and companionship on athletic development. Henriksen et al. noted how a hierarchy of performance levels within the training group gave the aspiring elite athletes a clear vision of what was required physically and mentally in order to make it to the top. To add to this, visiting athletes may have caused younger athletes to perceive that their TDE was ‘in-demand’ and this encouraged them to commit to the process (Entwistle & Kozeki, 1985). Despite these important findings, Henriksen and colleagues (2011) mainly focus on extrinsic factors influential to the athlete and do not consider intrinsic athlete factors. As well as this, their sample is taken from pre-elite, successful development and performance environment. This project aims to build on this work by sampling a broader spectrum of athletes and coaches operating in clubs as well as high performance environments.

2.2.3 Exposing Core Philosophy and Values

The coaches sampled by Henriksen et al. believed that the TDE portrayed a strong philosophy with clear values supporting the development of idiosyncrasies through self-discovery. The objectives of the TDE sampled in Henrisken’s work were rooted in a
strong belief in natural individual physical adaptations to promote the development of desirable characteristics (e.g., self-reliance and commitment; Henriksen et al., 2011). This expands on Martindale’s (Martindale et al., 2005) TDE model which features ‘ongoing individualised development’ as a key factor for successful development. Similarly, the athletes’ sampled in Henriksen and colleagues (2011) work were encouraged to engage in more autonomous exploration and self-development using natural learning resources that are potentially external to the TDE (e.g., cross-training, international training camps). In this way, Henriksen et al. emphasise how experiences can shape the development of the athlete. These athletes described that self-responsibility was a key value of the TDE and coaches used strategies to encourage the athletes to seek their own pathway within the sport’s environment. For example, athletes received general outlines rather than specific programmes which required them to self-adjust their programmes to train as a group, adapt, and progress. Highlighting the positive influence of establishing a clear TDE philosophy and values has introduced another important ESF.

2.2.4 A Diverse Approach to Talent Development

There is growing evidence to support the development of sport expertise through a more diversified rather than an early specialised approach (Côté et al., 2007; Philips et al., 2010). For example, Henriksen et al. (Henriksen et al., 2011) suggest that this approach was found to assist athletes in exploring their own physical, technical, and mental abilities and ultimately contribute to attainment in the athlete’s chosen activity. This sampling and cross fertilisation of talent is becoming more common with high performance athletes. Duffy and colleagues (2006) found similar results from a
large sample (n = 191) of international athletes, with 74% of athletes reporting achievements in other sports. The psychological skills the athlete develops during these experiences appear to be important in order to help prepare and cope with later challenges and key transitions on the TDP (Durand-Bush & Salmela, 2002; Holt & Dunn 2004; MacNamara et al., 2010; Wylleman & Lavallee, 2004). In fact, these skills may be key facilitators of both talent development and talent transfer (Collins, Collins, MacNamara, & Jones, 2014) and as such appropriate emphasis on the development and deployment of these skills would appear to be central to talent development. These individual characteristics and skills are explored later in the Chapter 4.

For the time being though, it is important to consider the impact of these findings. It may be that better equipped and more ‘supportive’ environments can actually limit the development of talent as they do not promote the development of those characteristics central to the development process through self-exploration and autonomous practice. Furthermore, the lack of clarity regarding the TDE’s philosophy and values can result in hazy developmental objectives and a negative impact on the athlete’s development. Reflecting these issues, the following chapters explore the extent to which those involved in TDE understand and share similar philosophies and the extent to which these are aligned to the talent development process. From an applied perspective, highlighting and exposing the values of a TDE may help create the culture required to stimulate talent development, this is examined more specifically in Chapter 6.
2.2.5 Sources of Social Support

As described previously, it is important that there is a coherent approach to talent development and that the underlying philosophy is shared amongst key stakeholders. Of course, getting the environment right is key but we must also consider how to support athletes as they progress through this pathway. Effective development has been considered a ‘people business’ and having ‘the right’ people is seen as instrumental in cultivating a positive motivational climate (Mills, Butt, Maynard, & Harwood, 2012). Creating the optimal development environment is largely reliant on coaches, sport science support and establishing the right culture or atmosphere (Henriksen et al., 2010b; Mills et al., 2012; Williams & Reilly, 2000). In fact, Duffy and colleagues (2006) highlighted that the absence of, or inadequate, support resources can play an inhibiting role in the development of high performance athletes. Indeed, a lack of sufficient resources including facilities, sports science and medical support, training and competition opportunities, and structural or organisational difficulties were perceived by the athletes as significant barriers to their development (Duffy et al., 2006).

Social support has been shown to be critical to successful talent development. According to previous researchers (Bloom, Schinke, & Salmela, 1997; Duffy et al., 2006; Hassell et al., 2010) the most prolific means of social support in an athlete’s career are in the form of the coach, parental involvement and teammates or peers (Sheridan, et al., 2014). Sheridan and colleagues (2014) published an extensive systematic review of 73 studies (1999-2003) examining social support in youth sport. Their conclusions support that coaches, parents and peers have been shown to positively influence a
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range of factors impacting youth development. However, practitioners need to be
cognisant of the type of support and the changing patterns of support emerging within
an athlete’s psychological network (Sheridan et al., 2014). This reflects the dynamic
nature of talent development and that the roles of those offering social support
change over-time. Research requests (Sheridan et al., 2014; Wylleman & Lavallee,
2004) that future work performs longitudinal examinations on the interaction of these
significant others (i.e. coaches, parents, siblings, peers) evolve before during and after
their sport career.

Adopting a narrower perspective, Durand-Bush and Salmela (2002) examined
micro-level factors in the athletes’ immediate environment by sampling a group of
male and female Olympic and World medal winners from a variety of sports. Semi-
structured interviews were employed to identify the factors that contributed to the
development and maintenance of elite performance. Their results supported the
importance of having supportive figures in the TDE including, coaches, parents,
support staff, friends, other athletes, and school/education. In a similar way, Henriksen
(Henriksen et al., 2011) noted that the educational context was important and
described the beneficial impact of having representatives from a variety of sports in
the same environment to facilitate interaction and the exchange of knowledge. This
environment provided a stimulating resource for learning and motivation.

Researchers have also identified that athletes perceive the influences of social
support in different ways (Rees, Ingledew, & Hardy, 1999) and although team mates
and peers were perceived to offer support in the form of guidance, competition,
company, and friendship athletes did not consider their team mates as a source of
informational support (Duffy et al., 2006). It is important to recognise here that Durand-Bush and Salmela (2002) sampled Olympic Champions and further research should examine whether pre-elite athletes perceive similar sources of social support. The perception of more novice athletes may be quite different considering they are beginning to specialise in their sport (Côté, Baker, Abernethy, 2007) and this may be a highly influential period of the athlete’s life (Balyi & Hamilton, 2004. Furthermore, the retrospective nature of the data collection in many of these studies must be considered as this can often result in inaccuracies and loss of potentially important information due to issues associated with memory bias, social desirability and accurate recall (Côté, et al., 2005).

2.2.5.1 The multi-faceted role of the coach.

The fundamental role of the coach is the development of the athlete’s abilities but in order to achieve this the coach must work with a number of complex interactions (e.g., biological transitions) and variables (e.g., demands of the sport; Duffy et al., 2006). As well as having the technical competency to train and develop athletes, the coach must have sufficient inter-personal skills to engage successfully with their athletes (Duffy et al., 2006). Indeed, the coach has been recognised as an important source in every aspect of social support (Hassell et al., 2010). Athletes perceive their coaches as valuable sources of self-esteem and information support, through shared understanding, experiences and perspectives. Jowett and colleagues (2007) have completed extensive research on the unique interaction between coaches and athletes. Subsequently, the interpersonal constructs of Closeness, Commitment, Co-orientation and Complementarity, or The 3 + 1Cs model as it has become known,
emerged to define broadly coaches’ and athletes’ emotions, thoughts, and behaviours (Jowett & Ntoumanis, 2004). As such, it is understandable that the competency of a coach is viewed by athletes in a multi-faceted way. A player’s perception of the socially supportive nature of their coach has been found to have an effect on the athlete’s satisfaction with the coach’s leadership (Chelladurai, 1993). This working partnership between coach and athlete is a signature characteristic of an ‘athlete-centred, coach-led’ model to talent development (Miller & Kerr, 2002). A major part of establishing a clear and coherent relationship between a coach and athlete is to share the responsibility of goal setting and planning as this can help an athlete adhere to a coach’s vision or strategy (Miller & Kerr, 2002). At the same time, research suggests that, as the athlete works towards mastery of a sport, the responsibility for training and competition is shifted from coach to athlete and in this way the athlete becomes more independent (Bloom, Durand-Bush, Schinke, & Salmela, 1998). This provides further support for Salmela’s (1994) suggestion that the coach-athlete relationship should change over time. With increasing performance level, coaches become the most important mentors with the emphasis mainly on performance enhancement. However, during these later stages of development the coach is also regarded as socialisation agents who are caring and who give social support (Salmela, 1994). Clearly, the coach’s input and understanding of their role in the talent development process is central to the success of that environment.

In 1998 Bloom and colleagues conducted a study with a group of expert tennis players and swimmers. Although the athletes reported that their coaches were instrumental in helping them to reach the pinnacle of their sport, they did not view
them merely in terms of their sporting development (Bloom et al., 1998). On reflection the athletes recognised that their coaches worked with them on a daily basis in all aspects of their lives. This relationship style may give the athlete increased self-esteem and perceived control (Cohen, 1988). Enhancing a positive psychological state may lead to increased positive effect and a greater motivation for good performance (Cohen, 1988). In contrast, Park and colleagues (2013) suggest that unbalanced power, conflict, and an unpleasant coach-athlete relationship could be a major source of athlete’s career transition difficulties, disengagement and can even lead to drop-out from sport. Understanding the coach-athlete relationship and how the coach can support the developing athlete as they progress in their activity must therefore be a critical part of the talent development ‘jigsaw’.

There is also research that suggests that some aspects of social support can potentially hinder progression. These situations may occur when the support provided is not the support needed, when the support provided is either more or less than what is needed or if the support provided engenders a false sense of self-efficacy (Newsom, Rook, Nishishiba, Sorkin, & Mahan, 2005; Rook, 1992). In terms of impression management, Goldsmith (1994) added to this the possibility that the athlete may suffer a loss of “face” from being in the position of needing support. Given the central role played by the coach we must also consider how the need to offer social support influences their behaviour. From the coach’s perspective, if the support required significantly and consistently taxes them physically, emotionally, or in tangible means, this could lead to changes in the coach’s well-being, perceptions of the support recipient, or his/her willingness and/or ability to offer further support (Rook, 1992). As
such, understanding not only role clarity (i.e., what support the coach needs to offer the athlete) but also role acceptance and ability to offer this support is central to the efficacy of this approach.

The interaction between the coach and the sport system can be equally taxing. From an organisational level the coach needs to be mindful of their role within the system. In many cases, resources (e.g., financial, time) are limited and it is the coach’s responsibility to shape the environment to fit the developmental needs of the athlete. It is the coach’s role to provide optimal conditions for training and competition through transparent strategies including setting a clear vision, seasonal and long term performance planning, delivery of specific training sessions, guiding technical development, and creating a support network for other coaches and service providers (Bloom et al., 1998; Gilbert, Côté, & Mallet, 2006). In order to facilitate this effectively the coach needs to be knowledgeable about both the demands of the sport and needs of the athlete in order to put the right physical and social resources in place to address their needs and overcome the demands of the sport (Côté et al., 2007).

There can often be, especially when dealing with young athletes, the tendency to “over support” the athlete and providing a smooth pathway to boost their progress. This may be especially apparent when coaches are dealing with the highest performing junior athletes. However, this approach may be misplaced. As alluded to in the previous section, Larson (2000) describes how the most effective coaches present young athletes with opportunities to be self-directed and intrinsically motivated by creating an environment that is structured enough to stretch learners into new domains of complexity. As such, there is a tension between providing support for
young athlete and ensuring that the TDE is challenging enough to allow aspiring elites the opportunity to develop the skills needed to both progress along the TDP and refine these skills in anticipation of the challenges they will likely face at the highest level.

We have a reasonably good understanding of the range of challenges aspiring elites will face as they develop in their activity (e.g., Wylleman & Lavallee, 2004) and the role of significant others in supporting athletes through these challenges and transitions. For example, Wylleman and Lavallee’s (2004) Career Transitions Model suggests that as the athlete matures the role of the coach becomes more influential and in many cases supplements the reducing involvement of parents and family. This reflects the work of Bloom (1985) and Côté (2007). Although parents remain major sources of tangible resources (e.g., finance, travel and accommodation) throughout the athletic career and as the athlete matures the coach’s role changes with this progression. Understanding the differing sources of support is important to facilitate the development pathway. On one hand, supportive coaches were described as providing an effective approach of reinforcement, encouragement, and technical advice. On the other hand, parents were perceived to offer significant financial assistance and commitment of time (Duffy et al., 2006; Hassell et al., 2010; Wolfenden & Holt, 2005). Again reflecting the issues of role clarity discussed in the previous paragraph and to ensure the required coherence between stakeholders is present, it is important that the coach clarifies the expectations around the roles and responsibilities of the parents in relation to the development of the athlete. It may be that the coach expects the parent to provide tangible support but to remain removed from the technical aspects of the performance, the latter being the role of the coach.
Difficulties often arise on the TDP when this role clarity does not exist and reflect the issues of coherence highlighted by Martindale et al. (2005).

As described thus far, the coach occupies a highly demanding, multi-faceted and influential role in the development of the athlete (Bloom et al., 2003; 1998; Côté et al., 2007). As such, it is important that coaches involved in talent development are adequately supported by their NGB, and equipped with the required knowledge and experience to manage the TDE in which they operate. There is a growing body of research that highlights the need to address the competency of coaches working with developing athletes (De Bosscher et al., 2009; Duffy, North, Curado, & Petrovic, 2013). Interestingly, findings from this body of literature have shown that coaches consider certification programmes to be of limited practical value in comparison to non-formal methods of coach education and development through observation, mentoring and applied experience (Larkin, Duffy, & O’Leary, 2007). Similarly, Bloom and colleagues (1995) investigated methods for training young coaches and found that a formalised and structured mentoring programme was considered by the participants as the most important factor in their development. These programmes provide novice coaches with opportunities to work with skilled coaches, allowing them to acquire valuable hands-on experience, and gain insights about the ‘dos and ‘don’ts’ of their profession (Bloom et al., 1998). Using this approach, coaches can also integrate the information relevant to crystallising their own philosophies and unique coaching styles (Bloom et al., 1998). Such programmes should address ways in which coaches can nurture and empower their athletes, thereby developing desirable psychological skills (e.g., commitment and self-responsibility) and working towards a more holistically
developed individual (Côté et al., 2007; Miller & Kerr, 2002). In a Sports Coach UK Research Project, Cropley, Miles and Peel (2012) provide recommendations for enhancing Reflective Practice techniques in coaching practices. Cropley et al. (2012) describe the importance of shared reflection (through the development of reflective networks and critical friends/mentors), provide recommendations in line with key components (Education, Implementing, Refining and Maximising) and provide an outline of how these can be facilitated and supported. These recommendations are potentially transferable to other aspects of coach support and development by encouraging them to implement similar components in their own TDEs to effectively enable skill education in young athletes.

Finally in relation to the role of the coach it is important that attention is drawn to the fact that most “up and coming” coaches are volunteers and support needs to be provided in light of the coaches’ time and work demands. Considering the influence of the coach in the development of current and future athletes it is important that NGBs and national sports councils work towards a more formalised educational system for their coaches that include experiential learning opportunities, mentorships, and informal opportunities for sharing practice. It may also be that the necessities of coaches working within TDE needs explicit attention as this environment presents a set of unique challenges compared to those at the grassroots or elite levels of sport.

2.2.6 Tangible Support

Tangible support refers to the availability of physical resources including facilities, funding, and specialist services. Access to well-equipped facilities that are logistically convenient appears to play a major role in creating opportunities for
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potential high performance athletes to develop. Of course, facility provision is dependent on the nation’s ability (e.g., finances and government sports policy; De Bosscher et al., 2006) to provide and give access to specialised facilities for training (Storm & Nielsen, 2010). In many cases these facilities are built with multiple purposes to accommodate corporate and public events and services as well as high performance sports’ requirements. As such, restricted availability often forces sports systems to compromise training times and specific practices and this causes tension between high performance staff and management staff of the facility (Houlihan & Green, 2008). In another way, differences in socio-economic living backgrounds also play a major role and can be powerful constraint in the successful emergence of talent. An athlete’s development can be restricted by logistics and the standard of the resources available (e.g., access to safe playing fields). As such, the acquisition of opportunity and expertise can be significantly dependent on where the athlete resides (Duffy et al., 2006; Philips et al., 2010). In contrast to adequately resourced readily available support, athletes can develop desirable psychological skills (e.g., resilience and a hard work ethic) and competencies (e.g., autonomously and self-reliance) by experiencing the challenges of a poorly resourced unsupportive TDE (Gould, Dieffenbach & Moffet, 2002). Gould et al. highlighted that self-development contributed to the growth and maturity of individuals by enhancing a greater sense of self-awareness and an ability to put themselves in the right environment. In another way, an overly supportive TDE may be a distraction and can cause stress for an athlete when contrasting opinions between coaches, parents or service providers arise. Durand-Bush and Salmela (2002) found that Olympic athletes who did not perform up to their potential reported not
being prepared to deal with distractions, changing things that worked, experiencing late team selection, and not being able to focus after distractions. Chapter 6 seeks to gain a greater understanding on the negative impact of organisational issues within a TDS on the progress of a talented athlete.

\section*{2.2.6.1 Funding}

Unsurprisingly, on-going research declares that the best predictor of effective TDSs (i.e., performance at elite competition) is correlated to the allocation of financial resources to elite sports (De Bosscher et al., 2009; Green & Oakley, 2001; Hogan & Norton, 2000). It is common for NGBs to be under pressure to secure medals as national governments adopt a more results driven approach when granting annual sport budgets. As a consequence, resources tend to be designated toward top tier athletes in an attempt to achieve “last minute” results to secure further funding (Carlson, 1988). Reflecting this ‘vicious circle’ of funding distribution, Gulbin and colleagues (2013) found similar results when reviewing a number of national level TDPs. Pre-elite athletes tended to be more vulnerable in terms of funding cuts compared to their elite counterparts as resources were preferentially aligned to the elite end of the pathway (Gulbin et al., 2013).

Limited financial resources can create difficulty in the development of upcoming prospects and can obstruct the flow of the TDP and the overall effectiveness of the TDE (Storm & Nielsen, 2010). The lingering concern to an NGB and subsequently funded athletes is that if medals are not attained and goals not achieved then cutbacks take effect (Storm & Nielsen, 2010). Unfortunately, investing in “ready-made” athletes is an all too familiar threat to sports and this lack of foresight can have a detrimental
impact when creating the right structures for long term athlete development (LTAD) and successful TDPs. Simply, it often takes a long time for the investment to pay off! As such, NGBs must consider the long-term needs of the athletes within their system and be knowledgeable and clear on the requirements of their sport, the sport system’s performance objectives and the strategic plan. In this way, financial support may be used to better effect bearing in mind the talent development strategy and future direction and requirements of the sport. A recent newspaper article in which Gibson (2014) interviewed Peter Keen (former HPD of British Cycling and current director of sport at Loughborough University) suggests that coaches and performance directors can’t aspire to a culture of world class performance whilst at the same time reward a culture that is not. Keen (2014) suggests that there needs to be a merit for a system that has a clear ambition to strive to be the best, otherwise the system will struggle.

Poor strategies relating to the allocation of funding and resources are a recurring theme throughout both the literature (Durand-Bush & Salmela, 2002; Phillips, et al., 2010) and applied practice. As stated previously, financial support is known to be one of the main drivers in attaining medals at major international events (De Bosscher et al., 2006). However, reflecting the long-term requirements of developing in sport, (Martindale et al., 2005), sport systems should also consider means of working within the constraints of the system by investing time in correct planning and management of inputs (e.g., finances, facilities) and throughputs (e.g., coaching provision and development) that are key to international success (DeBosscher et al., 2009). The knock-on effects of funding allocations should also be considered. For example, researchers and NGBs often fail to consider the psychological
impact of funding on the athlete. According to a recent newspaper article (O'Rourke, 2014) many funded athletes feel a responsibility to deliver results, justify the investment made in them and sense a broader responsibility to promote their sport. Considering the impact of other well documented sources of stress associated with elite athletes including athletic identity and body composition requirements (Byrne & McLean, 2002; McKay, Niven, Lavallee, & White, 2008) and the increasing publicity of mental health issues in sport (McCarthy & Collins, 2014) future researchers should direct more attention to the negative implications of funding on an athlete’s personal and performance development.

Of course, there are further examples of successful athletes emerging from environments that lack what, are perceived to be, key resources (e.g., Kenyan distance runners, Jamaican sprinters). As such, those responsible for the TDE should also consider how the lack of resources may develop coping skills, resilience, and grit, key factors that are important for negotiating the TDP and eventual world class performance. McCarthy and Collins (2014) present support for this hypothesis with their study of the relative age effect in rugby. The relative age effect is a well-documented phenomenon where relatively older athletes are suggested to be at an advantage because they are typically physically more mature and more experienced than their relatively younger peers. However, McCarthy and Collins found a reversal of the RAE “benefit”, whereby late-birth players (in that calendar year) were less likely to be selected into rugby academies but were more likely to achieve senior professional status. This is interesting since typically these late-birth players would not have experienced the same opportunities, coaching or experience as their early maturing
counterparts. This conversion rate was proposed to be underpinned by a psychologically based explanation of greater “growth” due to additional challenge experienced by these initially disadvantaged younger players (McCarthy & Collins, 2014). It may well be that similar explanations underpin the emergence of athletes from apparently, un-ideal TDEs.

2.2.7 Psychological skills

As suggested in the previous section, the role of psychology in talent development may be central to the efficacy of the process. There are many examples of young athletes who, despite having the (supposed) ideal physical and anthropometric qualities, fail to progress to the top of the sport. As such, even if an athlete has the physical attributes associated with world class performance in a particular sport, their potential to succeed depends on other psychological determinants such as commitment, motivation, and self-management skills that interact with environmental factors to more genuinely determine eventual levels of success (Ceci, Barnett, & Kanaya, 2003; MacNamara et al., 2010; van Yperen, 2009). The terms psychological skills and life-skills are used, often problematically, interchangeably throughout the literature and can be defined as ranges of transferable skills needed for everyday life to help people thrive (Jones & Lavallee, 2009). These skills can be physical (e.g., body language), behavioural (e.g., communication), and cognitive (e.g., decision making) (Danish & Donohue, 1995; Danish & Nellen, 1997). Research supports that successful elite athletes display characteristics of commitment, self-confidence, focus, willingness to work hard, a sense of dedication and motivation (Williams & Reilly, 2000; Reilly, Williams, & Richardson, 2003). Cognitive skills such as
decision-making ability, the ability to control anxiety and aggression, awareness and coping strategies have been identified in successful athletes (Lawrence, 2010; Miller & Kerr, 2002). As discussed previously, research has highlighted the role of self-regulation as a key determinant in effectively translating one’s potential into excellence (Cleary & Zimmerman, 2001). These self-regulatory skills include the ability to consciously reflect, and self-monitor, assimilate and adapt (Miller & Kerr, 2002; Toering, Elferink-Gemser, Jordet, & Visscher, 2009). Jonker and colleagues (2011) provide evidence to support the use of self-regulation skills when combining a dual-career (education or employment and sport) by examining the role of six self-regulatory skills (i.e. planning, self-monitoring, evaluation, reflection, effort and self-efficacy) in the sport and academic performances of elite youth athletes. They found that these athletes (12-16 year olds) reflect more on their past performance in order to learn and make more of an effort to accomplish tasks successfully compared to their non-athletic counterparts in both a pre-university and pre-vocational education system. Expanding on this, the question arises as to whether these psychological skills are learned or innate. Research suggests, active students have a higher skill level of emotional intelligence (e.g. the ability to perceive, understand, and effectively manage emotions) compared to inactive student individuals (Ashmataheri Ahmadizadeh, Heydarinejad, & Mousavian 2013). It may be that physical activity increases an individuals’ awareness in how to use emotion to their advantage. For example, athletes must learn to control their emotions to perform a task or may react in the field of play based on their ability to read the emotions of their opposition or teammates (i.e. body language, facial expressions, tone of voice). It is important at this
stage to also consider Deci and Ryan’s (2002) Self Determination Theory. This phenomenon is based on extrinsic and intrinsic motivation factors to address a person’s psychological needs through competence, autonomy and psychological relatedness. The theory suggests that people will develop and perform optimally if the environment supports and satisfies their needs. As such, it seems that firstly the environment needs to provide the right environment and nurture the development of the athlete whom will subsequently develop the skills necessary for success. Indeed, Sheridan and colleagues (2014) compile evidence to support how athletes potentially use self-determination as a motivational mechanism (via sources of social support) to influence how they think, feel, or act. Further work is needed to continue to understand how athlete’s process emotions, in order to expand the knowledge base concerning the psychological experiences of young people in sport. A better understanding of such theories (i.e. self-determination theory) and paradigms (i.e. emotional intelligence) as well as how they could be used more effectively to bridge the link between research and applied practice could be a profitable investigation.

2.2.7.1 Developing psychological skills.

Perhaps understandably, the focus within the coach education literature and applied practice is on the development of the physical and performance skills associated with that sport. Despite the recognised role of psychology in talent development, there is less emphasis on the development of those skills that may actually form the mechanisms of development (MacNamara et al., 2010). This is a limitation of many talent development programmes since it is unlikely that even the most ‘gifted’ (Gagné, 1995) individuals will become talented with the ability and skills
to engage with the challenges and opportunities they face within the TDE. As such, interventions to develop the psychological skills (e.g., self-efficacy and goal-setting) required to cope effectively with the stressors and challenges associated with the TDP should be an integral part of the coach’s arsenal. Some attention is paid to psychological skills training (e.g., attention control techniques, relaxation, self-talk, the use of cue words, and imagery) but this is often done as an additional focus (Cropley, et al., 2012) and rarely incorporated into the holistic development of the athlete. Less attention is generally paid to developing the psychological skills that athletes need as they progress in their activity. As such, the growing contention in the literature is that these skills should be explicitly developed and practiced within TDE (Calmels et al., 2003; Gould et al., 2002) rather than in an ad-hoc nature.

Extensive research has been carried out by previous researchers to identify different types of coping strategies including emotion focused, problem focused, and avoidance coping, understand what types of coping strategies are utilised (Kristensen, & Roberts, 2010; Lazarus, 1999; Lazarus & Folkman 1984; Reeves, Nicholls, & McKenna, 2009). More recently, researchers have provided evidence to suggest that athletes at different stages of their development use different styles and mixes of coping strategies (Reeves, Nicholls & McKenna, 2009). For example, Reeves and colleagues (2009) found evidence to suggest that middle adolescents (15-18 year olds) perceived a greater number but similar stressors to early adolescents (e.g. a dysfunctional coach-athlete relationship, clashes with teammates). As well as this the older athletes used a greater range of coping strategies; mainly emotion focused (e.g. rationalisation, venting emotions) and problem focused (e.g. winning the ball back,
increased concentration). In contrast, early adolescence (12-14 year olds) reported less stressors and the use of more problem focused and avoidance (e.g. ignoring the issue) coping strategies. This correlates with findings from Skinner and Zimmer-Gembeck (2007) who suggest that as young people mature they are more aware of the uses of social support surrounding them and draw on combinations of both cognitive and behavioural strategies to manage difficult events. Building on these findings, Reeves and colleagues (2009) suggest that to assist in the talent development process emphasis should be placed on increasing the early adolescent’s perception to social support and the use of cognitive and behavioural coping strategies (e.g. learning/reflection, communication with others). There is limited understanding of how to best implement these techniques for learning especially in relation to athlete development (Cushion et al., 2010). MacNamara and colleagues (MacNamara et al., 2010; MacNamara, 2011) do offer some insights into how these psychological skills can be incorporated into the TDE. These researchers suggest that the coach can structure their practice to develop the skills required by athletes and offer opportunities to deploy and refine these skills in advance of meeting key developmental challenges. In this manner, the athlete is prepared for the challenges of development, can negotiate these challenges and ultimately is more likely to stay on the pathway. Indeed, Sheridan and colleagues (2014) support this through their review by recommending that social support should be examined for its uses in response to key stressors and point towards a research opportunity to determine the types of support that are beneficial for athlete coping relative to the stress related condition. According to Tamminen and
Holt (2012), research examining the social influences on athlete coping is relatively unstudied.

Of course, encountering setbacks and challenges is an unavoidable and perhaps a welcome part of the development process (McCarthy & Collins, 2014). In applied practise, a challenging event or a performance at competition, despite the outcome, can be a rich source of information. This is especially true if the athlete is encouraged to reflect upon and learn from these events. Cropley et al. (2012) suggest that strategies for the use of reflective practice have to be established as a primary aspect of talent development at all levels. Unfortunately, these key learning opportunities are often passed over within the TDP. Coaches rarely purposefully identify these events as opportunities to learn and many athletes stumble along journey without adequate skills to cope with the demands of high performance sport (Calmels, D’Arripe-Longueville, Fournier, & Soulard, 2003; Gould, Dieffenbach, & Moffett, 2002; Reilly et al., 2003). Harnessing these events, and supporting athletes to learn from these to guide their future development, would seem an important part of the learning process. As such, it is important that the range of skills which athletes and coaches perceive as important for successful development is identified and opportunities are provided within the TDP to test and grow these skills.

Reflecting the model presented by Wylleman and Lavallee in figure 2.4 (page 62) it is important that we recognise that athletes will encounter stages, transitions, and challenges from both within their sporting career and from other aspects of their development (e.g., psychosocial, educational). As such, athletes should also recognise the skills they acquire during their athletic career are transferable to multiple contexts.
both within and outside of sporting experiences (Miller & Kerr, 2002). Baltes and Heydens-Gahir (2003) suggest that athletes could use compensation strategies in which they are encouraged to think of how the abilities and skills in their preferred domain (e.g., sport) could be transferred and applied to other life domains (e.g., school or interpersonal relations). Similarly, some NGBs have provided lifestyle support services and life skill development programmes for athletes to assist in preparing athletes for developmental challenges and constraints associated with high performance sport. These programmes and services offer a form of guidance for athletes struggling with self-management of their lifestyle demands and aim to develop the athlete in a wholesome fashion. It may well be that the manner in which these programmes are offered to young athletes is not optimal and the extent to which these lifestyle programmes benefit the athlete’s development has yet to be established (Gould, Chung, Smith & White, 2006). Indeed Gould et al. suggest that the school coaches play an important role in helping adolescents develop personal and social life skills through their sports participation. Reflecting the issues of coherence and consistency highlighted at the start of this chapter, it is important to consider that these opportunities to develop psychological skills are implemented in a coherent and effective manner by means of the coach.

2.2.8 The Talent Development Environment - Where to next?

The uncritical adoption of successful TDEs and TDSs is a very common occurrence in sport! Consider, for example, the call for centralisation of sports following the success of GB cycling post Athens Olympics and in preparation for their home games in London 2012. However, the context of the sport, needs of the athletes,
availability of resources, and potential for developmental challenges all must be considered to make the implementation effective. The interaction of critical support factors (i.e., the coach, availability of resources, and psychological skills) within the athlete’s TDE is central to the success of the TDE but often lacks consideration and understanding by both researchers and applied practitioners alike. As such, this section of the literature review has pointed towards some major gaps between theory and practise in talent development that require further investigation including the clarity and value of the TDE philosophy, development of psychological skills, and support for both development level athletes and coaches. These matters suggest that further research is required to identify the challenges experienced by sport systems when attempting to implement effective TDSs.

2.3 The Talent Development Pathway

The TDP is the process by which an athlete negotiates their developmental journey in pursuit of fulfilling their personal and performance potential. Throughout the journey an individual must gain the expertise needed to satisfy the unique constraints impinging on them in specific performance domains (Philips et al., 2010). Much of the research surrounding TDPs focuses on defining talent and the long term effects of talent identification (Williams & Reilly, 2000). Unfortunately not enough is known about the processes of effective TDPs or how they may be optimised. Reflecting the unique characteristics of the TDE in which the TDP is embedded it is clear that an athlete’s growth is dynamic, non-linear, and individual in nature; simply, there is no simple ‘one size fits all’ approach (Abbott & Collins, 2004; Martindale & Mortimer,
2011). Instead, the TDP must be shaped by the demands of the sport, needs of the athlete, developmental challenges and the resources of the environment in which it resides. As an example of this “blended approach”, Durand-Bush and Salmela (2002) reveal that although world class athletes passed through four stages throughout their career (i.e., sampling, specialising, investment, and maintenance years) they did not all follow the same path. The athletes took different routes, used a variety of resources and strategies, and were innovative and creative as they developed and maintained their expertise in sport (Durand-Bush & Salmela, 2002). Further work to examine how exactly these athletes come to access and integrate their sources of support to such success would seem profitable. As such, this section of the literature review explores potential developmental constraints of the TDP and identifies gaps in the literature and weaknesses between theory and applied practice where further research is warranted.

2.3.1 Danger of prescriptive models of Talent Development

In recent years, well entrenched pyramidal-type athlete development models illustrating the progressive pathway from mass participation to sporting pinnacle, have been criticised for greatly oversimplifying the development trajectory with the limited “up” and “out” pathway (Green, 2005; Kirk & Gorely, 2000). More recently, Ford and colleagues (2011) provided a critical overview of development pathways such as Balyi and Hamilton’s (2004) LTAD model. These authors suggest that there is a distinct lack of empirical data to support many of the elements of this model (e.g., windows of opportunity) as well as the applicability of the model to the realities of high performance sport. Instead Ford et al. suggest that the LTAD should be viewed as a
work-in-progress and urges caution to ensure that the model does not become too
owned as fact. In 2010, Bailey and colleagues reviewed numerous talent
development models including Côté’s DMSP and Bloom’s stages of development
(1985) and proposed that limiting talent development to a restricted number of phases
was questionable and lack a strong empirical foundation. Furthermore, elements of
LTAD such as “windows of opportunity” were also questioned and a call was made for
models of talent development to have a strong empirical foundation before they were
implemented in practice.

More recently and reflecting some of the issues raised by previous authors
(e.g., flexibility of stages of development, stages delimited to ages) Gulbin and
colleagues (2013) aimed to further understand these issues with a review of
theoretical perspectives and current practices in international level TDPs in Australia.
As a result, Gulbin and colleagues proposed the Foundations, Talent, Elite, Mastery
framework (FTEM). In comparison to previous models (e.g., Career Transitions Model,
DMSP, and the LTAD) the FTEM framework is devoid of fixed age boundaries and
instead emphasises the variability of developmental progression and offers flexible
time frames to accommodate unique characteristics of the sport and the individual
(Gulbin et al., 2013). It is encouraging to learn that research is attempting to provide
flexible models that attend to dynamism and complexity and reflects many of the
limitations of previous talent development models. Researchers and practitioners
should remember that the FTEM is a novel framework designed by combining current
theoretical research perspectives with extensive empirical observations from one of
the world’s leading sport agencies (Gulbin et al., 2013). As such, MacNamara and
Collins (2014) proposed the need to move beyond prescriptive models of talent development (such as the FTEM). They suggest a progression towards consideration for features of best practice (factors such as coherence, clarity, coaching) as highlighted in Section 1, and process markers (psychological factors, support factors) of development together with robust guidelines about the implementation of these in applied practice. Further support for the validity of the FTEM is required (MacNamara & Collins, 2014) by measuring its applicability over-time in a real world setting and in other nations. The FTEM was developed exclusively with athletes supported by the Australian Institute of Sport, Gulbin does not acknowledge the extent to which the developmental trajectories observed by the authors were socially constructed by the demands of the particular systems and sports in which the athletes resided (Ford & Williams, 2012). Therefore, as suggested by MacNamara and Collins (2014) an emphasis on the mechanisms of development rather than a model of development would seem a more effective approach to guide talent development.

2.3.1.1 Talent identification.

Although the focus of this research is not specifically on methods of talent identification, it is important to consider the talent detection and selection processes that underpin many TDPs and the limitations often associated with such processes. To clarify, Williams and Reilly (2010) distinguish between talent detection, talent identification and talent selection respectively as; the discovery of potential performers who are currently not involved in the sport in question, the process of recognising current participants with the potential to become elite players, and the ongoing process of identifying players at various stages who demonstrate prerequisite
levels of performance for inclusion in a given squad or team. In essence, talent identification processes should act as an opportunity for athletes to display their potential for future elite performance and filter those athletes who have a relatively strong chance of success in that sport (Lawrence, 2010). In the following sections, several aspects of talent identification are explored against the TDP process.

2.3.1.1 Measures used for talent identification.

One major limitation of a talent identification process is that the NGB seldom acknowledge the distinction between finding out what characterises a champion and the qualities required to become a champion (Geron, 1978). This lack of distinction between potential and performance in talent identification processes has caused controversy between researchers and those involved in talent development (Abbott & Collins, 2004; Lawrence, 2010; Regnier, Salmela, & Russell, 1993; Vaeyens, Lenoir, Williams, Philippaerts, 2008; Williams & Reilly, 2000). Many existing methods of talent identification typically focus on a limited range of outcome based procedures (e.g., exams, auditions, performances) selecting those individuals within a domain who - at the time of selection – may have the best combination of attributes (Wolstencroft, 2002). Although physical attributes and the ability to perform are undoubtedly important, this narrow focus results in potentially elite athletes being prematurely excluded from programmes due to ineffective identification methods while limited resources are mis-invested in others who may or may not have the potential to achieve at the highest level (Abbott & Collins, 2004). Lawrence (2010) outlines that talent identification processes cannot be effective without a series of psychological tests to ensure that a rounded profile of the player is developed; physical talent may
not be enough to ensure success in the international arena (Lawrence, 2010). This supports earlier work by Carlson (1988) that emphasises the importance of various athletic characteristics. As an example, observing how an athlete interacts with the environment in training or at competition could provide useful indicators that dictate future performance. Instead, Collins and MacNamara (2011) suggest that a heightened awareness for desirable psychological characteristics that point towards performance potential and the ability to negotiate the TDP need be identified and then nurtured and developed within the TDE if success is to be achieved. Of course, selection based on psychological skills or characteristics are likely to have the similar limitations and flaws as uni-dimensional talent identification methods based on physique or performance. As such this is not a recommended course of action either. As such, it is advocated that the emphasis be moved from the identification of talent towards the development of talent with a more worthy focus on the multidimensional nature of talent.

2.3.1.2 Timing and talent identification.

Previous research examining talent development models have criticised traditional talent identification processes for pursuing early identification and for not considering variations in maturation rates of developing performers (Abbott, Button, Pepping, & Collins, 2005). There is clear and robust evidence that developmental patterns vary from person to person and even within one individual different physical and mental components develop at different rates (Wolstencroft, 2002). A youth's talent potential is not a stable innate trait but rather is constantly transforming during the maturation process (Wolstencroft, 2002). Typical physical and motor
developments of young people do not follow a strict chronological pattern and, as such, the accuracy of identification improves with age especially when this identification occurs post-puberty (Lawrence, 2010). This aligns with Williams and Reilly’s (2000) view that continuous talent identification should occur at various stages of development. Several researchers support this view suggesting that the talent identification process should take place over a longer period of time, months or even years, because early identification procedures do not benefit late developers or those athletes outside the “normal” range of physical and motor development (Lawrence, 2010). Continuous talent identification or talent detection could then include talent transfer athletes and late developers and offer athletes the opportunity to develop the skills and characteristics necessary to fulfil their athletic potential (Gulbin et al., 2013).

A positive aspect of many talent development programmes is the inclusion of a talent confirmation phase. Confirmation of talent is often associated with an increase in intensity and or volume of discipline-specific practice. Identifying the different rates and constraints of learning, growth and maturation which influence each physical and mental trait or system is important in order to manipulate and facilitate effective transitions of an individual to a new performance level (Cobley, Baker, Wattie, & McKenna, 2009). Growth and maturation relate to an integrated development of genes and hormones that are coordinated according to a biological clock and other factors (i.e., nutritional and environment factors), which are time independent but which all affect the physiological systems of the body (Beunen & Malina, 2008). Beunen and Malina (2008) go on to suggest that there is a lack of clarity regarding the training stimulus required to facilitate active growth periods. This correlates with
Bailey’s (Bailey et al., 2010) more recent review which highlights the ambiguity of optimising periods of active maturation or “windows of opportunity”. Yet it is still unclear whether optimising these supposed periods of active maturation actually result in greater levels of performance and long term effects or just fast-track an athlete to a pre-destined level regardless of whether these periods are augmented or not. Either way unidentified talent and athletes outside of these “windows” often miss out on rich training environments that provide opportunities to engage with skilled peers, mentors, skilled coaches and acquire skills specific to their sport (Philips et al., 2010).

Research has emphasised that time spent training was the most distinguishing variable of those who achieve at the highest levels and their less successful counterparts (Baker & Côté, 2003; Durand-Bush & Salmela, 2002; Ericsson, Krampe, & Tesch-Römer, 1993). This compares with extensive research that has examined the effects of practise on developing excellence in a range of domains including music, mathematics, swimming, distance running, and tennis (Baker & Côté, 2003; Baker et al., 2003; Baker, Horton, Robertson-Wilson, & Wall, 2003). More recently in his highly popularised book ‘The Sports Gene’ Epstein (2013) argues that too much attention is paid to practise and TDSs need to pay more attention to the biological setup of an individual and stimulants within the environment in which they grow up. As previously acknowledged researchers have highlighted the beneficial use of a diverse training approach which can use cross-training and sampling techniques combined with periods of deliberate practise to stimulate skill and physical development (Henrisksen et al., 2011). This suggests that the timing of sport specific training and deliberate
practice is individual and dependent on the demands of the sport. Practitioners should consider a blend of sampling and specialised training methods to find the right balance to support optimal athletic development. Previous researchers (e.g. Henriksen et al., 2011) suggest that a versatile sports profile was more beneficial to elite performance. Furthermore, considering the importance of practice to the talent development process, attention must be paid to those characteristics that allow individuals invest the required time and focus to training and development. This reemphasises the importance of psychological characteristics and skills as these factors may well be the key mechanisms by which individuals engage effectively with the development process.

2.3.2 Understanding Transitions of Development

It is clear that many athletes move through an individual sequence of stages at different rates and each stage has various stressors, obstacles, and challenges. In 2004, Wylleman and Lavelle formulated a lifespan model reflecting a developmental perspective on transitions faced by athletes in athletic, individual, psychological, and academic vocational domains as seen in figure 2.4.
Figure 2.4 Wylleman and Lavallee’s (2004) Career Transitions Model

This model describes how former elite athletes have been found to describe their own athletic career in terms of normative events (e.g., moving to university, leaving home, moving to senior level competition), non-normative events (e.g., a season ending injury, winning a particular competition) and non-events which were expected but did not occur (e.g., not being selected for the Olympic Games, missing out on a new record) (Wylleman & Lavallee, 2004). Such events are associated with a strong mix of emotions, thoughts, and behaviours (Wylleman & Reints, 2010). Failure to negotiate developmental transitions can result in negative feelings of inadequacy which in turn can be sources of career transition difficulties (Park et al., 2013). Interestingly, results from Wylleman and Reints (2010) indicated that although athletes in different sports experience similar events, the perceived associated stressors and how they coped with these events differed, suggesting that the nature of the sport can influence how well prepared an athlete is to manage the progress of their TDP. For example, a swimmer
moving to university may experience an increase in training volume but the new training environment may be more logistically suitable, affording a better situation for the athlete to balance dual-career demands. As mentioned earlier, the use of natural life experiences can be useful to encourage athletes to develop coping skills and adapt to the changing TDP. Ideally, these skills should be developed, deployed and refined in advance of meeting significant challenges so that the athlete is well positioned to cope with the inherent stressors they will face at these key moments (Collins & MacNamara, 2011). These strategies can be used to influence a positive change in an individual and act as a catalyst for development of skills and/or physical attributes. Given the importance of successfully negotiating challenges, it is important to consider the effectiveness of the TDS in developing these key skills.

2.3.2.1 Dual-Careers.

According to Wylleman and Lavallee’s model athletes typically experience two academic transitions during their adolescent years. These changes are normative and necessitate an athlete to combine a career involving high performance sport and education. Obvious challenges (e.g., reduced recovery, reduced practice time, increased demand to manage work tasks) ensue when an athlete occupies a dual-career role. Many athletes struggle with the social constraints of the student-athlete persona, where spending too much time training reduces time for social growth and can lead to “social isolation” (Reeves, Nicholls, & McKenna, 2009; Weirsma, 2000). For example, Hassell and colleagues (2010) observed how adolescent female swimmers were frustrated that their school peers did not identify with their training, level of athletic commitment, and performance. In contrast and presenting a positive angle on
the ‘dual career’, Henriksen and colleagues (2011) reported that pre-elite athletes had friends at school that enabled them to unwind mentally from sport and relax. Some sport systems and researchers have recognised the need for adolescent athletes to value school and education in their life domain (Miller & Kerr, 2003). According to Gaudreau, Amiot, and Vallerand (2009) an athlete in education has significant advantages due to the challenges experienced with managing the demands of a student-athlete lifestyle, athletes often adopt a more multidimensional identity. Park and colleagues (2013) suggest that athletes manage the right balance between their sporting and non-sporting lives during athletic careers report higher life satisfaction, have greater self-esteem and are more positive about the future. Similarly, participation of the athlete in school activities increases the pool of opportunities to experience diversified successes and to derive general feelings of self-worth (Park et al., 2013). If utilised correctly, a higher level of identification with school could act as a stabiliser likely to promote the emotional well-being of adolescent student-athletes (Gaudreau, Amiot, & Vallerand, 2009). Considering the unpredictable nature of the TDP, the readiness of individuals to overcome developmental transitions needs to be considered in light of normative and non-normative events.

2.3.3 Understanding the Talent Development Pathway – What do we need to know?

Section two reviewed the literature concerning the TDP. The athlete’s talent development journey is clearly depicted in the literature as non-linear, dynamic, unstable, and riddled with developmental challenges. Athletes can potentially leapfrog a number of development stages as well as re-circulate or oscillate en-route in the case of talent transfer athletes or late developers (Gulbin et al., 2013). Certainly literature
suggests that stages of sampling and specialisation are important to achieve mastery of a sport (Balyi & Hamilton, 2004; Gulbin et al., 2013) but research also suggests that these stages should not be allocated to specific time-points and instead should be versatile to shift along the TDP time continuum offering a more diversified approach (Duffy et al., 2006; Henriksen et al., 2011). There is evidence available to inform applied practices to offer individualised, on-going and systematic development with consideration for the maturation, physical and mental ability of the individual (Gulbin, et al., 2013; Wolstencroft, 2002). Despite this understanding, NGBs are still failing to facilitate successful talent development and may be guilty of building their talent development practices on a foundation that lacks both empirical evidence and a validity concerning talent development. As such, further applied research to better understand the constraints experienced by those living-through and working with these processes would appear profitable.

2.4 Where to next?

The implementation of an individual holistic flexible approach appears to be a promising way for development and sustainable success of elite athletes (Henriksen et al., 2010a; 2010b; 2011; Martindale et al., 2005). This approach should encourage researchers and sports practitioners to not only focus on the presence of micro level factors (e.g., individualised training programmes) but equally consider key factors of the larger environment (e.g., values and philosophies) in an effort to establish a more effective and sustainable TDE (Henriksen et al., 2011). Although research has provided substantial evidence to support what an effective TDE should look like it fails to
address the “yet to be reached ideal” experienced by coaches and those responsible for the talent development process. Further research needs to contribute to the literature by exploring how theoretical evidence can be translated more efficiently into applied practice. This project intends to build on this theoretical framework and contribute novel findings to applied sports practice in the following ways;

Firstly, previous research has identified what is important for successful talent development, but much of this research has sampled “ready-made” elite athletes, whilst few studies have identified what development level athletes and their coaches perceive as important for progress. Those that are currently living through and those that have experienced high performance sport first-hand can serve as rich sources of information and can be used to guide the development of future models or theories of sport expertise (Durand-Bush & Salmela, 2002). As well as this, considering the significance of interpersonal relationships between key stakeholders involved in the process (Hassell et al., 2010; Sheridan et al., 2014; the coach-athlete relationship) it is important that perspectives from both sources at different levels of performance are examined. These sources can inform us what is happening “on the ground”. Chapters 4, 5 and 6 proceed to explore this route.

Secondly, much of the existing literature utilised retrospective data collection methods which is often effected by memory and recall bias as evidenced by (Gilbert, Trudel, & Bloom 1994). The use of prospective longitudinal investigations allow researchers to examine the dynamic processes of talent development over time (Park et al., 2013). Considering the variability and individuality of each TDP it seems profitable to examine how aspiring athletes and elite athletes use factors from their
TDE to negotiate normative and non-normative transitions. Identifying sources of social support and examining the forms of support used and received by a successful aspiring athlete during their development may help practitioners design evidence based interventions to teach coping strategies (Stambulova, Alfermann, Statler, & Côté, 2009). Chapter 5 considers how insufficiency in one area (e.g., financial support) may positively stimulate the development of another (e.g., self-management skills).

Thirdly, research shows that it is important for a sport system to establish a clear philosophy and core values throughout a communicative network of coaches to facilitate effective talent development. In this way, desirable psychological skills and physical attributes may be more easily influenced by the environment in which they develop (Palmer, Burwitz, Smith, & Collins, 1999, Siedentop, 1978). This is especially important considering many aspiring elites do not experience immediate rewards. Evidence that informs them that they are progressing towards strategic goals can provide reassurance and motivation. As such, if long term aims and developmental objectives are clear and athletes are less likely to follow counter-productive avenues on their TDP. Indeed, addressing requests by Martindale and colleagues (2007) further evidence is required to understand why TDSs struggle to operate coherent systems and fail to define consistent objectives and methods across the TDP. This project explored this issue in Chapter 6.

Finally, despite the amount of evidence exposing critical factors for a successful TDE (Duffy et al., 2006; Rees, Ingledew, & Hardy, 1999) there is still scarcity of knowledge in how to optimise the use of available resources in practice. Essentially, this project aims to help bridge the gap between what we know and how will apply
this knowledge into better practice (Farrow et al., 2013; MacNamara & Collins, 2014). The expected outcomes of this research project aim to encourage those responsible for talent development to establish a clear understanding of the constraints and autonomies of their TDS and reap the benefits of its resources and developmental opportunities for the talent development process. The following chapters are shaped by this literature review and aim to address these gaps to help talented athletes fulfil their performance and personal potential.
Success, is massively culturally determined. It dictates what you can interact with and what is denied to you as a sportsperson. Tradition, success, climate factors, cultural factors – these are more important than some apparently fundamental drivers, such as genetics [Peter Keen, director of performance at UK Sport]
3.1 Logic for this Research Approach

The previous chapter provides an overview of the existing literature and practices in the area of talent development and sports performance under investigation. This research project intends to support extant findings but more importantly contribute to these areas with novel work by addressing the gaps and offering a real life means for those responsible with talent development to inform and apply more effective practices. Considering the main focus of this project was on the optimal development of talented athletes, a key support factor involved in this process is the relationship between the athlete and significant others in their TDE. The following studies engage with the subject matter (i.e. athletes, coaches and significant others) in real time to examine phenomena involved in the talent development process, as such this project should be considered to belong to the area of social sciences. To support this, the research approach uses both qualitative (e.g. direct observation, communication with participants, and analysis of interview texts) and quantitative (e.g. Exploratory Factor Analysis) methods to achieve its objectives.

Considering the characteristics of a grounded theory approach outlined by Mills and colleagues (2006) the following factors were addressed:

- Theoretical sensitivity. This was enhanced by ensuring the main author (and interviewer) entered the field of inquiry with an open-mind, recorded events at face value, and remained unbiased to the responses and observations of the participants and their environment. In this way, findings were constructed through interpretations of given perspectives (Strauss & Corbin, 1994).
Treatment of the literature. To say that this project is purely grounded in theory would be untrue, considering that pure grounded research generates theory on a subject area about which little is known (Mills & Birks, 2014). As previously described in Chapter 2, this project begins its investigations with a thorough knowledge of the factors integral for successful talent development and highlights that there is a lack of understanding and clarity surrounding how the processes of talent development should be optimised. Original approaches to grounded theory such as Glaser’s work in 1992 avoid reviewing the literature in the area of study for fear of contaminating the researcher’s analysis of codes that emerge from the data. However, Strauss and Corbin (1994), suggest that in the evolution of grounded theory, engaging in the literature can offer another voice when the researcher is reconstructing the data by providing another source of information. For example, nontechnical literature such as the use of NGB reports, offer information on the context in which the participant operates. This evolution of a grounded theory approach is explored by Charmaz (2000) in developing the constructivist grounded theory. This approach reveals the researcher as the author of a co-construction of experience and meaning. As the researcher and author, a conscious effort was made to maintain objectivity and to ensure an unbiased interpretation of the data collected. The voice and perspective of the participant was imperative to the study of the environment in which the people involved in these studies reside (Mills et al., 2006; Strauss & Corbin, 1994; Duffy et al., 2013). Considering the nature and characteristics of this research project, a more constructivist approach was
adopted compared with a pure grounded theory approach. Further evidence for this approach is offered in the following paragraphs.

- Coding and diagramming. The data analysis process in this constructivist approach began with fracturing and initial coding of the participant’s text into smaller segments for comparison with other data from other data sources. Further coding involved theory generation through the development of themes and categories, often around a common meaning (see Appendix 3.1 as an example). Saturation occurred when the process of theoretical sampling does not add further to the development of the categories that form the final theory (Mills & Birks, 2014). Throughout the analysis the use of diagramming was used to help with structuring and organising the data into meaningful themes and categories for the generation of theory (see Appendix 3.2 as an example). The results were then discussed with reference to the literature and applied sports practice. This process provided the author and researcher with an opportunity to identify gaps in the theory (Mills & Birks, 2014).

- Identifying the core category. Another characteristic typical of grounded theory is its relevance and impact through the effective dissemination of findings (Mills & Birks, 2014). This entire research approach acknowledges the importance of maintaining the participant as the core. As such, since the researcher was also the author this helped to reconstruct the participant’s stories as accurately as possible, albeit in the context of my own inevitable interpretation (Strauss & Corbin, 1994). The following chapters discuss the findings relevant to the extant literature as well as in an applied sports context.
Memoing (e.g. logging research activities, and decisions made; see Appendix 3.3 as an example) was used throughout the data collection procedure and helped to maintain an audit trail of the research process that served to reinforce and articulate quality activities (Mills & Birks, 2014). As advocated by Charmaz (2000), raw data was included in the storyline to keep the participant’s voice and meaning present in the theoretical outcome.

The following section of this chapter describes an overview of the research method along with the work programme used in this research project.

### 3.2 Research Method

#### 3.2.1 Participants

The first three studies are described in Chapters 4, 5 and 6 respectively. Specific sports environments were purposefully sampled to allow an investigation of athletes who were competing at a range of levels from competitive club to world class performance. This allowed for insights to be gathered from various stages on the developmental pathway. Study 1 sampled both development level athletes, defined as athletes aspiring towards a level of high performance, and a group of high performance athletes. All athletes were swimmers and were training in clubs, regional squads, or high performance centres in the same country. To collect data from a wider perspective; the coaches, High Performance Director (HPD) and Lifestyle service provider were also recruited.

Study 2 employed a longitudinal design and gathered more in-depth data from a group of swimmers over the period of one year. Furthermore, to get a more rounded
perspective the researcher spent time observing the swimmers’ training and performance environment and collected data from their coaches.

In an effort to broaden the scope of the thesis and include both team and individual athletes, Study 3 purposefully sampled participants from the national women’s field hockey squad. The players were members of the under-16, under-18, Development (Ireland A) or Senior National panel. This sample proved ideal to clearly examine the coherency of a TDP and observe its impact on the progress of the players.

Chapter 7 describes the design and initial validation of the Athlete Support and Skill Assessment Questionnaire (ASSAQ). In order to ensure that this questionnaire would be useful across sports and stages of development, data was collected from a vast variety of athletes. During the validation stage, coaches, with a minimum of 10 years’ experience, were recruited from a range of sports (e.g., Gaelic Games, Olympic Weightlifting, Athletics, Triathlon, Swimming and Rugby). During subsequent stages of validation (e.g., cognitive interviews, a pilot test, and Exploratory Factor Analysis (EFA)) athletes were sampled from various sports that reflected the intended population for which the ASSAQ would be used. Participants were also purposefully sampled from a range of competitive levels (i.e., club to World/Olympic level). The age range of these athletes was from 12-35 years old; again reflective of the population for whom the questionnaire was designed.

3.2.2 Data Collection (Chapters 4, 5, and 6)

A semi-structured qualitative interview design (both retrospective and longitudinal) was used during the qualitative studies, with probes and prompts to ensure a guided and free flowing relaxed conversation. Interviews were conducted
one-on-one between the participant and the researcher, in a quiet (yet public), convenient location (e.g., the training grounds). The interview content was developed from a review of the literature in consultation with principal investigator. Considering the ‘human’ themed examination of these studies, face-to-face interviewing was deemed appropriate to gain a thorough insight and understanding of the factors and processes involved in talent development of athlete. Extensive research in areas of social sciences have effectively used semi-structured interviews to provide rich original data on the behaviours and interactions of people on the ground (Côté, Ericsson & Law 2003; Duffy et al., 2006; MacNamara et al., 2010). However, the effectiveness of these interviews heavily depends on the communication skills of the interviewer (Newton, 2010), this includes their ability to make the participant feel at ease, listen attentively, pause probe or prompt appropriately and encourage the interviewee to talk freely (Cohen, Manion, & Morrison 2007). Steps were taken to ensure the utmost comfort of the participant and ensure they felt at ease during the interview process. This was done by establishing a rapport, adding humour, and by clearly outlining the intent of the study and procedures involved. Pilot tests were carried out on the interview guides to ensure that the questions were clear and that the structure allowed for free-flowing conversation. Importantly, the same interviewer was used for all interviews to help ensure that the data collected could be compared with another which has been highlighted as a potential weakness of this method of data collection (Patton, 2002). Again, this helped to build trust and attended to the relational aspect which was important in the overall process. Some data was also gathered through observation of
the training and competition environment. Further detail on these studies is included in the relevant chapters.

3.2.3 Data Analysis

The analysis for the three studies outlined in Chapters 4, 5 and 6 used ATLAS TI (version 5.0.66) software to explore the interview transcripts. Following recommendations of Côté and colleagues (1993), the data analysis followed an inductive and deductive process (Chapter 4 only) process where meaningful units of information were extracted from the transcripts. The quotations that emerged from the interview transcripts formed raw data codes which were inductively filtered into second order themes and subsequently filtered into first order categories that best captured the substance of the group of codes (Miles & Huberman, 1994). Methodological steps were taken to ensure the trustworthiness and credibility of the data analysis, these are outlined further in Study 1 Chapter 4.

3.2.4 Data collection (Chapter 7 only)

Chapters 4, 5 and 6 and the associated systematic qualitative analysis procedures provided a substantial evidence base for the content development phase of the fourth study described in Chapter 7. The raw data codes that emerged from these studies provided the initial content of the questionnaire. Although researchers typically only consult the literature in order to identify potential items for a ‘tool’ (Zervas, Stravrou & Psychountaki, 2007). Clients or other experts can also be approached through focus group or individual interviews (AERA, APA, & NCME, 1999). The methodology employed in Study 4 contained two phases. This first phase involved three steps to test for content validity of the items. Step 1 involved meetings with
expert coaches to examine the relevance, applicability and comprehensibility of each item. To consider the response process from the perspective of the respondent rather than the researcher (Drennan, 2003) step 2 involved a cognitive interview with a group of purposefully sampled development and high performance athletes from a range of sports (Blair & Brick, 2010). The participants were asked to complete the questionnaire and encouraged to comment on the relevance, similarity and comprehensibility of each of the items. The development of a questionnaire demands that a precise and accurate pilot test be carried out to ensure that the results are valid, reliable, unbiased and complete (Collins, 2003). As such, step 3 involved a pilot test with a group of developmental level and high performance athletes. At this point, the questionnaire was issued for completion with an initial introduction only. The respondents were asked to mark any item they felt did not apply to them, was irrelevant, a duplicate of another item, or incomprehensible. Throughout this validity phase, items were filtered for duplicates, and rearticulated so that the response of each remaining item conformed to one answer. If an item scored significantly high after the Pilot Test and displayed a common response pattern, then this item was subsequently removed from the questionnaire. On completion of the content validity phase, the purpose of the second phase was to explore the factor structure of the questionnaire using an Exploratory Factor Analysis (EFA). In the event of subsequent item deletion, it was important to secure adequate scale reliability and coverage of the construct domains by warranting a sufficient number of items remained in each domain (Benson & Clark, 1982). IBM SPSS 21 Software package was used to perform a Principal Axis Factoring (PAF) test to identify latent variables and reduce the number of items whilst still
Chapter 3 Logic for the overall programme of work

maintaining the construct and objective of the questionnaire. The EFA also allowed the exploration of the questionnaire content across a wide spectrum of sporting populations. This was important given the qualitative nature of the previous three chapters. The concluding questionnaire was designed as a practical measure for applied sports practitioners to test and monitor the competency of their athlete support system as such it was aptly named the Athlete Support and Skill Assessment Questionnaire (ASSAQ). From an applied perspective, it could be used to identify areas that require immediate attention, improvement, or maintenance.

3.2 Overview of Work Program

An examination of existing literature and practices in talent development were fundamental to building the work programme for this research project. Chapter 2 consists of a review of the literature focusing on the TDS which, for clarity, this research projects considers the TDE and the embedded TDP. The review highlights weaknesses between and within existing research and current talent development systems (TDSs) in sports practice. These gaps act as a source of guidance and motive for the subsequent structure and goals of the proceeding studies. The literature review was conducted using the following strategies:

- Researching scientific databases
- Examining NGBs performance strategies and reviews
- Examining newspaper and website articles
- Attending seminars and conferences
- Observing high performance training environments and competitive events
Key words used in this search included; talent, environment, development, high performance, sport, athlete, athletic, support, sport system, and pathway. Results from this desktop study highlighted the need for a more in-depth examination of the difficulties experienced by those responsible for talent development when attempting to translate evidence from the literature into applied sports practice. There appears to be an abundance of literature informing those responsible for talent development what is important for success (Duffy et al., 2006; Sheridan et al., 2014) but little information on how to apply this information (Farrow et al., 2013; MacNamara & Collins, 2014; Martindale et al., 2007; Pankhurst, Collins, & MacNamara 2013). Critically, the review highlights that a lack of transparency still exists between the literature and applied practice surrounding how to optimise individual talent development and employ effective TDPs. Further still, there is a scarcity of knowledge identifying underlying in-competencies of a TDS and how key stakeholders can address these issues to facilitate more effective talent development (De Bosscher, De knop, van Bottenburg, Shibli, & Bingham, 2009; Martindale et al., 2007).

Chapter 4 presents a qualitative study that pursued to address the first objective; to identify factors required for successful development in elite sport from the perspective of developmental and high performance athletes and their coaches. The results from this study provide a more in-depth understanding of the environmental, academic, and individual factors within the TDE that help a young athlete’s development. Most notably, are the findings relating to the needs of the development level coach and the potential side-effects of these deficiencies on the athlete’s development. Although this study provided a useful starting point for
investigating the factors associated with successful development, the limitations of retrospective methodologies are well documented (Côté, Ericsson, & Law, 2005). As such, it was important to continue to examine these factors within the development environment using both prospective and retrospective designs.

Reflecting these issues and addressing the second objective, Chapter 5 sought to gain a greater understanding of the developmental challenges which athletes face throughout a competitive season. The longitudinal methodology employed in this chapter overcame some of the limitations of retrospective designs but also allowed an investigation of factors, both anticipated and unanticipated, that occurred during a competitive season as well as the ability of the athlete to cope with such factors. Specifically, this chapter examined the skills the athletes used to optimise their trajectory along the TDP and how the athletes acquired these skills. Significant findings included the ad-hoc use of reflective practice to maximise the learning outcomes from competitive events. It was also interesting to observe the ‘shock-wave’ like effect of injury and illness on other realms of an athlete’s life (Tracey, 2003; Wiese-bjornstal, Smith, Shaffer, & Morrey, 1998) and how the athletes reacted to such stressors in an attempt to maintain progress. Results also underlined the importance of clarity and understanding for accessing resources in the TDE to assist in autonomous managing and preparing for significant events.

Results from the first two studies suggest that there are potential weaknesses in the competency of the NGB to operate a coherent TDS. When a fracture in the efficacy of the system is perceptible this appears to impact on the ability of the athlete to access resources for development. Fletcher and Wagstaff (2009) recognised similar
limitations regarding the lack of clarity surrounding roles, responsibilities and competency of key agents (e.g., coaches, parents, HPDs, managers). Creating coherent long-term aims and methods are a massive challenge in many sports, recognising these issues; Chapter 6 examined the impact of coherence and communication between the athletes, coaches and support staff involved with a high performance programme. Preceding studies outlined in Chapters 4 and 5 provided a good picture of the factors required and the importance of implementing resources at predetermined time points on the athlete’s pathway to allow them to negotiate obstacles effectively. The findings presented in Chapter 6 identify obvious weaknesses in how a NGB attempts to operate a TDP, and the impact of these liabilities on the athletes. The results suggest that coaches and HPD should integrate coach communication strategies to enhance the coherency amongst those involved in talent development. This may enhance the competency of those working towards a mutual set of developmental objectives to prepare their athletes for the next level of performance. Adopting an ‘open-door philosophy’, as iterated in Chapter 4, to support a scarcity of educated and experienced coaches at a school and club level was also suggested as a cost effective investment of time and resources.

Chapter 7 describes the process by which the ASSAQ was designed and validated. The purpose of this tool was to provide an informative means for key agents to assess the competency of the TDS and indicate whether an athlete has the right skills to optimise talent development effectively. The ASSAQ was essentially designed for use of the coach, however HPDs, and other support staff may benefit from its service. To date there has been no known method for coaches or performance
directors to measure the competency of their sport’s support system or the ability of the athlete to utilise the support offered within their TDE. Freeman, Coffee, and Rees (2011) came close to developing such a tool with the design of the Perceived Available Support in Sport Questionnaire (PASS-Q). However, in contrast the ASSAQ takes a more holistic approach by examining the availability of physical features in the athletes’ TDE (e.g. ‘My training environment is not sufficiently equipped for my sport’) and competencies of key individuals that provide the main sources of social support (e.g. ‘My coach doesn’t know when I access support providers such as physio or nutrition advice’). As well as this, the ASSAQ assesses the athletes’ own psychological skills (e.g. ‘I spend time planning my competitions/ events so that I am clear on what to expect from my performance’) and examines for potential signs of stress (e.g. ‘Taking time out to recover from training makes me anxious’). Whereas the PASS-Q examines features of what an athlete understands by or interprets as support in four different dimensions (i.e. Emotional, Esteem, Informational, and Tangible). For example, the PASS-Q requests it’s respondent to rate on a 5 Likert scale (0 = not at all, 4 = extremely so) whether they recognise the availability of the support in their sport (e.g. ‘provide you with comfort and security’). Similarly, the two questionnaires cover the same number and comparable domains integral to successful talent development.

Chapter 8 provided an opportunity to reflect on the findings and trajectory of the research project. This chapter specifically draws attention to recommendations that have materialised throughout the investigation, and identifies how these results can be applied to address gaps in the literature and weaknesses in real world practice. These studies suggest that a number of factors (e.g., adequate coaching, access to
support services, psychological skills, and an integrated coherent TDS were critical in supporting athletes along the developmental pathway. As this research project progressed it became clear that such an instrument would be highly useful to inform and guide the dissemination and practical application of these findings. This is particularly important in applied settings where coaches are not always engaged with or apply research. This final chapter concludes by recognising limitations of the research project as well as encouraging specific areas that require further research in pursuit of supporting talent development toward sustainable performance. The final chapter aims to present and offer the findings of the research project to those for whom this research was intended to support. Practical implications as well as future work on the ASSAQ for validation purposes are proposed. Coach education using the final product – the ASSAQ – to educate coaches and support athletes more effectively will help to disseminate this work.

In conclusion, although this research does not conform to original approaches to grounded theory, there is clear evidence that a constructivist approach underpins these empirical investigations to construct theory about issues of importance in the lives of those participants sampled (Charmaz, 2000). In this way, true factors critical for talent development are identified directly from the perspectives of those involved in the process (i.e. coaches, performance directors and athletes). From this approach a novel cost-effective method for practical use in the field was designed to help to address the research – practice divide. This method can also be used to help educate and optimise the use of resources in the TDE for an effective and successful TDP.
Chapter 4

An Investigation of the Support Required for Developing High Performance Swimmers

A lot of supports we put in the system are for when people are doing well. The support for people when they are not doing well is very poor [Liam Moggan, Coach Development Officer, Coaching Ireland]
Chapter 4 An investigation of the support required for developing swimmers

4.1 Introduction

The research reviewed in Chapter 2 has highlighted that talented athletes need adequate social and structural resources as well as high levels of commitment and motivation in order to develop superior performance (Côté, 2003; Hassell et al., 2010; Reilly, Williams & Richardson, 2003). In terms of the former, and as discussed in Chapter 2, the importance of social support factors has been well documented in the literature. For example, Hassell and colleagues (2010) provide a good description of the domains of social support (e.g., coaches, access to facilities/equipment, parents, team mates) that are integral to effective development. However, despite this understanding, these resources appear undervalued and remain underutilised and underexplored in an applied context (Hardy, Jones, & Gould, 1996; Richman, Hardy, Rosenfield, & Callanann, 1989). For example, it is accepted that the role of the coach is integral to athlete development, yet little research has examined how performance is affected when the coach-athlete relationship is dysfunctional. Furthermore, the extent to which the coach’s role changes with development and how both the coach and the athlete adapt to cope with these changes is underexplored. Chapter 2 explained how the coach’s role is multifaceted especially during the formative years; the coach’s duties go beyond delivery of training programmes to the management of the development environment including building coherent relationships with parents and staff of the NGB. Reflecting these issues and the role of the coach in the TDP, it is important to consider how coaches support athletes during the talent development process. Furthermore, to ensure that there is adequate coherence, a factor already
identified as critical to the talent development process, it is important that there is a shared understanding of the key support factors that facilitate development and how coaches support athletes during this process. As such, this study attempts to provide more valuable guidance on what athletes and their coaches perceive as critical factors for successful development with a particular focus on the type of support required by young swimmers at a developmental and high performance level.

The absence of appropriate support structures (e.g., appropriate coaching, medical support) at key points along the development pathway often forces young, and potentially talented athletes away from the sport at crucial and premature junctures (e.g., trials or de-selection time points) (Stafford, 2005). In terms of structural resources, the structure of support resources within the TDE has attracted attention from recent studies which have highlighted the prevalence of financial support and specialist services (e.g., coaching, funding, medical, psychological) at the top end of the sport. These resources are less evident, perhaps due to both funding issues as well as a lack of understanding of what exactly is required at developmental levels (Durand-Bush & Salmela, 2002; Philips et al., 2010). As stated previously, this is unfortunate since the importance of such factors for negotiating the pathway to elite performance is well established (Duffy et al., 2006; Philips et al., 2010). Of course, it may well be that different resources are important at different stages of the developmental pathway. There is already some evidence of this approach in talent development. For example, MacNamara and colleagues (2010) suggested that although Psychological Characteristics of Developing Excellence (PCDE) are important throughout the process, they are operationalised differently at different stages in
response to progressive challenges. It may well be that a similar case can be made for other developmental resources, suggesting that although there may be generic features of talent development the operationalisation of these features should account for differences along the pathway as well as between sports and cultures. Such an understanding should help optimise the support offered at different stages of the pathway and maximise the limited resources available to NGBs whilst ensuring athletes are provided with the support necessary to progress. A shift from rewarding winning towards a greater recognition for understanding and achievement may be a more profitable investment especially when one considers the long term development of the athlete and the ability for an athlete to sustain a high level of success (Martindale & Mortimer, 2011).

The importance of psychological factors as key facilitators of successful negotiation of the TDP was discussed in Chapter 2. In terms of psychological skills, evidence from applied settings (e.g., The Irish Hockey Association’s performance pathway, or British Triathlon’s World Class Performance Programme) suggests that the extent to which coaches and the NGB explicitly develop these skills within a support programme is not clearly evident. Even when an athlete is part of a scholarship scheme which integrates such psychological skill development (e.g., Talented Athlete Scholarship Scheme or Advanced Apprenticeship in Sporting Excellence) there is little evidence to support the efficacy of these approaches. This is especially the case when the development of ‘mental skills’ or ‘life-skills’ is not incorporated into the coaching and learning environment but is delivered as a separate feature of the TDE. This approach seems less effective than embedding the development of psychological skills
into the TDE (MacNamara & Collins, 2014) with an explicit focus on the negotiation of developmental and performance challenges (Collins & MacNamara, 2012). Despite the significant role these skills have been shown to play (Geron, 1978; Gould, Dieffenbach, & Moffett, 2002; MacNamara, 2011) those operating TDSs often do not pay enough attention or attempt to avoid these episodes. The repercussions of poor investment can be seen when an athlete who displays the right physiological capacity fails to move from one level to the next because they do not have adequate psychological skills to cope with new demands. Bailey and colleagues (2010) emphasise how an individual must employ a variety of skills to optimise development opportunities, adapt to setbacks and effectively negotiate key transitions encountered along the way. Without these important skills and the ability to negotiate developmental challenges, an individual may not maintain the motivation to achieve excellence at any level of participation, regardless of his or her ‘talent’ (Bailey et al., 2010). Given the support for the importance of possessing these skills (Durand-Bush & Salmela, 2002; Ericsson & Charness, 1994; Daniel Gould, Dieffenbach, & Moffett, 2002; Jones & Lavallee, 2009) ensuring athletes are provided with appropriate opportunities and support to develop and deploy these would seem a sensible approach (Gould et al., 2002; MacNamara, 2011). Furthermore, allowing athletes deploy and refine these skills in advance of meeting key developmental challenges would appear meritorious in terms of talent retention (MacNamara et al., 2010). At the same time, it is important to recognise that the pathway to excellence should not be “smoothed” for young athletes (Collins & MacNamara, 2012). Coaches and support service providers should recognise that aspiring elites benefit from periods of adversity throughout the pathway where coping
strategies that provide long term life skills are developed and refined (Nicholls & Polman, 2007; Tamminen & Holt, 2010).

There are a range of factors under the control of the NGB that, if managed in the correct fashion, can help support athletes as they develop. This can have significant performance and development benefits since a larger pool of athletes, equipped with the skills required to progress and perform, should be available for selection. Identifying these factors, and their most appropriate place on the development pathway, should help provide those responsible for talent development with a better understanding of the type of support required to support development along the TDP, as well as recommendations for optimising existing resources to better support the athlete/s. Reflecting these issues, the purpose of this study was to identify the critical factors required for successful development in elite sport from the perspective of developmental and high performance athletes and their coaches. This purposeful sample of developmental and high performance athletes reflects the earlier contention that different types of resources are required and more advantageous at different stages of the pathway.

4.2 Method

4.2.1 Participants

Competitive swimming, similar to many high performance sports, is renowned for its high demand of commitment and motivation from as early as ten years of age. As such, it represents an ideal laboratory to examine the efficacy of a sport’s support system in facilitating the long-term development of aspiring elites. Seven swimmers
(mean age = 18.2 years; SD = 2.9 years) were purposefully sampled from two high-performance swim centres, and three swimming clubs to participate in this study on the basis of their established potential for elite performance. The participants were members of either the national high performance (n = 4) or national development swim programme (n=3). In an effort to collect data from a number of perspectives, seven experienced coaches (n = 7) were also recruited to participate in this study. These coaches were purposefully sampled and coached at either a national or at an international level of competition. One of the coaches sampled was also the national HPD for this NGB. All the coaches were purposefully sampled on the criteria that they were working within the NGB’s performance programmes and were familiar with both the demands of elite swimmers and the current system that was in place at the time of data collection. In an effort to elicit information at a systems level, two employees of the Athlete Support Services division from the national Institute of Sport (IS) were also recruited to participate in this study.

4.2.2 Interview procedure

Prior to the interview each participant was informed about the nature and objectives of the study and the procedure involved with data collection. This was an important step in putting the participant at ease and to avoid socially desirable responses. Following ethical approval from the University of Limerick’s Physical Education and Sport Sciences Research Ethics Committee (PESSREC 1409; see Appendix 4.1) a series of one-on-one, semi-structured interviews were conducted. An open-ended, semi-structured interview protocol provided the necessary flexibility and allowed for more natural comfortable conversation. The interview guide was derived
from the literature review in Chapter 2. The guide was reviewed by the researcher and other peers involved in this research project to ensure the information being asked was relevant and that the questions were open-ended to encourage conversation between the participant and the interviewer. The guide consisted of three sections:

1. The introduction. This section consisted of demographic questions used to ‘break the ice’ and encourage active participation of the interviewee. The questions allowed the participant to reflect on their involvement and experience with the overall topic.

2. The main body. This section contained key questions at the core of the investigation. This section was versatile in order to allow the participant to explore different life domains.

3. The closing section. This section was used to bring the discussion to an end and ensure participants felt they had had an adequate opportunity to talk about issues they felt relevant.

More detailed information was elicited by probing and prompting to encourage elaboration in certain areas of the conversation. Time was also spent in the training and competition environment of the participants in an effort to establish rapport and familiarity with the demands of the sport. The interviews lasted approximately 50 minutes excluding introductory and ‘warm-up’ phases. The interview guide began with opening questions used to ‘break the ice’, establish rapport, and gain information on the participant. The interview guide (see appendix 4.2) then progressed into the key questions that created a discussion on the needs of athletes relative to their development in swimming. The open-nature of the interview encouraged participants
to speak liberally about weaknesses in the sport’s TDS and to voice their opinion on recommended improvements of the support system.

### 4.2.3 Data Analysis

Once all interviews were completed, they were transcribed onto a Microsoft Word document, and edited for spelling and grammar. The interviews were emailed to each participant allowing them time to read, delete, clarify, or expand on anything they may have stated. No significant changes were made at this stage suggesting that all participants were satisfied that the interview scripts represented their thoughts and opinions. The transcripts were then imported into the software ATLAS ti 5.0 which was used to structure and manage the data. Data analysis for this study employed an inductive paradigm and followed the steps outlined by Côté and colleagues (1993). The first phase of data analysis involved filtering through the transcripts identifying and coding meaningful pieces of information that adequately represented the data (Strauss, 1987). The second phase of the analysis involved grouping the codes or raw data themes with similar meanings together, and creating first order categories that captured the substance of the group of codes (Miles & Huberman, 1984). The purpose of the second step of the interpretational analysis was to re-contextualise the information into distinct categories, resulting in a set of categories that served as a preliminary organising system (Tesch, 1990). This stage of the data analysis was flexible and continued until no further categories could be established, thus theoretical saturation was met. Figure 4.1 depicts the data analysis process from interview transcripts to First Order Categories.
4.2.4 Addressing Reliability and Trustworthiness

Several further steps were taken to ensure the validity and trustworthiness of the data presented. It was recognised that in qualitative research the researcher becomes an instrument through which the data must pass for analysis. Coding interview transcripts involves interpreting what respondents mean in their answers to questions. As such doing so requires the researcher to have an in-depth knowledge of the subject matter (Campbell, Quincy, Osserman, & Pedersen, 2013). The ability to see meaningful conceptual breaks depends very much on the qualifications of the coder and their ability to discern not only obvious meanings, but also more subtle meanings of a respondent’s statements (Krippendorff, 2004). A number of steps were taken to enhance the intra-reliability of coding;

1. The development of the interview questions was based on literature that focused on the requirements for successful performance development. Familiarisation with the theoretical framework provided a solid base of training in preparation for the data collection process.

2. A series of pilot interviews were conducted to ensure that the questions were interpreted accurately. Following the pilot interviews, changes to the interview guide included the removal, addition or rewording of a number of questions.
3. Similar to Hassell and colleagues (2010), time was also spent in the participants’ training and performance environment to build a rapport and gain a better understanding of the participants’ lifestyle.

4. During the interviews the participants were asked to speak as clearly and coherently as possible. If it was felt that the clarity of the conversation the participant was asked to repeat an answer or explain what they meant by answer further. As such the latent meaning of most of the text was clear and simple to code.

5. Prior to analysis of the transcripts the main supervisor for this project spent time demonstrating how text should be coded in advance of the data analysis process.

6. Due to the length of the transcripts and potential fatigue in the coding process, regular breaks were taken during the coding process to ensure that mistakes or over-sights were avoided.

7. Once the interview was transcribed onto a document it was emailed back to the participant for review before data analysis occurred.

8. Recognising the risk for miscoding and misclassification of meaning units, a collaborative approach was taken with an independent researcher. This researcher was blinded to the conditions and objectives of the investigation and was asked to code part of the data (Rose & Jevne, 1993). When this process resulted in an analytic disagreement both researchers presented their interpretations until a plausible explanation was agreed upon (Sparkes, 1998). If both
researchers could still not come to an agreement then the coded section of transcript would have emailed back to the respondent to clarify their intent or meaning of that section or unit. However, this scenario never arose. This procedure suggested a high degree of congruence with only a small percentage of interpretations requiring discussion and all issues were solved as a result.

9. Throughout the data collection and analysis stages both the researcher and the main supervisor met regularly to discuss all aspects of the research process and a collaborative approach was undertaken during the data analysis stages.

### 4.3 Results

From the 16 participants interviewed for this study 742 quotations emerged creating 299 codes, 64 meaning units, 39 second order categories, eight higher order themes and three first order categories. In this section, the results are presented in the form of tables. A detailed description in the text of each of the three first order categories (i.e., Social Support, Tangible support, Psychological skills) with exemplar quotations from the participants and references to the literature. Attention is drawn in each section to the differential importance of each category at different stages of the pathway.

#### 4.3.1 Social Support

Social support and more specifically the people that are involved in the talent development process play key roles and have significant responsibilities in contributing
to the effectiveness of a successful TDS. The following results expose the people who development level and high performance swimmers believe to be most influential in their development. The positive impact of influential relationships also appears to be dependent on the lucidity of the communication pathways between these key stakeholders.

Table 4.1 Social Support category with associated higher order themes and 2nd order categories

<table>
<thead>
<tr>
<th>2nd Order Categories</th>
<th>Higher Order Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coach-Athlete relationship</td>
<td></td>
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<tr>
<td>Teammates</td>
<td></td>
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<tr>
<td>Parental support</td>
<td></td>
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<tr>
<td>Role of the NGB</td>
<td>Significant others</td>
</tr>
<tr>
<td>HPD Influence</td>
<td></td>
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<tr>
<td>Athlete or coach behaviour</td>
<td></td>
</tr>
<tr>
<td>Student-athletes</td>
<td></td>
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<tr>
<td>Across the sport system</td>
<td></td>
</tr>
<tr>
<td>Between academic staff, the athlete and coach</td>
<td>Effective communication pathways</td>
</tr>
<tr>
<td>Between clubs and the HPC</td>
<td></td>
</tr>
<tr>
<td>Lucid communication processes</td>
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Note: HPC = High Performance Centre, HP = High Performance, NGB = National Governing Body, HPD = High Performance Director

4.3.1.1 Significant others.

Unsurprisingly, the coach was cited as playing one of the most significant roles in an athlete’s development; thus, it is crucial for optimal progress that both the athlete and coach communicate effectively. Interestingly the high performance (HP) swimmers described how the coach’s communication style had a significant, and not always positive, influence on the swimmers within the squad.

Well I have had big run-ins with [Coach’s name], and long talks. A lot of it is experience and attitude. Those swimmers that can’t handle it, they are the ones that are looking to be spoon fed. You need to be able to take the sport on for yourself, you need to look up to the coach and work towards the same goal [HP swimmer 2 male].
The ‘tough love’ approach characteristic of many coaches was appraised by some swimmers as negative, while others found it effective as it gave them a realistic vision of what it takes to perform at the highest level. This realistic vision of where the coach believed the athlete to be and where athlete needed to be at a specific time point was seen as important for the athlete’s understanding of developmental objectives. The interactions that occurred between the coaches and swimmers also allowed the swimmers realise their own athletic strengths and weaknesses (Hassell et al., 2010) and the importance of these factors for future development. Reflecting this, the HP coach outlined how he strived to create a training environment that prepared athletes for the realities of high performance sport, described as “without the frills”. He recognised that this strategy did not suit all athletes and this may have been the cause of dropout from his training squad. Yet, this coach valued exposing the standard of development level and high performance swimming and was not prepared to change the approach for these individuals:

[Dropout from the program] could have been avoided, a lot of people left last year so maybe they see what they need to do to improve and decide they don’t want to do it. Elite sport is not made for everybody [HP coach 1].

Van Yperen (1995) suggested that coaches who employ such “tough love” behaviours do so to maintain a role of authority and emphasise the demands of high performance sport. This coaching style was described as a significant change for swimmers who had just moved into the High Performance Centre (HPC) from less competitive environments. The coach’s tough-love approach had a limiting effect on other swimmers reflecting the unique ways in which athletes develop along the TDP (Philips et al., 2010). One development athlete describes how she learned to cope with the
change when she moved to train at the HPC as result of progressing along the performance ladder.

We have all been stars in our individual clubs where the coach loves you to bits and thinks you are great, and then when you move to this squad you have to deal with not being the star anymore, its full of top swimmers and the coach has a top athlete and some people just can’t handle that. You are going to have bad days in the squad and it’s up to you to deal with that because you don’t have a coach to hold your hand anymore [HP swimmer 3 female].

It was noticeable that although some of the swimmers accepted the coach’s “make or break” to athlete development, it certainly clarified the standard he required for a swimmer to train and perform as part of the HP squad. In spite of the coach’s behaviour many of the swimmers learned to adapt to the demands of the performance environment and learned to manage their relationship with their coach.

Sometimes people think that [name of coach] is not working for you, and he is the ‘big bad wolf’ and being a [expletive] for no reason but he is young and he still has a lot to learn...At the moment our relationship is fine, but some days I will wake up and it will be absolutely horrible, and if you asked me then I could tell you that [name of coach] is the biggest [expletive] in the world and I will hate him [HP swimmer 2 male].

These results have some similarity with Jowett’s (2007) 3+ 1 C’s model of an effective coach-athlete relationship. This model includes ‘complementarity’ and suggests that if the coaches’ behaviours do not correspond to those preferred by athletes and those required by the environment the relationship can be impaired. In another way, this study also provides evidence of how the same HP coach provided an opportunity for the swimmer to become involved in the planning and decision-making process of their development. This offered a means of encouraging the swimmer to take responsibility and become more independent (Bloom, Schinke, & Salmela, 1997; Jowett & Nezlek, 2012). For example, one HP swimmer suggested that:
[Name of the coach] doesn’t go out of his way to talk to you, it’s like pulling teeth sometimes, but generally if I have a problem I will go to him, and we’ll talk about what I have to do and what will work best. I’m always trying to learn and I think he respects me for that [HP swimmer 3 female].

The analysis clearly showed how the coach was a major influential force in the swimmer’s development and how a firm yet sensitive approach to the needs of the swimmers was perceived as most beneficial. Interestingly, athletes learned to adapt to the coach’s demands as they moved along the pathway suggesting that learning and deploying these coping skills was a key component of this relationship and in their development as a high performance swimmer.

The role of team-mates also emerged as an indispensable source of social support in the development of these swimmers. It’s known that young athletes make significant sacrifices to maintain their development in elite sport. This is especially true in a sport like swimming which is known as an early specialisation sport (Côté et al., 2007) where young athletes must negotiate the balance between significant training volume and demands from other aspects of their lives such as their education and social life (Wylleman & Lavellee, 2004). Sport specific practice at a young age can monopolise much of an athlete’s spare time to be able to interact with friends in a social environment outside of school hours. One swimmer interviewed commented that she “has no social life, I swim and go to school”. Despite the obvious sacrifices required to compete at the highest level, the importance of experiencing a healthy social life and a balance between academic, sporting, and social commitments was recognised by all participants. This balance was described by one coach as achievable through planning and the creation of a healthy training environment whilst recognising the social aspect of attending college.
Not enough credit is given to social life attached to academics and swimming... It’s a social life within itself; college is social life, people need to recognise this and we need to cater for it [HP coach 2].

Similarly, Hassell and colleagues (2010) described how elite swimmers felt they were part of a large connected network because they shared each other’s experiences and understood and supported each other’s’ competitive goals. The athletes in this study felt their team-mates were there for them and could be counted on to support them when demands of their lifestyle became excessive.

I always felt in Germany that everybody was always so selfish; nobody would cheer for each other in training or anything so I came here and I actually felt that my team-mates were watching me and supporting me at races. So you could just feel them giving you a little boost. Even if someone is faster than you its good because it keeps you under pressure to train harder [HP swimmer 1 female].

The athletes involved in this study began swimming competitively at a mean age of 10.4 years (SD = 1.3 years). At the early stages of their sport’s career parents played a key role by providing emotional support, as exemplified by the following quotation.

What you need most of all is family support, that is the most important thing. Because if you don’t have it, you’ll feel lonely at certain stages. They should know what you want to do, and know what you want to achieve. That makes everything easier [HPC swimmer 2 male].

However, due to their key role in the athlete’s initial development, the importance of effective and clear communication pathways between parent and athlete, as well as with staff and coach, was stressed to ensure monitored progress in all aspects of the swimmer’s development.

We like to know as coaches what is going on at home...a lot of the parents are kind of taboo about it, you’d have a minority of the parents come up and speak to you about it [Club coach 3 male].
Similar to the coach-athlete relationship it was suggested by support staff that parents should not “over support” athletes along the development pathway. Instead, as the athletes mature parents should look to opportunities to encourage the athlete to take responsibility of their own self-management and become more independent. Research has shown that parent behaviours and parenting styles can have both positive and negative influences on children’s sport experiences (Côté & Fraser-Thomas, 2007; Fraser-Thomas et al., 2005).

I think a lot of the time with junior athletes I deal an awful lot with their parents and the parents seem to do a lot for them, I mean some of these athletes can’t get out of bed in the morning without their parents getting them up [IS service provider 1].

Jowett and Timson-Katchis (2005) describe athletes’ parents as “psychologically significant network member/s” considering the range of support they can offer (e.g., financial, emotional, informational). However, similar to the coach-athlete relationship the integration of parental support needs to consider the requirements of the athlete relative to the support provided by their TDE and the athlete’s stage of development. As such, considering the age of these athletes (mean age = 18.2 years; SD = 2.9 years), their maturity and their academic status it would seem that there should be many of opportunities for effective communication patterns, not only between parents and coaches, but also with staff of academic institutions, work places and other important parties (Côté & Fraser-Thomas, 2007; MacPhail & Kirk, 2006; Weirsma, 2000) to ensure an effective TDE. Indeed, research from organisational psychology highlights that effective organisations explicitly promote clear expectations and open communication systems to allow provision for any conflicts that may arise (Bemowski, 1996).
4.3.1.2 Effective communication pathways.

An active and transparent communication system amongst staff and between the coach and athlete was seen as a critical feature of an effective support system. Communication and mutual collaboration was suggested as the means of building cooperative relationships, and this was stressed by swimmers and support staff alike.

The coaches and the HPD of the sport would communicate the message to the athletes. We communicate directly to the athletes, as well as to the NGB or the HPD. There is also peer to peer communication [IS service provider 1].

Despite this, the athletes suggest that the communication between support staff of the sport’s NGB and service providers at the Institute of Sport was not always ideal, with many of the participants reporting that the communication pathway was poor, and mainly took place indirectly through their coach. For example, one swimmer stated that;

I don’t have any real communication with the NGB staff or support staff other than those directly in the HPC here...I’d know their names and there would be a few emails sent, but I don’t think I’ve actually met any of them, that communication is usually through [name of head coach] [Development swimmer 1].

Similar reports of poor communication networks were evident between swimmers and their associated academic institutes. All swimmers in this study were full-time students at secondary school or university. They all suggested that the lack of formal cooperative structures between educational and sporting organisations was a major road-block in terms of providing appropriate support for student-athletes. There was no consistency in the approach taken and the extent to which the balance was effectively found varied on a case-by-case basis dependent on each student-athlete’s situation.
What we found over the course of the year is that over a macro level it has been very difficult to get to the right people. However on a micro level, when we get one on one with the student and the academic we have had some real success. So what we have on a micro level is an athlete shows their individual lecturers their commitment not only to their academics but also to their swimming as well. And when this happens we find them [the academic staff] to be quite open and supportive [HP coach 2 male].

There were some instances of how academic institutions catered for the needs of the athletes (e.g., creating the opportunity to extend academic years and modify lecture hours to accommodate for excessive training loads). However, the challenge of combining academic and sporting commitments should not be underestimated and the lack of a clear and consistent relationship between these parties was identified as a significant limitation.

Clearer communication between clubs and between clubs and the HPCs could lead to higher rates of success in the transfer of developmental athletes to senior and international level. For example, the lack of communication between the two was found to create ambiguity for the development swimmer and the coaches involved.

I don’t have any direct contact with [name of HPC coach] really, originally he said he would post me down the sessions he was doing, but that hasn’t really happened. But I think he is happy enough with what I am doing, because he can see [name of development swimmer] is improving so he isn’t going to change something that is working. He has more or less said, ‘keep doing what you’re doing because your obviously doing something right’, he is beating people in that squad that have been in there a lot longer than he has [Club coach 1 male].

Another club coach explained how he was invited to observe the selection process of swimmers from a club onto the HP squad at an equivalent talent development swim squad in the USA. The coach found that the American coaches stressed the importance of involving people in the process of talent development (i.e., athletes, coaches, administrators) emphasising collaborative team-work towards the same goals.
In my mind, the HPC is a team with a leader as the coach. And they must train as such, so if you have an athlete who is not willing to train as a team then why should they be there [Club coach 1 male].

4.3.2 Tangible Support Services

Physical resources in the form of finance, sport science and sports medicine services and access to individualised coaching emerged as indispensable types of tangible support important for effective development of development level and high performance swimmers.

<table>
<thead>
<tr>
<th>2nd Order Categories</th>
<th>Higher Order Themes</th>
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<tbody>
<tr>
<td>HPC service</td>
<td>Sport science services</td>
</tr>
<tr>
<td>Nutritional support for athletes</td>
<td></td>
</tr>
<tr>
<td>Financial aid for clubs</td>
<td>Financial support</td>
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<tr>
<td>Financial aid for the athlete</td>
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<tr>
<td>Financial aid for the HPC</td>
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<tr>
<td>Ability of the coach</td>
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<tr>
<td>Inconsistent monitoring of development</td>
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<tr>
<td>Lucid performance plans and development pathways</td>
<td></td>
</tr>
<tr>
<td>Dependent HPC</td>
<td>Limitations of support system</td>
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<tr>
<td>Poor regional and club structure</td>
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<tr>
<td>Poor club facilities</td>
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<td>Logistics of the HPC</td>
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<td>Inadequate support services</td>
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Note: HPC = High Performance Centre, HP = High Performance, NGB = National Governing Body, HPD = High Performance Director

4.3.2.1 Sport science services.

All members of the HP squad had access to support services including physiotherapy, strength and conditioning coaching, nutritional advice, psychological training, and medical services. The coaches and athletes operating at a developmental level did not qualify for access to such support resources.

The guys here now in the HP squad, they would have all the right back up, the science, the coaches, the diet specialists, whereas the athletes I work with just
have me I don’t really have enough people to help with coaching. I need people to help develop the athletes to a level we are asking for but nobody is willing to dedicate time at the end of the day. I am the only one that can actually do the coaching. I’m years at it but I don’t really have any back up on, things like diet advice etc. They all should be on a special gym programme and I cannot provide that [Club coach 1 male].

The added benefit of having access to such resources such as support services was clearly evident. For example, one swimmer spoke about how this changed when he moved to train at the HPC.

It’s made a huge difference [the lifestyle support program], even my attitude and my approach has changed. I am more mature as an athlete. And even as a person as well if you want to be a HP swimmer every bit of your lifestyle has to be planned so that you can concentrate on training as well...It was a bit of a change coming up here, I had just been in University for 2 years and had just got used to that, but it was a big step. I think I almost doubled my workload. And just because the support was there from the Sports Council and the college I was able to negotiate a little to fit things in [HP swimmer 2 male].

In comparison, development swimmers aspiring towards a level of high performance were aware of the need for similar support services but did not have the same level of support as their HP counterparts. They recognised how these services could help them with their development in sport and in many cases sought out this support independently.

Advice on nutrition, what to eat and when would be great, especially when I have to go straight from the pool to school and back again. I realise that this is the time for recovery and I’m not sure what I should be eating. I pay for my own physio, so access to physio and massage would be great [Development level swimmer 2 male].

This evidence suggests that pre-elites have similar requirements in relation to sport science support and sport systems should investigate means of maximising these resources where possible to cater for developing elites.
4.3.2.2 Financial support.

Substantial financial support aid was required in three distinct areas. The swimmers required a source of finance to cover the expenses associated with national and international training camps, competition travel and entry fees, membership fees to the NGB, and training and competition kit. The HPC required financial aid to cover running costs of the centre including facility hire, coaching expenses, and support services. In a similar manner, club operation costs included facility hire and coaching expenses. The overheads involved in high-performance swimming can be overwhelming. It can cause a major obstacle for families and in some cases limit their participation in sport at a competitive level. One coach and swimmer described the impact that these costs had:

Joining fees and gala fees, it adds up to quite a lot, if you’re going to galas you could be paying €200-300 per child then maybe €70-80 for entry fees [Club Coach 2 male].

Training camps can cost up to €2000 and we have 2-3 a year so that is very expensive [HP swimmer 1 female].

A number of the swimmers recognised the time and financial sacrifices that their families made to support their pursuit in mastery of the sport. In line with other studies, parents constituted the most important source of financial support for pre-elite and elite athletes (Duffy et al., 2006; Hassell et al., 2010). One swimmer mentioned that he felt guilty that his parents had put so much time and money into his athletic development, and as a result felt pressurised to succeed.

It’s kind of on my conscience that everyone is sacrificing something for you to be on the squad, they [my parents] get up early and had to change job hours for me to be able to swim. So that was a bit of an obstacle. I feel real bad then when I don’t perform well because they have been putting in a load of effort as well [Development level swimmer 3 male].
The swimmers in the HPC described attaining financial aid as a complicated process; only once an athlete has performed to a certain level can they be considered for a sport’s council grant in the following year. Only one of the swimmers in this study was supported financially by the National Sports Council grant scheme. When the swimmer was asked about the importance of this financial assistance she responded:

Basically it’s my living, it pays for everything, and I wouldn’t really be able to live away from home if I wasn’t getting it [HP swimmer 4 female].

Small bursaries were in some cases awarded to athletes as rewards for their achievements. However, the “haphazard” manner in which this money was distributed was cited as a concern by the participants and, as such, financial issues were a significant burden for the athletes, especially when planning for training camps or competitions.

I can’t work on top of what I am doing, I am relying on my parents for money too and I feel so guilty for that, so any money I win I give back to them. It is always on the back of my mind. I spend as little money as I can. I wish there was more funding [HP swimmer 2 male].

4.3.2.3 Limitations of the support system.

One of the more concerning findings of this study was that club coaches stated that they did not feel confident about their ability to coach swimmers to a high performance level. This was perceived as a potential limitation to the successful development of talented athletes under their responsibility as the organisation of the sport required that club coaches must prepare swimmers for entry into high performance levels. The coaches suggested that coach education and development needed to progress in order to meet the demands of the high performance environment.
I don’t really have enough people to help with coaching. I need people to help develop the athletes to a level we are asking for but nobody is willing to dedicate time at the end of the day. I am the only one that can actually do the coaching [Club coach 2 male].

These findings from this analysis reveal poor development and support for coaches, this supports evidence from previous researchers (De Bosscher et al., 2009). Coach provisions and development were identified as major contributing factors when supporting talented swimmers in reaching their potential, this is important because world class coaching is widely accepted by athletes as the most important support service they receive (De Bosscher et al., 2009).

The biggest challenge the athletes have is finding the right level of coaches. We have a lot of great facilities now...but our coaches now need to be at a higher level...I think there are only a small number of coaches at a club level that realise the standard of coaching demanded for development of HP athletes ... coaches need to understand what is required of an athlete to bring them to a developmental level [HPD NGB].

This study also showed evidence that lack of coordination and coherency across the system was a major rate limiter in the talent development process. According to the coaches, it was the responsibility of the HPD to “coordinate and manage the high performance programme”. Yet, from the HPD’s perspective the objective of the sport system was to achieve a more independent TDS by delegating accountability to the head coaching staff at each regional HPC to operate their own TDE. According to the HPD, this process should have resulted in a more effective system.

What I have tried to do is take [name of NGB] out of the region which makes the HPC in this area more responsible for their athletes’ development, and makes the HPC more independent. This then should allow the NGB to focus more on European and International events and allow regions to look after the national and regional events, which will give them more responsibility as to what they are feeding into the National system, whereas before they were just sitting back and not doing anything, now they have to do it themselves [HPD].
Chapter 4 An investigation of the support required for developing swimmers

Obviously, more attention especially regarding the clarity of messages is required to operate this system as envisioned by the HPD. One coach desired a more valid ‘open door’ culture throughout the sport’s club system by sharing knowledge and access to facilities both between clubs and between clubs and HPCs. This process was described as a means to develop coherence in the TDS. The effect of coherency on the TDP is examined in more detail in Chapter 6.

[Name of HPC coach] gives me help with stuff, and anything he can’t help with he gives me something to read so that I can find the means and ways to learn...or even better he will tell me where he found the information himself and will suggest I try the same [Club coach 1 male].

Considering the stage of development and level of performance of the swimmers sampled for this study and the coaches working with them to ensure their success. A lack of coaching resources in the form of the availability of high quality coaching, coach education support as well as a poor communication system between coaching and management staff of the TDS would appear detrimental to the swimmers negotiation of the TDP.

4.3.3 Psychological Skills

Aside from resources and stakeholders it appears that certain behaviours, skills, and characteristics are important for successful negotiation of the talent development process. The swimmers exposed some prevalent factors and the applicability of these factors to their development.
Table 4.3 Psychological skills category with associated higher order themes and 2nd order categories

<table>
<thead>
<tr>
<th>2nd Order Categories</th>
<th>Higher Order Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing the transition from club to HPC</td>
<td>Characteristics of a successful HP swimmer</td>
</tr>
<tr>
<td>Planning skills</td>
<td></td>
</tr>
<tr>
<td>Managing a balanced lifestyle</td>
<td></td>
</tr>
<tr>
<td>Switching off</td>
<td></td>
</tr>
<tr>
<td>Characteristics of a HP athlete (motivation, focus,</td>
<td></td>
</tr>
<tr>
<td>commitment)</td>
<td></td>
</tr>
<tr>
<td>Ability to use life-skills outside of sport</td>
<td>Transferring Psychological skills</td>
</tr>
<tr>
<td>Learning responsibility</td>
<td></td>
</tr>
<tr>
<td>Learning goal settings</td>
<td></td>
</tr>
<tr>
<td>Learning communications skills</td>
<td></td>
</tr>
<tr>
<td>Balancing academics and sport</td>
<td></td>
</tr>
<tr>
<td>Loss of motivation</td>
<td>Lack of Psychological skills</td>
</tr>
<tr>
<td>Loss of commitment</td>
<td></td>
</tr>
<tr>
<td>Lack of foresight</td>
<td></td>
</tr>
<tr>
<td>Managing the increase in training load</td>
<td></td>
</tr>
<tr>
<td>Lack of goal setting skills</td>
<td></td>
</tr>
</tbody>
</table>

### 4.3.3.1 Characteristics of a successful High Performance swimmer.

Supporting the findings of previous researchers discussed in Chapter 2, motivation, focus, and time management skills were consistently cited as the most important skills required in order to succeed as a high-performance swimmer. Interestingly, one swimmer feared losing motivation as the biggest threat to his development.

The one thing I would be afraid of is loss of motivation. I can’t even imagine that now. But in the future it would be one thing which I would be worried about. It’s hard to get in and do 26 hours of training if you are not motivated [HP swimmer 2 male].

As suggested previously, the demands of balancing high performance sport and educational commitment were often too much to manage due to the lack of support, communication, and coherence between these two aspects of the swimmers’ life.
It started to get harder and I started not being able to do homework and then I was sacrificing school, I started missing a lot of school, and that is when I decided that I couldn’t really keep it up [Development level swimmer 3 male].

In an effort to prepare swimmers to cope with these challenges, one club coach working with club swimmers, development level swimmers and high performance swimmers described a method he used to encourage these athletes to learn self-management skills and become more responsible for their own development.

What I always try to do is have a younger swimmer work with an older swimmer. Now you /can call it a ‘buddy system’ or whatever but what it does with the senior swimmer is it puts them under different pressure. The senior would have this junior feeding off them, now they have the extra responsibility of having to think of someone else rather than themselves in the water. They need to care about their junior swimmer’s training as well as their own, so it creates added pressure on them to think about development [Club coach 1 male].

Coaches could use modelling techniques such as this, to promote development of certain characteristics by targeting specific role-models from which younger athletes can learn from through observation (Bandura, 2001).

### 4.3.3.2 Transferring psychological skills.

One swimmer in this study showed evidence of how the skills he had developed through sport were applied to other areas of his life.

I like to think that swimming has made me who I am, if it wasn’t for all the training I’ve done or the competitions I have travelled to, I wouldn’t have made the contacts that I have made. So if I was to give up training tomorrow I wouldn’t think, it was all for nothing. I don’t like to think that it was all for one thing. You don’t really realise how much you get from it [HP sport] until later. If it doesn’t work out then it will not have been for nothing [HP swimmer 2 male].

Talent development processes that promote the development of such transferable skills not only encourage and facilitate athletes to achieve their potential in their current performance domain but also allow for the “cross fertilisation” of talent into
other domains at later stages of development. This is important given the evidence provided in Chapter 2 for early diversification (Duffy et al., 2006; Henriksen et al., 2011; as well as more recent and highly publicised talent transfer approaches (e.g., UK Sport’s Girls4Gold programme). Even if an athlete does not change domain and remains committed to the TDP, these psychological factors will help them adapt their performance to the different situations and contexts inherent in their activity (Abbott & Collins, 2004). Furthermore, there is significant evidence to suggest that these psychological factors will also help young athletes cope with the broad range of other challenges, such as adolescence (Career Transitions model; Wylleman & Lavellee, 2004) which can be equally powerful derailleurs at any point on the TDP. It was interesting to note that despite not having received any specialist support to develop psychological skills to help manage his dual-career demands, the development level swimmer was aware of the value of the skills he learned through his experience in competitive sport.

I know it’s a bit of a cliché, but I have learned a lot through my losses. Even just in school I have learned a lot from swimming, managing my time, being organised and focused. I think the best thing about it is achieving the outcome after all the training, the reward of seeing the time up on the score-board. The experience of becoming a high performance athlete is an education in itself [Development level swimmer 1 male].

It is important that athletes, coaches and parents recognise the beneficial influences a sports career can have on life outside or after sport. Many successful athletes are typically endowed with valuable traits such as the drive to succeed, a hard work ethic, and the ‘hunger’ to learn and acquire new skills. For an employer, these traits make an individual an exceptional hire (Williams, 2013). Though few NGBs put any emphasis on teaching athletes to recognise or transfer these skills across other life domains,
An investigation of the support required for developing swimmers’ tend to discover these attributes in an ad-hoc manner. This is a significant point considering the amount of time and energy both athletes and their parent dedicate to their sport at a competitive level. It appears that there isn’t enough emphasis on the value of psychological skills and characteristics learned and developed through participation in high performance sport. There is a need for greater assurance to athletes and parents that the time, energy and finances dedicated to pursuing a high performance sports career is an investment in the personal development of the athlete and contributes an education towards a long term career.

4.3.3.3 A lack of psychological skills.

A lack of important psychological skills of any developing young athlete is known to have a significant impact on their rate of progress (MacNamara, 2011). For example, Abbott et al. (2007) suggest that an inability to focus on tasks or objectives as a skill might hinder the development of a young, but otherwise “talented” athlete. It could be argued whether, in the absence of such a key characteristic, such an individual should be considered talented at all. Certainly, the subsequent development and deployment of this characteristic, amongst others, can and does result in unexpected and non-linear changes in development and performance (Abbott et al., 2002) reflecting a more accurate, “dynamic conception” of talent. Coaches and support staff highlighted key transitions (i.e., from school to university or from club to HPC) as major obstacles in the development of the swimmers and noted that many fail to progress beyond these events. More specifically increases in mental (e.g., focus, commitment, motivation) and physical demands (e.g., strength, endurance) were identified by a number of swimmers as crucial at these time-points. As such the
importance of recognising these transitional demands, preparing athletes in advance and supporting them through the transition is critical if they are to progress:

They are coming from a background of maybe doing 9-10 hours training per week, and then they are pushing it to 20 hours a week straight away [at the HPC]. That way you are going to get swimmers dropping out, and that’s what has happened in [name of former HPC swimmer] case, how many swimmers in the HPC can’t hack it? It’s just too tough for them. So I think it should be a gradual step for them, or take them when they are a little more mature...wait until they are 18 or 19 before you give them these massive hours [Club coach 2 male].

As suggested earlier if an “open door” approach were to become more prevalent between clubs and HPCs within a TDS then transitions may be smoother. The coaches and/ or parents at all stages of the pathway would be more aware of the future demands expected of the swimmer. In this way, challenges can be anticipated and the necessary skills checked and developed in advance (MacNamara & Collins, 2014). At the same time it is important for coaches to recognise the level of competency of an athlete and their ability or “readiness” to negotiate developmental obstacles alone and in the process of doing so learns from the experience.

4.4 Discussion

Results from this study suggest that those responsible with developing talented athletes should have a clear understanding of both the critical factors required to achieve success and the optimal placement of these factors along the pathway. Findings from this study emphasise that high performance sport is demanding and includes a unique set of environmental stressors that could benefit from a strong social support network to help athletes negotiate challenges not just at the top level of performance but throughout their development. Interestingly, in this sample the
requirements of both developmental and high performance were similar, but it was clear that swimmers at the high performance level had access to more tangible resources than their development level counterparts. An under-resourced TDE during the pre-elite stages of a swimmer’s career at a time when they are attempting to make the transition into a high performance squad could be detrimental to their progress and success in transitioning onto a senior programme. For example, financial costs were shown to cause significant emotional and physical stress on both swimmers’ and development level club coaches alike. This evidence supports previous literature (Houlihan & Green, 2008; Gulbin et al, 2013; Storm & Nielsen, 2010) suggesting that redistribution of financial support and specialist support services needs to be considered more seriously. Of course, pragmatism must play a role in these situations, especially in the current economic climate. Nonetheless, the importance of providing aspiring elites with access to relevant coaching and tangible resources was shown to be a key driver in their development and NGBs should work towards maximising the use of available resources and natural learning experiences.

The role of the coach in supporting the TDP was found to be a key to success. In contrast to the HP coaches, club coaches highlighted that the TDS was under-resourced in terms of provision and development opportunities for coaches. Importantly, many of the club coaches expressed concern and self-doubt in their own coaching ability to progress swimmers beyond their training environment and onto the next level of performance. There is an explicit need for the NGB to recognise the significant implications if the coaches working at a developmental level are under resourced and incompetent to deliver to the needs of the swimmers and requirements
Chapter 4 An investigation of the support required for developing swimmers

of the sport. If a sport system can anticipate and recognise the needs of its key individuals, then it should be able to respond more effectively, maximising the use of available support resources across levels of performance (Collins & MacNamara, 2011).

The creation of a more “open-door” culture across the sport’s TDS could provide a cost effective opportunity to operate coach mentorship programmes (Bloom et al., 1995; 1993; Larkin et al., 2007). Martindale and colleagues (2005) underline the importance of long term aims and methods as well as coherent messages and support across the sport system as major factors contributing to an effective TDE. The level of coherency across the TDP and its influence on successful talent development is an area that requires further investigation; this is focused on in Chapter 6. The “open-door” philosophy could also help “bridge-the-gap” between development level and high performance swimmers, allowing them to experience the physical and mental skills required for training and competing successfully at the top of their sport. Without “throwing them in the deep end” the young swimmers could be strategically immersed to train alongside their peers which could assist in preparing them with the forthcoming demands of their sport through physical and psychological skill development. Additionally, the high performance swimmers may be encouraged to adopt the characteristics which they perceive convey the attitude of expert performers (Baker & Côté, 2003). This policy could benefit the development of swimmers further by enhancing the communication between the clubs and HPCs. In this way, clear development strategies and performance objectives could be disseminated more efficiently. Results from this study tend to fall in line with recommendations provided by Martindale and colleagues (2005) by suggesting that NGBs should initially invest in
An investigation of the support required for developing swimmers

resources to create the right context and culture rather than specific individuals or top tier performers.

As expected the relationship between the swimmer and their coach or coaches, parents, and teammates was identified as highly significant in their development. Interestingly, in this sample the coaching style of the HP coach generated much discussion around his ‘tough-love’ approach. In contrast to this style, Dweck (2006) described a “phony-praise” coaching style which can make individuals doubt themselves when things go wrong and inflict low self-confidence in overcoming future obstacles. Instead Dweck (2006) suggested that coaches should teach athletes to reflect on the process of attaining goals, to embrace challenges, enjoy effort and keep learning. In this way, key psychological skills (e.g., work, persistence, commitment and focus) are encouraged rather than praising the athlete’s innate talents. Reflecting on developmental challenges and exposing learning outcomes are examined more specifically in Chapter 5. The swimmers in this study described that the coaching style they perceived emerged due to the coach’s strong personal values of honesty and a desire to provide clear realistic direction and goals regardless of the emotional impact. The swimmers suggested that unrealistic goal setting caused a lack of respect for the coach and inhibited feelings of motivation in attempting to achieve goals. On the other hand, the HP coach believed he was creating stimuli to develop psychological skills and characteristics perceived to be necessary for successful development. Recognising that an athlete’s developmental trajectory can be unique (MacNamara & Collins, 2014) it is important to consider that some athletes may lack the physical and mental skills to cope with the pressures of a novel or tough work ethic. As a result, a lack of versatility
in the coach’s style can contribute to fatigue and drop out. The swimmers in this study valued honesty, clarity, commitment, and the sensitivity to recognise hard-work and emotional responses as traits of a good coaching style.

Findings from this study suggest that the tangible support requirements for developmental and high performance swimmers are similar. As discussed in Chapter 2, effective TDSs recognise and adapt support to fit differences in athletes including; age, stage of development, lifestyle demands, environmental constraints and objectives for that athlete. For example, in terms of psychological skills these findings suggest that developing athletes should be provided with the skills required to cope with developmental transitions and given opportunities to deploy and refine these skills. On top of this, further attention is warranted to consider the different challenges athletes face during their development, how they negotiate these episodes and learn from the experiences. This topic is further examined in Chapter 5. At the same time it is important to highlight the ability of the coach to recognise when an athlete is ready to negotiate certain experiences themselves and emphasise the importance of reflection in the learning process.

From a coach’s perspective the needs of a development level coach differ in relation to the high performance coach. Coaches at a developmental and underage level are in obvious need of educational and/or mentorship style support. This may simply begin with greater clarify and understanding of the TDP for high performance swimming including the physical and psychological characteristics and skills required to progress at each stage. It would be disillusioned to ignore the financial constraints of an NGB, but establishing a more ‘open-door’ culture amongst the sport could solve
many of these issues. Coaches identified that in order for a more cohesive TDS the mind-set needs to change from the top down. NGBs need to adopt a more integrated, holistic and individual approach to talent development (Martindale et al., 2005).

4.5 Conclusion

In summary, this study provides an examination of what development level and high performance swimmers and their coaches perceive as critical factors to assist their aspirations toward mastery of their sport. The use of multiple perspectives provided an opportunity for key individuals to offer first-hand recommendations to their NGB to more effectively support aspiring high performance swimmers. These findings contribute towards the overall objective of the research project by helping to address the theory-practice divide by directly asking those at the centre of the TDS and those responsible for performance what they perceive as the critical factors for successful development. Although this study provides a good insight into the dynamism of social support, tangible resources, and psychological skills and characteristics within a swimming environment, it is important to consider the extent to which these findings are transferable to other sports and contexts (MacNamara & Collins, 2014; Park et al., 2013). Further to this, it is important to consider how the use of these resources may change over-time in response to developmental challenges and events. Greater efforts should be made to encourage an NGB to examine how effective its organisation is at supporting its athletes through crucial developmental periods at all stages of the athlete’s career. To enhance understanding and improve the use of these findings in an applied setting Chapter 5 examines how these critical factors are
used by athletes to negotiate challenges along the TDP. More specifically the next chapter identifies strategies which athletes use to cope with challenges and stressors on the talent development journey toward fulfilling their potential.
Chapter 5

A longitudinal examination of the challenges experienced and the resources required for progress of developmental and high performance swimmers

I got into a position where I should have talked with someone, but I just kept it all inside. I think some athletes do that, put on a brave front, look at the next race and think everything will be okay, once I get through that. I didn’t know how to reach out, and didn’t feel I’d anyone to reach out to [Martin Fagan, Irish Athlete, 2012]
5.1 Introduction

Although we have some insight into the types of challenges and transitions athletes are likely to face as they progress (Wylleman & Lavallee, 2004), Davidson and Williams (2009) suggest that more evidence is required to inform those responsible for talent development how to implement theoretical and empirical based findings into their practice. For example, Wylleman and Lavallee’s (2004) athletic transitions model does not detail the specific nature of the challenges or the skills required to successfully negotiate talent development. As well as this, the challenges they identify mainly describe normative transitions that run in parallel to chronological age and maturation. It is understood that in addition to these normative transitions, athletes are likely to encounter a range of non-normative and unexpected transitions that are equally as important and must be negotiated to ensure progress. As discussed in Chapter 2, there have been some advances in this area with Gulbin et al. (2013) providing a revised talent identification and development framework, the FTEM model, that encourages sports to consider the non-linear development of athletes in sport. A critique of this can be found in Chapter 2 but for the moment, and in a similar fashion to Wylleman and Lavallee, consider how Gulbin et al. (2013) still provide little information on the unexpected and non-normative challenges (e.g., illness, injury) experienced by these athletes. Every challenge, whether expected or not, has the potential to be a crisis, or a beneficial experience depending on the individual’s perception, preparation and support (Sinclair & Orlick, 1993). The challenges
experienced by developing athletes can be unique to the individual and shaped by the demands of the sport and the TDE in which the athlete is expected to grow.

The previous chapter highlighted the importance of a versatile and communicative coach-athlete relationship and the beneficial effect of an “open-door” culture across the coaching network to support coach development, clarify development and performance objectives, and optimise the use of resources within the TDE. However, due to the individual, dynamic and unpredictable nature of the TDP more information is needed to inform coaches how to make better use of these factors to overcome challenges and stressors associated with talent development. Without a good understanding of these events and experiences there is a risk that preparation strategies will overlook conditions that are particularly damaging to athlete well-being and the progression of an aspiring elite athlete (MacNamara & Collins, 2014); it could even be argued that ensuring psychological well-being is an even more important pursuit than achieving elite success. As such, coaches must consider how athletes develop coping skills and strategies to negotiate these obstacles.

Although the study reported in Chapter 4 represented a good starting point for identifying the factors associated with development in HP swimmers between the ages of 15 to 21 (mean age = 18.2 years; SD = 2.9 years), it also included some methodological limitations notably the employment of a retrospective, self-report design. Even more critically in light of the need to consider both normative and non-normative developments, this retrospective protocol may also have failed to detect or examine the unanticipated stages and transitions evident during development and how athletes cope with these developments and how the TDP supports this
negotiation. Accordingly, in an attempt to counter the limitations of the retrospective study reported in Chapter 4, while shedding more light on the interesting implications for talent development, the purpose of this study was to identify what athletes perceive as challenges or stressors within their environment, how they cope with and prepare for these events and what they learn from these experiences. Specifically Chapter 5 was interested in examining:

1. The key challenges athletes experience throughout a typical training season.

2. How athletes prepare and reflect on these experiences

The combined use of retrospective and prospective means of data collection over a long period of time provides multiple lenses and helps to avoid inaccuracies due to memory loss and bias (Côté, et al., 2005).

5.2 Method

5.2.1 Participants

Following ethical approval from the PESSREC (Appendix 4.1) a purposefully sampled group of developmental and high performance swimmers (n = 6, 3 males, 3 females; age 18.8 ± 1.3) were recruited from a national HPC to take part in this study. The HPC sampled depicted a tiered squad structure, including a high performance (HP) squad of internationally competitive swimmers, and a development squad of nationally competitive swimmers. All participants were dual-career athletes, defined as athletes in education. Three of the swimmers were in secondary level education, two of the swimmers were studying at university and aiming to qualify for the London
Olympics in July 2012, one swimmer had just entered university as a first year student. In an effort to collect data from multiple perspectives, the HP squad coach, and the development squad coach (2 males, age 32 ± 3) were also interviewed for this study. This HPC offered a good environment to pursue the objective of this study through efficient access to a group of developmental and high performance athletes and the ability to observe the training environment. The HPC also had a good variety of both development level and high performance athletes who were at different stages of their academic education. The age range of the swimmers offered a sample of athletes both dependent and independent of living and with a wide spectrum of developmental and performance goals (i.e. qualification to the Olympic games, transition into the HP squad).

5.2.2 Interview Procedure

A series of five semi-structured interviews were conducted with each participant approximately every 90 days over a 12-month period. The first interview (see appendix 5.1) took place in late September/ early October at the start of the swimmers’ season, the fifth interview took place in August at the end of their season. The interview guides were designed in the same way as described in Chapter 4. However, the content of the interview was versatile to encourage conversation between the researcher and interviewee and to allow the conversation to flow. As well as this, the content of the interview guide was adjusted to consider the events surrounding each interview stage.

The first section was used to ‘break-the-ice’ with the participant and included only general questions to begin conversation. The second section, used questions to discuss the planning and coping strategies for upcoming challenges, as well as details on short
and long term goals. In the second, third, fourth, and fifth interview the participants were asked to reflect on significant events which they had experienced. The third section involved questions about the participant’s training environment and the support resources within and outside of this environment which they used to prepare and cope with events. Following the fifth interview, data saturation was met, further data collection would not have contributed anything more to the generation of new themes (Côté, Salmela, & Baria, 1993). Interviews were performed face-to-face in a quiet public location. After recording, the interviews were transcribed to a document and emailed to the participant approximately one month after the interview. At this stage the participants were asked to clarify, or rephrase anything they said.

The coaches were interviewed twice, once at the beginning (September) and again at the end of the training year (August). The interview questions were modified to take into consideration past, present and future events at the time point of the interview. Probes and prompts were given by the researcher to encourage the participant to recall the detail of significant events and to ensure accurate understanding. The participants were free to proceed in the direction dictated by the flow of the conversation, until the interviewer felt the line of discussion went off point. The use of sampling a case study cohort longitudinally allowed for more control over the data collection but also the ability to explore a more holistic view of the athletes’ and coach’s training and performance environment.

5.2.3 Data Analysis

The same content analysis procedure as described in Chapter 4 was used for this study. Following the re-contextualisation of data twenty eight higher order themes
inductively emerged and were subsequently deductively reduced to relate to one of the three distinct categories. These categories functioned as the main categories for discussion which most clearly describe the challenges experienced, the associated coping methods used by the swimmers to overcome these obstacles and the outcomes learned through reflection in order to progress.

5.2.4 Reliability and Trustworthiness

The interview questions for this study were developed based on the literature that focused on challenges and coping strategies of developing HP swimmers. Prior to the interview process the interview transcript was subjected to pilot tests, with two athletes (a triathlete and a GAA player) and three sports practitioners including a triathlon coach, an athletics coach, and a sport scientist to ensure that the questions were interpreted accurately. Following the pilot interviews, probes and prompts were modified to help guide the interview.

Similar, to the method used in Study 1 (Chapter 4 Section 4.2.4) steps were taken to ensure the trustworthiness and reliability of the interview process and analysis of transcripts. This included emailing the participants their transcripts to allow them review the content. At this point participants were allowed change, delete or clarify anything that was stated during the interview. Throughout the data collection and analysis a collaborative approach was undertaken as all investigators met to discuss numerous aspects of the research process. Throughout the year, time was also spent observing training sessions and attending competitions whilst interacting with the participants. This helped to build a comfortable relationship between the
interviewer and the swimmer as well as get a more holistic perspective of their development environment and lifestyle.

5.3 Results

Content analysis resulted in 752 quotations, 352 codes, 27 second order categories, and three first order categories. Since the objective of this study was to examine how athletes prepare, cope with and reflect on challenges experienced during their development, each of the second order categories deductively filed under each of the three first order categories; ‘Key Challenges’ category are presented along with a discussion of the ‘Coping Strategies’ employed by the athletes. Finally, the ‘Reflection’ category is presented. Results are depicted in Table 4.1. Exemplar quotations from the participants are used throughout to provide a more perceptible appreciation for the skills and support that the participants required to cope with the identified challenges and stressors.
### Table 5.1 Coping strategies used to manage challenging experiences and the associated learning outcomes on reflection

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Coping strategies</th>
<th>Learning outcome on reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coach-athlete conflict</td>
<td>Planning meetings with the coach</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>Creating clear communication and relationship between athlete-coach</td>
<td>a b</td>
</tr>
<tr>
<td></td>
<td>Goal setting and performance planning</td>
<td>a c</td>
</tr>
<tr>
<td></td>
<td>Trusting and committing to a performance programme</td>
<td>c</td>
</tr>
<tr>
<td>Organisational Challenges</td>
<td>Goal setting and performance planning</td>
<td>a c</td>
</tr>
<tr>
<td></td>
<td>Clarifying performance objectives</td>
<td>c</td>
</tr>
<tr>
<td></td>
<td>Creating clear communication and relationship between athlete-coach</td>
<td>a b</td>
</tr>
<tr>
<td></td>
<td>Trusting and committing to a performance programme</td>
<td>c</td>
</tr>
<tr>
<td>Transition related factors</td>
<td>Distancing self from challenge</td>
<td>d</td>
</tr>
<tr>
<td></td>
<td>Embracing the challenge of HP Sport</td>
<td>d e f</td>
</tr>
<tr>
<td></td>
<td>Using psychological skills (Commitment, hard work, self-reliance, time management, planning &amp; organisational skills)</td>
<td>a b d</td>
</tr>
<tr>
<td></td>
<td>Support from teammates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Access to the Development Squad</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enhanced communication between HPC Coach and Club coach</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Open-door” culture</td>
<td></td>
</tr>
</tbody>
</table>

*Note. Applying the use skills gained through HP sport = a, Recognising psychological skills gained = b, Career transition out of sport becomes clearer = c, Recognising performance improvements from investment in HP sport = d, Personal characteristics shaped by HP sport = e, Recognising physical gains = f*
### Challenges

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Coping strategies</th>
<th>Learning outcome on reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balancing a dual career</strong></td>
<td>Utilising support resources</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>Planning meetings with the coach</td>
<td>b</td>
</tr>
<tr>
<td></td>
<td>Goal setting and performance planning</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>Creating clear communication and relationship between athlete-coach</td>
<td>a, b</td>
</tr>
<tr>
<td></td>
<td>Creating clear communication between athlete-academic staff</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>Life style management and balance</td>
<td>a, c</td>
</tr>
<tr>
<td><strong>Illness and Injury</strong></td>
<td>Family Support</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>Utilising support resources</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>Planning meetings with the coach</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>Goal setting and performance planning</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>Creating clear communication and relationship between athlete-coach</td>
<td>a, b</td>
</tr>
<tr>
<td></td>
<td>Creating clear communication between athlete-academic staff</td>
<td>a, b</td>
</tr>
<tr>
<td></td>
<td>Life style management and balance</td>
<td>c</td>
</tr>
<tr>
<td></td>
<td>Persistence, motivation. The use of psychological skills</td>
<td>b, d</td>
</tr>
<tr>
<td><strong>Competition</strong></td>
<td>Letting go, switching off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-race routine</td>
<td>c</td>
</tr>
<tr>
<td></td>
<td>Self-belief, confidence, motivation. The use of psychological skills</td>
<td>b, d</td>
</tr>
<tr>
<td></td>
<td>Family Support</td>
<td></td>
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<td></td>
<td>Team mate support</td>
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5.3.1 Coach and Athlete Conflict

As identified in the previous chapter, the coach has been highlighted as one of the main sources of social support to the athlete and, as such, an effective relationship is seen as vital to the athlete’s development.

Table 5.2 Coach-athlete conflict and associated coping strategies

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Coping strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coach-athlete conflict</td>
<td>Planning meetings with the coach</td>
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<tr>
<td></td>
<td>Creating clear communication and relationship between athlete-coach</td>
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<td></td>
<td>Goal Setting</td>
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<tr>
<td></td>
<td>Trusting and committing to a performance programme</td>
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</table>

The participants described many instances of when this relationship was challenged and how this caused stress and impacted on their development pathway.

For example, one High Performance (HP) swimmer described how the “up and down” relationship with her coach was a major source of stress throughout the training season. This was especially noticeable when the coach’s attitude or behaviour was perceived to lack empathy when the swimmer was struggling to improve performance.

At the moment I am training hard and swimming well, so we are both happy but when you start struggling that’s the hardest. On the training camp [name of HP coach] was being a [expletive], he went over-board on everything, and that’s tough whenever you are in a close training environment. It helps if you don’t take it personally, and just try and do everything right, I don’t like to complain. It’s when you are doing everything right and you are swimming badly then [name of HP coach] will be pissed off with you and you will be pissed off with yourself. It’s a horrible circle and it could be like that for months [HPC swimmer 2 male].

In order to cope with this, the swimmer described how she purposefully scheduled meetings with her coach in order to help her manage the relationship. The swimmer found that these meetings allowed both for herself and the coach “vent” their
opinions through discussion of their progress and development plan. The swimmer described the importance of being able to manage and learn from the critical feedback he received from this coach and how she learned to interpret it in a process-oriented manner.

I had a big talk with my coach during the camp. It was an angry talk, it was a bit of a wake-up call. He basically said that I wasn’t being the top athlete that I could be, and that I wasn’t doing things right. I think he can get a bit hot tempered and then he blows out every comment he has about you. For the first while after it you hate him and you are thinking ‘why did he say that’, but I think I needed it, and after a while you can see where he was coming from and he is just trying to get the best out of you. I think since I joined the HPC I have had 3 serious talks with my coach, and it helps [HPC swimmer 3 female].

A number of the swimmers described the importance of managing key relationships as a means of coping with training stressors and how systematic feedback and progress-report meetings enabled them develop a coherent working relationship with their coach.

### 5.3.2 Organisational Challenges

Interestingly some of the more prevalent development challenges emerged due to incoherency across the sport’s organisation. Vague developmental standards and requirements for progress within a sport system appeared to cause stress for both the athlete and coach.

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Coping Strategies</th>
</tr>
</thead>
</table>
| Organisational challenges| Goal setting and performance planning.  
                          | Clarifying performance objectives  
                          | Creating clear communication and relationship between athlete-coach  
                          | Trusting and committing to a performance programme |
Chapter 5 A longitudinal examination of the challenges faced by developing swimmers

It is the responsibility of the sport’s organisation to outline clear performance requirements in line with international standards for their athletes to qualify to compete at major events. One HP swimmer described how a lack of clarity from the sport’s organisation regarding selection criteria resulted in confusion between both himself and his coach in relation to what to expect from his performance and progression.

Back in September we asked the HPD what he wanted me to do for qualification to enter the Worlds, and every month since we have been onto him, up to now we have been trying to figure it out, but he never got back to us on it. But today we found out that I might have to go under two hours in the European Cup in May. I don’t know where he is getting his times from. I am just going to have to swim it anyways [HP swimmer 2 male].

Although elite performance is, of course, dictated by outcome goals, the ability to set realistic, short-term, process oriented goals and adhere to such targets is an essential part of becoming an elite performer (Philips & Gully, 1997). In order to cope with the lack of clarity surrounding long term objectives and selection criteria, one HP swimmer described how he used his performance at events, including training camps and small scale competitions, as short term goals and performance measures to help structure his season until a decision regarding his qualification criteria from the NGB was announced.

We have the camp in Australia in January, I know it’s going to be tough, so I aim to get as fit as possible for that. There is a gala at the end of the camp against Australian swimmers, and I will use that as a gauge of my fitness. Two weeks after that I have a non-tapered event, this will be good performance indicator in preparation for the worlds. I have it all in the back in my mind; I know what I have to do [HP swimmer 2 male].

As the season progressed it was interesting to observe how the effects of his goal setting strategy paid-off. The swimmer increasingly saw the requirements to achieve
his own goals become more explicit, helping to direct his efforts and avoid wavering from his development plan.

The goals I made with my coach at the start of the season are the same [since the beginning of the season], I have achieved the qualification set out by the HPD to compete at the worlds, my goals now are just much clearer, I know what I am up against I know where my levels are at, I am a lot more confident and the goals seem a lot easier to achieve. It’s very clear what I have to do, and I am very clear on how I am going to go about it [HP swimmer 2 male].

Due to the vague performance criteria provided by the NGB, this swimmer and coach were forced to estimate the selection criteria and set their own performance indicators and goals. From these, development steps became clearer, adding structure and direction to their development plan.

5.3.3 Transition Related Factors

Unsurprisingly swimmers noted that transition related factors contributed to difficult development experiences (i.e. increases in training load, a change in coaching style, and support from teammates). Coaches also noticed obvious obstacles in the transition from one level of performance to the next (e.g. poor communication between club and HP coaches).

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Coping Strategies</th>
</tr>
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</table>
| Transition related factors | Distancing self from challenge  
Embracing the challenge of HP Sport  
Using psychological skills (Commitment, hard work, self-reliance, time management, planning & organisational skills)  
Support from teammates  
Access to the Development Squad  
Enhanced communication between HPC Coach and Club coach  
“Open-door” culture |
The transition into a new training environment, especially when a swimmer moves from a club to a HPC, can be quite stressful for young swimmers. Transition related factors cited by the participants included new training partners, new coaches, a change in status among the training group, an increase in training intensity, an increase in training duration, an increase in mental and physical fatigue, and a greater demand for self-reliance were all highlighted as common factors which impacted on the swimmers once they moved. One development level swimmer described how the transition to the HPC significantly impacted on his progress and it took time to adapt to the new training demands of the environment and to develop into an independent swimmer away from home.

It’s a big jump to HP swimming. Here nobody is going to feed you stuff, you’ve got to be self-managed and motivated. [name of HP coach] isn’t the nicest man, if you are doing something wrong you are going to know about it and it’s up to you to sort it out [Development swimmer 3 male].

This swimmer did not refer to any specific resources or method to help him cope with the transition from a club into the HPC. Instead he stated that “he just dealt with the move and got on with the training”, distancing and ignoring challenges has been identified as a method of coping (Holt, Hoar, & Fraser, 2005).

The HP coach explained that the creation of the development squad, characteristic of the HPC sampled in this study, provided potential HP swimmers with a stepping-stone to high performance environment that helped buffer the impact of transition related factors. Additionally, the introduction of the development squad increased the number of swimmers in the HPC and created more of a team-like atmosphere.
The development squad is there to help ease swimmers into HP, by having development swimmers train along-side the HP swimmers creates a sense of extra motivation. It’s very hard getting up at 4.30am to train by yourself, it helps a lot to be part of a team [Development coach 1 male].

The HP coach also facilitated regular HP training camps during school mid-term and summer breaks to offer club swimmers the opportunity to train beside the HP swimmers at the HPC. These were described as invaluable learning opportunities that acted as important transitional mechanisms to guide the swimmers towards high performance standards. At the same time, the club coaches were also invited to visit the centre and observe and learn from the HP coach.

I took the coaches and swimmers in and did workshops with them and told them this is what I am doing this is where I am going. They can contact me at any stage to come down and train at the HPC, all they need to do is contact me. I don’t have to do this; I am using my own initiative here. I want more swimmers at a HP level and if more swimmers come down then I can see them swim and offer feedback on what they need to be working on to make it to the next level [HP Coach 1 male].

As a result of these procedures, the club swimmers and coaches gained a better perspective of the standards and coaching objectives at a HP level. Furthermore, the HP swimmers began to see themselves as role models and in response began to act in a way that best fitted their HP status. Reflecting this, one HP swimmer described how “you have brazen young swimmers, nipping at your toes, and this pushes you along”.

The creation of this “open-door” philosophy associated with the HPC was described as helping development swimmers cope with the transition to the next level in swimming, as well as creating a more effective HP team training environment and should be considered as a model for other NGBs to assist in talent development.
5.3.4 Balancing a Dual Career

Unsurprisingly, the dual demands faced by the swimmers from both their sporting and academic worlds placed significant stressors on the participants. Relative to the sample, these swimmers exposed challenges associated with managing a full time sports career alongside college or school. For example these swimmers typically managed twice daily training sessions, the first starting at 5am and the second at 3:30pm or after school, as well as home-studies, exam periods, an adequate diet, and regular sleep/rest routine.

Table 5.5 Balancing a dual career and the associated coping strategies

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Coping Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balancing a dual career</td>
<td>Utilising support resources</td>
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<tr>
<td></td>
<td>Planning meetings with the coach</td>
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<tr>
<td></td>
<td>Goal setting</td>
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<tr>
<td></td>
<td>Creating clear communication and relationship between athlete-coach</td>
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<tr>
<td></td>
<td>Creating clear communication between athlete-academic staff</td>
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<tr>
<td></td>
<td>Life style management and balance</td>
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</table>

Reflecting the developmental model of transitions offered by Wylleman and Lavallee (2004), the transition to higher levels of performance and training coincided with an increase in academic loads, as well as typical biological stages of maturation and psycho-social development. On top of this each academic year starts simultaneously with the beginning of the swimming season. In this regard, one of the development squad swimmers expressed how he experienced significant pressure when trying to balance training, study, and recovery time.

I thought that I would be able to do the HP training and keep high grades, I want a good leaving cert, but I would advise them [upcoming HP swimmers] not to expect keeping high marks in school. I find you have to choose either one or the other [Development swimmer 2 male].
This swimmer found that study demands were satisfied at the expense of training requirements and vice versa. In response, to try cope with the study-training demands he dropped from the HP squad down to the development squad, gaining more study hours and decreasing time spent training. Other participants commented that they found the use of a lifestyle support officer helpful in learning how to maintain active clear communication pathways with their coach and their academic staff. One HP swimmer explained that by informing his coach of upcoming stressors at college it allowed him to pre-empt and plan to accommodate extra academic related time and energy demands into the training programme.

I mentioned to my coach that I have exams coming up, and that I am under a bit of pressure, at least he’ll know there is a reason if I’m tired in training [HPC swimmer 1 female].

Another HP swimmer felt that it helped her to notify her lecturers for reasons as to why her study workload was not being completed.

The training camp interrupted my studies, so I emailed my teachers whilst I was away and explained that I was really stressed, so they compromised a little by moving my pre exams around [HPC swimmer 1 female].

Access to support resources such as lifestyle support clearly provides options and help for athletes in education confronted with the associated demands of their daily regime. As a result of acquiring the psycho-social skills to open up clear lines of communication the swimmers were then better equipped to pre-empt other such challenges.

5.3.5 Injury and Illness

It seems inevitable that an athlete will experience some form or degree of sport’s related injury and or illness during their early career in competitive and HP
sport. These two occurrences provided the most common sources of non-normative unexpected stress.

**Table 5.6 Injury and Illness and the associated coping strategies**

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Coping Strategies</th>
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</thead>
<tbody>
<tr>
<td>Injury &amp; Illness</td>
<td>Family Support</td>
</tr>
<tr>
<td></td>
<td>Utilising support resources</td>
</tr>
<tr>
<td></td>
<td>Planning meetings with the coach</td>
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<td>Goal setting</td>
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<td></td>
<td>Creating clear communication and relationship between athlete-coach</td>
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<td></td>
<td>Creating clear communication between athlete-academic staff</td>
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<td></td>
<td>Life style management and balance</td>
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<tr>
<td></td>
<td>Persistence, motivation-Using psycho social skills</td>
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</tbody>
</table>

Swimmers reported that the lack of predictability, disruption to development plans, and the psychological stressors caused by injury and illness posed the greatest challenges. The example below provided by a HP swimmer shows how her motivation, commitment and focus both in training and in her studies also appeared to be challenged during these time periods.

It was a couple of months before my stress fracture was actually diagnosed and in the mean time I was trying to swim through it. It was frustrating because I knew there was something wrong. I have looked at my goals realistically for this season, and my coach has said that I won’t be back in the water until December or January. That was hard to take, it’s all very vague, I just have to wait and see. It even hurts me when I sit down so I’m constantly thinking about it [HPC swimmer 3 female].

Interestingly in response to the diagnosis of her injury this HP swimmer began to access and maximise the use of the support resources in her environment. She met with the lifestyle advisor more regularly, she ensured that the lines of communication between her physio, strength coach, and coach were kept transparent and active with
regular updates on her rehabilitative status, and she scheduled meetings with her coach to revise realistic short term goals.

With the injury my long term goals went on-hold, it was hard to plan because it all depended on recovery. But I focused on improving smaller things, like my posture and strength work, I developed a clear honest relationship with my physio and strength coach [HPC swimmer 3 female].

Also, she ensured that her lecturers were informed of her status so as they could reschedule more suitable assessment periods.

They have been really accommodating with college, I am having difficulty sitting [with the back injury] so studying gets affected. I have the option of moving some of my exams to August [HP swimmer 3 female].

On returning to full training, this swimmer realised that by drawing upon the environment’s resources and establishing a clear active support system she had succeeded in getting back in the water and competing again.

I have worked so hard to get back training. I learned so much during my rehab, I’m better for it. My mind frame is more focused, I’m more organised and I have clear goals [HPC swimmer 3 female].

5.3.6 Competition

Performing better in training than in competition can be a highly frustrating and stressful challenge for any athlete. A prevalent challenge experienced by these swimmers was their ability to access their full performance potential when it mattered most. Performing a personal best (PB) is no light-hearted feat, it demands an athlete to synchronise all components of fitness (i.e. physical, mental, technical and tactical) at one time in an efficient manner.
When the swimmers were asked about their long term objectives all participants targeted performances and results at competition as long term, outcome oriented goals, “I want to break the national record”, “I want to qualify for the London Olympics”, “and I want to achieve my personal best before Christmas”. Many sport systems use competition performance as justification for the selection of athletes onto funding programmes. However, such methods of goal setting and selection add significant pressure on athletes to perform well. Abbott and Collins (2002) suggest that successful athletes who have continued to win at the highest level have been shown to handle the stressors associated with the increased personal and external expectations and to focus effectively rather than being caught up in distractions. In contrast to this, one swimmer described how he felt that he had let his family and coach down due to a poor performance at competition.

I tried to just let it [the race] happen because I know I over-think in a race and that affects my performance. I feel terrible because, I know how much they [parents] have invested in me. It’s their time too and their money [HPC swimmer 2 male].

Subsequently, during this study this swimmer dropped from the HP squad to the development squad to focus more on his studies, and cut down on the demands of HP sport.
The development squad is also somewhere they can drop too if they are struggling with the HP squad. There isn’t as much pressure on them to perform. It’s a little more relaxed [compared to the HP Squad] but in saying that [name of HP Coach] is always expecting 100% from them [Development coach 2 male].

Another HP swimmer reacted in an opposite manner, he used competitions as purposeful training events to measure his standard of fitness and fine tune aspects of his performance for later, more large scale events. Despite the pressures associated with the competition environment almost all of the swimmers felt that racing helped them stay motivated and committed to training.

I use low profile national level galas as targets to see where I am, readiness wise. Of course, I get nervous, I enjoy racing, the anxiety of it all, it’s a love-hate relationship. I find one of the hardest things to do is to just switch off, and let the performance happen [HP Swimmer 2 male].

5.3.7 Reflection and Learning Outcomes

Recognising the evolving and dynamic nature of talent development it is important that athletes and coaches are encouraged to learn from past experiences (Knowles, Gilbourne, Borrie, & Neville, 2001). As mentioned earlier in this chapter, this study was also interested in examining how athletes reflected and learned from challenging experiences and the use of coping strategies to manage these episodes to progress and move forward along the TDP. These learning outcomes are depicted in Table 4.1 in relation to the Challenges and Coping Strategies utilised.

Similar to findings published in recent report by the United States Anti-Doping Agency (Boxill, Glanville, Murray, & Hanna, 2012) the swimmers in this study recognised the benefit of acquiring many of the valuable psychological skills from growing up and participating in HP sport (e.g., discipline and commitment to train, a hard work ethic, greater physical abilities). One swimmer in his final interview spoke of the benefits he gained from living and managing a highly demanding student-athlete
life style. At the time the swimmer had just finished his final year exams at secondary school and was exploring his career options and potential courses of study at university. He recognised that the challenges he experienced increased his capacity to tolerate a physically and mentally demanding career and an arduous lifestyle.

I have looked at a career in the defence forces and looked at their physical tests, and the physical demands of what they do, and I think to myself, well I’ve done that amount in training. Swimming has given me such physical capabilities and mental toughness. Not everyone can get up at 4am for training five mornings a week, then go to school, and train again in the evening before sitting down to study! The lifestyle teaches you something! [Development swimmer 2 male].

Similarly, another HP swimmer described how his swimming career had shaped his personal characteristics and life skills. This swimmer recognised how these skills (e.g. resilience and self-regulation) were transferrable into other life domains to benefit his career outside of sport.

If I had a disappointing event or race it used to eat away at me, and I’d be kicking myself and feeling sorry for myself. Now I just take what I can from the experience and put it to bed and move on. I like to think that in day to day life I can deal with issues in the same way, for example, when over-coming a stressful period of exams or a bad break-up! [with a girlfriend] [HP Swimmer 2 male].

Interestingly, the same athlete was the only swimmer to purposefully use reflective practice to aid his performance. However, it was only during the data collection process that the swimmer actually recognised that they were using the technique. The swimmer’s coach did not purposefully employ Reflective Practice in his coaching method as a means to extract greater gains from his own coaching experiences. Mirroring this, the coach did not implement Reflective Practice techniques with his swimmers to use on their own events and performances. This is consistent with the findings from previous researchers (Cropley et al., 2012) who suggest that once
outside of formal training hours, reflective practices are not used or valued. Comparable to its use for coach development, use of reflection by inexperienced and novice athletes is potentially more crucial than for more experienced expert performers. As such it should be established as a primary aspect of coaching practice at all levels (Cropley et al., 2012). In this way, athletes can recognise the profits (e.g., improvement in performance, development of psychological skills) of competitive experiences and development challenges and stressors. Methods of disseminating better implementation of its practice are discussed later in this chapter.

5.4 Discussion

It is apparent that elite athletes experience a wide spectrum of stressors both within their immediate environment as well as those associated with the operation of the NGB at an organisational level of their environment (Fletcher & Wagstaff, 2009). The results of this study identified significant sources of normative (e.g., transition related factors, study and sport demands) and non-normative (e.g., illness and injury) challenges. In addition, competitive (e.g., pressure to perform well) and organisational (e.g., coherency of the sport system) stressors were evident, which according to Kristiansen and Roberts (2010) play a major role in flow and rate of athletic development. In order to facilitate the development of the athlete it is important that both the nature of these stressors and the means by which athletes negotiate these challenges are understood.
4.4.1 Challenges and Stressors

A debilitating coach-athlete relationship, unclear performance criteria, transitional related factors, and managing the balance between training and study emerged as the most common sources of stress for the participants. Injury and illness posed the greatest unforeseeable disruption to the athlete’s progress. It was interesting to observe how the repercussions of injury caused a “shock-wave” like effect across all domains of the swimmer’s life. Similar to extant research (Hanton, Fletcher, & Coughlan, 2005; Kristensen & Roberts, 2010) organisational challenges were perceived by swimmers to be more prolific compared with competitive challenges. Hanton and colleagues (2005) suggest that this may be due to the diverse and unstable nature of organisational stressors. Throughout this investigation organisational related challenges (e.g., clarity in qualification criteria, poor relationships between clubs and HPCs and unclear developmental objectives) caused a sense of frustration amongst the swimmers, this may have been due to their lack of control of these particular situations. Feelings of anger and frustration were also recognisable when speaking to the coaches about the sport’s “fixed mind-set” culture that obviously resounds between clubs and HPCs. This in turn enhanced the difficulty of managing transition related factors when progressing swimmers from a club to a HPC or Development Squad. The pressure to perform well was perceived as the most significant competition related stressor. This pressure is often exuded from the NGB for swimmers to attain eligibility for financial support and/ or qualification to international competitions. Securing a position on the start line is typically based on results and times achieved at national level fixtures. The qualification process for
major events has already been shown to be highly problematic and a barrier to development (Abbott & Collins, 2002). This study supports this issue considering a number of the swimmers felt pressure to perform in order to prove their ability to qualify for major competitions and (in their mind) move forward on the TDP. High profile events offer valuable learning experiences but also the opportunity to compete against more challenging opponents yet many athletes that do qualify are often fatigued by the qualification process and under-perform. In another way, failure to perform was seen to result in feelings of guilt and inadequacy when the swimmer perceived that they had disappointed those that have sacrificed time and money for their development.

### 5.4.2 Coping Strategies

The swimmers in this study displayed a wide range of coping strategies to help manage their unique life style demands. Key strategies included creating comprehensible communication pathways, regular goal setting and performance planning meetings with their coach, creating camaraderie amongst team mates, and optimising the use of available support services. Interestingly, a variety of coping strategies were used for each identified challenge, as well as this, one strategy was used to manage multiple experiences. In contrast to Giacobbi and colleagues (2004) this study did not recognise any change in how the swimmers prepared for competitions throughout the season. Both the developmental and HP swimmers were very clear on how they prepared for events to ensure the greatest chance of success. This supports research that suggests that athletes may feel that “tried and true” strategies are more effective (Eubank & Collins, 2000; Tamminen & Holt, 2010). Each
swimmer described their own personal way of coping which included methods such as, a clear breakdown in the structure of their training in the weeks leading to the event, control of their diet, and using a specific pre-race routine. At competition, swimmers reported that “over thinking” was one of the greatest causes of competitive stress. In order to manage this, mental skills were practiced including the use of self-instruction (e.g., self-talk and trigger words), and relaxation techniques (e.g., music and social interaction/distraction) to encourage them to “just let things happen”. However, we cannot assume that all age groups of athletes cope with stressors in the same way (MacNamara et al., 2010). Anshel and Wells (2000) have shown that the coping strategy can be dependent on personal and situation factors. For example, the manner in which the swimmers adjusted and managed the coach-athlete relationship tended to be unique to each swimmer yet their strategy varied throughout the year. In another example, one female HP swimmer was uncertain about a prescribed training load and as a result scheduled a meeting with the coach to discuss the objectives. Whereas the same swimmer at another time-point decided to “just get on with training” and trust the coach’s programme, both strategies seemed to satisfy the swimmer at the time.

These findings suggest the need to offer individualised support to athletes based on their individual requirements. Kristiansen and Roberts (2010) recommend that social support and behavioural strategies might be more important for younger athletes, especially where a novel or elite experience is considered. Evidence of this is clear where coherent lines of communication between the coach and swimmer had a significant influence on the success of the athlete when managing challenging events.
Social support that is provided by the coach and correlates with athletes’ satisfaction has been shown to aid the ability to adapt to new challenges (Petrie & Stoever, 1997; Weiss & Friedrichs, 1986).

Notably, none of the participants took part in any formal psychological skills training; three of the swimmers had access to a Lifestyle Advisor, though only two of these swimmers actually engaged with the service. Many of the coping techniques were learned in an ad-hoc manner through experience at competition or with the help from the coach. Indeed many athletes are forced to learn new coping strategies when they are presented with a new condition with different associated stressors (Eubank & Collins, 2000). However few of them recognise that they acquire such valuable skills and as a result may fail to use their existing skillset adequately for future challenges or in other life domains. A further problem arises when it goes unnoticed that an athlete is not sufficiently equipped with the skills to negotiate an upcoming event or unexpected challenge. The majority of research suggests that athletes with a range of coping resources may manage more effectively with appraised stressors than athletes who do not possess these skills (Nicholls & Polman, 2008). At the same time creating an arsenal of back-up strategies is useful for future times of need (Eubank & Collins, 2000).

In response to injury, coping strategies involved putting long term goals “on hold” and revising short term goals. Goal setting offered some motivation and instilled a positive outlook in the swimmer. One swimmer was seen to use her support resources better during periods of injury; this suggests that athletes may try to cope more during times of disorder as opposed to pre-empting challenges (MacNamara &
Collins, 2014). As recommended in Chapter 4, if support services were made more easily accessible and the purpose of these resources was made more lucid to the athlete prior to time of impact such debilitating circumstances may be avoided or better managed. Especially in circumstances when the event is expected.

Evidence to support the use of psychological behaviours, both cognitive (e.g., time management, planning, process oriented goal setting) and inter-personal (e.g., encouraging training partners at training and competition) was prevalent with all of the swimmers when attempting to manage their demanding lifestyles (MacNamara, 2011; Philips & Gully, 1997). Being able to balance one’s life stresses is extremely important in staying injury free, motivated, developing and performing well (Salmela & Moraes, 2003). The swimmers in this study suggested that they coped better when they embraced the challenge of HP sport. Relishing competitive races helped to stimulate motivation and contributed to their enjoyment and commitment to training.

5.4.3 Reflection and Learning Outcomes

Results from this study suggest that not all stressors are detrimental to performance; indeed athletes can grow and learn from naturally occurring life stressors (Collins & MacNamara, 2012). In fact, stressful situations can act as triggers to encourage the materialisation of psychological skills and characteristics (e.g. resilience and a hard work ethic) which are known to be beneficial to future progress in their athletic and non-athletic careers (Collins & MacNamara, 2012; MacNamara & Collins, 2014; McCarthy & Collins, 2014). In contrast to the systematic development of psychological skills that is suggested in the literature, the swimmers in this examination seemed to develop coping strategies in an ad-hoc manner and coaches
did not encourage reflective practice as a learning tool. Thus we can speculate that even in a HP training environment it would seem that reflective practice is an undervalued and underused training tool. Regardless of whether an experience was successful or poor, taking time to reflect on narrow (e.g., factors in the immediate realm of the environment) and broad (e.g., factors in the macro realm of the environment), positive and negative factors that influence performance can provide a more comprehensive picture with valuable material for future improvements. This can be an effective strategy to maximise learning outcomes from developmental challenges and stressful events resulting in a more able athlete.

Tamminen and Holt (2012) suggest that coaches and parents can optimise reflective learning by creating a supportive context, by listening, monitoring the athlete’s reactions, sharing experiences, and fostering independence. The swimmers in this study may have experienced more learning outcomes if their coach had used regular reflective practice techniques in the form of post session debriefs, performance evaluation, and setting goal oriented training objectives with positive reinforcement. Extant literature (Cropley et al., 2012; Gilbert, Trudel, & Bloom, 1994; MacNamara, 2011) provide further recommendations to encourage coaches to use reflective learning techniques in the development and application of psychological behaviours. As described earlier in Chapter 2, Cropley et al. (2012) urge sports organisations to provide coaches with the opportunity to develop their understanding of reflective practice through methods including: educational workshops, mentoring, developing support networks and refining and monitoring the implementation in practice. Considering the influence of the coach on an athlete’s development, the use
of reflective practice may then be more effectively disseminated into the talent development processes.

**5.5 Conclusion**

The majority of studies that have dominated this line of enquiry have used singular time points for data collection and are influenced by the associated limitations of participant recall (Hanton, et al., 2005; Woodman & Hardy, 2001). The nature of these studies often fails to consider the process by which athletes approach, live through, and “come out the other end” of critical developmental episodes. Furthermore, recent events can distract from details of the older events encountered (Davidson & Williams, 2009). This study used a longitudinal approach to capture the seasonal demands of a group of swimmers and provided a means to explore their experiences as they faced different setbacks across different stages of the year. As suggested in the literature (Giacobbi et al., 2004) the use of prospective questioning proved particularly useful in mapping the trajectories of how the swimmers planned to negotiate expected stressors in both competitive and organisational domains. These findings provide further evidence that athletes perceive and cope with challenges differently (Wylleman et al., 2007) and many negotiate the development pathway in a unique way (MacNamara, 2011; Philips et al., 2010). As such future studies should consider using more extensive longitudinal studies with a range of athletic populations to enhance the available knowledge and understanding for coaches to harness developmental challenges with the most profitable outcome.
NGBs have a huge role to play in managing the resources of the TDE whilst considering the holistic development of their athlete in line with the demands of the sport (Henriksen et al., 2010a; 2010b; Woodman & Hardy, 2001). Those responsible for driving talent development programmes should make themselves aware of the sources of stress and understand the coping strategies typically utilised to help future athletes negotiate challenges effectively (Fletcher & Hanton, 2003). However, in an attempt to make the athletic journey easier, sport systems often try to eliminate obstacles from the TDP. Research has suggested that such challenges can act as catalysts for skill development and build the resilience needed for future participation at the top level of their sport (Collins & MacNamara, 2012; Gaudreau et al., 2009). The calculated use of exposure to stressful stimuli to activate skill development in athletes could allow athletes experience and deal with challenges in a supportive environment (Tamminen & Holt, 2012). Research has shown (Gould & Maynard, 2009; Green, 2005; MacNamara et al., 2010) that sources of stimuli come from a variety of individuals, institutions, and environmental factors directly and indirectly influence the development of skills and attributes. In contrast to some literature (Fletcher, Hanton, & Mellalieu, 2006; Hanton, et al., 2005; Kristensen & Roberts, 2010; Nicholls & Polman, 2007; Tamminen & Holt, 2010) participants in my own work show that although different combinations of coping strategies were used to deal with organisational stressors, one strategy or skill may be used in a variety of contexts both within and outside of sport. Furthermore, the results of this study suggest that organisational stressors are more common and dynamic while athletes are more likely to be better prepared for competitive events because of their perceived control in the lead up to the event. Due to the significant
influence of the NGB on the shape and success of the athlete’s development, further investigations should focus on what is happening at an organisational level and its effect on the future success of its athletes. Chapter 6 examines the coherency of an NGB’s TDS and its impact on the developmental trajectory on a group of athletes.
Chapter 6

An examination of the coherency of a talent development system and its effect on the developmental success of female hockey players

The sometimes tense and niggling relationship between the high performance unit and the clubs who supplied the fighters seems entirely a thing of the past now. Everybody recognises the trickle-down benefits of international success. The clubs nurture and develop boxers, the high-performance unit refines them and moulds them into world class fighters. Every link on that chain is vital. And in the end everybody wins [John O Brien, 2012].
6.1 Introduction

Chapters 4 and 5 provide a detailed understanding of the critical factors important for success (e.g., adequate coaching, access to tangible support services) and the challenges developing and high performance athletes experience during their career (e.g. injury, competition). These chapters have also provided some guidance on how to optimise the use of resources within the constraints of a sport’s NGB whilst also avoiding the pitfalls specific to that sport. For example, a more effective development pathway for talented athletes may be established by creating open-door philosophies and integrating stimuli to develop psychological skills prior to stressful events. More importantly these chapters provide information on how athletes and coaches manage these experiences and use the resources available to them in pursuit of successful development. In recent years researchers (Araújo & Davids, 2011; Henriksen et al., 2010b; Martindale et al., 2005) examining talent development have identified that there is a need to look beyond the athlete and take a broader perspective by including an examination of relationships within the development environment to fully understand its complex nature. In a similar way, Chapter 5 noted that a high frequency of stressors originated from an organisational context (e.g., lack of communication between clubs and HPCs, lack of transparency regarding qualification criteria), an examination of these factors in a TDS would be advantageous. A review of the literature (Bronfenbrenner & Morris, 2006; Krebs, 2009) suggests that the applied setting in which these factors reside is relatively underexplored and sports
practitioners need a better understanding of how the efficacy of the sport system at an organisational level can impact on the success of the TDP.

As described in Chapter 2, numerous models have been publicised to assist sports organisations in managing the talent development process and help guide development strategies (Balyi & Hamilton, 2004; Bloom, 1985; Côté et al., 2007, Gulbin et al., 2013). However, evidence shows that because of the uniqueness of dynamic constraints such as those identified in Chapter 5 (e.g., transition relation factors, organisational challenges, illness and injury) ‘models’ of talent development cannot be expected to be suitable to all athletes and sports (MacNamara & Collins, 2014; Philips, et al., 2010; Wolstencroft, 2002). Individualised pathways to expert performance need to be flexible and should be supported. Chapter 5 provides a clear example of this in current talent development practice by showing that development level swimmers have a greater need for coping skills in comparison to high performance swimmers who require assistance with transferring skills into other life domains. As discussed earlier, Martindale and colleagues (2005) stress that for a TDE to be effective and successful it needs to be strategically led, integrated and cohesive in nature. In this way, TDPs are more likely to be efficacious at recognising and catering for the developmental needs of its key stakeholders (i.e., the athlete and the coach) and ensuring long term success. This approach appears to be a more realistic avenue for applied practice than prescriptive models of talent development. Again, despite the credibility of well-justified features of the TDE model, it’s implementation and operation still appears elusive in examples of current practice (Martindale et al., 2005).
The study described in this chapter was interested in understanding the organisational stressors, previously identified in Chapter 5 (e.g., lack of communication between key stakeholders and unclear performance and developmental objectives) more thoroughly and examining the effect of coherency on the talent development process. The results should expose the issues causing a lack of coherency across the TDS and offer practical guidelines that are conducive to improve its performance. Too often research led examinations of high level NGBs leave out the crucial dialogue between athletes and coaches, despite the fact that they are key sources of information in applied practice and the main stakeholders for delivering performance objectives. As such, data for this study was gathered from athletes, coaches and support staff of a national female field hockey squad.

6.2 Method

6.2.1 A Case Study Approach

Similar to the previous two chapters this study used a sample of participants from an Irish, high performance sport. Reflecting the evolving and dynamic nature of TDSs internationally it is important to note that at the time of this investigation the Irish Hockey Association had recently made significant changes to the approach in which its female TDP operated. Usually, the structure of the system included an under-16 years of age (u16) squad, under-18 years of age (u18) squad, under-21 years of age (u21) squad and a senior national squad. All teams were competitive at an international level. In September 2004 the association identified that it could not financially support four international teams, and as a result the u21s squad was
discontinued. The intention was that this squad would be replaced by a Development squad or Ireland A panel that would operate as a ‘feeder’ team to the senior national panel. The rationale was also that this squad would allow late developing players to prepare for the transition to senior level. Another significant change at this time was the establishment of the Centralised Preparation Programme (CPP). The intention of this programme was to put a structure in place to assist the players’ development towards a competitive international level. The senior women’s panel were involved in the design and planning of the CPP as it enhanced the quality of their training and recovery avoiding fatigue and burnout associated with the demands of playing for multiple teams. As a result of these changes and developments, the Irish women’s field hockey programme offered a good opportunity to examine a TDP in action and the impact of changes to this environment on the players’ development. This system provided a good example of a purposeful TDP evident in many team sports where there is a staged approach to development and performance based on different levels of age groups. In this case the age groups ranged from u16 to u18 to “Development” to senior.

6.2.2 Participants

Following ethical approval from the PESSREC (Appendix 4.1), a sample of twenty-six internationally competitive female field hockey players and their coaches were purposefully sampled to participate in this study via semi-structured qualitative interviews. These interviews took place one-on-one with the researcher at the player’s training grounds. In order to meet the aims of this study, a stratified sample was used where participants were sampled from different stages of the development pathway.
A sample of senior players (n = 5), senior head coach (n = 1), u18 players (n = 6), u18 lead coach (n = 1), u18 assistant coach (n = 1), Ireland A squad players (n = 6), Ireland A squad coach (n = 1), u18 players (n = 2), and u16 coaches (n = 2) were recruited. To collect data from a number of different perspectives; the managers senior manager (n = 1), u18 manager (n = 1), and the high performance director (n = 1) from this sport were also recruited. All the coaches were purposefully sampled on the criteria that they were working for the sport’s performance development programme and were familiar with both the demands of players and the current system that was in place at the time of data collection. The age of the players ranged from 15-26 years (20 ± 5.5 years). The majority of the players occupied a dual-career lifestyle, 12 players were full time student-athletes, three were full time players and part time students, two were full time players only, and two were full time students-athletes and part time employed. All participants were recruited via recruitment email or word of mouth.

6.2.3 Interview Procedure

Each participant was informed about the nature of the study and the procedure involved with data collection. Following ethical approval a series of one-to-one, semi-structured interviews were conducted. An open-ended, semi-structured interview protocol provided the necessary flexibility and allowed for more natural comfortable conversation. More detailed information was elicited via verbal probes and prompts to encourage elaboration. Time was also spent in the training environment of the participants in an effort to establish rapport and familiarity. The interviews lasted approximately 50 minutes excluding introductory and ‘warm-up’ phases.
Chapter 6 An examination of the coherency of a TDP and its effect on development

The interview guide (see appendix 6.1) was designed in a similar way to outlined in Chapters 4 and 5. The content reflected information generated from the literature review in Chapter 2 but also from the findings of the previous two chapters. The interview began with opening questions used to ‘break the ice’, establish rapport, and gain information on the participant. It then progressed into the key questions that created a discussion on the needs of hockey player relative to their development in their sport, and the effect of the training environment and coaching system on the player’s development. The interview closed with questions that allowed the participant to voice their opinion on what issues they felt impacted most on their development. The coaches, managers and HPD’s interviews included open questions to investigate the strength of cohesion of the TDP. These included questions relating to; the communication process between squads, the clarity of development objectives, and factors within their system that impact greatest both positively and negatively towards player development (e.g., accessibility to support resources, individualised coaching).

6.2.4 Data Analysis

All interviews were transcribed verbatim and the text was read by the researcher and re-read by the interviewee to ensure the content was clear and accurate to their intended meaning. Analysis followed the recommendations of Côté et al. (1993) and mirrored those steps described in Chapters 4 and 5.

6.2.5 Addressing Reliability and Trustworthiness

A number of steps were taken to address trustworthiness throughout both the data collection and data analysis stages. These stages are outlined in Study 1 (Chapter
4 section 4.2.4). The interview questions were based on literature that focused on the requirements for successful talent development and effective systems. A series of pilot interviews were also conducted to ensure that the questions were interpreted accurately. Following the pilot interviews, changes to the interview guide included the removal, addition or rewording of a number of questions. Similar to Hassell and colleagues (2010), data was also collected whilst observing the participants’ training sessions to gain a better sense of the hockey players’ training environment. This information was noted and contributed to the interpretation and coding of transcripts in the data analysis phase. Reliability of the data provided in the interviews was insured by emailing the participants their transcripts for review before data analysis occurred. In this study, one participant requested a change (deletion of a statement) in her transcript which was completed on return of the document. Throughout the data collection and analysis stages the researchers involved in this project met regularly to discuss all aspects of the research process and a collaborative approach was undertaken during the data analysis stages.

6.3 Results

An inductive content analysis resulted in 728 quotations, 273 codes, 28 second order categories, 13 higher order themes, and five first order categories. In this section, the results of each first order category are presented along with detailed descriptions of the higher order themes within each category. Exemplar quotations from the participants are included to support the data. The first order categories include the following:
1. Clarity in the objectives of the development pathway
2. Lack of cohesion between coaches
3. Underage Development
4. Requirements for a senior international player
5. Bridging the gap between underage and senior levels of performance.

### 6.3.1 Clarity in the objectives of the development pathway

Clear strategies and individualised flexible developmental objectives form vital features on the TDP for coaches, players and support staff. When these factors are vague and or poorly planned the key stakeholders may be misled and or fail to develop and fulfil their potential. Due to an ambiguous development strategy and lack of resources coaches felt that they were being reactive in their roles as opposed to proactive by taking on more management and administrative tasks. Adopting other roles and poor planning appeared to negatively impact the ability of the coach to deliver an adequate talent development programme.

<table>
<thead>
<tr>
<th>Second order category</th>
<th>Higher order theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance objectives encourage more elite behaviour</td>
<td>Long term development strategy</td>
</tr>
<tr>
<td>Performance Vs. Development oriented holistic athlete development</td>
<td></td>
</tr>
<tr>
<td>Holistic athlete development</td>
<td></td>
</tr>
<tr>
<td>Coach serving many roles</td>
<td>Under resourced coaching</td>
</tr>
<tr>
<td>Manager's role</td>
<td></td>
</tr>
</tbody>
</table>

### 6.3.1.1 Long term development strategy.

Many TDPs are still guided more on gaining short-term performance than on an application of scientific and technical training principles (Stafford, 2005). This method, along with a complete lack of a systematic approach to competition and development,
does not support and may even impair optimum development. Reflecting these issues, the underage coaches in this study stated that their coaching was focused on “preparing the athlete for the next level” and ultimately on ensuring as many players as possible were prepared to play at the senior international level. However, when asked how this development was measured, most admitted that the focus was on how well those players performed at competition at that given point in time rather than on their potential to develop.

Of course, there was some understanding of long-term development evident. For example, the u16 and u18 coaches used a two year cycle to structure macro phases of training. This included a ‘Development’ Year where the objective of the squad was development focused and a ‘Championship’ Year where the objective of the squad was performance focused.

We have performance every two years, a non-European year you’d have a nation’s tournament or a series of matches, but the outcome of these matches is not about results, the aim is to get the athletes ready for the next level [selection for the u18 squad] and long term going forward selection onto the senior squad [u16 coach 1 female].

Although this planning shows some evidence of a focus on development it was at times compromised by the competitive structure within which the coaches worked. For example, within a two year time span, the majority of players may struggle to develop technical skills, learn tactical systems of play, improve physical conditioning, and perform at major international competition to a level that is adequate for selection into a senior national panel. In this TDP, on average two u18 players were selected annually to directly transfer into the senior squad; as such the competition between players to prove their ability is extremely high. No doubt competition among
players can have motivating effects as they strive to perform well at interprovincial and national fixtures but it is likely to lead a player to be performance focused rather than development focused and it may inhibit the development of important tactical, technical, and psychological skills. This was described by one coach as:

I think the challenge is that we try jump them ahead, you know some will say if they are good enough they are good enough and I don’t really believe that. I think that right here we have some high potential internationals, but that is not to say that in two years’ time that others will not be strong internationals also, we have to facilitate as many players as possible to transfer into internationals. Because you could be in your twenties when things only start to catch on [U18s lead coach 1 male].

As such, the TDP and the competitive structure appeared to compromise the long-term development of players. For example, the senior head coach found that many of the u18 players were lacking competency in fundamental technical skills as well as the physical and mental capacity required for a successful transition to senior level training and performance.

### 6.3.1.2 Under resourced coaching.

For a team sport like field hockey the demands for a coach to address the multiple technical, tactical, physical and mental aspects of the sport is high. Many of the players at an u18 level commented that there was inadequate one-to-one coaching available to support their development. These players stated that the transition from the u18 to senior national squad was a big step and in order to succeed they needed more individual coaching.

More one-to-one feedback would be good, because we get group talks as a team but I know I need to be working on aspects of my own performance, I just don’t know what aspects [U18 player 1].
Unsurprisingly, the underage squads (u16, u18 and Ireland A) appeared to be the most under resourced, especially in management and specialist coaching roles (e.g., strength and conditioning, goal-keeping, defensive, offensive). Indeed, many of these roles were completed on a volunteer and ad-hoc basis. As a result head coaches of the squads were forced to coach the players with a generic approach. In addition, the coaches also noted that they had to complete significant administrative duties in addition to their on-the-field coaching commitments. The lack of resources caused a negative impact on the delivery of goal-oriented, structured individualised coaching.

The currency of a coach is energy, time is energy, and I choose to spend it in a certain way [Senior head coach 1 male].

I need another one of me! At the moment I am trying to negotiate with another country to go over and train, have access to pitches, accommodation the whole lot. This could all be the manager’s roles, and in some ways it is but in other ways it’s not. Because at the end of the day my programme is dependent on the budget I have to work with. I have to make sure that we get that budget. I am determined to do it whether or not others are determined to do it. And maybe that’s a problem I have in that I won’t let it go, but I need to make sure I get there so that my programme runs smoothly. But the other side of it is that it increases the workload, but I don’t mind as long as there is a value to it [U18 coach 1 male].

6.3.2 Lack of Cohesion between Coaches

Cohesion may be defined as the action of forming a united whole. Previous chapters have stressed the influence of the coach on the talent development process. As such when multiple coaches are involved in the process it is not surprising that the interaction between these coaches and other key stakeholders is a key factor in ensuring the successful operation of a TDP.
Chapter 6 An examination of the coherency of a TDP and its effect on development

Table 6.2 Lack of cohesion between coaches, associated themes and categories

<table>
<thead>
<tr>
<th>Second order category</th>
<th>Higher order theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of consistency across squad structures</td>
<td>Unclear direction and goals</td>
</tr>
<tr>
<td>Coaching independently</td>
<td></td>
</tr>
<tr>
<td>No formal communication structure in place</td>
<td>Lack of communication between key stakeholders</td>
</tr>
<tr>
<td>Players lose out on specific individual development</td>
<td></td>
</tr>
</tbody>
</table>

6.3.2.1 Unclear direction and goals.

Although the coaches were clear on the importance of establishing and outlining progressive and seasonal goals for their players, it was obvious that many of the underage players were uncertain as to what they were meant to work towards.

There are no clear steps as to what I need to achieve to make it onto the senior squad. I know I have to be better all-round but I don’t know what they [the senior coaching staff] are looking for, and I don’t know specifically what I need to be working on in order to make it [U18 player 2 female].

We know from previous literature that athletes should progress through developmental transitions in their athletic career (Wylleman & Lavellee, 2004) but the rate and timing at which each athlete develops is individual as well as this different psychological skills and physical attributes are required at different times (MacNamara et al., 2010). For these reasons it is important that a TDP outlines a strategy with clear direction and goals so as athletes know what standard is expected of them (Martindale et al., 2005). Due to this lack of clarity from the NGB the coaches were required to become self-directed when setting systematic goals. This may be viewed as a positive reaction by stimulating a coach to become independent, but in this study it resulted in a lack of coherency in the developmental objectives across the TDP. Martins (1992) suggests that it is possible that changes made to the sport’s development context (i.e., exclusion of a u21 squad and creation of the Ireland A squad) can cause slack in the TDP structure and can effect coaches’ networking abilities.
What you’ll find is that at an u16 level we’ll have identified an issue that a player might have needed to work on and yet at an u18 or development level you’ll see that player with the same issue. Whereas in other countries, the styles and systems of play are generated from a young age and are transferred on up through to the senior level. We do not have that national guideline of what way our style of play should go. So I come in and I do what I think is the right thing to do. There is no meeting where we sit and talk about a player’s attributes and development of a player, that doesn’t happen [u-16 coach 1 female].

6.3.2.2 Lack of communication between key stakeholders.

Previous literature has stressed the importance of establishing a clear understanding of roles and objectives of the different stakeholders involved and an effective communication network to maintain a successful TDS (Green & Oakley, 2001; Martin, 1992). This should occur throughout the entire coaching structure, in clubs and schools as well as at a national level. Within this TDP there were four identified competitive structures; schools/universities, clubs, inter-provincials and national squads but coaches and support staff stressed that there is no communication between these structures. Typically, a national squad player could be playing for a club, provincial and school squad at the same time yet there was little direction given to the players as to where they should designate their priorities. In fact, there was often no communication between any of the key stakeholders!

As well as the national squad, I play hockey back home in [name of town], I’m a member of a club there, and play for my school too. Oh and I am on the regional panel as well. I’m thinking of going to [name of university] next year because that’s where the national squad’s training base is and there is a good university team there. At the same time I don’t want to leave my club, but travelling home for training and games would probably kill me [u18 player 4 female].
One coach highlighted that this lack of communication between structures leads to inadequate recovery between competitive bouts - not to mention the demands of training and other lifestyle demands – and causes players to burnout.

We would like to see more communication between the teams for the sake of player development, but they [support staff and coaches] are so busy that that is not happening to the extent that it should. So I have had to be more of a facilitator for lines of communication, otherwise nobody seems to be making an effort to open up that flow of communication between squads. There is no forum, there is no formal face to face meeting to discuss the squads as a group of staff or coaches [u16 coach 1 female].

6.3.3 Underage Development

Developing a large talent pool is important to encourage the growth and emergence of athletes in a sport. Good athletes can materialise from club or schools competitions, through talent identification opportunities or through support from another coach or parent. As discussed in Chapter 4, the competency of the coach to understand what is required at each level of development and facilitate under-age development is a significant factor on the overall and long term success of a TDP.

<table>
<thead>
<tr>
<th>Second order category</th>
<th>Higher order theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of interprovincial competition</td>
<td>Clubs and regions are major sources of development</td>
</tr>
<tr>
<td>Clubs &amp; Regions major sources of development</td>
<td></td>
</tr>
<tr>
<td>Education at a school level</td>
<td>Autonomous coach development</td>
</tr>
<tr>
<td>Needs at an under age level</td>
<td></td>
</tr>
</tbody>
</table>

6.3.3.1 Clubs and regional squads are major sources of development.

Reflecting the significance of an efficient and effective TDP the coaches’ recognise the importance of school and club level participation for developing fundamental skills of the sport. The national coaches are highly dependent on the talent emerging through these systems. At a school level, field hockey is introduced as part of Physical Education class and there is a competitive inter-schools league,
similarly local clubs compete in county and inter-county competitions which in-turn lead to an intro-provincial tournament (the main source of national squad selection). However, at a club and schools level the focus is on early success rather than individual player development. For example, the “better” players are selected for a range of teams and, as a result, the “better” players are being over-played, whereas the less developed players are missing out on practice time.

I think our schools are our biggest strength because they get young kids playing hockey, they are also our biggest weakness, and they are match focused rather than development focused. This is one of the biggest obstacles on the TDP, but it’s up to the schools and clubs to buy into it [Senior Head Coach 1 male].

Of course, and reflecting the issues associated with talent identification discussed in Chapter 2, understanding what ‘better’ is, especially at premature stages of performance, is problematic. More specifically, the repercussions of this focus on winning at an early age was suggested to result in poor tactical and technical skill development of underage players. As a result national squad coaches suggested that they then had to spend time educating fundamental hockey skills and systems of play if long term success is to be achieved.

Tactically the players are very naive. At this level [u16] we have players coming mainly from a school level where tactical coaching would not be great. The movement of the players on the pitch would be poor even just the basic stance of the player would not be good [u16 lead coach 1 female].

**6.3.3.2 Autonomous coach development.**

The lack of coach education was reflected in the tactical and technical ability of the players coming through the schools and clubs structures. In response, national coaches have expressed concern over the autonomy of these underage coaches, and suggest they should seek learning sources such as coach mentors and NGB supported coach
education programmes. At the same time, national coaches must firstly have the time to dedicate to these coaches and be willing to impart knowledge and to offer guidance.

There are programmes now like “hooked for life” and “stepping stones” which coaches and teachers can access through the organisation so that should make a difference. My own club would ask me to do sessions with the club. Because it is a competitive game, some coaches may be afraid to share their ideas and might say ‘well that’s my team or they are my players’, a lot of coaches are not willing to share their own “ground-breaking ideas [u16 lead coach 1 female].

The senior head coach adds to this by suggesting that once a coach has worked at the highest level in their sport they should revolve and coach at the grass-roots level, either by means of direct coaching or by creating a coach-mentor relationship with underage coaches.

I’d like to see senior international experienced coaches rotating downward in a sport system so that you have an ex-international coach working with an u12s coach [Senior head coach 1 male].

National coaches conducted weekend workshops around the country for underage coaches but the impact of these workshops was on a small cohort of under-age coaches and because there was no follow-up (e.g., practice and mentor monitoring) the impact tended to be acute and short-lived. Similar to the results generated from Chapter 4, if utilised adequately a more ‘open-door’ culture between national training centres and schools/universities and clubs could have a more valuable and lasting impact on underage coach development and players emerging through these structures.

I think that the universities could play a big part on the development of these players, we are aware that universities can have a good coaching structures and scholarship programmes. I know that one of our current players will choose [name of university] to play hockey, and hopefully her experience there will be enough to see her improve so that in 3 years’ time she is good enough to play at a senior level [Assistant u18 coach].
6.3.4 Requirements for a Senior International Player

Many of the participants involved in this study could recognise the characteristics of a good quality player however developing players were unclear in how to achieve this level of competency in their sport. It seemed that a successful player displayed a range of skills, tactical abilities and psychological characteristics many of which are described below.

Table 6.4 Requirements for a senior international player, associated themes and categories

<table>
<thead>
<tr>
<th>Second order category</th>
<th>Higher order theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most talented athletes will always surface</td>
<td>Importance of physical ability</td>
</tr>
<tr>
<td>Physical attributes stand out</td>
<td></td>
</tr>
<tr>
<td>Sampled sports then hockey prioritised</td>
<td>Characteristics of a high performance player</td>
</tr>
<tr>
<td>Autonomy to work &amp; learn</td>
<td></td>
</tr>
<tr>
<td>Commitment to the sport</td>
<td></td>
</tr>
<tr>
<td>Managing training &amp; academic demands</td>
<td>Ability to manage a balanced lifestyle</td>
</tr>
<tr>
<td>Managing recovery</td>
<td></td>
</tr>
</tbody>
</table>

6.3.4.1 Importance of physical ability

All coaches and athletes were asked what attributes were characteristic of good players. The coaches reflected on factors that they felt ‘stood-out’ to them at interprovincial tournaments (the main source of national squad selection), at school and club games and during training.

The very top players in the world have three things, they are athletic, they have good awareness and good decision making skills, and they are good technically [Senior head coach 1 male].

Although no objective process of selection at the interprovincial tournament was evident the responses from the u16 and u18 national coaches were similar. Physical fitness emerged as highly influential, as well as match-play awareness. Interestingly, tactics were not seen as significant due to the amount of team-time interprovincial squads practiced.
The ones trialling for the squad, we’d be looking more for speed, agility, strength, match and game awareness. We wouldn’t be looking for tactical skills. They only have four matches during the Interprovincial tournament, so that’s really the main chance they have of showing their ability [u16 Assistant coach 1 female].

6.3.4.2 Characteristics of a High Performance player.

Coaches identified that commitment to training and willingness to learn was clearly evident in the psychological skill set of many of the national players. These types of behaviours and characteristics have been identified by previous researchers as indicative of future successful players (Baker & Côte, 2003; MacNamara et al., 2010). Similarly, the players identified self-reliance, determination, commitment, confidence and time management as important for selection.

I don’t know what made me stand out, basically giving it my all, things like, sticking my hand up in training and saying ‘I’ll try that’. Practising on my own after school three times a week, on top of school work and regular training, those extra hours built up I suppose [u16 player 1 female].

Our coach was telling us what they were looking for and telling us what would make us stand out. So in training I was practicing the specifics of what they were looking for. I think I showed improvement and the ability to manage myself [u16 player 2 female].

As mentioned earlier, the interprovincial tournament is one of the main opportunities for players to be selected for national squads. Many players see this tournament as a vital occasion to display their abilities and potential to perform at the next level. But such a narrow window of opportunity creates pressure on players to perform well and many potential national squad players could be over-looked and under-valued. Interestingly, the senior head coach believed that the “better” players will always emerge despite the system, “the cream will always rise to the top”.

Some girls go up and they are like, I am going to go show off my skills, or I am going to go up and score loads of goals, and you could be a really good player
but at the end of the day it’s not just you against say Spain or the Dutch. If you play like that then you are just one player missing from a team. So if I was to advise anyone going up I’d say look, play your own hockey play as a team player, it’s not an individual sport, you can’t just do it yourself [u16 player 1 female].

6.3.4.3 The Ability to manage a balanced lifestyle.

The ability for a player to manage their lifestyle adequately was recognised by all coaches, as well as the majority of the players, as a necessity for optimum development. Chapter 4 showed that stressors can emerge from multiple sources including family, education and employment commitments. With the creation of the CPP, senior level players were required to commit to a central training base. Obviously this presented massive strain on some of the more mature players with a job and or family responsibilities and they were forced to retire from the squad.

Before I moved to the CPP I had such a busy schedule, it feels a bit weird just having hockey now. I studied engineering at university and I was used to being busy from 9-5pm [Senior player 2 female].

I made a lot of enemies [with the creation of the CPP], because I cleaned out a lot of players immediately who I thought didn’t have a future [Senior National Coach 1 male].

In another way, players at an u16 and u18 level were confronted with high volumes of intense study and exam periods at school. Time constraints, logistical issues, and fatigue were prevalent challenges which these players needed to negotiate if successful development was to be achieved.

I am in the middle of my exams but I am training with the intention of playing in the Europeans, I am thinking as if I am going. When the exams are over I will focus on my preparation for competition a lot more. I’m planning my summer as if I’m going to the tournament, so that I reach my peak. I am watching my diet and thinking about match tactics to help my preparation [u18 player 3 female].
As mentioned previously, if a player cannot manage the demands of their lifestyle adequately it can result in fatigue and burnout. In another way, the assistant u18s coach highlighted the common issue of player burnout.

We have a tendency to over-train our players. We had a guy last year who played 56 games between matches with the senior club, hockey league, national squad, and interprovincial squad. Then training on top of that with all those squads and that’s not including what he would have done on the side like basketball or whatever. This player did his hamstring in there last year. Now I’m not saying it’s down to what his coaches were doing but it’s certainly something we need to monitor. The 4 coaching structures, schools, clubs, ‘interpros’ [regional] and national there is no communication, there is no priority given over tournaments. But also there should be parental education, so that the parents can say to the player look you need to rest. We need to improve it otherwise we are going to end up killing our players [Assistant u18 coach 1 male].

As highlighted in Chapter 5, educating players on the expected stressors and demands of high performance sport and equipping them with the right skills in advance of challenges can assist an athlete in becoming more self-sufficient in managing their lifestyle. It is apparent from this study that the players need to prioritise their long term development and potential to sustain an international athletic career and not be made feel like they must commit to every team.

I’ve started to use a planner with them [u16 squad] which includes prospective and retrospective training, study, and games times. They have to email me this and I review it. It often happens where I notice some of the planners do not include rest days, and that is something that they must structure into their programmes [Assistant u16 Coach 1 female].

6.3.5 Bridging the Gap between Underage and Senior Levels of Performance

Chapter 5 highlighted how they negotiated transition related factors as significant in the developmental success of an athlete. Findings have identified coping strategies to negotiate these obstacles. Further methods emerged when players attempted to manage the transition between levels of performance on the TDP.
Chapter 6 An examination of the coherency of a TDP and its effect on development

Table 6.5 Bridging the gap between underage and senior levels of performance and associated themes and categories

<table>
<thead>
<tr>
<th>Second order category</th>
<th>Higher order theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relocating and travelling to centralised system</td>
<td>The CPP</td>
</tr>
<tr>
<td>Social, and Tangible support services</td>
<td></td>
</tr>
<tr>
<td>Major challenges in transition to national panel U18 to senior gap is decreasing</td>
<td>The transition between squads</td>
</tr>
<tr>
<td>Smoothening the transition between squads</td>
<td></td>
</tr>
<tr>
<td>Non-selected players feed back into clubs, regions</td>
<td>Support for non-selected players</td>
</tr>
<tr>
<td>Selection re-considerations</td>
<td></td>
</tr>
</tbody>
</table>

Note: CPP = Centralised Preparation Programme

6.3.5.1 The Centralised Preparation Programme.

Recognising that in order to make significant advances in pursuit of Olympic qualification the senior head coach created a CPP requiring all senior players to commit to full-time training at a centralised location. This caused many players to uproot logistically and in some cases quit a dual-career lifestyle. Many of the players could not commit to the programme and due to other responsibilities retired from the national squad. The objective of the CPP was to create a more coherent programme, increase the volume and intensity of training, build team camaraderie, and allow better monitoring of recovery and lifestyle management with sports science and sports medicine specialists accessible through the national sports institute. This change was associated with a huge resistance from the tradition and culture of the sport in the country.

I knew that if this squad was to make Olympic qualification then we had to have certain parameters in place. There is a direct correlation between age, experience, getting to the Olympics, and where you finish at the Olympics. Centralisation of the national senior programme was totally foreign to the system here. They [club committee members] thought they were trying to protect a history of success, but it’s actually a history of failure. They had nothing to lose and they cannot say that since centralisation it has gone downhill, because really you couldn’t get much worse given the history of the
clubs in Europe. They didn’t have much further to go. But there is a danger for me in paying too much attention to the controversy, because the argument that clubs are losing players is and will always be the lowest common denominator. It was a fight but it was worth it [Senior Lead Coach 1 male].

Interestingly, the senior players were involved in the design and implementation of the CPP and were supportive of its objective (qualification for the Olympics). Retrospectively, the players felt that the CPP served its purpose successfully; it created a more coherent squad, and created the opportunity for players to access an adequate level of support resources inclusive of physiotherapy, specialist services and coaching.

Everyone on this squad has had to give up other responsibilities to commit to the same goal [Olympic Qualification]. It created a bond amongst the squad. We have all we need here and we are all focused on achieving the same goal [Senior national player 1 female].

6.3.5.2 The transition between squads.

Players that were unsuccessful in making a direct transition from the u18 squad onto the senior squad were assumed to be supported by the newly formed Ireland A squad. They were also expected to continue to play for their club and regional squads. The objective of the Ireland A squad was to provide a ‘stepping-stone’ for players toward senior level performance, it afforded the players time to work on weaknesses of their game and attend to other lifestyle responsibilities without the stressors of a congested hockey programme. However, despite the rational objectives of the Ireland A squad the NGB failed to follow-through in supporting its structure. For example, no fixed coach was employed, no strategic or systematic development plan was implemented and there seemed to be no connection between the Ireland A squad and other national squad structures.

Players on the Ireland A squad are falling through the net. Players that who are just below the cusp who might develop that bit later, are getting a disservice
from the NGB. Whether it’s the chance of being selected for the senior national squad or playing for an u21s squad it doesn’t matter, there needs to be an incentive for them to work towards. Ideally they need to create a programme that is part of the overall system [Ireland A Squad Temporary Coach 1 male].

Due to the lack of coherency and structure evident in the Ireland A squad, the senior squad was dependent on players with adequate physical and mental attributes to feed up through the system from the u18 squad. In another way, the senior head coach suggested that the u18 squad was sufficient to offer a stable ‘feeder’ system of players into the senior squad and proposed that the Ireland A squad is unnecessary.

I always knew that the national programme would serve as a development tool, if I have two spots opening up I will choose the next 2 best players coming through. Those would be selected through subjective evaluation in a tournament, all I need is motivation and a fair bit of athleticism and affinity for the game and we can work with that [Senior Lead Coach 1 male].

At an u16 national level players were invited out into the senior clubs to play against older and more physical opponents. These players found these opportunities useful by challenging their fitness levels and skills to adjust to different systems of play. For similar reasons, u18 players were occasionally invited into the senior national squad to train at the next level.

My club brought myself and another girl up to play senior club hockey, so we are only like 15 and they are anything from in their 20s to 30s, it wasn’t a big deal for them but for us it was a big step, they were more physical [u16s player 2 female].

The first day I trained with the seniors it was a bit strange; I was invited along with a couple of others. The experience was more intensive than I expected I just wasn’t used to that level [u18 player 3 female].

Chapter 4 highlighted the value of this transition technique. Giving a player the opportunity to play at a more intense level provides a clear perception of what to expect physically, tactically, technically, and mentally at the next level. However,
before providing this opportunity the coach must carefully consider the readiness of
the player to be able to manage the demands. At the same time, the player should be
observed, monitored and receive feedback on their performance at this level.

I think if I was just chucked in their now, I would feel very uncomfortable very
unconfident. If you were giving the chance to play at the next level and you
completely mess it up, you may not be given the chance again [u18 player]
The senior squad are much stronger, I don’t know what it’s like now but I know
when I was at U18s we wouldn’t have been doing any gym work and I would
have only started doing gym work at the start of University. Strength takes time
to build up. You build mentally too, we get talks from the psychologist and you
start to think about things differently, even on the pitch you might
communicate differently as a team. At the start it was a bit of a shock playing
with girls you didn’t know that were older than you [Senior Player 4 female].

One of the u16 coaches described how at a local club the senior players would take it
in turns to coach to the junior clubs members. Better use of players that are familiar
with the demands of the development system and knowledgeable about skills, tactics
and fitness requirements can be very effective in developing young players as well as
bridging the gap between squads.

We had a rota coaching underage players every two weeks for an hour but for
this [development of junior club players] to work you need to have the right
senior coaches in place to be coaching the right things in the first place
[Assistant u16Coach 1 female].

6.3.5.3 Support for non-selected players.

Typically, if a player was not selected for a national squad at the interprovincial
tournament or recommended by a local coach for a trial then the player was at risk of
been overlooked and or undervalued. The first resort for a player that failed to make
selection was to revert back into their club and regional squad.

There doesn’t seem to be any other real way of getting selected for the
national panel other than being spotted at interpros or club games. My club
coach kind of helped me with that transition and just told me to give it a lash.
She supported me by going to trials with me too. She knew I had no confidence
at all, she just brought me up and watched me and encouraged me, and was just there [u18 player 1 female].

It seems that players at an u18 that are not sufficiently equipped with the physical and mental attributes required for the senior national squad will fail to progress further. The lack of structure and systematic development associated with the Ireland A squad ensues that these players will ‘slip through the net’.

I have coached u18s previous to this and I have seen a lot of very good players drop off at this gap, it would be terrible if this upcoming u18 group have nothing formalised afterwards. Once you lose them you’ve lost them [Assistant u16 coach 1 female].

6.4 Discussion

The purpose of this study was to examine the coherency of a TDP and its effect on talent development from an u16 and u18 international level through to senior international level of performance. Previous results described in Chapters 4 and 5 suggest that sports practitioners are already aware of the significant challenges their athletes are confronted with throughout their TDP. Further to this there is an abundance of literature (e.g., Park et al., 2013; Wylleman & Lavellee, 2004) that describes the challenges and stressors encountered along the development pathway. However, research surrounding talent development neglects to capture why some NGBs fail to apply theoretical and empirical evidence into practice. From an organisational level this study had two objectives:

1. To understand the organisational stressors of a TDS and examine the effect of coherency on the TDP.

2. To expose the issues causing a lack of coherency across the TDS and offer practical guidelines that are conducive to improve its performance.
Addressing the first objective, evidence from this study suggests that an NGB should not try to adhere to any one specific model of talent development but instead consider the key constructs of current models and frameworks against the expected challenges and needs of the sport, its athletes and its coaches. An effective TDP requires constant management and a unified collaborated work ethic from its members (Martindale et al., 2010). Similar to the findings of other researchers (Bailey et al., 2010; MacPherson & Howard, 2011; Pankhurst & Collins, 2013) an investigation of this TDP showed that for an effective systematic and strategic approach to talent development a considerable interaction of organisational members, division of work and synchronisation of their activities is required. Coaches reported that no form of routine communication took place between the squad structures and there was no evidence of a common strategic development plan for its players. Players at an underage level (u16 and u18) reported a lack of individual coaching and vagueness in relation to what was expected of them if successful transitions between national squad structures were to be achieved. Limited resources (e.g., management staff, specialist coaches, knowledge, and experience) and limited time were the two main reasons why coaches suggested they could not deliver effective individual instruction to their players. This emphasised the importance of the ability of coaches in schools and clubs to develop innate talent, player characteristics and fundamental skills of the sport. Findings support Sotiriadou and Shilbury (2009) by suggesting that the wellbeing of a sport at an underage level is a precondition for elite player growth and development at a senior national level. Of most concern was that national level coaches were not confident that the quality or the focus of the coaching at a school or club level was
suitable to capitalise on critical periods of the players’ growth and long term development. A report from the National Coaching and Training Centre in Ireland (2007) suggests that coach education programmes are often not designed with close enough reference to the phase of development at which the coaches will be operating. In this NGB it seems that the best equipped coaches were working at the highest levels of the sport rather than at underage levels at key developmental time points. The strategic timing of a suitably equipped coach and initiation of a coach-athlete relationship is key to fulfilling an athlete’s developmental needs in parallel with the elite progression that is expected of them (Bloom, 1985; Jowett & Timson-Katchis, 2005).

The second objective of this study was to provide those responsible for talent development with guidelines to operate an effective TDP. In order for this to occur a shared understanding of the needs of the players at each stage is required. This is engineered through regular communication with key stakeholders mutually collaborating on strategy development, defining system values, and setting target long term and stage objectives. Henriksen and colleagues (2010a) provide good evidence of this in their investigation of the success of the 49er Danish sailing team. Henriksen directly emphasises the importance of openness, cooperation, autonomy and self-responsibility among the athletes and coaches to create a successful development and performance culture within the NGB. Similar findings were evident in this study. Regular routine communication between coaches at each squad structure as well as with their players was seen as vital. Clarifying stage objectives and system processes including selection procedures and ways of improving performance (e.g., fitness,
tactical drills, technical skills, systems of play, psychological skills) should be inclusive in these conversations. In this way an NGB can work towards applying the features of Martindale’s TDE model (2005) more effectively.

The future legacy of a sport relies on the successful development of its underage players. Coaches working at this level need to work more autonomously and seek sources of mentorship from peer coaches. Coach education should be a two-way process. For example, the senior head coach suggested that experienced national coaches should feed back into the system and supervise or coach at an underage level supporting individual constructive feedback to the players.

It was also interesting to note the speed at which these players were required to develop. At an u16 and u18 level the focus of each year alternates between being ‘development’ focused or ‘competition’ focused. Considering the stressors associated with competition and transition periods this quick two year turn-around between national squads affords the players and the coaches’ little time to recover, adapt, and make significant developmental progress. Evidence from the literature informs us that unsuccessful negotiation of key transitions and performance can be influenced by unstable biological indicators (e.g., physical literacy; Ford et al., 2011), in-active psychological skills (e.g., coping strategies; Kristiansen & Roberts, 2010; Collins & MacNamara, 2012), and environmental constraints (e.g., socio-economic background; Philips et al., 2010). If the Ireland A squad had been supported adequately it could have offered a solution to these challenges by providing a retreat for struggling players to recover, adapt and spend time working on physical and mental weaknesses required for improved and sustainable performance. Whilst recognising the financial constraints
of the NGB, if the Ireland A squad is to function as originally intended, a coach and strategic plan with clear objectives needs to be implemented. Burke (2002) advises that it is a duty of the NGB’s leader/s to encourage a network of relationships between key members within the system, and engage their contribution in continuous decision making processes to achieve the smooth running of development programmes via a focus on operations, planning, and control.

6.5 Conclusion

Recent research has provided compelling evidence to suggest that TDSs lack evidence, skills, and knowledge to support the constructs of TDPs currently in practice (Farrow et al., 2013; Martindale et al., 2007; Pankhurst et al., 2013). The intentions of this study were to move beyond prescriptive models of development and give greater consideration for the specific environment in which these athletes are required to grow, the interdependence of the organisation and the TDP on the success of an athlete to successfully move from one stage to the next (Araujo & Davids, 2009). Of course the variability of sports contexts and individuals plays an impeding role in attempting to operate an effective coherent TDP. However this study highlights a lack of communication and poor cohesion between squad structures as key debilitating factors that could be easily avoided. This study also provides practical guidelines to assist NGBs to conform to features of Martindale’s (et al., 2005) TDE model through which a more successful TDP can be established and managed within the constraints of the system. Reiterating some of the findings from previous chapters, NGBs should spend more time designing, implementing and managing strategies surrounding their
TDP structure. A more coherent TDS will assist in supporting athletes to fulfil their potential and create a successful legacy for the future of the organisation (Cashman & Hughes, 1999).

Collectively, the findings from this study and the previous two chapters point towards the need for a way to help assess and monitor the competency of a TDS to support its athletes effectively. Chapter 7 moves forward to address this requirement and design a questionnaire for the use of coaches and support staff to ensure that their TDS has athletes on track.
Chapter 7

The Design and Initial Validation of the Athlete Support and Skill Assessment Questionnaire

The issues radiate far beyond this individual case. How many more of our elite sportspeople face the kind of challenges that ultimately overwhelmed Fagan (Martin)? What can we do to help? What is being done? Could there have been an earlier intervention? There are no instant answers but it is a conversation we need to have.

[Denis Walsh, 2012]
7.1 Introduction

Previous theoretical research and empirical evidence (e.g., Hassell et al., 2010; 2011; Martindale et al., 2005) identify key factors (i.e., organisational cohesion, individualised development) critical for operating a successful talent development environment. In pursuit of consistent long term development and refined successful performance the athlete must have the skills to manage and interact with their environment to negotiate the TDP (MacNamara et al., 2010). Utilising the results generated from the grounded qualitative studies described in the previous three chapters, along with evidence from current literature in the area of talent development, the objective of the study described in this chapter was to design and complete the preliminary validation of a questionnaire that could assess the effectiveness of the athlete’s support system as well as the skill proficiency of the athlete to manage their development environment. The aim was to create a simple, reliable and valid instrument to use with a wide range of development level and high performance athlete populations, predominantly by the coach or a key figure responsible for the athlete’s TDE. Such an assessment tool could help coaches and other members of the sport’s staff identify weaknesses in their TDS that may be causing athletes to fail to progress and perform. The questionnaire could also provide a means to assess the effectiveness and impact of interventions designed to impact on the TDP. As mentioned in Chapter 1, Freeman and colleagues (2011) designed the PASS-Q to assess the athlete’s perception of emotional, esteem, informational, and tangible support in their sport’s TDE. However, the PASS-Q does not inform the
employer of the competency of key individuals important to successful facilitation of
talent development. Nor does it assess the athlete’s own psychological competencies.
Indeed, Freeman et al. (2011) suggest that future tools should specify the providers of
the support. Further to this the tool does not assess other social support constructs
such as structural aspects of social networks (e.g. communication pathways) or
functional support currently received or received in the past (Freeman et al., 2011). If
such an instrument was designed and validated then, critical factors for successful
talent development within the TDS that require immediate attention, improvement, or
maintenance could be identified and a more valuable TDS may evolve (MacPherson &
Howard, 2011).

7.2 Method

This chapter describes a multi-stage approach to the design and initial
validation of a questionnaire. In line with recommendations for the development of
new measurement scales (AERA, 1999; Rattray & Jones, 2007; Zervas, et al., 2007) this
chapter is divided into two phases outlining the steps taken in the development of the
questionnaire. The first phase was concerned with the generation of questionnaire
items with clear content and face validity. The purpose of the second phase was to
explore the factor structure and reliability of the questionnaire. All procedures were
approved by the University of Limerick’s Education and Health Sciences Research
ethics committee (ULREC 08/48; see appendix 7.1) and participant consent was
collected.
Chapter 7 The design and initial validation of the ASSAQ

7.2.1 Phase 1 Item Generation, Justification and Refinement

The purpose of phase 1 was to construct the questionnaire content. In light of the objectives of the questionnaire this content included items that are relevant to the support resources of a sport system and the skills necessary for an athlete to progress successfully along the TDP. Specific steps were taken to ensure content validity and comprehensibility of the questionnaire as addressed in detail below.

7.2.1.1 Item generation.

The creation of an initial pool of questionnaire items is a crucial stage in questionnaire design. The goal of the item generation stage was to systematically sample all content that is potentially related to the target construct (Clark & Watson, 1995). It was important that the questionnaire items were empirically supported by research and relevant and acceptable to the target group (i.e., coaches, athletes, HPDs) for whom the questionnaire was designed (Rattay & Jones, 2007). Therefore, initial item generation was developed with specific reference to the themes that emerged from findings presented in chapters 4, 5 and 6 (see figure 7.1), as well as the earlier review of literature (see Chapter 2; Benson & Clark, 1982).

As such, the first step in designing the questionnaire was the content development process. This involved accumulation and categorisation of all raw data codes from the three previous studies. These data codes related to a significant factor for athlete development as determined by a coach, service provider or athlete participant. Each data code was rephrased to form a question. An initial list of 356 items was generated which were subsequently examined for duplicates, clarity, interpretation, and applicability to the purpose of the questionnaire. Following
DeVellis’s (2003) suggestion, lengthy items, double-barrelled items, and items requiring a high level of reading ability were avoided. This reduced the item number to 246. It should be recognised that this is a large number of items but, in line with Clark and Watson’s recommendation (1995), the content development phase should tend to over-include items since the initial pool should contain items that ultimately address as many potential constructs related to the target construct as possible. This was an important step since subsequent psychometric analysis can identify weak, unrelated items that should be dropped from the scale but is unable to detect items that should have been included in the first place but were omitted. Ensuring an adequate sample of items within each of the content areas was also important to ensure that all relevant themes were adequately represented in the final questionnaire. The key focus area of each of the three previous studies formed the initial categories under which all items were ordered. Further examination and interpretation of the meaning of the items within each of these three categories suggested that the items could be interpreted more specifically by creating five key factors depicted in Figure 7.1.
i. The sport support system

ii. The talent development pathway

iii. The athlete

Figure 7.1 Key categories from Chapters 4, 5, and 6 interpreted into key factors

These factors are supported by the literature as critical for athletic development and success in high performance sport as reported by coaches, athletes, service providers, and HPDs (Hassell, et al., 2010; Jowett & Timson-Katchis, 2005).

7.2.1.2 Item justification: Expert meetings

The next step in the process of content development was to discuss the applicability, clarity, and interpretation of the list of items with a panel of six expert coaches. Similar to the selection criteria used by Abraham, Collins, and Martindale (2006) the quality of the coaches involved was controlled by ensuring that each had experience as a coaching for a minimum of 10 years with both developmental and high performance athletes. Peer identification was also used to select these coaches, in this circumstance staff members from the national coaching association were asked to recommend adequate coaches that fitted the selection criteria for participation. The coaches \( n = 6 \) male; age 40 ± 5 years) represented a range of sports (Olympic
Weightlifting, Gaelic Games, Athletics, Rowing, Rugby, Swimming and Triathlon) and one coach worked as both a Gaelic Games and Olympic Weightlifting coach. One coach was 25yo, however he was also still performing as an athlete and was involved in his sport since the age of 15 years. The strength of the panel lay in the diversity of expertise and interactions that occurred during the reviews (Czaja & Blair, 1996). The meetings took place one-on-one at a quiet and convenient location. In this setting, it was felt that the coach could express their views more freely. Short breaks were taken during the meeting to avoid the effects of fatigue. Coaches were also permitted to follow-up on the meeting with any further points that they felt could contribute to item justification. It should be noted that these meetings were not recorded; instead, notes were taken throughout the meeting and the coaches made changes to a document containing the list of initial items.

7.2.1.2.1 Procedure.

Each meeting lasted approximately 60 minutes. Prior to the meeting, all coaches were emailed the item list to familiarise themselves with the objective of the questionnaire and its contents. During the meeting each item was examined for interpretation, relevance and applicability to the intention of the questionnaire (Dillman, 2000). As such, and following the recommendations of Dillman (2000), the experts were asked to review and scrutinise all items and comment on the clarity, face and content validity, comprehensibility, and age appropriateness of each item. The coaches were also encouraged to suggest an item that should be deleted, or rephrased. As well as this the coaches were encouraged to generate further items that they felt were critical to the entire spectrum of athlete development and support.
7.2.1.2.2 Results.

Following the expert coach reviews the item list was reduced from 246 to 151. This was a noticeable and dramatic reduction and most items were lost due to the relevance of the item to the intention of the questionnaire (n = 67). Two of the coaches felt that the questionnaire deviated too much from its desired objective. They suggested that the questionnaire should focus more on answering whether the athlete has the ability to adapt to typical changes of the TDP. Another coach believed that the questionnaire would not be applicable or comprehensible for amateur sports such as Gaelic Games due to the difference in the level of performance and knowledge of junior and youth athletes. Since the questionnaire was initially designed to cover a wide range of sports (i.e., team and individual), ages (i.e., 12-35 years), and abilities (i.e., club level to world championship level), 12 items were deleted as they were deemed inapplicable or unsuitable to the athlete population. A further 12 items were deleted due to comprehensibility and lexical issues. However, four new items were added to the Resources theme, where two coaches felt that more information needed to be gathered regarding ‘strength and conditioning service and use’, as well as ‘how athletes cope with injury and illness’.

7.2.1.3 Item justification: Cognitive interview.

To consider the response process from the perspective of the respondent rather than the researcher (Drennan, 2003) a cognitive interview was held with a purposefully sampled group of developing and high performance athletes. The cognitive group interview helped to examine how respondents perceive and interpret questions, as well as identify potential problems that may occur in the completion of the
questionnaire (Gerber & Wellens, 1996). Further to this, the group interview helped to improve the design of the questionnaire, and reduce potential non-response as well as to improve the subsequent validity of results (Collins, 2003; Willis, 2004). Conrad and Blair (1996) identified semi-structured, in-depth interviews as the fundamental procedure in satisfying these objectives. During the cognitive interviews, attention was paid to mental processing and body language during the completion of the questionnaire and notes were taken where this suggested confusion or hesitation in their response. Willis also proposes that the cognitive interview is a useful tool for ‘fixing the logic of the questionnaire’ (2004). Therefore, the interview protocol was designed to detect structural and logical problems with the questionnaire. The cognitive interview was to check for misunderstandings, inconsistencies, unclear questions, and inappropriate response options (Conrad & Blair, 1996). Given the age and maturity of the target population, it was deemed critical to ensure that the respondents understood the questions in the manner that was intended (Collins, 2003). Since potential problems with questionnaire responses are multi-factorial (Drennan, 2003), it makes sense to identify these problems earlier rather than later and the cognitive interview served this purpose well. Conrad and Blair (1996) suggest that possible response problems that can occur with questionnaire completion can be classified into five categories, these are explained as follows:

1. **Lexical Problems** are associated with the meaning and use of words in context. This is important considering the associated range in age and variety of NGBs of the intended respondents

2. **Inclusion / Exclusion problems** are concerned with the scope of the questions
and are primarily concerned with categories in a question (Conrad & Blair, 1996).

3. Temporal Problems in questionnaires relate to time concepts such as questions about length of time or time spent on different activities. Drennan (2003) offers examples of potential temporal problems including phrases such as ‘in the last year’, ‘all the time’ or ‘some of the time’.

4. Logical Problems are concerned with the difficulty that respondents have in relation to words that connect concepts such as ‘and’ or ‘other than’, together with the use of presuppositions in questions (Drennan, 2003). These words can lead to a respondent perceiving one item as asking more than one question.

5. Computational Problems are similar to temporal problems and relate to questions that require information using long term reflection or calculations as well as questions with a complicated structure (Dillman, 2000).

7.2.1.3.1 Participants.

A sample of athletes (5 male; 2 female; age 22 ± 4 years) from a range of sports (i.e., Olympic Weightlifting, Open Water Swimming, Surf-lifesaving, Triathlon, Taekwondo, Judo and Professional Cycling) were recruited through word of mouth, emails, and phone calls. Participants were sampled from both developmental (n = 3) and world class levels (n = 4) of performance. This stratified sample was reflective of those to whom the questionnaire was intended. Although Dillman (2000) cautions researchers that small numbers of cognitive interviews cannot identify all the potential problems of a questionnaire, this number represented all the sub-populations of the intended target population of the questionnaire. In addition, other ‘front-end’ steps
had been taken to identify potential problems in the questionnaire design, notably the use of an expert panel. Participant consent was also collected.

**7.2.1.3.2 Procedure.**

The group interview took place in a quiet location, which was convenient to the athletes. A combination of three cognitive interviewing techniques (i.e., observation, retrospective probing, and think-aloud protocol) were employed over a 40 minute period;

1. **Observation.** After a five minute introduction to the intention of the questionnaire the athletes were asked to answer the questionnaire individually. Athletes were requested to complete the questionnaire in full and mark any item that they felt was confusing, irrelevant, or inapplicable for the questionnaire’s purpose. While the athletes were completing the questionnaire, they were observed for body language that suggested that the athletes were skipping questions, pausing, putting answers in the wrong place, changing answers, or confused (MacNamara et al., 2010).

2. **Retrospective probing.** Once all athletes had fully completed the questionnaire 15 minutes was then spent questioning and probing them in relation to their observed behaviours. An example of such probing techniques include; ‘I noticed that you hesitated quite a lot on this section – why?’. Additionally, spontaneous probes were used at the discretion of the interviewer based on the respondents’ reactions. These are especially effective in allowing the interviewer explore unexpected responses and behaviours (Conrad & Blair, 1996).
Think aloud protocol. A group discussion ensued where the athletes were encouraged to think aloud in response to their feelings and thoughts in relation to individual items and/or the objective of the questionnaire. Further probes were used to encourage feedback on potentially problematic items (e.g., ‘Can you repeat that question in your own words?’, ‘what does the term X mean to you?’, ‘How did you decide on that answer?’), this generated further debate until athletes agreed on similar responses. During this stage athletes were asked to paraphrase questions, to redefine meanings using their own words, explain their responses and identify parts of the questionnaire that were difficult to understand, interpret, or complete (Willis, 2004). This cognitive group interview process was different to previous literature (e.g., MacNamara et al., 2010) which used one-on-one cognitive interviews. The think-aloud protocol has been found to be problematic in a number of ways (Biehal & Chakravarti, 1995). It can be quite demanding on respondents to verbalise and articulate his or her thoughts while completing the questionnaire. Although the group setting may have hindered some of the intentions of a think-aloud protocol (e.g., shyness) it did generate group discussion and resulted in mutually agreed changes to the questionnaire content.

7.2.1.3.3 Cognitive interview results.

Results from the cognitive interview process were summarised on a question-by-question basis before completing an entire review of the questionnaire content. Two items were highlighted as asking two separate questions (‘If am often fatigued because I do not know how to manage my recover effectively’ and ‘There is nobody I
can go to advise me on lifestyle management so I just let things happen’). As such, these items were subsequently split to form four items. A further two items were rephrased due to lexical and temporal issues (‘I tend to use sport psych when it’s too late’ and ‘I look towards others for motivation to train’). Athletes were satisfied that the negatively worded items helped to maintain their concentration in the response process without causing confusion to the question being asked. Although the athletes were satisfied that the questionnaire covered a broad spectrum of important factors important to their own specific development - commenting that they felt like the questionnaire “had been designed for them” - they all agreed that answering it was laborious and time consuming. As such, each of the 151 remaining items were examined and rephrased to ensure it related to one of two competencies; the ability of the support system to provide the right resources or the ability of an athlete to successfully negotiate the TDP. An item was deleted if, despite rephrasing, it did not question the sport system’s resource provision or an athlete’s ability to utilise resources. This did not affect the initial objective of the questionnaire; to examine the effectiveness of the athlete’s support system as well as the skill proficiency of the athlete to manage their development environment. This phase of content validity dramatically reduced the item content list from \( n = 151 \) to 82 and included 35 negatively worded items. The loss of 69 items during this stage of questionnaire testing can be explained by the different role played by the athletes during the cognitive interview as opposed to the expert panel. The purpose of the expert panel was to assess the content validity, face validity and comprehensiveness of the questionnaire items. The cognitive interview ensured allowed athletes identify questions that were
irrelevant, difficult to understand, very similar to other questions or incomprehensible due to the age, level or sport associated with the participant. Further to this, research suggests that in preparation for phase 2 of the methodology - the Exploratory Factor Analysis (EFA) – statistical tests provide more accurate results when each key factor is represented by 3 to 5 items (Fabrigar, Maccallum, & Wegener, 1999; Velicer & Fava, 1998). As such it was ensured that each factor was represented by a minimum of five items (Bollen, 1989). Reflecting significant aspects for successful talent development that emerged from the previous three chapters these factors were as follows:

1. Resources of social support within in the sport system
2. Tangible resources of the sport system
3. Skills of the athlete in utilising social support
4. Skills of the athlete in utilising service provision
5. Skills of the athlete for performance planning.

7.2.1.4 Item refinement: Pilot test.

The development of a questionnaire demands that a precise and accurate pilot test is carried out to ensure that the results are valid, reliable, unbiased, and complete (Collins, 2003; Czara & Blair, 1996). This is especially important in self-administered questionnaires where the researcher has little influence on the respondent’s approach to answering the question. Therefore a final pilot test was conducted at this stage, using this initial version of the questionnaire, to test the comprehensibility of the items as well as the ease of the overall administration (Gaudraeu & Blondin, 2002).
7.2.1.4.1 Participants.

The questionnaire was completed by 24 individuals (13 males, 11 females; 20 age ± 2 years) competing in different sports (i.e., Hockey, Equestrian, Athletics track and field, Swimming, Rugby, Badminton) at a range of levels (national, inter-varsity, Europeans, International). As before, this sample of athletes intended to reflect the range of sports and age groups for which the final questionnaire was intended. The questionnaire was issued to the athletes in a group in a convenient and comfortable setting. Participant consent was also collected.

7.2.1.4.2 Procedure.

The pilot version of the questionnaire included an instruction page, followed by a section seeking demographic information including age, sex, sport, and amount of time involved in the sport. This section was followed by 82 items using a 6-point Likert scale (from 1 = Highly disagree to 6 = Highly agree). According to Martindale et al., a Likert scale of between 3 and 9 points is considered appropriate for such questionnaires. A 6 point questionnaire provided a 3-point range of discrimination for both positive and negative choices with no neutral answer available this ensured that athletes could not ‘sit on the fence’ (Martindale et al., 2010). This supports recommendations elsewhere in the literature that suggests omitting a neutral option encourages participants to think more carefully about whether he or she disagrees or agrees with the statement leading to greater precision (Buckley & Williams, 2002). To minimise the danger of acquiescent bias and ensure that athletes using the questionnaire did not fall into an automatic response pattern a number of items were purposefully negatively worded (n = 35) to encourage concentration when completing
the questionnaire. The participants were instructed to complete the questionnaire in full and to write comments next to any problem item. It is important to compare here that, both the purposeful inclusion of negatively worded items and a 6 point Likert scale answering system are in contrast to Freeman’s (et al., 2011) questionnaire. The PASS-Q does not include any negatively worded item and uses only a 5 point Likert scale (0 = not at all, 4 = extremely so).

The questionnaire also included a brief paragraph of information at the top of the questionnaire acted to instruct the athletes on how to answer the questionnaire and to assure them that their responses would remain confidential with only the researcher knowing the result. Similar to the cognitive group interview the athletes were observed for body language that could indicate confusion or hesitation. The participants spent approximately 12 minutes to complete the questionnaire in full at which point they were encouraged to discuss any question they felt was problematic. Probes were used to encourage the respondents to discuss the relevance, similarity and comprehensibility of these items (Carron, Widmeyer, & Brawley, 1985; Patrick Gaudreau & Blondin, 2002)

**7.2.1.4.3 Results**

Since the questionnaire was designed to differentiate respondents according to the characteristics being measured, good items were ones where different respondents gave different responses. Subsequent changes were made if following the analysis of the pilot test results showed that over 50% of the athletes responded the same to any item. Such an item was made redundant and not included in the final version of the questionnaire as indicated by Rust and Golombok’s facility index (1989).
However, there was an adequate range in responses for all questions from the pilot test and no item was deleted as a result of this step. Two items were highlighted as inapplicable to the athlete’s sport (equestrian and rugby). One item was highlighted as asking two separate things. These three items were rephrased as recommended by the athletes, and the item total remained at 82. As mentioned previously, the questionnaire intended to assess five key factors, two factors relating to the athlete’s resources and support system, and three factors relating to the athlete’s skills. In the event of subsequent item deletion and to ensure adequate scale reliability and coverage of the construct domain of all five factors (Benson & Clark, 1982). As such five items were created and added to two of the factors, ‘Skills of the athlete in utilising service provision’ and ‘Skills of the athlete for performance planning’. These items were reviewed by the athletes in the pilot group to ensure their suitability to the construct being measured and the objective of the questionnaire.

On completion of the initial item generation and content validity phases, the purpose of the second phase was to explore the factor structure of the 87 item questionnaire using an Exploratory Factor Analysis (EFA).

### 7.2.2 Phase 2 Questionnaire Construct Validity and Reliability

Following phase 1 - the initial item generation and content validity phase - the questionnaire contained 87 items assessing five key factors. The purpose of the second phase was to explore the factor structure of the questionnaire using an exploratory factor analysis (EFA). The EFA was used to determine the number of underlying latent factors of the questionnaire, reduce the number and dimensionality of the items and gain a clear view of the data (Field, 2000; Rietveld & Van Hout, 1993). An assessment
of the reliability and internal consistency of the questionnaire was also conducted
toward the end of this phase. To reduce the number of items and identify clear
constructs under which a reliable questionnaire could be used the following steps
were taken:

1. Data collection. Responses were collected from a wide range of athletes
   through the use of an online version of the questionnaire. This data was then
   used for the factor analysis. This method of data collection was used as it
   offered a low probability of data errors, it could be self-administered, it was
cost effective and could reach a wide international population.

2. Sampling adequacy. The data collected was tested for sampling adequacy
   examining the KMO value, Bartlett’s test of Sphericity, Correlation Matrix and
   Cronbach’s Alpha.

3. Determining the number of factors to extract. Multiple tests (Kaiser’s Criterion,
   Cattell’s Scree Plot, and Parallel Analysis) were used as a guide to indicate the
   number of factors to extract from the pattern matrix. This was followed by a
   thorough examination of pattern coefficients and factor loadings in the pattern
   matrix using strict exclusion criteria.

4. Relationships between the factors. An examination of the communality values
   and correlation matrix was necessary to explore the relationship between
   items and highlight items that were irrelevant or too similar.

5. Interpretation of factors. Pattern coefficients and emerging factors were
   examined to interpret and name key constructs.
6. Examining reliability statistics. Cronbach Alpha values and Inter-Item correlations were examined to assess the internal consistency and reliability of emerging factors.

7. Relationship of the factors to the literature. Each factor is discussed in relation to the literature and findings of previous chapters.

8. Addressing validity. This section highlights the validity measures taken throughout both phases of the questionnaire design.

### 7.2.2.1 Data collection.

To collect data for the EFA analysis, the questionnaire was copied into an online survey administration tool. The questionnaire was password protected with only the researcher having access to the information. To ensure the questionnaire was compatible and clear in its new electronic form a preview of the questionnaire was administered to six colleagues (24-35 years; 3 male, 3 females; Sport Scientists (n= 2), Physiotherapists (n= 2), Dietician (n= 1), Coach (n= 1). These participants were asked to answer the questionnaire online and report back any lexical or comprehensibility issues with their experience. Following this step two items were rephrased to improve clarity.

### 7.2.2.1.1 Questionnaire format.

The final version of the questionnaire contained five key factors and 87 items. The first page of the questionnaire contained an information sheet outlining the objectives of the study and instructions in proceeding to answer the questionnaire. The second page collected demographic data on each of the respondents. The questionnaire was answered by ticking a box using a 6-point Likert scale with a
similarity response format from 1 (highly disagree) to 6 (highly agree). Only one answer per item was permitted and responders had to answer the question before continuing onto the next item. An example of the questionnaire can be found in the appendices (see appendix 7.2).

7.2.2.1.2 Procedure.

Permission from coaches and NGBs of sport was sought and granted to conduct this study. Athlete and parental (where the athlete was under 18 years of age) consent forms were collected from participants. All athletes who had returned parental consent forms and athlete consent forms were subsequently asked to complete the questionnaire. A uniform resource locator (URL) link (https://www.surveymonkey.com/athletesupportandskillquestionnaire) was provided to all participants to connect them directly online to the questionnaire via Survey Monkey (© 1999-2013). The use of an online version was cost effective and allowed the participant to complete the questionnaire using their mobile phone in privacy. This helped to ensure confidentiality and avoid socially desirable responses. Participants were also reassured that their answers would remain confidential and were reminded of the need to be honest when answering the questions.

7.2.2.1.3 Participants.

Over 500 athletes were contacted via a recruitment email (see appendix 7.3). These athletes were purposefully sampled through NGBs, clubs, and HPCs by contacting coaches, parents, HPDs, and support staff of these organisations. A sample of 255 athletes responded and an initial analysis of these responses meant that this number was reduced to 210 when incomplete questionnaires were excluded. Only
fully complete questionnaires were included. The demographic data of the participants is depicted in the tables below (Table 6.1), the percentage figure displayed is a value relative of the total number of responses. In contrast to Freeman and colleagues (2011) who only recruited a population of undergraduates from the same university (n = 180), this study targeted a greater spectrum of athletes in terms of age, nationality and level of performance and experience.
Table 7.1 Demographic data of participants

<table>
<thead>
<tr>
<th>Demographic data of participants</th>
<th>No. of participants</th>
<th>% against total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-18</td>
<td>44</td>
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<tr>
<td>19-25</td>
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<tr>
<td>26-35</td>
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<tr>
<td>36-45</td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>119</td>
<td>58.9</td>
</tr>
<tr>
<td>Male</td>
<td>83</td>
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</tr>
<tr>
<td>Occupation</td>
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<td></td>
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<tr>
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<td>8.3</td>
</tr>
<tr>
<td>Part Time Athlete</td>
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<td>38.1</td>
</tr>
<tr>
<td>Employed &amp; Studying</td>
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<td>7.1</td>
</tr>
<tr>
<td>Employed</td>
<td>89</td>
<td>20.4</td>
</tr>
<tr>
<td>Studying</td>
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</tr>
<tr>
<td>None</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Nationality</td>
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<td></td>
</tr>
<tr>
<td>American</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Australian</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>British American</td>
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<td>0.4</td>
</tr>
<tr>
<td>Bulgarian</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Canadian</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>GBR</td>
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</tr>
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</tr>
<tr>
<td>German</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>Irish</td>
<td>182</td>
<td>74.6</td>
</tr>
<tr>
<td>Irish French</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>NZ</td>
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<td>0.4</td>
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<tr>
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<td>0.4</td>
</tr>
<tr>
<td>Norwegian</td>
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<td>0.4</td>
</tr>
<tr>
<td>South African</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Highest Level of Performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olympics/ World Championships/</td>
<td>31</td>
<td>7.5</td>
</tr>
<tr>
<td>Commonwealth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euros</td>
<td>41</td>
<td>9.9</td>
</tr>
<tr>
<td>International</td>
<td>109</td>
<td>26.2</td>
</tr>
<tr>
<td>National</td>
<td>104</td>
<td>25</td>
</tr>
<tr>
<td>State/ Regional</td>
<td>34</td>
<td>8.2</td>
</tr>
<tr>
<td>County</td>
<td>37</td>
<td>8.9</td>
</tr>
<tr>
<td>Club</td>
<td>58</td>
<td>13.9</td>
</tr>
<tr>
<td>Six Nations, Europeans and World Cup</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>College and Club</td>
<td>1</td>
<td>0.2</td>
</tr>
</tbody>
</table>
7.2.2.2 Sampling adequacy.

Using the statistical software package SPSS (IBM SPSS Statistics 21.0), the first step of factor analysis was to ensure the suitability of the data set. Field (2005) recommends that the ratio of three participant responses per item is necessary as an adequate sample size for an accurate factor analysis. This study collected 255 data sets of which 210 were accepted as fully complete, this resulted in 2.4 participants responses per item. This is less than Field’s (2005) recommended ratio. However, Fabrigar and colleagues (1999) suggest that adequate sample size is not a function of the number of measured items per se but is instead influenced by the extent to which factors are over-determined and the level of the communalities of the measured items which are discussed later. According to MacCallum and colleagues (1999) when each common factor is over-determined (i.e., at least 3-4 items represent each factor) and the communalities are high (i.e., an average of 0.70 or higher), accurate estimates of population parameters can be obtained with samples as small as 100. The communality values of 87 items ranged from 0.179 to 0.679 (mean item communality = 0.405) suggesting that further examination of reliability measures. The 87 item data set revealed a moderate level of internal consistency, Cronbach’s Alpha value = 0.644. This value was lower than the acceptable value (over 0.7) recommended by Nunnally and Bernstein (1994) however since the questionnaire contains five factors that measure different features important for talent development it can be considered multi-dimensional as such it was expected that many of the items would not be related. Attention was clearly paid to the factor analysis and later elimination of items to ensure that remaining items were conceptually meaningful to the group of items.
which formed that relative factor.

The Kaiser-Meyer-Olkin of sampling adequacy (KMO) was used as another check for sampling adequacy (Hutcheson & Sofroniou, 1999). Kaiser (1974) recommends that a KMO value between 0.7 and 0.8 is considered ‘good’. The KMO test for this data set revealed a value of 0.767 (p > 0.5) a value close to 1 indicates that patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors (Field, 2005). Bartlett’s test of sphericity was used to test for an adequate level of correlation between items or an equal level of variance across the sample of responses. This value was significant P = 0.0 (Chi-Squared = 9210.0, df = 3741, P < 0.5) suggesting that there was a correlation between the variables and thus exploratory factor analysis was appropriate. This supports evidence that the sampling size was adequate for factor analysis (Sharma, 1996). In addition, the strength of inter-correlations among items was examined using the Correlation Matrix. Values that correlate too highly (close to or greater than 0.8) indicate manifestation of the same underlying variable (Rietveld & Van Hout, 1995) or a potential latent factor. Correlations among the variables varied, the majority of the item values were greater than 0.05 whilst the highest correlation value recorded was 0.731 (between item numbers 56 and 57). The closer the correlation value to 1 the higher the correlation value. As such multi-collinearity of this data set was not a concern.

7.2.2.3 Determining the number of factors to extract.

Factor analysis is an exploratory tool and should be used to guide the researcher in making decisions. One important decision is the number of factors to extract (Field, 2005). To avoid both a loss of potentially important information and
withholding trivial and misleading data, a number of measures were taken to indicate the number of factors to retain whilst maintaining the greatest amount of discrepancy for the entire questionnaire. Kaiser’s Criterion suggests that only factors with an Eigenvalue greater than 1 should be retained for further investigation. The Eigenvalue of a factor represents the amount of total variance explained by that factor. The higher the percentage variance explained by the least number of items indicates high levels of communality among the variables. A low total percentage variance may be due to reliability of the items in the questionnaire, the reliability of the sample and or the reliability in the interpretation of the items by the participants. An examination of the Initial Eigenvalues depicts a 25-factor structure with values ranging from 13.798 to 1.02 and accounts for over 70% of the total variance, with the first factor accounting for almost 16% (see Table 6.2). Considering the initial communality values and multidimensionality of the questionnaire content, it was expected that a high number of items would need to be retained. However, Kaiser’s criterion has been criticised for suggesting the retention of too many factors (Field, 2005) largely due to sampling error. Furthermore, a 25 factor questionnaire would be difficult to interpret and would be unrealistic to the desired intention of the questionnaire, as such it was necessary to direct attention to Cattell’s (1966) Scree plot see figure 7.2.
Table 7.2 Total Variance explained with Eigenvalues set at > 1

<table>
<thead>
<tr>
<th>Factor</th>
<th>Initial Eigenvalues</th>
<th>% of Variance</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>13.798</td>
<td>15.86</td>
<td>15.86</td>
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<tr>
<td>2</td>
<td>5.617</td>
<td>6.457</td>
<td>22.317</td>
</tr>
<tr>
<td>3</td>
<td>4.371</td>
<td>5.024</td>
<td>27.341</td>
</tr>
<tr>
<td>4</td>
<td>3.617</td>
<td>4.157</td>
<td>31.498</td>
</tr>
<tr>
<td>5</td>
<td>2.925</td>
<td>3.362</td>
<td>34.86</td>
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<tr>
<td>6</td>
<td>2.513</td>
<td>2.889</td>
<td>37.749</td>
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<tr>
<td>7</td>
<td>2.257</td>
<td>2.594</td>
<td>40.343</td>
</tr>
<tr>
<td>8</td>
<td>2.152</td>
<td>2.474</td>
<td>42.817</td>
</tr>
<tr>
<td>9</td>
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<td>45.19</td>
</tr>
<tr>
<td>10</td>
<td>1.87</td>
<td>2.149</td>
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</tr>
<tr>
<td>11</td>
<td>1.731</td>
<td>1.99</td>
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<td>1.609</td>
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<tr>
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<td>1.517</td>
<td>59.631</td>
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<td>1.373</td>
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<tr>
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<td>1.288</td>
<td>66.523</td>
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<tr>
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</tr>
<tr>
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<tr>
<td>25</td>
<td>1.02</td>
<td>1.173</td>
<td>70.101</td>
</tr>
</tbody>
</table>

The Scree plot reveals a curve with an inflexion point indicating the number of factors to retain. Examination of the plot shows that the curve begins to break and curtail at approximately the tenth factor, suggesting that factors after this point have an eigenvalue less than 1 and should not be considered for the remaining analysis.
The decision to retain 10 factors was further supported by conducting a Parallel Analysis (see Table 6.3), which showed 10 factors with raw data eigenvalues exceeding the corresponding percentile eigenvalues for a randomly generated data matrix of the same size (87 variables x 210 respondents). Parallel analysis has been recommended as the best method to assess the true number of factors (Lance, Butts, & Michels, 2006) unlike the Kaiser criterion method it adjusts for the effect of sampling error (Hayton, Allen, & Scarpello, 2004) which can be expected in questionnaires that contain psychometric items.
Table 7.3 Parallel Analysis for Principle Axis Factoring Random Normal Data Generation

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7.2.2.4 Relationships between the factors.

Exploratory factor analysis provides insights into the latent factors underpinning the questionnaire and allows important items to be retained and interpreted at a later stage. Due to the cognitive nature of the items, presence of error variance and the expected relationship between factors a Principal Axis Factor analysis (PAF) was chosen. A PAF determines the dimensionality of a set of variables, such as a set of items in a questionnaire, and is used specifically to test whether one factor can account for the bulk of the common variance in the set (Habing, 2003). Tabachnick and Fidell (2001) suggest that this type of analysis is most appropriate when the research is driven by theoretical and empirical predictions. In this case, the content of the questionnaire was based on previous grounded qualitative research with data collected from coaches, athletes and key stakeholders working in the field, and as such PAF was chosen as the most suitable test.

7.2.2.4.1 Procedure.

Based on earlier findings from the Scree Plot (Figure 7.2) and Parallel Analysis (Table 7.3) the PAF test was set to produce a 10-factor pattern matrix with 87 items.
The resulting Pattern Matrix was subsequently examined for factor loadings and item coefficients to indicate latent factors and items with no or little loading value inconsistent with main factors and the objectives of the questionnaire. Applying a factor rotation altered the pattern of the factor loadings, and served to make the output of the initial factor analytic solution more understandable by seeking a more simple structure between the variables (Field, 2000). As such in an effort to improve the interpretation of the factor extraction, a Direct Oblimin Rotation (non-orthogonal oblique) was used to simplify and clarify the data structure. Meyers and colleagues (2013) recommend this type of rotation, as opposed to an orthogonal rotation which could potentially have resulted in the loss of valuable information, since correlations between the factors were expected as previously identified through Bartlett’s test of sphericity ($P = 0.0, P < 0.5$). Default Kappa and Delta values were used in order to standardise the extent to which factors were allowed to correlate (Fabrigar, Wegener, MacCallum & Strahan, 1999). Kappa was set to the power of 4 by default whilst the Delta value was left at 0. The 10-factor 87 item Pattern Matrix is presented below.
Table 7.4 10-factor Pattern Matrix on 87-item questionnaire, prior to the application of exclusion criteria

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Chapter 7 The design and initial validation of the ASSAQ

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It is important to remember that the goal of factor analysis was to reduce the number and the dimensionality of the items and gain a clear view of the data (Field, 2000; Rietveld & Van Hout, 1993). As recommended by Field (2005) and Gable and Wolf (1993), the cleanest factor loadings within the pattern matrix were examined under the following criteria:

1. Pattern coefficients of ± 0.40 or higher were considered salient in the first instance. Items with lower pattern coefficients, ± 0.30 ≥ ± 0.40, were also noted as these can also give important information about a factor (Field, 2005). Items with values ≤ ±0.3 were eliminated.

2. Items with fewest cross-loadings were retained, items that cross-loaded with more than three factors were eliminated.

3. Factors that failed to load more than three items were not retained.

4. All items were examined to ensure they were conceptually meaningful to the group of items that formed a factor. Items with complex loadings were
examined to see if they fitted logically into the factor based on the wording of
the item and the label given to the factors.

5. Items with complex loadings were scrutinised to find possible reasons
underlying their complex loadings (e.g., wording and relevance of the item).

6. Subjective judgment was used throughout the data analysis process to assess
the relevance and value of each item, interpretability of competing factors
where objective criteria indicated more than one potential factor (cross-
loading) or no factor loading.

Following these steps, thirty items were eliminated. Nine due to low factor loading
values (<0.4), eight due to low factor loading values and cross-loading, and eleven
items that failed to load under any factor. Two factors with only one item loading each
were also subsequently eliminated. A seven factor pattern matrix emerged with 57
items. It was expected that most items would have high loadings on the most
important factor, and small loadings on all other factors (Field, 2000).

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Factor Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>0.733</td>
</tr>
<tr>
<td>33</td>
<td>0.705</td>
</tr>
<tr>
<td>57</td>
<td>0.7</td>
</tr>
<tr>
<td>56</td>
<td>0.668</td>
</tr>
<tr>
<td>58</td>
<td>0.649</td>
</tr>
<tr>
<td>28</td>
<td>0.647</td>
</tr>
<tr>
<td>51</td>
<td>0.639</td>
</tr>
<tr>
<td>53</td>
<td>0.632</td>
</tr>
<tr>
<td>29</td>
<td>-0.63</td>
</tr>
<tr>
<td>52</td>
<td>-0.61</td>
</tr>
<tr>
<td>32</td>
<td>0.601</td>
</tr>
<tr>
<td>19</td>
<td>0.593</td>
</tr>
<tr>
<td>46</td>
<td>-0.35</td>
</tr>
<tr>
<td>Item No.</td>
<td>1</td>
</tr>
<tr>
<td>---------</td>
<td>-----</td>
</tr>
<tr>
<td>25</td>
<td>-0.58</td>
</tr>
<tr>
<td>31</td>
<td>0.548</td>
</tr>
<tr>
<td>35</td>
<td>-0.54</td>
</tr>
<tr>
<td>18</td>
<td>0.518</td>
</tr>
<tr>
<td>34</td>
<td>-0.51</td>
</tr>
<tr>
<td>59</td>
<td>-0.5</td>
</tr>
<tr>
<td>50</td>
<td>-0.49</td>
</tr>
<tr>
<td>74</td>
<td>-0.34</td>
</tr>
<tr>
<td>48</td>
<td>0.411</td>
</tr>
<tr>
<td>85</td>
<td>-0.46</td>
</tr>
<tr>
<td>24</td>
<td>-0.46</td>
</tr>
<tr>
<td>45</td>
<td>0.451</td>
</tr>
<tr>
<td>60</td>
<td>-0.32</td>
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<td>22</td>
<td>0.44</td>
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<tr>
<td>7</td>
<td>0.426</td>
</tr>
<tr>
<td>23</td>
<td>-0.4</td>
</tr>
<tr>
<td>30</td>
<td>0.404</td>
</tr>
<tr>
<td>55</td>
<td>0.387</td>
</tr>
<tr>
<td>84</td>
<td>0.377</td>
</tr>
<tr>
<td>5</td>
<td>-0.37</td>
</tr>
<tr>
<td>3</td>
<td>0.368</td>
</tr>
<tr>
<td>72</td>
<td>0.357</td>
</tr>
<tr>
<td>15</td>
<td>0.3</td>
</tr>
<tr>
<td>20</td>
<td>0.522</td>
</tr>
<tr>
<td>21</td>
<td>0.466</td>
</tr>
<tr>
<td>64</td>
<td>0.419</td>
</tr>
<tr>
<td>66</td>
<td>0.37</td>
</tr>
<tr>
<td>63</td>
<td>0.38</td>
</tr>
<tr>
<td>39</td>
<td>0.347</td>
</tr>
<tr>
<td>36</td>
<td>0.3</td>
</tr>
<tr>
<td>69</td>
<td>0.33</td>
</tr>
<tr>
<td>76</td>
<td>-0.44</td>
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<tr>
<td>77</td>
<td>0.42</td>
</tr>
<tr>
<td>37</td>
<td>0.42</td>
</tr>
<tr>
<td>14</td>
<td>0.4</td>
</tr>
<tr>
<td>79</td>
<td>-0.34</td>
</tr>
<tr>
<td>70</td>
<td>0.49</td>
</tr>
<tr>
<td>67</td>
<td>-0.39</td>
</tr>
<tr>
<td>82</td>
<td>0.41</td>
</tr>
</tbody>
</table>
7.2.2.4.2 Examining item communality values.

It was important to measure the percentage of variance of each given item, the communality of an item gives the sum of the loadings of that item on all extracted factors (Field, 2000; Rietveld & Van Hout, 1993). A communality value is considered high when it is greater than 0.6 meaning that it accounts for a big proportion of the variance (Field, 2000). If the communality for a measured variable is low (<0.3) it indicates that the variable may be unreliable and or unrelated to the factor of interest and therefore shares little in common with other items in that factor. Low communality values could also indicate that an item is affected by random error, either way it highlights the need to examine the item further (Fabrigar et al., 1999) and possibly eliminate the item from the data set.

The communality values of remaining 57 items ranged between 0.698 and 0.199 (mean item communality = 0.462), items with values less than or close to a value of 0.3 were examined further and subsequently six items were eliminated from the data set, resulting in a set of 51 items.

7.2.2.4.3 Inter-item correlations.

Tabachnick and Fidell (2001) recommend inspection of the correlation matrix of item coefficients greater than 0.3 (see appendix 7.4; 10 Factor Correlation Matrix). Since inter-item relations were expected but specific attention was focused on clusters
of items embedded in the data with high correlation values (> 0.5). Following extended inspection of the items, if it they were deemed to have the same meaning then the item with least communality value was eliminated. As a result the following changes to the remaining items were made. This step resulted in the elimination of two items:

- Item number 50 “My coach is reluctant to change the training programme despite my struggle to manage the training load” and 51 “My coach advises me how to manage the effects of extra or harder training” correlated moderately-highly with a value of 0.411, subsequently item number 50 was eliminated.

- Item number 45 “I access physio / physical therapy to maintain my health” and 18 “There are people available to advise me on how to manage and avoid injury” correlated mildly (0.356), as a result item number 45 was eliminated.

Following the suggestion of Henson, Capraro, and Capraro (2004), a second PAF analysis was conducted on the remaining 49 items. It was expected that good items would load under the same strong factors and that the questionnaire would be reduced even further to result in a simpler form of the questionnaire that was efficient to use by practitioners in the field. The same exclusion criteria as outlined on pages 191 and 192 was applied resulting in the elimination of a further nine items. Item numbers 6 and 41 failed to load under any factor, whilst item numbers 24, 25, 22, 23, 42, 46,and 49 resulted in a pattern coefficient value < 0.4 and cross-loaded under more than one factor. This analysis confirmed a 40 item 4-factor structure, explaining 41.33% of the total explained variance with the first factor accounting for 22.4% (see
This compares to an initial 47.34% total explained variance with the 10-factor structure. Between factor communality values for all 40 items in the 4-factor structure were > 0.3, and internal inconsistency was negatively affected, Cronbach’s Alpha was reduced to 0.567. Nunnally and Bernstein (1994) recommend a criterion of 0.3 as an acceptable corrected item-total correlation and 0.8 as a ‘Good’ internal consistency value for Cronbach’s Alpha. However, it must be remembered that the intent of each of the four factors was to measure different constructs. The low values which emerge from these results suggest that the items do not meaningfully contribute to the same measure. Despite the small decrease in the total explained variance (6.1%) between the initial and second PAF analysis a clearer 4-factor structure emerged. The item content of these factors along with the associated Pattern Coefficient and Extraction Communality Values are displayed separately in the following tables.
Table 7.6 Factor 1 of a 4-factor structure following second EFA extraction criteria

<table>
<thead>
<tr>
<th>Quest No.</th>
<th>Question</th>
<th>Pattern Coefficient</th>
<th>Comm. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>My team mates encourage me at training and competition</td>
<td>0.438</td>
<td>0.364</td>
</tr>
<tr>
<td>47</td>
<td>I never review my performance at training or competition</td>
<td>0.441</td>
<td>0.32</td>
</tr>
<tr>
<td>5</td>
<td>I purposefully learn from other athletes in my environment</td>
<td>0.36</td>
<td>0.307</td>
</tr>
<tr>
<td>7</td>
<td>People in my training environment advise me on how to avoid and treat injury</td>
<td>0.526</td>
<td>0.603</td>
</tr>
<tr>
<td>8</td>
<td>There are people around me who help get me in the right place mentally to train and compete</td>
<td>0.583</td>
<td>0.468</td>
</tr>
<tr>
<td>12</td>
<td>High quality coaching in my sport is not easily accessible</td>
<td>0.458</td>
<td>0.597</td>
</tr>
<tr>
<td>13</td>
<td>I feel that the technical coaching I receive is inadequate</td>
<td>0.603</td>
<td>0.724</td>
</tr>
<tr>
<td>14</td>
<td>My coach monitors my developmental progress so that we are in line with the target standards</td>
<td>0.764</td>
<td>0.659</td>
</tr>
<tr>
<td>15</td>
<td>My coach is fully committed to his/her duties as a coach</td>
<td>0.691</td>
<td>0.635</td>
</tr>
<tr>
<td>16</td>
<td>My coach doesn’t give specific individual coaching</td>
<td>0.672</td>
<td>0.593</td>
</tr>
<tr>
<td>17</td>
<td>My coach spends time on getting the basics correct before moving onto more advanced skills</td>
<td>0.464</td>
<td>0.433</td>
</tr>
<tr>
<td>18</td>
<td>My coach is open to learning and trying new techniques</td>
<td>0.588</td>
<td>0.499</td>
</tr>
<tr>
<td>19</td>
<td>My coach is flexible to my individual needs as a person and athlete</td>
<td>0.629</td>
<td>0.516</td>
</tr>
<tr>
<td>20</td>
<td>I trust my coach’s programme</td>
<td>0.755</td>
<td>0.711</td>
</tr>
<tr>
<td>21</td>
<td>I find it difficult to be honest with my coach</td>
<td>0.553</td>
<td>0.472</td>
</tr>
<tr>
<td>28</td>
<td>My coach advises me how to manage the effects of extra or harder training</td>
<td>0.652</td>
<td>0.533</td>
</tr>
<tr>
<td>29</td>
<td>I don’t discuss the programme with my coach I just do it</td>
<td>0.622</td>
<td>0.521</td>
</tr>
<tr>
<td>30</td>
<td>The direction of my coach’s programme is very clear</td>
<td>0.668</td>
<td>0.522</td>
</tr>
<tr>
<td>31</td>
<td>My coach and I regularly sit down and discuss my progress</td>
<td>0.698</td>
<td>0.679</td>
</tr>
<tr>
<td>32</td>
<td>I work with my coach when setting goals</td>
<td>0.734</td>
<td>0.7</td>
</tr>
<tr>
<td>33</td>
<td>There is regular one-on-one communication between me and my coach</td>
<td>0.694</td>
<td>0.653</td>
</tr>
<tr>
<td>34</td>
<td>My coach doesn’t know when I access support providers such as physio or nutrition advice</td>
<td>0.501</td>
<td>0.428</td>
</tr>
</tbody>
</table>
### Table 7.7 Factor 2 of a 4-factor structure following second EFA and extraction criteria

<table>
<thead>
<tr>
<th>Quest No.</th>
<th>Question</th>
<th>Pattern Coefficient</th>
<th>Comm. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>There is no strength and conditioning coaching available to me</td>
<td>0.611</td>
<td>0.592</td>
</tr>
<tr>
<td>10</td>
<td>There is no sport science testing service available to me</td>
<td>0.491</td>
<td>0.473</td>
</tr>
<tr>
<td>11</td>
<td>Nutrition advice is easily accessible</td>
<td>0.417</td>
<td>0.397</td>
</tr>
<tr>
<td>35</td>
<td>I can easily access facilities and equipment in my training environment that help my development</td>
<td>0.382</td>
<td>0.484</td>
</tr>
<tr>
<td>36</td>
<td>Lack of money limits the opportunity for me to travel to competitions</td>
<td>0.411</td>
<td>0.668</td>
</tr>
<tr>
<td>37</td>
<td>My training environment is not sufficiently equipped for my sport</td>
<td>0.428</td>
<td>0.46</td>
</tr>
<tr>
<td>38</td>
<td>I am always concerned about my financial support</td>
<td>0.385</td>
<td>0.576</td>
</tr>
<tr>
<td>26</td>
<td>There are people available to advise me on how to best manage my recovery</td>
<td>0.44</td>
<td>0.656</td>
</tr>
<tr>
<td>27</td>
<td>I don’t know what support services I have access to</td>
<td>0.437</td>
<td>0.476</td>
</tr>
</tbody>
</table>

### Table 7.8 Factor 3 of a 4-factor structure following second EFA and extraction criteria

<table>
<thead>
<tr>
<th>Quest No.</th>
<th>Question</th>
<th>Pattern Coefficient</th>
<th>Comm. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>I use competitions/ events as markers of my performance level</td>
<td>0.383</td>
<td>0.483</td>
</tr>
<tr>
<td>40</td>
<td>I use competitions to motivate me and focus my training</td>
<td>0.521</td>
<td>0.646</td>
</tr>
<tr>
<td>43</td>
<td>I spend time planning my competitions/ events so that I am clear on what to expect from my performance</td>
<td>0.318</td>
<td>0.478</td>
</tr>
<tr>
<td>44</td>
<td>I look for new ways to improve my performance because I want to be ahead of my competitors</td>
<td>0.482</td>
<td>0.567</td>
</tr>
</tbody>
</table>

### Table 7.9 Factor 4 of a 4-factor structure following second EFA and extraction criteria

<table>
<thead>
<tr>
<th>Quest No.</th>
<th>Question</th>
<th>Pattern Coefficient</th>
<th>Comm. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>Taking time out to recover from training makes me anxious</td>
<td>0.319</td>
<td>0.41</td>
</tr>
<tr>
<td>48</td>
<td>I rarely make time to switch off and socialise</td>
<td>0.488</td>
<td>0.423</td>
</tr>
<tr>
<td>4</td>
<td>My family/ parent/s are familiar with the demands of my sport</td>
<td>0.333</td>
<td>0.465</td>
</tr>
<tr>
<td>1</td>
<td>I have people around me who help me relax away from my sport</td>
<td>0.421</td>
<td>0.414</td>
</tr>
<tr>
<td>2</td>
<td>My family are supportive of my sports career</td>
<td>0.335</td>
<td>0.541</td>
</tr>
</tbody>
</table>
7.2.2.5 Interpretation of factors and relationship to the literature.

Factor analysis does not provide an interpretation of the meaning of identified factors (Tabachnick & Fidell, 2001). However, examination of clusters within the correlation matrix and the meaning and intent of the items that loaded in a similar way influenced the naming of factors and overall title of the questionnaire. The resulting questionnaire intended to assess the competency of a sport’s support system and the ability of the athlete to utilise their TDE to optimise progress along the TDP. As such the questionnaire was aptly named the Athlete Support and Skills Assessment Questionnaire (ASSAQ). Specifically when interpreting the factors in the 4-factor pattern matrix, attention was paid to the wording of those items with the highest loadings (coefficients) and fewest cross loadings. However, items with lower pattern coefficients were also noted as these can also give important information about a factor (Field, 2005). It is also highly important to consider the relationship of the 4-factor ASSAQ structure with evidence provided from the previous three chapters and the literature. All factors contain items relating to both the environment in which an athlete develops and their journey along the TDP. The four factors which emerged from the 40-item Pattern Matrix were interpreted and presented in the following paragraphs.

7.2.2.5.1 Factor 1: Social support.

Factor 1 contained twenty-two items, of which 7 were negatively worded, with a mean Pattern Coefficient loading value of 0.595 and it accounted for 22.42% of the total variance. Communality values ranged from 0.36 to 0.764. Item-total correlation values ranged between 0.32 and 0.506, and the mean Cronbach alpha value was 0.556.
Chapter 7 The design and initial validation of the ASSAQ

The items loading under this factor all related to some aspect of Social Support especially the influence of teammates and the coach. Findings from chapters 4, 5 and 6 highlighted the significant influence of team-mates as a prime source of motivation in training and at competition whilst a coherent coach-athlete relationship appears to have the strongest influence on the athlete’s development. Item number 14 ‘My coach monitors my developmental progress so that we are in line with the target standards’ displayed the highest loading value (0.764). Factor 1 ‘Social Support’ was concerned with a broad range of aspects in relation to the coach and significant others in the athlete’s immediate TDE. This factor pays particular attention to the competency of the coach in the delivery of individual training programmes and management of the athlete’s TDP. These features were prevalent throughout the previous three chapters and emphasised as important in Chapter 2 for facilitation of an effective TDE. Items directly assess whether there is clarity in the direction of the athlete’s developmental trajectory and transparency of stage and seasonal objectives (Miller & Kerr, 2002). The role of teammates and their influence on an athlete’s motivation and commitment to a development programme are also assessed. As described in the Chapters 2 and 4, the coach’s role is known to be highly demanding in terms of time and energy (Richman et al., 1989). Results from the ASSAQ could inform performance directors about the well-being of the coach and the influence of novel interventions integrated into the TDP such as, the introduction of a new coach or skills development programme.
Table 7.10 Factor 1 statistical values

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Item Statistics</th>
<th>Item-Total Correlation</th>
<th>Cronbach's Alpha if Item Deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>5.0476</td>
<td>0.91118</td>
<td>0.35</td>
</tr>
<tr>
<td>47</td>
<td>2.2714</td>
<td>0.99647</td>
<td>-0.325</td>
</tr>
<tr>
<td>5</td>
<td>4.8048</td>
<td>0.83865</td>
<td>0.426</td>
</tr>
<tr>
<td>7</td>
<td>4.5048</td>
<td>1.15435</td>
<td>0.322</td>
</tr>
<tr>
<td>8</td>
<td>4.2952</td>
<td>1.07982</td>
<td>0.407</td>
</tr>
<tr>
<td>12</td>
<td>3.2381</td>
<td>1.50294</td>
<td>-0.141</td>
</tr>
<tr>
<td>13</td>
<td>2.7524</td>
<td>1.30352</td>
<td>-0.318</td>
</tr>
<tr>
<td>14</td>
<td>4.0095</td>
<td>1.30142</td>
<td>0.506</td>
</tr>
<tr>
<td>15</td>
<td>4.7429</td>
<td>1.13263</td>
<td>0.432</td>
</tr>
<tr>
<td>16</td>
<td>2.7333</td>
<td>1.32886</td>
<td>-0.469</td>
</tr>
<tr>
<td>17</td>
<td>4.5381</td>
<td>1.10717</td>
<td>0.393</td>
</tr>
<tr>
<td>18</td>
<td>4.4333</td>
<td>1.16481</td>
<td>0.431</td>
</tr>
<tr>
<td>19</td>
<td>4.4238</td>
<td>1.22432</td>
<td>0.411</td>
</tr>
<tr>
<td>20</td>
<td>4.7524</td>
<td>1.11348</td>
<td>0.535</td>
</tr>
<tr>
<td>21</td>
<td>2.3905</td>
<td>1.14495</td>
<td>-0.435</td>
</tr>
<tr>
<td>28</td>
<td>4</td>
<td>1.19007</td>
<td>0.404</td>
</tr>
<tr>
<td>29</td>
<td>3.1476</td>
<td>1.3456</td>
<td>-0.449</td>
</tr>
<tr>
<td>30</td>
<td>4.481</td>
<td>1.09024</td>
<td>0.465</td>
</tr>
<tr>
<td>31</td>
<td>3.3571</td>
<td>1.30918</td>
<td>0.416</td>
</tr>
<tr>
<td>32</td>
<td>3.9143</td>
<td>1.4116</td>
<td>0.462</td>
</tr>
<tr>
<td>33</td>
<td>4.119</td>
<td>1.38347</td>
<td>0.471</td>
</tr>
<tr>
<td>34</td>
<td>3.319</td>
<td>1.39312</td>
<td>-0.344</td>
</tr>
</tbody>
</table>

7.2.2.5.2 Factor 2: Tangible resources.

Factor 2 contained nine items - of which 3 were negatively worded - with a mean Pattern Coefficient loading value of 0.444 and it accounted for 8.29%. Communality values ranged from 0.397 to 0.688. Item-total correlation values were very low, ranging between 0.021 and 0.179; the mean Cronbach’s alpha value was 0.57. The items loading under this factor all related to aspects of tangible resources including, strength and conditioning, nutrition advice, and finances. Items also related to the ease of access to utilise these services to assist athletic development. As highlighted in Chapter 5, athletes suggested that it was important that their TDE was
adequately equipped to manage talent development but more specifically clarity regarding ease of access to use of services and facilities was just as important. Item number 9, ‘There is no strength and conditioning coaching available to me’ displayed the highest loading value (0.611). Factor 2 addresses organisation related issues including the availability and ease-of-access to resources in the athletes TDE. Chapter 4 highlighted that ‘Tangible Resources’ including sport science and financial support were important for facilitation of effective talent development. However, it is important for a sport system to acknowledge whether their TDS is adequately resourced and that these resources are clearly accessible to cater for the needs of athletes at the right time.

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Item Statistics</th>
<th>Item-Total Correlation</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>2.6714</td>
<td>1.56567</td>
<td>0.044</td>
</tr>
<tr>
<td>10</td>
<td>3.4762</td>
<td>1.66928</td>
<td>0.047</td>
</tr>
<tr>
<td>11</td>
<td>3.6333</td>
<td>1.45551</td>
<td>0.003</td>
</tr>
<tr>
<td>35</td>
<td>4.1714</td>
<td>1.27888</td>
<td>0.179</td>
</tr>
<tr>
<td>36</td>
<td>3.6524</td>
<td>1.4404</td>
<td>-0.096</td>
</tr>
<tr>
<td>37</td>
<td>4.2952</td>
<td>1.22121</td>
<td>0.029</td>
</tr>
<tr>
<td>38</td>
<td>3.7857</td>
<td>1.57941</td>
<td>0.161</td>
</tr>
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<td>26</td>
<td>2.6571</td>
<td>1.3257</td>
<td>-0.021</td>
</tr>
<tr>
<td>27</td>
<td>3.8095</td>
<td>1.46144</td>
<td>0.117</td>
</tr>
</tbody>
</table>

7.2.2.5.3 Factor 3: Psychological skills.

Factor 3 contained four items with a mean Pattern Coefficient loading value of 0.426 and it accounted for 5.676% of the total variance. Communality values ranged from 0.478 to 0.646. Item-total correlation values were again very low, ranging between 0.311 and 0.443; the mean Cronbach’s alpha value was 0.544. Items loading under this factor all related to psychological skills and characteristics of high performance.
athletes. Previous studies described in Chapters 4 and 5 emphasised the significance of these psychological skills as important to successfully negotiate expected and unexpected challenges of the TDP. In Chapter 4 one athlete feared that loss of motivation would be detrimental to his future commitment to training and competition in his sport. The items under this factor including item number 40 ‘I use competitions to motivate me and focus my training’ (pattern coefficient value = 0.521) help to indicate whether means of developing motivation and other skills and characteristics are present. Factor 3 assesses for the presence and competency of important ‘Psychological Skills’ that are known to assist athletes when coping with demands and challenges associated with a performance athletes’ lifestyle. This factor reflects coping strategies previously outlined in Chapter 5, such as the use of goal-oriented training sessions and monitored sessions as markers of performance which are highly valuable tools when maintaining commitment and motivation to train (Baker & Côté, 2003; Gould et al., 2002). Competitive events were also highlighted as a means to effectively stimulate motivation and commitment to training in an athlete. These events can also be used as effective markers of performance and a guide for ensure the athlete is progressing on the right track.

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Item Statistics</th>
<th>Std. Dev</th>
<th>Item-Total Correlation</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>4.9571</td>
<td>0.78446</td>
<td>0.362</td>
<td>0.547</td>
</tr>
<tr>
<td>40</td>
<td>5.1714</td>
<td>0.69801</td>
<td>0.311</td>
<td>0.552</td>
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</tr>
<tr>
<td>44</td>
<td>4.7</td>
<td>0.94363</td>
<td>0.316</td>
<td>0.547</td>
</tr>
</tbody>
</table>
6.2.2.5.4 Factor 4: Signs of stress.

Factor 4 contained five items – of which 2 were negatively worded - with a mean Pattern Coefficient loading value of 0.379 and it accounted for 4.94% of the total variance. Communality values ranged from 0.41 to 0.541. Item-total correlation values were again very low, ranging between 0.025 and 0.275; the mean Cronbach’s alpha value was 0.561. The items loading under this factor all related to signs and symptoms of stress. Athletes that are inadequately equipped with the skills to manage difficult challenges may experience high anxiety levels. For example, responses to item number 48 ‘I rarely make time to switch off and socialise’ (pattern coefficient value = 0.488) could indicate that an athlete has the potential to not recover or adapt adequately from training stimuli which can lead to over-training and burnout (Budgett, 1998). The information provided by the items in this factor can indicate that an athlete is not equipped with the skills or knowledge to manage the physical and mental demands of their lifestyle and may have the tendency to over-train. Factor 4 contains items that could indicate that an athlete is not coping well or has the potential to fail to cope with the demands of high performance sport. An athlete that finds it difficult to take time out from their sport to adapt and recover may need emotional and informative support from their coach or support staff to reassure them of the importance of recovery in their training programme. The potential for over-training and burnout can be pre-empted and proactive means can be administered to avoid detrimental instances and disruption to an athlete’s developmental progress (Budgett, 1998). As identified in the previous three chapters, family support is important during this time,
it seems especially important that family understand the demands of the athlete’s lifestyle and offer emotional support allowing the coach to provide more tangible evidence and reassurance of the athlete’s physical and mental state.

Table 7.13 Factor 4 statistical values

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Item Statistics</th>
<th>Item-Total Correlation</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>3.119</td>
<td>1.33775</td>
<td>0.025</td>
</tr>
<tr>
<td>48</td>
<td>4.7333</td>
<td>0.97595</td>
<td>0.101</td>
</tr>
<tr>
<td>4</td>
<td>5.3095</td>
<td>0.91474</td>
<td>0.275</td>
</tr>
<tr>
<td>1</td>
<td>4.7286</td>
<td>1.26326</td>
<td>0.131</td>
</tr>
<tr>
<td>2</td>
<td>3.8667</td>
<td>1.29826</td>
<td>0.134</td>
</tr>
</tbody>
</table>

7.2.3 Examining Reliability Statistics and Internal Consistency

Stringent means were employed to ensure that the ASSAQ measured what it was intended to measure and that the constructs reliably reflect underlying dimensions (Hayes, 1998). The closer Cronbach’s alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. George and Mallery (2003) suggest that 0.8 should be a target value. The resulting Alpha value for the 40-item ASSAQ was poor (0.567). However due to multi-dimensionality of the entire questionnaire this does not confirm that the ASSAQ is unable to measure consistently. Fundamentally, the concept of reliability assumes that uni-dimensionality exists in a sample of items, and since the ASSAQ measures different constructs this assumption is violated and as a result potentially caused underestimates of reliability statistics (Tavakol & Dennick, 2011). Similarly, due to the psycho-metric nature of a number of the questions (e.g., Factor 3. Psychological Skills and Factor 4 Signs of Stress) some random error variance was expected, this may also have impacted on the reliability values. Since the alpha value assumes that each test item measures the same construct, Tavakol and Dennick
(2011) suggest that alpha should be calculated for each of the concepts rather than the entire questionnaire. As such, Factor 1 was assessed separately for reliability and presented an acceptable value of 0.694. However, due to an insufficient number of items in factors 2, 3 and 4, alpha could not be analysed on these subscales individually. An increase in the number (>300) and diversity of responses and items representing each construct (20:1 ratio) may have resulted in a higher alpha and stronger reliability statistics of the resulting factors (Tabarnik & Fidell, 1996). It should be noted that this can have diminishing returns (Gliem & Gliem, 2003) where the objective of the ASSAQ may be effected resulting in a long and arduous questionnaire to administer and complete.

Internal consistency between all items was also weak, with the exception of Factor 1 (Social Support) which presented acceptable corrected item-total correlation values ranging between 0.32 and 0.506. The majority of values in factors 2, 3, and 4 were less 0.3. Again, due to the number of items in these latter three factors separate item-total correlations could not be analysed. Total inter-item relatedness may have been affected by the reduction in questionnaire items, where a higher number of items have been known to increase the reliability of a test (Tavakol & Dennick, 2011). It is important to remember that the intended purpose of the ASSAQ as a simple and efficient instrument to use with athletes in an applied sport setting. Low internal consistency values can also be attributed to various sources of error, such as rater variance (Cook & Beckman, 2006). For example, participants may have given socially desirable responses which may have caused systematic error and may have been a threat to the resulting reliability statistics (Podsakoff, MacKenzie, Lee, & Podsakoff,
Research suggests that items with low corrected item-total correlation values (<0.3) should be eliminated; however this would have resulted in a substantial loss of items which would have been detrimental to the purpose of the ASSAQ.

7.2.4 Content and Face Validity of the ASSAQ

Although reporting reliability statistics is important for studies using Likert scales (Gliem & Gliem, 2003), the values are not sufficient for valid interpretation of an instrument (Cook & Beckman, 2006). As recommended by Messick (1995) multiple techniques were used throughout the methodology to support evidence of validity. Cognitive interviews and pilot tests with athletes for whom the questionnaire was intended, as well as other front-end tools such as the use of expert coach meetings ensured that the content represented the constructs being measured and that there was clarity in phrasing and interpretation of items. The internal structure of the ASSAQ was assessed by factor analysis (Cool & Beckman, 2006). The use of parallel analysis, in addition to factor extraction methods, is noteworthy since this method has a tendency to yield more accurate conclusions about the presence of reliable factors (Zwick & Velicer, 1986). Items that tended to measure the same construct were grouped under one factor and a rigorous factor retention criterion was applied eliminating items that failed to load adequately, as described earlier (pages 191 and 192). Cook and Beckman (2006) suggest that interpretations informing important decisions in any setting should be based on substantial validity evidence from multiple sources (Cook & Beckman, 2006). As such it should be recognised that subjective judgment was used throughout the data analysis in consultation with coaches, athletes and sport service specialists to assess the interpretability and relevance of each item, and the value of each factor.
This helped to maintain a strong application to the sport setting for which the questionnaire was intended. Further to this, repeating the expert meetings with the 40-item ASSAQ may assist in supporting construct validity by testing its suitability to applied sports settings. Despite low reliability statistics, each of the five support factors (Social Support, Service Providers, Resources, Self-Management, and Coach Competency) originally identified in previous chapters are captured in the 40-item 4-factor ASSAQ, providing added evidence of the content validity of the questionnaire.

**7.2.5 Further Validity of the ASSAQ: Face Validity**

One of the major underlying purposes of this research project was to assist linking theory and practice between science and coaching in the world of athlete talent development. Application is a primary goal not merely an afterthought (Farrow et al., 2013). As such, checking the validity for use of the ASSAQ in an applied setting was important. The subsequent 4-factor questionnaire should provide evidence to inform employers (i.e., coaches and support staff) of the competency of critical support factors in their respective TDSs. Information resulting from its use should notify coaches and support staff of unforeseen competitive or organisational stressors within the TDE and warn them of the potential negative impact of these challenges if an athlete is insufficiently equipped with the skills to negotiate the obstacles. An inability to manage these experiences could influence rate limiting set-backs in their progress along the TDP. Of course those responsible for managing the support system want to be confident that the tool they use to assess and monitor the competency of their environment is valid and reliable. Cook and Beckham (2006) suggest that validity evaluation is an on-going cycle of testing and revision, and the amount of evidence
necessary will vary according to the proposed uses of the instrument. As such, conducting a re-test of the expert meetings with the 40-item questionnaire was an effective means to further support validity and discuss the ASSAQ with its intended employer. More specifically, the purpose of this procedure served to identify the applicability of the questionnaire to an applied sporting context from the responses of those responsible for talent development.

### 7.2.5.1 Procedure for examining face validity of the ASSAQ.

The same procedure as outlined earlier in this chapter (see pages: 192-193) for ‘Item Justification - Expert Meetings’ was used. The coaches sampled (n = 5; age 35 ± 8 years) represented a range of sports (GAA, Rugby, Athletics, Swimming, and Triathlon). Two of the coaches participated in the initial expert meeting procedure. Each meeting lasted approximately 60 minutes, at the beginning of the meeting the purpose and design of the ASSAQ was briefly described to the coaches. The coaches were then presented with a simple one page hard-copy version of the 40-item questionnaire and were allowed time to review each question and their respective factors. The final prototype of the ASSAQ can be viewed in appendix 7.5 (see pages 303-305). Following the recommendations of Dillman (2000) the experts were asked to review and scrutinise all items and comment on the clarity, relevance, and content validity, comprehensibility, and age appropriateness of each question and its respective factor. Retrospective probing was also used to encourage discussion in relation to the applicability of the entire questionnaire to a real-life talent development sport setting, for example ‘What is the best way to deliver the questionnaire to athletes?’ and ‘What problems do you foresee with the reliable use of the questionnaire with athletes?’
Chapter 7 The design and initial validation of the ASSAQ

7.2.5.2 Results & Discussion: Face validity of the ASSAQ.

The results from the expert meetings are presented below with reference to the literature, the 4-factor questionnaire and with direct exemplar quotations from the coaches under themes that reflect practices for the ASSAQ in an applied talent development sport setting. Before discussing these areas, it is important to advise on the developmental context in which this research is most attributable. The ASSAQ was purposefully designed to assist those at the core of talent development with a resource to assess the competency of the support system in which they operate. All coaches interviewed in this phase agreed that the ASSAQ could be used across a range of sports. Corresponding to the findings from the previous expert meetings all coaches established that the questionnaire was most suitable to athletes already operating in a high performance TDS, and was not applicable to athletes outside of a system.

7.2.5.2.1 Identifying weaknesses in an athlete’s skillset.

The ASSAQ considers both psychological skills as well as personal characteristics that may suggest future limitations to an athlete’s personal and performance development (Factor 3 Psychological skills and Factor 4 Signs of Stress). Results from using the questionnaire allow coaches and HPDs move beyond the use of generalities or “gut feelings” into more detailed examinations of the support system. This can help to better equip coaches with the tools to support the needs of individual athletes.

This could help identify why a talented player does not progress as expected [County GAA coach].

The questionnaire can be used alongside other questionnaires including MacNamara and colleagues (2010) Psychological Characteristics of Development Excellence
The design and initial validation of the ASSAQ

Questionnaire and Smith and Christensen’s (1995) Athletic Coping Skills Inventory (ASCI-28) which are both specifically designed to assess psychological skills and characteristics that athletes use to manage their performance and development. The ASSAQ does not try to replicate these questionnaires but instead aims to inform coaches or HPDs whether the athlete’s support system is adequate and whether the athlete is able to negotiate future challenges effectively.

7.2.5.2.2 Tracking and profiling.

In contrast to the initial expert meetings during the ‘Item Justification’ phase described earlier in this chapter, all coaches believed that the questionnaire targeted a clear objective and could be used effectively as an informative tool to assist in directing talent development strategies. Results from use of the ASSAQ (Factor 3 Psychological skills and Factor 4 Signs of Stress) could provide a useful measure to track the progress of a young athlete (Loomis, 2014). Three coaches stated that they could use the ASSAQ as a profiling tool to use at strategic time-points (e.g., start of season, mid-season, end of season) to monitor the development of their athletes.

It could be used to motivate an athlete, especially if they are not seeing physical performance gains... I could use it [the ASSAQ] to prove to them that they have developed holistically and have acquired desirable characteristics of a high performance athlete [Triathlon Coach].

Abbott and Collins (2006) suggest that the mark of a true champion may be his or her ability to retain excellence. This ability can help distinguish between athletes who are able to retain consistent performance at their highest level and those that are not. With further longitudinal validity tests the ASSAQ could track athletes all the way to the top of their sport and identify how the key factors and skills change over-time as the athlete progresses. Employers should remember that tests typically measure a
moment in time and the real goal of a talent development program is to make the athlete/s better over the long haul (Loomis, 2014). The results gathered from use of the ASSAQ will not predict failure but more so will inform areas for improved practice so that excellence can be more efficiently achieved. The importance of planning and coherent management has been identified as critical to the effectiveness of a TDP (Shilbury & Moore, 2006). The ASSAQ provides those responsible with operating a TDP with a simple informative tool to identify potential fractures in the sport’s support system. For example, use of the ASSAQ could indicate that there is a lack of transparency between clubs and HPCs making it difficult for athletes to understand the development pathway. One coach stated that:

There is a necessity for this type of measure to help inform coaches where to direct support in an applied talent development setting [Regional Talent Academy Rugby Coach].

The information gathered from using such an instrument could help coaches monitor progress but also provide them with quantifiable data that facilitates the evaluation of programme effectiveness (Loomis, 2014). In this way resources or strategies may be put in place to help address highlighted weaknesses and more adequately support talent development.

**7.2.5.2.3 Preparing for and monitoring transitions.**

The ASSAQ has potential to lend itself to supporting athletes in making significant transitions and coping with developmental challenges. This may include decisions to progressively challenge the athlete’s boundaries when developmentally appropriate (Loomis, 2014). One coach felt that using the ASSAQ would be a good way to get to know an athlete when they make the first transition into a squad. Talent
identification processes often fail to consider athletes who do not initially display the right set of skills or characteristics associated with performance potential. By identifying these inabilities, strategies and/or support resources may be put in place to catalyse the actualisation of innate talents and desired behaviours may emerge (Simonton, 1999).

It would be nice to be able to have evidence to prove to a club coach that although their athlete may be physically ready for the HPC, mentally the athlete doesn’t have the right skills to cope with the demands associated with this level of training and performance [HPC Swim coach].

The ASSAQ has the capacity to inform a coach if an athlete is ready for a significant transition and can assist in the decision making process (Factor 3 Psychological skills and Factor 4 Signs of Stress). At the same time, it is important that social and physical support factors in the TDE function effectively and are shaped to optimise athlete development at critical episodes along the TDP (Factor 1 Social Support and Factor 2 Tangible Resources). The ASSAQ has the potential to help those responsible for talent development to harness challenging events and encourage an athlete to become more idiosyncratic and assist athletes develop more holistically. This advocates Abbott and Collins (2006) appeal for continual monitoring and development of all components that may influence the fulfilment of an individual’s personal and performance potential. As opposed to the traditional approach of identifying a ‘talented athlete’ based on ‘once-off’ performance observations (Abbott & Collins, 2006) instead the focus can be shifted towards developing talent.

7.2.5.2.4 The coach – athlete relationship.

Talent development is a complex unstable interaction of an athlete’s inherent physical and psychological abilities at any particular developmental stage. Before
programme design and specific coaching takes place, it would be wise for coaches to begin working with an athlete by making a conscious effort to build a positive clear relationship (Kenow & Williams, 1999). If coaches understand the athlete on an individual and holistic level then they can capitalise on those abilities and facilitate talent development by utilising their knowledge and skills to better effect (Bloom, 1985; Gould et al., 2002).

When an athlete comes into the system it takes a while to get to know what makes them tick. At the age when we typically first meet them they are at a key influential period in their life and they all respond differently to the experience [Triathlon Coach].

Influential coaches are known to take their time to individualise programs, provide individual attention, meet individual needs, and understand the athlete as a person (Gould et al., 2002). Côté and Gilbert (2009) defined an effective coach as having the ability to align their coaching skills and knowledge to particular situations and match the context of the athlete to optimise development. This information allows the coach to gain a better understanding of inherent physical and psychological abilities of the athlete. Inversely use of the questionnaire could also stimulate the athlete to think about what they need in order to progress. This way the athlete can gain a better perception of the coach’s style and desirable characteristics required for successful development in their new TDE. This act can count towards starting an efficient working relationship between the coach and the athlete.

7.2.5.2.5 Coaching competency.

According to Côté and Gilbert (2009) only once an effective coach establishes a track-record of coaching effectiveness over many years can he or she be considered an expert coach. The coach plays a key role in the athlete’s support system and tracking
the athlete’s development to guide the provision of the right resources at the right time will assist in ensuring holistic long term development. One coach stated that he could use the ASSAQ to evaluate the competencies of specialist service providers and underage coaches operating in the same TDS (Factor 1 Social Support and Factor 2 Tangible Resources). However, the process of how the questionnaire is distributed must be taken into careful consideration to ensure that the athletes do not give a socially-desirable response.

A club team I work with recently contacted me for advice on conducting a blind evaluation of their coaches; this tool (the ASSAQ) could be really useful to them. The only problem is you have got to be careful with who distributes the measure. If I was using it I would be very clear that the information is confidential and that an honest response is for the benefit of the athlete’s development and the benefit of the system [Regional Talent Academy Rugby Coach].

It should be noted that the ASSAQ is a not measure of effective coaching or a measure of the coach-athlete relationship but more so it assists coaches in continued professional development through use of reflective practice of their own performance. The ASSAQ could be used alongside other measures such as Jowett and Ntoumanis’s (2004) coach-athlete relationship questionnaire (CART-Q) or Martindale’s (et al, 2010) TDE Questionnaire to examine, create and facilitate more effective relationships of the key stakeholders involved in the TDE.

7.3 Recommendations for Future Research

Further research should attempt to continue validation procedures, correlation scores from another instrument or outcome for which correlation would be expected or lack of correlation where it would not, could provide further evidence of this questionnaire’s validity (Cook & Beckman, 2006). This chapter outlined the
development of the ASSAQ along with rationale and evidence for its content and structure yet its ecological validity remains un-examined. This is important because, without statistical assessment of the real world use of the questionnaire, it is difficult to support the extent of its validity in an applied setting (Martindale, Collins, Douglas, & Whike, 2013). Ideally, where time and resource limitations can be overcome, future research should conduct a test-retest reliability measure, as well as concurrent and predictive validity measures. Longitudinal criterion validity through tracking in order to examine whether the competency of the support system and the psychological skill level of its athletes genuinely has an impact on the success of the athlete would be highly beneficial to influencing real world use of the questionnaire.

### 7.4 Conclusion

The literature provides us with many perspectives on how to maximise talent development. Broadly speaking most researchers and sports practitioners agree that if sports mastery is the objective of an athlete’s career then the athlete needs to be equipped with the right innate physical abilities and skills to manage, integrate and react to variables in order to progress consistently towards successful senior international competitive performance (Henriksen et al., 2010a; 2010b; Smith, 2003). This study involved a rigorous, multi-stage approach to the design and initial validation of a questionnaire aptly titled the ASSAQ considering its purpose. The final EFA revealed a 4-factor structure, with 40 items in total. Forty-seven items were eliminated between item generation in phase one and item validity in phase 2 including items that cross-loaded, items with low pattern coefficient loading values, and items with low
communality values. There was an average of 10 items per factor with the highest number of items in Factor 1 (Social Support) (18 items) and the lowest number of items in Factor 3 (Psychological Skills) (4 items). Bollen (1989) cautions that less than three items in a subscale is problematic. Expanding on the work of previous researchers in questionnaire design (Freeman et al., 2011) the ASSAQ includes negatively worded items to ensure respondents do not fall into an automatic response rhythm. As well as a larger spectrum of athletes was recruited for the collection involved in the EFA. Chapter 8 discusses the findings of this research project as a whole with reference to the literature and original objectives. Most importantly it pursues to emphasise its contribution to an applied sport setting.
Sometimes we get bogged down by focusing on facilities and our perceived lack of them. What matters is people? Coaches with know-how, experience, and crucially, the time to give to athletes. Coaching is primary...Facilities is secondary to coaching [Paul Hession, Irish Track and Field Sprinter, 2012]
8.1 Introduction

Previous researchers in the field of talent development in high performance sport suggest that the voice of the coach and the athlete should become more strongly embedded in the way sporting and related organisations operate (Duffy et al., 2006). This research project used multiple processes (semi-structured interviews, expert meetings, cognitive interviews, exploratory factor analysis) to build on existing literature and expose grounded empirical evidence to tackle the gaps in the literature and needs of applied practice. The approach to data collection included; the use of both retrospective and prospective interviewing to gain rich original information directly from those responsible for performance and development (e.g. athletes and coaches) this included a longitudinal examination and recruiting participants from a range of performance levels (i.e. developmental and elite performance). Data was collected from 273 athletes, 29 coaches and support staff through 85 individual interviews and reliability measures. The use of data gathered directly from the experiences and understandings of the participants and the environments in which they reside owes support that this research resides in the area of social sciences. To enhance the comparability of the results across a wide spectrum the sample included; 14 nationalities, 26 sports, and ages ranging between 12 and 35 years of age. As well as this, the time spent observing the athletes and coaches training and performance environment served as a valuable subjective tool and build a rapport with the participants recruited. To support the application of this work to a constructivist grounded theory approach, inductive research methods were used to generate latent
findings within data collected. The fact that some of this evidence was corroborated by previous research indicates that the findings are relevant to talent development (Holt & Dunn, 2004). Results described in Chapters 4 and 6, support existing constructs (e.g. the role of the coach; Sheridan et al., 2014 and coherency of the system; Martindale et al., 2007) in current literature important for talent development. Chapter 7, describes a multi-stage approach to the design and initial validation of the ASSAQ. Finally This chapter reflects on the objectives of the project and discusses some of the key overall findings against the literature and implications for applied practice. The objectives of this research project emerged through an examination of the literature in Chapter 2 and observation of practices in the field. These objectives were addressed in Chapters 4, 5 and 6 respectively. Each chapter built upon findings to justify the need to design the ASSAQ described in the previous chapter. As a reminder, the objectives were four-fold:

1. To identify the critical factors required for successful development in elite sport from the perspective of developmental and high performance athletes and coaches.

2. To identify the key challenges athletes experience throughout a typical training season and observe how they prepare and reflect on these experiences.

3. To examine the coherency of a talent development pathway from an under-16 to senior International level of performance and examine its impact on the development of talented athletes.

4. To design and conduct the initial validation of a questionnaire for coaches and high performance directors to assess and monitor the competency of a sport’s support system and the athletes’ ability to utilise the support offered.
This research project provides evidence to support the concept that successful talent development is a multidimensional and interactive process. The pathway toward mastery of a sport is shaped by a range of environmental influences including the competency of the coach, the support of family, and the opportunity to engage in specific-practice. On top of this, athletes require psychological skills such as perseverance and motivation as well as the prerequisite technical, tactical and physical skills in order to achieve their goals (Carlson, 1993). We know that if athletes fail to develop these skills or access social support and tangible resources in their environment then they are more likely not to progress along a TDP and as a result fail to maximise their potential as a high performance athlete. As mentioned at the start of thesis, there is a need for more effective translation and application of sport science research into the daily practice of coaching and athlete training (Farrow et al., 2013). This research project aimed to address this need by critically examining current TDSs in high performance sport. More specifically these studies provide;

1. An examination of what athletes and coaches at both developmental and a high performance level perceive as important for successful progress. This builds on existing research by using both retrospective and prospective interviewing, and by sampling at both pre-elite and elite levels. More importantly, considering their significance in the process, the voice of the coach is more prevalent in this work. It appears
that the development level coach is “crying-out” for support to progress their athletes onto the next level.

2. Findings that reveal a more thorough understanding of the challenges currently experienced by NGBs and coaches when attempting to apply research into applied sports practise. By establishing clear values and practicing an “Open-door” philosophy, a TDS can clarify development (e.g. technical skills) and performance (e.g. target times/ results) objectives across the system whilst maximising the use of resources (e.g. experienced mentor coaches and pool time).

3. Recommendations and methods to overcome both normative and non-normative challenges along the way by maximising use of resources within the sport’s TDE. For example, Reflective Practise is a valuable tool for skill refining and experiential learning, yet these studies provide evidence that the technique is under-valued and under-used. Supporting the recommendations of previous investigators (Sheridan et al., 2014; Tamminen & Holt, 2012) this technique should be practiced to facilitate the development of important psychological skills through challenging experiences.

4. A novel tool for those operating at the ground level (i.e. coaches, support staff, performance directors) with a means to examine the competency of their own TDS in the facilitation of effective talent development. Organisational challenges and issues outside of the athletes control (e.g. coach competency) appear to be the most
inhibiting factors of an athlete’s successful progress. The ASSAQ offers to identify these issues in advance, providing evidence to those responsible for talent development that action needs to be taken to construct a more effective TDS.

These key implications and recommendations are discussed more thoroughly below with reference to the literature and current applied sports practice.

8.2 Overview of the Findings

Previous researchers (De Bosscher et al., 2006; 2009; Henriksen et al., 2010a; 2010b; 2011; Martindale et al., 2005) provide substantial theoretical and empirical based evidence which informs NGBs about what is important for successful talent development and how it should be facilitated. The qualitative studies presented in Chapters 4, 5, and 6 have contributed to this literature by outlining what development level and high performance athletes and their coaches perceive as critical for successful negotiation of the TDP and fulfilling potential. This research project expands on this evidence by offering NGB’s solutions to help bridge the gap between theory and practice. Another distinguishing characteristic of this project was its strong connection with the applied world of talent development in sport since all participants were directly involved in a TDS. Recommendations were sourced from those working on the ground in TDSs to overcome the challenges of applying theoretical and empirical evidence into practise. Significant findings along with key recommendations for implementation within talent development practices are discussed below. It is intended that these findings be applied to drive talent development processes forward in an athlete centered, coach led approach.
8.2.1 Supporting Coach and Athlete Development

In the pursuit of success NGBs are known to actively endorse talent identification schemes and implement generic TDPs often without adequate consideration of major inputs (e.g., organisational structure), throughputs (e.g., talent development) or outputs (e.g., coach development; DeBosscher, et al., 2006; 2009). In this way, NGBs often focus on securing medals for those already at the top rather than investing in the environment and pathway from which talented young athletes are expected to emerge. In comparison to previous researchers (e.g., Durand-Bush & Salmela, 2002; Hassell et al., 2010; Gould et al., 2002) the studies described in this thesis used multiple perspectives by sampling athletes and their coaches at both a development and high performance level as well as the HPD and support service providers of the sport. This allowed a more holistic view to compare and contrast the needs of athletes aspiring toward elite performance as well as those already at the top of their sport. Interestingly, findings from Chapter 4 suggest that the needs for both groups of athletes are similar, yet it was obvious that much of the tangible support is directed and prioritised toward those who had already “made it”. This supports previous recommendations from researchers (Houlihan & Green, 2008; Gulbin et al, 2013; Storm & Nielsen, 2010) signifying that redistribution of financial support and specialist support services needs to be considered more seriously if resources of the TDE are to be optimised. At the same time, findings from Chapter 5 support research (Collins & MacNamara, 2012) that suggests that challenging experiences - and in some cases a lack of resources - can build important psychological skills (e.g. self-sufficiency, resilience and a hard work ethic) in athletes, as long as the timing and support is well-
managed. Chapter 5 also revealed that one of the major stressors experienced by athletes on the TDP was the pressure to perform well as competition. Athletes expressed feelings of pressure, guilt, and frustration due to the investment (i.e., finances and time) of significant others (i.e., coaches and parents) to support them in fulfilling their sporting potential. This highlights the relationship between support resources in the TDE and suggests that attention needs to be paid to the psychological skill level of the athlete considering the potential impact of inadequate tangible resources on their development (MacNamara et al., 2010). Considering the coach and athlete are responsible for the delivery of performances on the world stage it is crucial that NGBs give major consideration to the type and timing of support resources for these key stakeholders, especially at the developmental and pre-elite levels. Results from this project suggest that there is no distinct time-point where athletes do not need support; instead they may require different types of support at different times. This reflects a statement by Balyi and Way (2005) in relation to “windows of accelerated adaption”, they suggest that the “windows” are always fully open and never fully closed (i.e., all systems are always trainable).

In contrast to athletes, the requirements of development level coaches appeared higher than a high performance coach. The coach occupies a multi-functional role pulling together all elements important for athlete development (Côté et al., 2007). Effective coaches should be viewed as instrumental in the overall development of athlete not just in the education of sport-specific skills but also in the development of the athlete’s character and psychological skills (Côté & Gilbert, 2009; Côté et al., 2007). Due to their fundamental influence and multi-faceted role on the success of a
TDP their support, the coach’s development and connection with the TDE should be considered at the forefront of talent development strategies in all NGBs (Côté et al., 2007; Côté & Gilbert, 2009) alongside that of the athlete’s needs. Findings from Chapter 4 highlight that many TDSs are under-resourced in terms of provision and educational opportunities for the development of coaches especially those operating at an underage level. The coaches were blatantly concerned for their level of competency and ability to progress athletes successfully toward a level required for world class performance. These findings were reinforced later in Chapter 6, where athletes coming into the national squad displayed unrefined fundamental movements skills and sport specific techniques expectant of that performance level. This supports De Bosscher’s et al. (2009) work highlighting a major deficit in how an NGB supports coach provisions and development in practice. Coaches specifically requested support in the form of peer coach mentorship opportunities and clarity on developmental objectives and performance criteria along the TDP. In Chapter 6, Coaches described how a lack of time and other administrative tasks drained them of their energy and affected their ability to competently deliver as a coach. Rather than reiterating what we already know is important for a successful TDE, findings from Chapter 4 confirm that by establishing management positions and clarifying the duties of specialist service providers (e.g., managers, strength and conditioning coaches) the coach can become more capable of attending to coaching responsibilities and facilitating a talent development programme. Thus, optimising the use of available resources in practice. Further to this, by establishing an effective long term talent development strategy it would seem sensible that a sport system devotes time and resources toward coach
development and support, at the same time, translating new findings from scientific research into applied practice.

8.2.2 Creating an Open-Door Culture

One of the most noteworthy trends to emerge from Chapter 4 was support for the concept of an “open door” philosophy throughout a sport’s TDS. Synonymous with recommendations of Dweck (2006), coaches believed that the key to growing potential world class athletes was in changing the fixed mind-set culture of the sport system in which they worked. This concept was reiterated in Chapters 5 and 6 as a major strategy to overcome the developmental challenges of aspiring athletes. Findings from Chapter 4 and 5 suggest that establishing clear communication pathways between clubs and between clubs and HPCs can provide opportunities for swimmers to train alongside their peers gaining valuable visual learning cues (e.g., movement proficiency and coach-athlete communication). In this way, younger swimmers may start mimicking the behaviour of their peers by engaging with the coach when planning the training programme or clarifying the objective of a session. This experience could also allow development level swimmers experience the demands of the high performance environment before becoming completely immersed in the associated stressors (e.g., increase in training volume and a change in coach). Obviously, strategies similar to this should be carefully monitored and controlled to ensure the athlete is not ‘over-phased’ by the experience. Applying the recommendations of Collins & MacNamara (2012) this progressive immersion strategy is just one way of potentially harnessing environmental stimuli to develop desirable psychological skills through the “open-door” philosophy. While it is important for an NGB to recognise the limitations of its
resources (e.g., finances, sport science support, facilities) a more “open-door” culture could help to maximise available assets. Coaches should optimise the use of resources in their TDE and be open-minded to free learning experiences to naturally obtain critical psychological skills and physical competencies (Calmels et al., 2003; Gould et al., 2002). Establishing an “open-door” philosophy also offers coaches mentorship opportunities and a means to work in a more coherent TDS. Chapter 5 suggests that a dysfunctional relationships between (e.g., between clubs, between coaches, between the athlete and coach) and a lack of clarity surrounding performance objectives can have major debilitating effects on the rate of development of the athlete. Establishing systematic lines of communication to enhance the interaction of expert coaches and coaches working at a grass-roots level could also ensure correct fundamental skill development at an under-age level.

8.2.3 Recognising the value of Challenging Experiences and Coping Strategies

Reflecting the idiosyncratic nature of an athlete’s journey described by previous researchers (Philips et al., 2010; MacNamara, 2011) Chapter 5 showed that not all athletes react in the same way to developmental challenges, in fact a number of the athletes showed evidence of actually benefitting from a difficult experience. These athletes found that the move to a new training environment worked out more suitable for them logistically and helped them manage their dual-career lifestyle. In another way, some athletes “relished” the associated stressors of an increase in training volume and competitive events and this helped them cope with these experiences. This evidence further supports previous researchers who have identified that each
individual is unique and comes into a talent development and performance context with a particular set of inherent characteristics that have already been shaped by genes, development and early experiences (Philips et al., 2010). Interestingly, athletes also displayed a variety of coping strategies for each identified challenge. As well as this one coping strategy was often used to manage multiple challenges and the way in which an athlete managed a particular stressor was seen to vary throughout the year. A collection of coping strategies emerged from Chapter 5 including; creating comprehensible communication pathways, regular goal setting and performance planning meetings with the coach, creating camaraderie amongst team mates and optimising the use of available support services. Athletes that appeared to cope well with challenges were those that autonomously created clear lines of communication with the coach and support staff and set realistic developmental and performance goals.

Considering these findings it seems sensible that athletes are equipped with the necessary skills and competencies and provided with appropriate support structures to anticipate, cope with and learn from critical events if the ultimate goal of achieving and maintaining senior success is to be achieved (Csikszentmihalyi, Rathunde, & Whalen, 1997; Durand-Bush & Salmela, 2002; Holt & Dunn, 2004; Wylleman & Lavallee, 2004). That way challenges can be anticipated and prepared for by utilising support resources available in the athletes’ TDE such as the use of parents for emotional and financial support, or teammates to boost moral or motivation (Tamminen & Holt, 2012; Kristiansen & Roberts, 2010). As mentioned in Chapter 2, much of the extant literature has used retrospective data collection methods and this
can suffer from recall bias and memory loss issues. The athletes interviewed in Chapter 5 found that the process of retrospective and prospective viewing used to collect data served as a useful tool to learn from and prepare for developmental challenges. Otherwise – surprisingly - only one athlete showed evidence of using reflective practice to aid his performance. In this case, this valuable learning tool was practiced in an ad-hoc manner without cognisant planning. Again this supports recommendations from other researchers (Farrow et al., 2013) who suggest that not enough of what is known through science is being translated into applied practice by athletes or coaches. According to Knowles and colleagues (2011) equipping athletes with the tools and encouraging them to reflect upon experience is known to create the opportunity for the exploration of good practice, the identification of areas for improvement and the formulation of ideas for change. In an interview with Liam Moggan (Coach Tutor in Coaching Ireland) Shannon (2014) wrote

> What are missing from the training schedules of our top athletes are both the time and the guidance to reflect. They need to think about their own vision and their values, and why they want to go where they are going.

Chapters 5 and 6 provide further evidence to support the development of psychological skills by optimising the use of available resources and natural learning experiences to create catalysts to develop desirable coping skills in advance of chaotic periods (MacNamara, 2011; Collins & MacNamara, 2012; Philips & Gully, 1997). As mentioned earlier, strategies such as immersing a pre-elite athlete into the HP environment at strategic intervals are exploratory and adopt a diverse approach to talent development, in which the NGB should offer a supportive and encouraging climate for the athlete to develop.
8.2.4 Facilitating a Coherent Talent Development System

Although the literature does well to describe how a good athlete should adapt and progress (Smith, 2002) few studies have examined why many systems fail to move athletes from one stage to the next along the TDP. A concerning finding from Chapter 5 was that organisational stressors such as (e.g., lack of clarity regarding qualification criteria and the accessibility of resources) appeared significantly harmful to the athlete’s progress. Outcomes from this study underlined the impact that the NGB plays on the developmental progress and long term success of the athlete. Building on this Chapter 6 sampled athletes, coaches and support staff operating at an under-age, developmental, and senior national level to capture the effect of coherency across developmental phases. Poor inter-relations between coaches and confusion regarding performance objectives emerged as significant factors that disrupted the flow of the TDP. For example, players at an u16 and u18 level were not clear on what was expected of them at the next level. As a result of this players were unsure whether they were on the right track for senior selection. These factors were shown to negatively affect athletes at each stage of developmental pathway and suggest that future athletes would experience the same negative effect. Chapter 6 provides further evidence to support that at the core of a successful TDP should be an explicit and coherent link between strategic direction, long term planning, and monitored individual contribution of key members (Burke 2002; Sotiriadou & Shilbury, 2009; Bailey et al., 2005). In the same way, findings also confirm that a lack of coherence as a result of unclear developmental objectives and poor communication between the NGB and coaches can impact on the developmental success of an athlete (e.g., misguided,
vague performance and developmental objectives, and poor physical skill development).

As such, this study suggests that an NGB’s high performance system should aim to establish, coordinate and manage a clear and active coaching network throughout national squad structures, clubs and school systems. Smith (2002) suggests that in order for an NGB to achieve and sustain a dominant position within high performance sport, the organisation must build a strong youth and junior development programme; only in this way can it ensure a good flow of well-rounded athletes likely to perform at the highest international level. Implementing a visible talent development strategy, defined by key values and a core philosophy (Henriksen et al., 2011) can help the development of desirable skill sets in a broader group of athletes and prepares them for higher levels of performance across all stages of development. As well as this, mutually collaborating and exposing TDS values and a philosophy by which those operating in a TDE should work has shown to help guide and motivate coaches and athletes (Henriksen et al., 2011). Coaches suggested that the simple use of regular meetings to enhance communication networks, review athlete profiles, clarify objectives and evaluate the support system would assist in paving the way for an effective TDP and individual athlete development. The use of a systematic debrief procedures between the coach and the athlete/s could be organised and facilitated to recognise specific training adaptations (Richards, 2011) along with process oriented feedback. Shared goal setting and decision making processes can help key stakeholders find ways to improve how they support development and performance as well as identify areas where they may need more work. At the same time, it is important that
these key stakeholders are aware of the psychological skills and physical capacities required for its athletes to succeed at the highest level. With this knowledge the coach may choose to mediate if they feel the individual requires specific support to negotiate upcoming events or may allow the athlete explore the developmental experience independently as a learning resource thereby facilitating individualised support when its needed.

Raw material is one thing. The shaping process from rough stone to championship gem takes much expertise. Even professionals can destroy the perfect stone if they cut it the wrong way [Watterson, 2012].

Given the complexity and individual nature of talent development, it makes sense that NGBs initially spend time establishing a coherent philosophy, creating a clear communication process and outline developmental and performance related objectives. A coherent network helps to transmit messages (Martindale et al., 2005) and offers more flexibility to attend to individual needs resulting in more effective TDPs (Philips et al., 2010) for current and future athletes.

8.2.5 Assessing and Monitoring the Competency of the Talent Development System

As highlighted by Farrow and colleagues (2013), in the sport coaching environment there is often a considerable gap between new research findings and real world application. As such this research project aimed to help close the theory and practice gap with the design and validation of an instrument that can inform the competency of the TDS and the skill level of an athlete. The role of a TDE is to support athletes in pursuit of optimal performance. Nevertheless research to date has not produced any technique to inform NGBs or coaches of how effective their TDS is at supporting its athletes. Instead, NGBs tend to rely on performance at competition as
an indicator for the efficacy of the sport system. The majority of extant literature focuses more broadly on evaluation of the sport’s organisation or macro-environment (De Bosscher et al., 2010; Martindale et al., 2005) and defining the factors that characterise effective TDEs (Henriksen, et al., 2010a; 2010b; Duffy et al., 2006). As well as this, competency measurements in existence are designed solely to assess the coach (McLean, Yang, Kuo, Tolbert, & Larkin, 2005; Myers, Feltz, Maier, Wolfe, & Reckase, 2006) the athlete (MacNamara et al., 2010) or the coach-athlete relationship (Jowett & Ntoumanis, 2004). In contrast to Freeman and colleagues (2011) PASS-Q, the ASSAQ offers a more holistic examination of key features of social support, the availability of tangible resources and assesses for the presence of important psychological skills and signs of potential stress in the athlete. The direct purpose of the ASSAQ was to provide those responsible for talent development with a tool to assess whether the TDS is competent to effectively support its athletes and whether the athlete has the skills necessary to progress. The nature and depth of the approach described in Chapter 7 was important as it allowed key items to emerge from the data to fill the content of the questionnaire. Previous literature has taken similar means to provide valid measurements for coaches to assess and monitor critical factors for successful development (e.g., PCDE questionnaire, MacNamara et al., 2010; TDE questionnaire, Martindale et al., 2010; CART questionnaire, Jowett & Ntoumanis, 2004). A more thorough discussion on the use and application of the ASSAQ can be found in Chapter 7 (pages 237-244). Examining the key factors in this way can mark the difference between weak and poor support in specific domains of talent development, those responsible can intervene where necessary and put the right resources in place.
to allow the athlete to progress. Since the ASSAQ is multi-dimensional it can also be used to examine the impact of interventions on one factor on other factors within the support system. Lane and colleagues (2004) suggest the questionnaire can be used as educational tool to inform developing coaches of the key factors and skills necessary for continued development and sustainable performance. The resulting ASSAQ offers an informative means for key stakeholders to proactively mediate and shape the TDS in an attempt to provide a more adequate environment and supportive development pathway for future athletes.

8.3 Future Applications and Limitations of the Project

In pursuit of mastery of their sport an athlete is required to integrate a combination of many factors, some trainable (physiology, psychology and biomechanics), some teachable (tactics), and others outside their control (genetics and age) (Smith, 2002). Considering the potential blends of factors, both within the TDE and along the TDP that influence development it is easy to understand how individuals move through various stages of development at different rates. Findings from this research project support previous researchers (Côté et al., 2007; Philips & Gully, 1997; Philips et al., 2010) by suggesting that more adaptable unique pathways must be supported by managing a combination of key factors and developmental challenges to facilitate holistic individual growth and progress. This research project presents a more lucid picture of what developmental and high performance athletes and their coaches perceive as critical factors for success. More valuably this project highlights valid recommendations to assist TDSs apply theoretical and empirical based evidence that
 outline best practices for talent development in real-life settings. In the same way, the strength of validity of this research project can be attributed to its strong connection with real-life high performance sport settings. The input of coaches, athletes, HPDs and support staff had a substantial influence on the shape and direction of the project. Recognising the limitations of the project, further developments could be made in a number of ways;

1. To conclude with more favourable internal consistency values (i.e. Cronbach Alpha > 0.7, inter-item correlation < 0.8; Nunnally & Bernstein, 1994; Carron, Widmeyer, & Brawley, 1985) data collection could be extended across a greater spectrum of sports, contexts and levels of performance, as discussed previously in Chapter 7 (pages 237-244). As well as this, an increase in the sample size through a variety of recruitment strategies and a more stringent approach to data collection to ensure honest responses from athletes and avoid socially desirable responses. By collecting more data from a broader scope of service providers and others influential in the TDS (e.g. parents, partners/friends) this may also have contributed beneficially to the data collection process. However, to ensure adequate scale reliability and coverage of the construct domain of all the initial five factors (Benson & Clark, 1982) items were added to the questionnaire in the event of subsequent item deletion during the EFA phase. An over exclusion of items during phase 1 of the questionnaire design (from 356 to 87; Item Generation, Justification and Content Validity) and again during phase 2 (from 87 to 40; EFA and PAF analysis) may have resulted in the loss of important information (Clark & Watson, 1995). An increase in the number of
expert coaches recruited and athletes involved in the meetings, cognitive interviews and EFA may have reduced this significant loss of items. Lance and colleagues (2006) recommend the use of Parallel Analysis as the best way to determine the number of factors to retain. This analysis suggested 10 factors. However, bearing in mind the intended application of the tool in a real world setting a simple efficient measure was needed, whereas a lengthy questionnaire may have discouraged its intended respondent and employer. As such a second PAF test was used to retain the strongest factors resulting in a 4 factor 40 item questionnaire with 41.33% total variance. The remaining variance may be explained by the multi-dimensional constructs of the questionnaire. A uni-dimensional questionnaire, in which each factor relates to a similar construct could have resulted in stronger reliability statistics and internal consistency. However, reflecting complexity of talent development a uni-dimensional questionnaire would have differed with the holistic approach of this research project.

2. A test-retest reliability measure of the ASSAQ with the same sample at the same time-point could be used to check for credibility of responses generated. A triangulated data collection process could also be used to support empirical findings from the first three studies, this could be performed using athletes and coaches from difference sports contexts at the same time considering cultural and socioeconomic influences (De Bosscher et al., 2006). As mentioned in Chapter 8, Longitudinal criterion validity could be performed by using the ASSAQ at strategic time-points whilst tracking developing high performance
athletes over-time. These reliability measures could offer immense credibility to the trusted and true use of the ASSAQ in the field.

3. Moving forward, researchers should consider creating a coach development evaluation and monitoring system to assist in evolving more competent coaches to operate at each level of the TDP from under-age through to senior level of performance. In another way, as described by previous researchers (Cropley et al., 2012; Knowles et al., 2006; 2012) interventions to enhance the development of Reflective Practise techniques as a means to assist coach education could be employed in TDSs and monitored longitudinally for the sequential effect on an athlete’s development.

8.4 Perspectives

Many young talented athletes are lost from sport or fail to fulfil their potential for various reasons (Hollings, 2002). Professionalism, international competition, modern training methods, strength and conditioning, better nutrition, high-tech aids and indoor facilities have all contributed to the bounding evolution of sport (O’Flynn, 2008). This project presents deductive findings to support existing evidence that outlines the key factors important for successful talent development (e.g., Duffy et al., 2006; Hassell et al., 2010; Martindale et al., 2005). Additionally, valuable inductive information is described to contribute to the literature with new practical ideas to help bridge the gap between theory and practice. Previous research has provided significant evidence to inform coaches and NGBs what is required for an athlete to successfully attain and sustain world class performance. However there was clearly a lack of
support to identify why this evidence has not been translated efficiently into applied practice. It seems that many high performance sport systems fail to pay adequate attention to the foundations of effective talent development; findings from this project show that resources are under-utilised, communication systems hinder progress and athletes lack competency in the fundamental skills of a top level performer. This research project provides evidence to suggest that those responsible for talent development do not pay enough attention to the key factors in the athlete’s TDS, the underlying demands of high performance sport or the needs of individual athletes. There is clearly a necessity for coaches to have the knowledge and understanding to recognise the innate characteristics which an athlete presents with (physically and psychologically) and how to facilitate the growth and application of these features in order to satisfy the athlete’s progression along the TDP. Coaches and those responsible for talent development should remember that the athletic experience is not easy, there are many factors involved in the process, there is no secret to success and certainly no one model that fits all approach. It’s a combination of factors subtly combined (Bro. O Connell, 2011) but the fundamentals need to be done right, and this includes listening to the athlete and responding in such a way that promotes positive growth. Evidence from this thesis suggests that there is little doubt that at the core of an effective TDP is a coherent network of key stakeholders with strong values and an “open-door” culture to clearly promote easily accessible resources for supporting the coach’s role. Further to this, the project introduces an informative means for coaches to assess the competency of their sport’s support system and the potential ability of athlete to work towards sustainable performance at the highest level. In this way
those responsible for talent development can identify constraints and proactively put effective systems in place to support talented athletes in maximising their potential.


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**About the ASSAQ**

The **Athlete Support and Skill Assessment Questionnaire (ASSAQ)** has been designed by coaches and athletes for coaches and athletes to assess and monitor the system in which the athlete is expected to develop. The questionnaire should be transferable across sports, and is most applicable to athletes on a talent development pathway. It may be used to assess the influence of new interventions or as a coach education tool.

**Objectives**

The questionnaire contains 40 questions against 4 main constructs as highlighted in the left column. Your opinion as a coach working in an applied setting would be very beneficial. Please comment on the relevance of any question or construct where you see necessary. Recommendations and critique in relation to the overall applicability of the measure to the field are welcome.

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<th>Factor</th>
<th>Question</th>
<th>High disagree</th>
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<th>Disagree more than Agree</th>
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<td><strong>Social Support.</strong></td>
<td>My team mates encourage me at training and competition</td>
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<td>I never review my performance at training or competition</td>
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<td>I purposefully learn from other athletes in my environment</td>
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<td>People in my training environment advise me on how to avoid and treat injury</td>
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<td>There are people around me who help get me in the right place mentally to train and compete</td>
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<td>High quality coaching in my sport is not easily accessible</td>
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<td>I feel that the technical coaching I receive is inadequate</td>
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<td>My coach monitors my developmental progress so that we are in line with the target standards</td>
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<td>My coach is fully committed to his/ her duties as a coach</td>
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<td>My coach doesn’t give specific individual coaching</td>
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<td>My coach spends time on getting the basics correct before moving onto more advanced skills</td>
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<td>My coach is open to learning and trying new techniques</td>
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<td>My coach is flexible to my individual needs as a person and athlete</td>
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<td>I trust my coach’s programme</td>
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<td>I find it difficult to be honest with my coach</td>
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<td>My coach advises me how to manage the effects of extra or harder training</td>
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<td>I don’t discuss the programme with my coach I just do it</td>
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<td>The direction of my coach’s programme is very clear</td>
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<td>My coach and I regularly sit down and discuss my progress</td>
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<td>I work with my coach when setting goals</td>
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<tr>
<td>There is regular one-on-one communication between me and my coach</td>
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<td>My coach doesn’t know when I access support providers such as physio or nutrition advice</td>
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<tr>
<td><strong>Tangible Resources.</strong></td>
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<td>There is no strength and conditioning coaching available to me</td>
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<tr>
<td>There is no sport science testing service available to me</td>
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<tr>
<td>Nutrition advice is easily accessible</td>
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<td>I can easily access facilities and equipment in my training environment that help my development</td>
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<td>Lack of money limits the opportunity for me to travel to competitions</td>
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<tr>
<td>My training environment is not sufficiently equipped for my sport</td>
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<td><strong>I am always concerned about my financial support</strong></td>
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<tr>
<td><strong>There are people available to advise me on how to best manage my recovery</strong></td>
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<tr>
<td><strong>I don't know what support services I have access to</strong></td>
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<table>
<thead>
<tr>
<th><strong>Signs of stress.</strong></th>
<th><strong>Taking time out to recover from training makes me anxious</strong></th>
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<tbody>
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<td><strong>I rarely make time to switch off and socialise</strong></td>
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<td><strong>My family/ parent/s are familiar with the demands of my sport</strong></td>
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<td><strong>I have people around me who help me relax away from my sport</strong></td>
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<td><strong>My family are supportive of my sports career</strong></td>
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<tr>
<th><strong>Psychological skills.</strong></th>
<th><strong>I use competitions/ events as markers of my performance level</strong></th>
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<td></td>
<td><strong>I use competitions to motivate me and focus my training</strong></td>
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<td><strong>I spend time planning my competitions/ events so that I am clear on what to expect from my performance</strong></td>
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<td><strong>I look for new ways to improve my performance because I want to be ahead of my competitors</strong></td>
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</table>
You have to take care of the whole person; you need to look at them not as winners not as losers but as people. I tell them that it’s not easy, it’s about survival of the best, and that means, learning about the sport, learning the value of different types of training [Br. Colm O Connell, Athletics Coach].